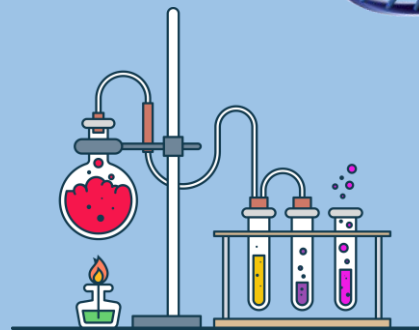
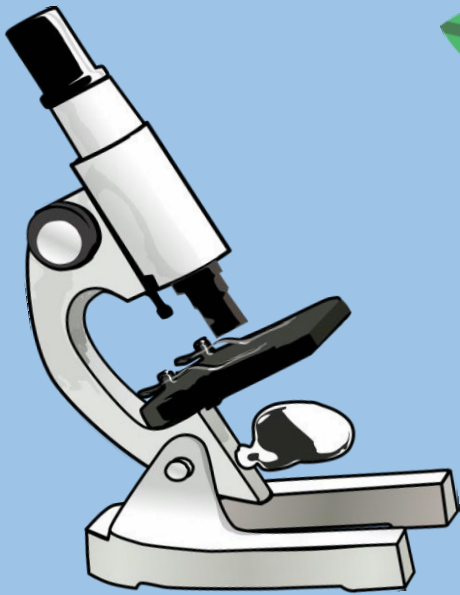


# III INTERNATIONAL SIIRT CONFERENCE ON SCIENTIFIC RESEARCHES

'18-19 November 2022'

## CONFERENCE PROCEEDING BOOK



### EDITORS:

Prof. Dr. Cahit PESEN  
Assoc. Prof. Dr. Seyithan SEYDOSOGLU  
Assist. Prof. Dr. Enser YILMAZ  
Assoc. Prof. Dr. Seyfettin KAYA



**III. INTERNATIONAL SIIRT CONFERENCE  
ON SCIENTIFIC RESEARCH**

**Siirt University  
November 18-19, 2022**

**CONFERENCE PROCEEDINGS BOOK**

**EDITOR**

**Prof. Dr. Cahit PESEN**

**Assoc. Prof. Dr. Seyithan SEYDOŞOĞLU**

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**Assist. Prof. Dr. Enser YILMAZ**

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## **CONFERENCE ID**

### **CONFERENCE TITLE**

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### **TOTAL ACCEPTED ARTICLE**

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**III-INTERNATIONAL  
SIIRT CONFERENCE  
ON SCIENTIFIC RESEARCH  
Siirt University, November 18-19, 2022**

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**CONFERENCE PROGRAM**

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**Zoom Meeting ID: 864 8881 6529  
Zoom Passcode: 003300**

## IMPORTANT

- To be able to make a meeting online, login via <https://zoom.us/join> site, enter ID instead of “Meeting ID or Personal link Name” and solidify the session.
- The presentation will have **15 minutes** (including questions and answers).
- The Zoom application is free and no need to create an account.
- The Zoom application can be used without registration.
- The application works on tablets, phones and PCs.
- Speakers must be connected to the session **15 minutes before the** presentation time.
- All congress participants can connect live and listen to all sessions.
- During the session, your camera should be turned on at least %70 of session period
- Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

## TECHNICAL INFORMATION

- Make sure your computer has a microphone and is working.
- You should be able to use screen sharing feature in Zoom.
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- Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

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(Hall-1, Sevda KOC-AKRAN)**

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## ÖNEMLİ

- Kongremizde Yazım Kurallarına uygun gönderilmiş ve bilim kurulundan geçen bildirimler için online (video konferans sistemi üzerinden) sunum imkanı sağlanmıştır.
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## TEKNİK BİLGİLER

- Bilgisayarınızda çalışır durumda mikrofon bulunmalıdır.
- Zoom’da ekran paylaşma özelliği kullanılabilir.
- Katılım belgeleri kongre sonunda tarafınıza pdf olarak gönderilecektir.
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**Zoom'a girişte sırayla salon numarasını ve soyadınızı yazınız  
(Salon-1, Enser YILMAZ)**

# -Opening Speech-

**Date: 18.11.2022**

**Ankara Time: 10.30 - 11.00**

\*\*\*

**Prof. Dr. Cahit PESEN**

Chairman of the Organizing Committee

\*\*\*

**Dr. Mustafa Latif EMEK**

Chairman of the IKSAD

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**Prof. Dr. Nihat ŞINDAK**

Rector of Siirt University

**Zoom Meeting ID: 864 8881 6529**

**Zoom Passcode: 003300**

## **PARTICIPATING COUNTRIES:**

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**18.11.2022 / Session-1 / Hall-1**

Ankara Local Time: 13<sup>30</sup>-15<sup>30</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Prof. Dr. Murat GULMEZ**

Authors	Affiliation	Presentation title
Muhammed Ahmed Selçuk Figen Çelik Harun Kaya Kesik Şeyma Günyakti Kiliç Sami Şimşek	Siirt University	In-silico Determination of Phylogenetic Analysis and Haplotype Diversity of Human Echinococcus granulosus sensu stricto (G1 genotype) Using Mitochondrial CO1 and ND1 Gene Markers
Murat Gülmez Kübranur Yıldız Bayhan Sefa Üner	Siirt University	Development of a process suitable for cow's milk kumiss production
Murat Gülmez Kübranur Yıldız Bayhan Sefa Üner	Siirt University	Technical, Physical, Chemical and Microbiological Analyses of Siirt Herby Cheese
Ebru Bilen Serpil Kahya Demirbilek Öznur Yılmaz Muhammet Ali Karadağ Havva Kurnaz	Siirt University	Kedi Ve Köpeklerde Farklı Hatlardan Yapılan Ovariohisterektomi Sonrası Operasyon Bölgesinden İzole Edilen Bakteriler Ve Antimikrobiyal Duyarlılıkları
Muhammed Ahmed Selçuk Figen Çelik Burçak Aslan Çelik	Siirt University	Investigation of Endoparasites in Sheeps of Siirt Province
Gülşah Akgül Mustafa Barış Akgül Erman Gülendağ Mahsum Başak Sevdet Kılıç Özlem Erdeğer Tekin Şahin	Siirt University	Evaluation Of Ck-Mb, Troponin-1, D-Dimer, And Nt-Probnp Levels Before And After Two Different Anesthesia Protocols In Casrated Dog
Günsel Kirman Büşra Deveci Şenay Deveci Fırat Aşır	Siirt University	Gingival Yara Modelinde Honokiol'un Histopatolojik Değişiklikler Üzerindeki Etkisi
Günsel Kirman Büşra Deveci Şenay Deveci Fırat Aşır	Siirt University	Gingivida oluşturulan Deneysel yara modelinde Resveratrolün koruyucu etkisinin incelenmesi
Özgül Gülaydın Kemal Gürtürk Muazzez Yeşilyurt	Siirt University	Hemoplasmas And Feline Infectious Anemia

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 / Session-1 / Hall-2**

Ankara Local Time: 13<sup>30</sup>-15<sup>30</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Prof. Dr. Veysi OKUMUŞ**

Authors	Affiliation	Presentation title
Songül Ötkün Sevil Erdenliğ Gürbilek Kübranur Yıldız Bayhan	Siirt University	Antibacterial Effect Of Propolis Extract And Royal Jelly From The Pervari Region Of Siirt Against Brucella abortus S19 Strain
Mustafa Barış Akgül Sevdet Kiliç Ali Gülaydın Gülşah Akgül Nihat Şındak	Siirt University	A Case And Treatment Of Congenital Ankyloglossia In A Dog
Nurullah Akcan Veysi Okumuş	Siirt University	Research On The Antioxidant Properties Of Nasturtium Officinale (Mint) Essential Oil
Nurullah Akcan Veysi Okumuş	Siirt University	Research On Antibacterial Effect Of Foeniculum Vulgare (Fennel) Essential Oil
Veysi Okumuş Nurullah Akcan	Siirt University	Determination Of Antioxidant And Antiobesity Activities Of Agrocybe aegerita Collected From Siirt Region
Veysi Okumuş Nurullah Akcan	Siirt University	Determination Of The Antimicrobial And Antidiabetic Activities Of Hot Water And Ethanol Extracts Of The Edible Mushroom Lactarius deliciosus
Metin Kertmen	Siirt University	Investigation Of The Biosorption Of Safranin Dyeing Substance Of Aspergillus Flavus
Çağdas Kaynak Muzaffer Aslan	Siirt University	Challenges Of Ellis Type 3 Coronary Perforation Complication Management In A Center Without Cardiac Surgery On Site
Mehmet Irmak	Siirt University	The Effects Of L-Carnitine Addition To Broiler Diets On The Fattening Performance
Hasan Karageçili Ebubekir İzol İlhami Gülçin Ekrem Kireççi	Siirt University	Antioxidant, Anti-Alzheimer, Antidiabetic and Antimicrobial Effects of Zivzik Pomegranate (Punica granatum L.)

(All speakers required to be connected to the session 10 min before the session starts)  
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 / Session-1 / Hall-3**

Ankara Local Time: 13<sup>30</sup>-15<sup>30</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Prof. Dr. Ibrahim TEGIN**

Authors	Affiliation	Presentation title
Adem Yılmaz Zülal Uğur	Batman University	Investigation Of Temperature Reducing Using Different Pcm In Photovoltaic Panels
Semra Çelebi Musa Ataş	Siirt University	Java-Based Software Architecture Proposal For Autonomous Vehicles
Cüneyt Özdemir Yahya Doğan Musa Ataş	Siirt University	Classification of Brain Tumors from MR Images with CNN Architecture
Musa Ataş Yahya Doğan Cüneyt Özdemir	Siirt University	Development Of A New Autonomous Vehicle Simulation Software With Processing
Musa Ataş	Siirt University	A New Data Annotation Tool For Computer Vision Applications
Yahya Doğan Cüneyt Özdemir Musa Ataş	Siirt University	Skin Lesion Classification Using Deep Learning Methods: Cnn, Mlp-Mixer And Vıt
Mehmet Fatih Eybek Musa Ataş	Siirt University	Estimating The Number Of Geographically Marked Olive Tree From Satellite Images With Deep Learning Methods
Himmet Özarıslan Berkay Karaçor	Siirt University	Thermogravimetric Analysis In Nitrogen Ambient Of Copper/Titania Selective Catalytic Reduction Catalyst Poisoned With Calcium
Ibrahim Teğın Bülent Hallaç Mehmet Fidan	Siirt University	Determination Of Antimicrobial Effects Of Allium Vineale L Growing In Siirt Eruh Region
Ibrahim Teğın Bülent Hallaç Mehmet Fidan	Siirt University	Determination Of Dry Material, Color, Antimicrobial Effects Of Allium Kharputense Freyn Et Sint. Extract Grown In Siirt Eruh Region

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 / Session-1 / Hall-4**

Ankara Local Time: 13<sup>30</sup>-15<sup>30</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Prof. Dr. Huseyin YASAR**

Authors	Affiliation	Presentation title
Nihayet Koçyiğit	Batman University	Effect Of Halloysite Nanotube On Mechanical Properties Of Polystyrene Nanocomposites
Veysel Çelik	Siirt University	Investigation of the effect of the Pb doping ratio on the conduction band level of Tin Dioxide, which is used as an electron transport layer
Ferhat Kutluay	Siirt University	The Relativity Of True And Wrong Concepts And The Concept Of Duty As The Foundation Of Moral Law In Kant
Yahya Aktu Mücahit Dilekmen	Siirt University	The Tendency Of Local Studies On Child Abuse Awareness
Yahya Aktu Mücahit Dilekmen	Siirt University	The Effect Of Cognitive Behavioral Therapy-Focused Program On Parents' Awareness Of Child Abuse: A Mixed Method Study
Hüseyin Yaşar	Siirt University	Yaşar Kemal'in Romanlarında Masal
Hüseyin Yaşar	Siirt University	Yaşar Kemal'in Romanlarında İnsanlık İdeali
Alper Cinoğlu	Siirt University	The Story Of "Bacayı İndir Bacayı Kaldır" In The Context Of Marxist Literary Criticism
Veysel Okçu Rümeysa Belkıs Erkoyuncu	Siirt University	Teachers' Views On The Transformational Leadership Behaviors Of School Principals: A Qualitative Research
Özlem Batğı Akman	Siirt University	A Part Of The Mecmua Tradition: Canto Mecmuas And Hasan Tahsin's Neş'e-İ Dil-Yeni Şarkı Ve Kanto Mecmuası
Mehdi Pekedis	İnönü University	The Center-Periphery Phenomenon And Ecological Destruction In The Context Of Sustainable Development End Environmental Security Policies

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 / Session-2 / Hall-1**

Ankara Local Time: 16<sup>00</sup>-18<sup>00</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Assoc. Prof. Dr. Melike SOMUNCU**

Authors	Affiliation	Presentation title
Ümit Çalışır Baki Çiçek	Siirt University	Investigation Of The Complexation Behavior Of Some Thiadiazol Crown Ethers
Ümit Çalışır Baki Çiçek	Siirt University	Synthesis, Characterization And Determination Of Some Theoretical Properties Of Ethyl 2-((4,6-Dimethylpyrimidin-2-Yl) Amino) Acetate
Şule Azime Yeniçeri Ebru Akkemik	Siirt University	Use Of Plant Extract And Oils In Edible Films
Zeki Acar Şule Azime Yeniçeri Bülent Hallaç	Siirt University	Investigation Of The Antibacterial Effect Of Different Combinations Of Vinegar And Salt Against S. Aureus And E. Coli O157:H7
Uğur Demlikoğlu	Siirt University	Ottoman Military Classes In The Region After The Conquest Of Ganja (1723- 1735)
Mehmet Tan	Siirt University	Trust And The Crime Of Abuse Of Trust
Aynur Kalkanoğlu	Siirt University	Effect Of Content Matters On Microstructure And Thermal Properties In The Al-Cu Eutectic Alloy
Barış Mercimek	Siirt University	Determining The Expectations Of Teacher Candidates For Increasing The Performance Of Using Web 2.0 Technologies In Education
Seyfettin Kaya	Siirt University	Sextante Instrument, Which It Was Used In Medieval Observatories
Melike Somuncu	Siirt University	Semiotic Analysis Of An Advertisement: "Domestos"
Abdullah Akgüneş	Islamic University of Minnesota	Alı Semerkandı's Socio-Economic Understanding In The Process Of Islamization Of Anatolia

(All speakers required to be connected to the session 10 min before the session starts)  
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 / Session-2 / Hall-2**

Ankara Local Time: 16<sup>00</sup>-18<sup>00</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Assoc. Prof. Dr. Erhan AKIN**

Authors	Affiliation	Presentation title
Recep Ayhan	Siirt University	Some Assessments On Siirt Waqfs In The Light Of 13011 Numbered Waqf Book (1848-1861)
Abdulkadir Inak Bedrettin Kesgin	Siirt University	Evaluation Of Social Assistance Provided To Working Poores In Turkey
Fatma Çavdarođlu	Siirt University	Immigration Element In Zülfü Livaneli's Novel Balıkçı Ve Ođlu
Adnan Alkan Ümit Çelebi	Siirt University	The Effect Of Organized Industrial Zones On Urban Development: The Example Of Siirt
Merve Sandıkçiođlu Ali Uzun	Siirt University	Temporal And Spatial Change Of Peatlands In The Gölbaşı Basin Adıyaman/ Türkiye
Murat Toprak	Siirt University	Everyday Life Relations Of Siirt's With Its Socio Cultural Difference
Enser Yılmaz Mahmut Epaydm	Siirt University	Following Serdar Özkan's Novel Title "Kayıp Gül" An Archetrical Journey
Mahmut Kaya	Siirt University	Disease Detection from Plant Leaves using Deep Transfer Learning Methods
Rasim Çekik	Siirt University	New Framework for Youtube Spam Filtering
Talip Çukurlu	Siirt University	Witnesses Of History: Literary Texts Or A Iosephic Poem Written For Abdulhamid I's Accession To The Throne And Its Poet Is Unknown
Talip Çukurlu	Siirt University	An Unknown Poem Of Selim I And Bakı's Nazire

(All speakers required to be connected to the session 10 min before the session starts)  
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 / Session-2 / Hall-3**

Ankara Local Time: 16<sup>00</sup>-18<sup>00</sup>

Siirt University, Faculty of Arts and Sciences

**HEAD OF SESSION: Assoc. Prof. Dr. M. Hadi AYDIN**

Authors	Affiliation	Presentation title
M. Hadi Aydin Berrin Kayalar	Siirt University	Factors limiting pistachio production
Berrin Kayalar M. Hadi Aydin	Siirt University	Pamukta (Gossypium spp.) fide kök çürüklüğü ve solgunluğa neden olan etmenler
Hasan Yeniçirak	Siirt University	Instruments of New Authoritarianism: Weakening Institutions and Dependent Media
Imray Nur Mustafa Batuhan Kurtoğlu Sungur Gürel Raziye Günay Bilaloğlu Yaşare Aktaş Arnas	Siirt University	Adaptation Of The Caregiving Helplessness Scale To Turkish
Mücahit Kumandaveren	Siirt University	The Effect Of Public Expenditures On Economic Life According To Ibn Haldun
Ebru Güç	Siirt University	Examining The Psychological Resilience Elements From A Psychodramatic Point Of View In The Book Titled "Steps Of Stone: The Journey Of A Refugee Family"
Nilgün Onursal	Siirt University	Siirt Kurtalan Structural Analysis Of Koçpınar Clay And Isotherm Analysis Of cadmium (II) Ion Adsorption By The Clay

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 | SESSION-1 | HALL-1**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Melih KUNCAN**

Authors	Affiliation	Presentation title
Irina-Ana Drobot	Technical University of Civil Engineering	The Japanese Fruit Sandwich: An Example Of Creativity In Culture Appropriation
Asmetkhanim Mammadova	Azerbaijan, Baku State University	The Role Of Azerbaijan Oral Literature And Folklore In The Works Of Nizami Ganjavi (Based On Bahruz Bamdadi's Article Of The Same Title)
Gwaison Panan Danladi Maimako Livinus Nkuri Othman Ibrahim Ahmed Akpan James E.	University of Jos	The implication of Treasury Single Account on the performance of First bank Nigeria PLC
Ly Dai Hung	Vietnam Institute of Economics	Term-Structure Of Foreign Direct Investment Into Vietnam Economy
Vorya Shabrandi	Knowledge of Master of International Relations University of Iran	Attitude To The Social Uprising Of The " Iranian World Movement Women's " And The "Women's Revolution" Of The Iranian People In Iran And World Within The Framework Of The Neil Smelser Theory To Form A Comprehensive And Transformative Social Movement
Shoukat Rafique Faiz Muhammad Shaikh Iqra Soomro	Shah Abdul latif University	Impact on Recent Mega Rain Flood in Sindh on Poverty in Pakistan: A Case study of Sindh
Rui ISIDORO Vera KRISCHER Ana DIAS	Polytechnic Institute of Beja	Relevant facts of Portuguese legislation for vibrations at work
Monireh Nouri Hooshyar Hossini	Kermanshah University of Medical Sciences	Investigating indoor and ambient air pollution of residential houses with microplastic particles
Saera Suhail Kidwai	Fazaia Ruth Pfau Medical College	Osteoporosis burden in low socioeconomic strata in Karachi , Pakistan.
Borislav Abrashev Marin Pandev Daniela Levi Valentin Terziev	Bulgarian Academy of Sciences	Sustainable Energy Solutions in a Changing World

(All speakers required to be connected to the session 10 min before the session starts)  
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.



**18.11.2022 | SESSION-1 | HALL-2**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Cuneyt DEMIR**

Authors	Affiliation	Presentation title
Akanimo Ekpenyong Udofia Aniekan Essienubong Ikpe Emem Okon Ikpe	Department of Welding and Fabrication Engineering	Exergy performance assessment of hybridize- nanofluids zeotropic blend as refrigerant replacement in vapor compression refrigeration system
Xiaoyu Yan Lixia Yang Ankang Kan Zhaofeng Chen Huanhuan Chen	Shanghai Maritime University	Theoretical prediction and aging experimental verification of the service life of vacuum insulation panels
Imane Yamari Oussama Abchir Hassan Nour M'Hammed El Kouali Samir Chtita	Hassan II University of Casablanca	In silico modeling studies of cyclic sulfonamide derivatives as potent inhibitors of SARS-CoV-2 via 2D-QSAR
Mereke Zeinollakizi	Al-Farabi Kazakh National University	The neurobiology of reading fiction
Ananda Majumdar	University of Alberta	Senior Housing Communities in Alberta: Independent and Assisted Living
Subhojit Chattaraj Sourav paul Sandeepan Saha	Department of Civil Engineering	Comparative study of Compressive and Flexural strength of M30 grade of Concrete using Coconut shell as Coarse Aggregate replacing Material
Anjali Ganesh	St. Joseph Engineering College	Application of Geert Hofstede's Model; Association between culture and management practices with reference to Rio Grande Do Sul, Brazil
A. N. Bhavale B. P. Aware	Department of Mathematics	Counting of some classes of lattices on upto three reducible elements
Yu Lingshuang Kan Ankang Chen Zhaofeng Cai Haofeng Chen Wu	Shanghai Maritime University	Innovation of Lightering Semiconductor Refrigeration Container with Vacuum Insulation Panels Embedded in Envelopes
Ankang Kan Xuexiang Zhang Lixia Yang Jiaxiang Zhang Zhaofeng Chen	Shanghai Maritime University	A study on Green Vacuum Insulation Panel Prepared with Recycled Cotton Core

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 | SESSION-1 | HALL-3**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Emrah YERLIKAYA**

Authors	Affiliation	Presentation title
Olubanjo-Olufowobi, Olufunso	Mountain Top University	A Reappraisal of Karl Marx's Critic of Capitalism: Global System for Mobile Communication (GSM) Network Providers in Nigeria as Case Study
Umar Ayotunde Adam Soladoye Lameed Uthman Mariam Benjamin Benson Ayodele	Lagos State University	Can Blended Learning Strategy Help Bridge the Gender Gap in Biology Classrooms?
Axundova Lamiyə Ramiz qızı	Gəncə Dövlət Universiteti	Azərbaycan, Avropanın Enerji Maraqlarına Cavab Verən Etibarlı Tərəfdaşdır
Rajat Goyal Sumeet Gupta Rupesh Kumar Gautam	Indore Institute of Pharmacy, IIST Campus	Insights On Prospects Of Novel Nsaid Prodrugs In The Management Of Gastrointestinal Toxicity
Sonali Sundram Neerupma Dhiman Rishabha Malviya Rajendra Awasthi	Galgotias University	Genetic Alteration and Role of Melatonin in the Management of Alzheimer
Bernadetha Nadeak Manotar Tampubolon	Universitas Kristen Indonesia	Bölgesel Okullarda Eğitim Örnekleri Analizi
Orazkhan Nazerke Nurbotakyzy	Al-Farabi Kazakh National University	The Role Of Oral Literature In Child Education
Said EL RHABORI Abdellah EL AISSOUQ Samir CHTITA Fouad KHALIL	Sidi Mohamed Ben Abdellah University	Design of new anti-breast cancer inhibitors via computer-aided drug discovery (CADD)
Baan Jafar Sadiq	Baghdad University	key Performance Indicators for Assessing Faculty and Staff
Shabir Ahmad Mir Nadeem Ur Rehman	Aligarh Muslim University	Some Basic Properties And Connectivity Indices Of Weakly Zero-Divisor Graph Of A Ring

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 | SESSION-1 | HALL-4**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Prof. Dr. H. Yıldız DAŞGAN**

Authors	Affiliation	Presentation title
Ali BAYRAM Ayşe Nida KURT	Muş Alparslan University	Biological Life Cycle And Control Of The Clover Pest
Mehmet ÖZ	Gumushane University	Chemical Composition Of Tilia rubra DC. subsp. caucasica V.Engler (Caucasian Linden) Leaf Essential Oil
Duygu SARI	Akdeniz University	The Use Of Different Restriction Enzymes For Reduced-Representation Sequencing In Chickpea
Emrah GÜLEN	Selçuk University	A Research On Dairy Cattle Operators In Şırnak Province
Hanifi YAVUZ Ramazan GÜRBÜZ Harun ALPTEKİN	Iğdır University	Weed Problem In Sugar Beet Cultivation Areas; The Case Of Ağrı Province
Belemir TAN Ertuğrul ELMA Zeynep PEKCAN	Kirikkale University	Comparison Of The Efficacy Of Intratesticular Lidocaine And Bupivacaine During Castration In Cats
H. Yıldız DAŞGAN	Çukurova University	Future Agricultural Model Indoor Vertical Farming
H. Yıldız DAŞGAN	Çukurova University	Heating Vegetable Greenhouses With Waste Energy From Thermal Energy Centrals
İbrahim ALAKUŞ	Hatay Mustafa Kemal University	Evaluation Of Long-Term Results Of Medical Therapy In A Cat With Acute Keratopathy
Halil ALAKUŞ	Hatay Mustafa Kemal University	Surgical Treatment Of Urethral Rupture Due To Transmissible Venereal Tumore (Tvt)

(All speakers required to be connected to the session 10 min before the session starts)

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**18.11.2022 | SESSION-1 | HALL-5**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Mesut SOYALIN**

Authors	Affiliation	Presentation title
Hassan ALIYU Bilkisu Umar MANI	Sokoto State University	Evaluation Of Efficiency And Effectiveness Of Integrated Virtual Instruction During Lockdown Caused By Covid-19 Pandemic Outbreak In Sokoto State University
Hassan ALIYU Corrienna Abdul TALIB	Sokoto State University	Strategizing Learning And Understanding Of Chemical Bonding And Structure For Effectiveness With The Aid Of Phet Interactive Simulations
Mr. Fareed Afzal Areej Zia	Government College University	Obesity and its treatment by Moringa herbs
Nuraiym Zhanibekova	L.N. Gumilyov Eurasian National University	Monitoring The Quality Of Education
Nur Kholifah Corry Yohana Nadya Fadillah Fidhyallah	State University of Jakarta	The Effect of Learning Motivation and Self-Efficacy on Academic Procrastination of Vocational Students
Puji Rianti Sarah Arisanti	IPB University	Wildlife Biodiversity In Peramun Hill, Belitung Regency, Indonesia
Fethi Khelfaoui Mohamed Athmane Yallese Nouredine Ouelaa Salim Chihaoui	May 8th 1945 University	Prediction and optimization of power consumption and cutting energy during discontinuous machining of steel for cold work (SKD1)
DEKHANE Azzeddine	The Higher School of Industrial Technologies	Material's Electric Field And Thickness Effect On Surface Potential Decay
Erdal YILMAZ Tunay ASLAN	Ondokuz Mayıs Üniversitesi	Şirket Değerlemesinde Fiyat/Kazanç Yöntemi: Yazılım Sektöründe Bir Uygulama

(All speakers required to be connected to the session 10 min before the session starts)

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**18.11.2022 | SESSION-1 | HALL-6**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Erkan ISIKTAS**

Authors	Affiliation	Presentation title
Ilker Turker Ehssan ALJanabi	Karabuk University	EEG Based Autism Spectrum Disorder (ASD) Detection: A Bibliometric Analysis
Mohammed Ali Ali Ayedh	Aligarh Muslim University	On central identities equipped with skew Lie product involving generalized derivations
Mohammed Lawal Toro	Tomsk Polytechnic University	Lung Segmentation Accomplishment Based On U-Net Architecture And Morphological Operations.
Ayazul Hasan Rafiquddin	Jazan University	On Completeness In Qtag-Modules
Salwan Hanafi Sri Indah Nikensari Saparuddin Mukhtar Fadhilah Atika Ningrum	Universitas Negeri Jakarta	Analysis Of Factors Affecting The Composite Stock Price Index Of Consumption Goods In The Indonesia Stock Exchange
Vicri Rahmatin Qadri Sri Indah Nikensari Suparno Fikri Fadhillah	Universitas Negeri Jakarta	Analysis Of Consumer And Business Confidence, Exports, And Government Expenditure Related To Economic Growth In Asia
Javier Fombona Jorge Puente Susana Sánchez	University of Oviedo	Primary Schools, And Organizations Transparents, Open To Society: Orgtransparente.Uniovi.Es/En
Ramya Dodda Sravani Ittedi	Pallavi Engineering College	Numerical simulations of MHD boundary layer stagnation point flow of Casson fluid over a non-linear stretching sheet with suction
Anastasia Vyacheslavovna Makhova	Russian State Social University	Physiological State Of The Youth Organism In The Conditions Of Central Russia

(All speakers required to be connected to the session 10 min before the session starts)  
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**18.11.2022 | SESSION-2 | HALL-1**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Talip CUKURLU**

Authors	Affiliation	Presentation title
Rizwan Alam	Aligarh Muslim University	On Closedness Of Some Permutave Posemigroup Identities
Izza Faiz ul Rasool Hadiqa Faiz ul Rasul Mr. Fareed Afzal Dr Zarina Mushtaq.	Government College University	The Power of Micronutrients throughout Life
Hafedh M. Alnoghashi	Aligarh Muslim University	On prime ideals with generalized derivations-II
Gunabalan Madhumitha	1Department of Chemistry, School of Advanced Sciences	Microwave assisted synthesis of Ag <sub>2</sub> O nanoparticles: a study against <i>S. incertulas</i> , <i>C. medinalis</i> and <i>S. Mauritia</i>
Sana Ghayas Rubab Hussain Shehla Akbar Saiqa Ishtiaq	Dow University of Health Sciences	Mitigation Of Paracetamol-Induced Hepatotoxicity By <i>Dicliptera Bupleuroides</i> Nees' Through Oxidative Stress Modulation
Manotar Tampubolon	Universitas Kristen Endonezya	Political Fraud Of Election In Indonesia: A Human Rights Perspective
Hajiyeva Mahbuba Camal	Sumgait State University	The Foundation Necessity Of Baku Branch Of Imperial Russian Technical Society
Fauzia Hasna Nauvallina Bintang Adde Harki Putri Kevin Maulana	Universitas Muhammadiyah Purwokerto	Selling to students: A sign landscape in an Indonesian college context
Simona Rodat	Adventus University	Nonverbal Barriers In Social Work Communication

(All speakers required to be connected to the session 10 min before the session starts)

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**18.11.2022 | SESSION-2 | HALL-2**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Mahmut KAYA**

Authors	Affiliation	Presentation title
Abdelkarim Elkhafir Miloud Chakit Ahmed O. T. Ahami	Ibn Tofail University	Factors influencing violent behavior in football stadiums in Kenitra city (Morocco)
Muhammad Jawad Fakhar Ud-Din Sibgha Batool Aimen Saleem	Quaid-i-Azam University	Development of Dexibuprofen Loaded Solid Lipid Nanoparticles to Enhance Oral Bioavailability
Nazim Nadeem Ur Rehman	Aligarh Muslim University	On Normalized Distance Laplacian Eigenvalues Of The Ring Zn
Ilnura Ibragimovna Fayzullina Ilya Nikolaevich Medvedev	Moscow State University of Food Production	Physiological Features Of Blood In Cows During The First Pregnancy
Maya Dmitrievna Shumova	Russian State Social University	Physiological Capabilities Of Platelets For Heifers Aged Over One Year
Elena Sergeevna Tkacheva	Department of Epizootology and Microbiology	Platelet Functions In Piglets Beginning To Consume Vegetable Feed
Nadezhda Viktorovna Vorobyeva	South-West state University	Platelet Functions In Yaroslav Calves In The Middle Of Early Ontogenesis
Svetlana Yurievna Zavalishina	Russian State Social University	Physiological Reaction Of Astenized Organism To Moderate Physical Loads
Dr. Remus RUNCAN Roxana ARDELEAN	Aurel Vlaicu University of Arad	Psycho-Social Problems Of Juvenile Delinquency Among Minors And Adolescents
Abbas Ali Rezaee	University of Tehran	Methodology of Teaching English for Specific Purposes: Unique or General

(All speakers required to be connected to the session 10 min before the session starts)

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**18.11.2022 | SESSION-2 | HALL-3**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Serkan SABANCI**

Authors	Affiliation	Presentation title
Dhanesh G. Mohan Anatoliy Zavdoveev Jacek Tomków3	Department of Material Processing Engineering	Transformative High Entropy Alloys For Additive Manufacturing
Zulqurnain ALI	King Fahd University of Petroleum and Minerals	Does Big Data Use impact Firm Export Performance? Investigating the Joint Moderating roles of Entrepreneur Orientation and Resource Coordination
Hassen Abazinab Abajobir Belay Duguma Eticha Eyersus Muleta Fatula	Gera District Agricultural and Livestock Development Office	Assessment Of Livestock Feed Resources Availability, Feeding Practices And Constraints To Livestock Production In Different Agro-Ecological Zones In Gera District, Jimma Zone, Oromia Regional State, Southwest Ethiopia
Nishant Kumar Singh Yashvir Singh Virendra Kumar	Harcourt Butler Technical University	Insights into the Turning Process Cutting Performance with Cotton Seed Oil Enriched with Nano-additive
Dr. Bidhu Bhusan Mishra Dr. Abhijit Mohanty	Utkal University	An empirical study on Community capacity building and promotion of Tribal tourism in KBK Districts of Odisha
Misbah Fareed Abid Hussanan Amir Abbas	University of Education	Heat Transfer Flow Of Viscoplastic Nanofluid Containing Different Shape Of Nanoparticles
Alka Verma Shilpee Patil	Teerthanker Mahaveer University	A brief perspective of Electromagnetic Band Gap Structures loaded on Microstrip Antenna for Dual band Applications
Lavinia Maria Mihali Roxana Sirbu	Politehnica University of Timisoara	Do Academic Spin-Off Perform Better Than Other Firms? Evidence From Romania
Gabriel Sunday Oladipo Oghenefego Michael Adheke Janet Nneoma Eke	University of Port Harcourt	Accuracy Of Age And Sex Estimation Of Nigerian Igbo Population Using Auricular Morphometrics
Imoh Ime Ekanem Usungurua Enefiok Okon Aniekan Essienubong Ikpe	Michael Okpara University of Agriculture	The Influence Of Parametric Variations On Environmental Sustainability Of Different Gas Turbine Inlet Cooling Systems

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**18.11.2022 | SESSION-2 | HALL-4**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Orhan BALCI**

Authors	Affiliation	Presentation title
Khuu Thi Phuong Dong Khong Tien Dung Tran Ha Nhi	School of Economics Can Tho University	Factors Affecting Decision To Participate The Life Insurance In The Emerging Market: An Evidence From Customers In Soc Trang Province, Vietnam
Nampiah Sukarno Astri Ariyani Sri Listiyowati Iman Hidayat Wendi Nurul Fadillah	IPB University	Fresh Water Fungi In Natural And Man-Made Lakes In Indonesian Tourist Destination Areas
Akpan, Immaculata Sylvesta Wilson, Emmanuel Okon Idiong, Kokoette Etim	Department of Civil Engineering, Akwa Ibom State Polytechnic	Overall Equipment Effectiveness (Oee) Analysis With Total Productive Maintenance. A Case Study Of A Brewery
Hicham Bouzekraoui Atika Mouaddine	Slimane University	Combination Of Urban And Rural Geosites In Geotouristic Routes For Geotourism Valorisation In Beni Mellal Province (Central High Atlas, Morocco)
Atika Mouaddine Ahmed Barakat	Slimane University	Spatial Variability Of Physical And Hydraulic Properties Agricultural Soils In A Semi-Arid Environment; Case Of The Beni Moussa Irrigated Perimeter In
Abdessalam Salmi Mohammed Al Baghdadi	Sultan Moulay Slimane University	The Quantification Of Hematite And Goethite In Hydromorphic Soils Using The Sentinel-2 Sensor And Xrf In The Beni Moussa Perimeter, Tadla Plain, Morocco
Abdessalam Salmi Mohammed Al Baghdadi Atika Mouaddine	Sultan Moulay Slimane University	Iron Behavior And Their Relation To The Physico-Chemical Properties In The Hydromorphic Soils Of Beni Moussa Perimeter, Tadla Plain, Morocco: Insight From The Multivariate Statistical Analysis
Muwafaq Mahdi Salih	University of Duhok	Some Connectedness Properties Of Relator Spaces
Maria El-Harram Mohamed El Baghdadi	Université Sultan Moulay Slimane	Organic Carbon Stability And Organic Matter Dynamics In Beni Moussa Soil (The Tadla Plain, Morocco)
Naseem Akhter	Shaheed Benazir Bhutto Women University	The Growing Ratio Of Redemption (Khula) In The Present Situation: An Examination Of Students' Perceptions In The Light Of Islamic Requirements

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**18.11.2022 | SESSION-2 | HALL-5**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Ferit SAHIN**

Authors	Affiliation	Presentation title
Syed Makhdoom Hussain	Government College University	Expanding the Utilization of Sustainable Plant Products and Dietary Supplements in Fish diets: Issues and Solutions
Ziad Shakeeb Al Sarraf	University of Mosul	Prediction the Weldability of Joining Materials by Shield Metal Arc Welding Using Artificial Neural Network
Rozina Khattak	Shaheed Benazir Bhutto Women University	Kinetics of the Biosorption of Rh-B in Aqueous Medium
Andrea María González López María Ángeles Pascual Sevillano	University of Oviedo	Perception of Secondary Education Teachers about the knowledge and use of active methodologies
Zeeshan Yousaf	Government College University	Effects of Aloe vera supplementation on overall performance of Catla catla fingerlings fed canola meal based diets
Najamuddin	Khairun University	Carbon Content in Several Species of Seagrass in Coastal Waters of Small Islands in Indonesia
Misbah Fareed Abid Hussanan Amir Abbas	University of Education	Thermal radiation and viscous dissipation effects on hybrid nanofluid over stretching sheet
Ankang Kan Qiaoling Zhang Zhaofeng Chen Jiaxiang Zhang Dan Cao	Shanghai Maritime University	Thermal performance analysis of vacuum insulation panel with aerogel composite core
Nisrine Nouj Naima Hafid Noureddine El Alem Ingrid Ioana Buciscanu Stelian Sergiu Maier Petrisor Samoila Gabriela Soreanu Igor Cretescu Catalina Daniela Stan	IBN ZOHR University	Valorization of $\beta$ -Chitin Extraction Byproduct from Cuttlefish Bone and Its Application in Food Wastewater Treatment
Onyishi, Peace Amaka Okoro, John Chukwuma	University of Nigeria	Rural Women Information Seeking Behaviour on Herbicide Usage in Nsukka Agricultural Zone, Enugu State, Nigeria

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**18.11.2022 | SESSION-2 | HALL-6**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Dr. Yunus OZDURGUN**

Authors	Affiliation	Presentation title
Favour C. Uroko	University of Nigeria	Proverbs 28:20, 22 and Nigerian youths' drive for rapid money
Priyanshi Goyal Rishabha Malviya	Galgotias University	Developments in Stem cell Therapy for the Management of Diabetes
Deepika Yadav Rishabha Malviya	Galgotias University	Potential of Stem Cells in Treating Breast Cancer
Aleena Maryiam Fakhar ud Din Zakir Ali Uswa Shafique	Quaid-i-Azam University	Improved Bioavailability of Levosulpiride using Solid Lipid Nanoparticles as Drug Delivery System
Ali Safari	Hazrat-e Masumeh University	A Costructionist Account of the Persian Constructional Idiom [pa ('leg') to [N] [LV]]
Mohammed Kaka Ahmed Moh'd Foad Rohani Azlan Mohd Zain Yusliza Yusoff	Universiti Teknologi Malaysia	Detection Techniques for Examinee Cheating: A Ten-Year Survey (Features and Solutions)
Valdete Loku	University of Applied Sciences	Tauberian theorems via the generalized Nörlund mean for sequences in 2-normed spaces
FlorenceA. Bello Mopelola A. Dada Lawrence J. Iwok	University of Uyo	Chemical Composition And Consumer Acceptability Of Maize Flour-Based Cookies Supplemented With African Yam Bean And Orange-Fleshed Sweet Potato Flour Blends
Rabiu Garba Ahmad Vineet Kumar	Lovely Professional University	Optimum Parameters for Phytopathogenic fungus Detection using Nanosensing Technique

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**18.11.2022 | SESSION-2 | HALL-7**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Emrah YILMAZ**

Authors	Affiliation	Presentation title
Rohith Gangaraju Amara Santosh Jayanth Dr. Karthika Natarajan	VIT-AP University	Machine Learning Architecture for Covid-19 detection Using Symptoms and Location (MARCUS)
Pradeep L. P. Singh	Indian Institute of Technology (B.H.U), Research Scholar	The effect of dust particles on the evolution of weak discontinuity in two-dimensional supersonic flow of van der Waals gas
Carla Santos Cristina Dias	Polytechnic Institute of Beja	Solving a counterintuitive probability problem
Çiçek Abbasova	ANAS Institute of Radiation Problems Baku Azerbaijan	Diagnosis of radiotracer processes
Rasheed Abou Hamdan	AUCE University, Lebanon	Work Life Balance among Lebanese working mothers
Raof Ahmad Bhat Abbas Hussain Shikeh	Aligarh muslim university	A Note On Generalized (M, N)-Jordan *-Derivations In Prime Rings
Ibrahim Maouhoubi Izeddine Zorkani	Sidi Mohamed Ben Abdellah University	Effects Of Applied Magnetic Field And Pressure On The Diamagnetic Susceptibility And Binding Energy Of Donor Impurity In A Circular Quantum Disk Made Out Of Gaas
Abbas Hussain Shikeh Raof Ahmad Bhat	Aligarh Muslim University	On The Characterization Of Certain Maps In Prime *-Rings

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**18.11.2022 | SESSION-3 | HALL-1**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Adnan ALKAN**

Authors	Affiliation	Presentation title
Udoye, C. E.	University of Nigeria	Usefulness of Agricultural Information shared Amongst Actors in the Poultry Value chain of the Commercial Agricultural Development Project in Enugu State, Nigeria
Abdellah Ousaa Mohamed chibane Boyhya Elidrissi Mounir Ghamali Samir Chtita Adnane Aouidate Adnane Ghaleb Mohamed Bouachrine Tahar Lakhli	Laboratory of Applied Chemistry and Environment	QSAR and docking studies on the pyrimidine derivatives analogs with antileishmanial activity
Ayoub Chaoui Asmae amjlef Salaheddine Farsad Ezzahery Mohamed Noureddine El Alem	Université Ibn Zohr	Adsorption of an anionic dye with raw clay material from the south of Morocco: characterization, kinetics
Pham Duc Thuan Nguyen Thi Thuy My	Cantho University	Diplomatic Relations Between Vietnam And Campodia (1979 -2020)
Kimya Parnoon Tooraj Massahi	Kermanshah University of Medical Sciences	Construction of a Novel sampler for the simple collection of sludge and sediment in Wastewater treatment plant ponds
Anna Kopiczko	Józef Piłsudski University of Physical Education in Warsaw	Bone mineral density, active smoking and environmental tobacco smoke among young women: cross-sectional observational study
Nguyen Tri Nam Khang Huynh Truong Huy Tran Thanh Liem	Can Tho University	Driving Forces And Barriers In The Implementation Of Green Adaption Strategies Of Accommodations: The Case Of Can Tho, Viet Nam
Tamara LUKIĆ Milka BUBALO ŽIVKOVIĆ Ivana PENJIŠEVIĆ Milica SOLAREVIĆ Bojan ĐERČAN	University of Novi Sad	They And We – Testimonies Significant For Historical Geography Of Serbia
Chatrina Galuh Pramesthi Mukhammad Murdiono, Suyato	Yogyakarta State University JI	Increasing Student Learning Motivation in Civic Education Learning Through Problem Based Learning Model assisted by the Flipped Classroom Method
Nisad Sardar Sudip Mishra	Department of Applied Mathematics	Allée Effect On The Prey-Predator Model Of Holling Type-I Functional Response

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**18.11.2022 | SESSION-3 | HALL-2**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Dr. Hasan YENICIRAK**

Authors	Affiliation	Presentation title
Aayad Ammar Sayhood Mohanad Hazim Halboos	University of Kufa	The Treatment of Environmental Pollution Caused by Mercury Ions by Adsorption Method Using Agricultural Residues of Vigna Peel
Shivani Yadav D.K Chauhan	Chaudhary Charan Singh University	Oral administration of Copper oxide nanoparticles (CuO NPs) to mature female albino rats leads kidney damage
Asma Tahir Fakhar Ud Din Kanwal Shabbir Mohsin Fawad Faisal Ghani	Quaid-i-Azam University	Development of Carbamazepine Loaded Nanostructured Lipid Carriers for Brain Delivery to Enhance In-Vivo Anticonvulsant & Anxiolytic Activity
Svetlana Yuriyevna Zavalishina	Russian State Social University	Functional Properties Of Platelets In Vegetable Calves
G.V.R Reddy K.Sandhya Rani	Koneru Lakshmaiah Education Foundation	Significance Of Cattaneo-Christov Heat Flux On Chemically Reacting Nanofluids Flow Past A Stretching Sheet With Joule Heating Effect
Ruhi Tomar Dushyant Kumar Chauhan	C.C.S University	Histopathological Modulations in the Liver of Hyperglycemic Rats Treated with Green Synthesised Zinc Oxide Nanoparticles
Javier Fombona Jorge Puente Susana Sánchez	University of Oviedo	Primary Schools, And Transparent Organizations, Open To Society: Orgtransparente.Uniovi.Es/En
Najwa Jbira Anass LEBNAITI Sanaa HAYANI MOUNIR	Sultan Moulay Slimane University of Beni Mellal	Application of Exergy Analysis in a Moroccan dairy process
Beatriz de Barros Souza	University of Malaga	Conflict and solidarity in refugee camps: MHPSS theory and practice
Elena Sierikova Elena Strelnikova Ivan Vierushkin	National University of Civil Defence of Ukraine	Taking into account the soil influence as the elastic Winkler foundation during the cylindrical tank oscillations under seismic loads

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**18.11.2022 | SESSION-3 | HALL-3**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Halil OZDEMIR**

Authors	Affiliation	Presentation title
Mustapha AIT HSSAIN Sara ARMOU Rachid MIR	Ibn Zohr University	Simulation of heat transfer and air circulation in heated agricultural greenhouses
Yassir Soulaïmani Nehéz Károly	University of Miskolc	Blockchain and hashing algorithms
Sagaya Aurelia P Rupam Kerketta Tauseef Rahman Ahmed Pongsakorn Pinrat Pranoy Basu	CHRIST University	Craft Dash
Halima El Bouami Assia Mabrouk Cyrille Mercier Claudine Follet Ahmed Bachar	Université Ibn Zohr	Sol- gel Synthesis of a new composition of bioactive glass
Bhakkeyalakshme D L.R.K Krishnan	VIT University	Life Of A Daily Wage Construction Worker In Chennai: A Socio-Economic Perspective
Farhana L.R.K Krishnan	VIT University	Impact of people practices in a retail outlet driving customer preferences with reference to Reliance Trends
Padmapriya S L.R.K Krishnan	VIT University	Analysis Of Relationship Between Employee Satisfaction And Customer Outcomes In The It Industry
J. Orgeldinger MBA	Dipl.-Kfm. (univ)	The newest compliance rules in the United States and how they are implemented in a company
Binyam Zigta	Wachemo University	Effect of Thermal Radiation and Chemical Reaction on Magneto hydrodynamics Flow of Blood in Stretching Permeable Vessel
Ekbal Rashid	RTC Institute of Technology	Application of Machine Learning Technique For Prediction Of Phishing On Android

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**18.11.2022 | SESSION-3 | HALL-4**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Melih KUNCAN**

Authors	Affiliation	Presentation title
Zohaib Hassan Sain	Superior University	Challenges in Quality of Education in Higher Education Institutions (HEIs) of Pakistan
Chandrakant Naikodi Roja C Sachin Kawad S Shaistha Anjum F	Davangere University	Smart Format Adapter for NoSQL Polyglot Persistence in Big-Data World
Ejaz Ahmad Waraich Humaira Ishaq Nasir Mahmood	University of Agriculture	Silicon-mediated growth, physiological, biochemical and root alterations to confer drought and nickel stress tolerance in Maize ( <i>Zea mays L.</i> )
Ummama Munir Asma Seemi Malik Shiza Zawar	Lahore College for Women University	Helicopter Parenting And It's Psychological Effects On Children And Adolescents
Haritha N S	Thunchath Ezhuthachan Malayalam University	Heritage, Heritagization and Heritage Industry: A Study on Clothing Heritage of Kerala
Ibrahim Zailani Abdullahi Dahiru	Puntland State University	The Knowledge And Practice Of Personal Hygiene Among Primary School Pupils In Paki Community Ikara Local Government Area Of Kaduna States
Gav, Benedict. L Anyanwu, Solomon Nonso Oloruntoba, S. O Tor. P	Federal University of Agriculture,	Proximate And Mineral Analysis Of Watermelon Sold At North Bank Market, Makurdi, Nigeria
Amine Ez-zoubi Saoussan Annemer Soukaina El Amrani Yassine Ez zoubi Abdellah Farah	Sidi Mohamed Ben Abdellah University	Encapsulation of <i>Origanum compactum</i> essential oil in beta-cyclodextrin metal organic frameworks: Characterization, optimization and antioxidant activity

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**18.11.2022 | SESSION-3 | HALL-5**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Cuneyt DEMIR**

Authors	Affiliation	Presentation title
Zohaib Hassan Sain	Superior University	Challenges faced to Online Education & Learning in Pakistan during Covid-19 Pandemic
Abdulhalim Musa Abubakar	Modibbo Adama University	Analysis of Microbial Growth Models for Microorganisms in Chicken Manure Digester
Khadija Bahend	Ibn Zohr University	Electrochemical synthesis and characterization of poly (Rhodamine B) coating on FTO
Ishaq Yahaya Lawan Abdulrahman Hudu Muhammed adamu Ansar Bilyamin Adam	Nigerian Army University	Wastewater Treatment Using Activated Carbon Derived From Detarium Microcarpum Seed And Their Adsorption Isotherm
Bernadetha Nadeak	Universitas Kristen Indonesia	Analysis Of Educational Patterns In Suburban Schools
G.P. Ashwinkumar C. Sulochana N.Sandeep	Vijayanagara Sri Krishnadevaraya University	A numerical computation on boundary layer analysis of persistent moving horizontal needle in MHD ferrofluid
D. John A. M. Ayinde T. O. Wahab H. B. Aliyu	University of Abuja	Estimation of Mann iterative fixed-point scheme of contractive-type conditions in Banach spaces
Dahab Banikhaled	University of Abuja	The effect of learning using multimedia software on the motivation of ninth grade students towards learning a computer subject

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**18.11.2022 | SESSION-3 | HALL-6**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Emrah YERLIKAYA**

Authors	Affiliation	Presentation title
Bhavna Gupta	All India Institute of Medical Sciences Rishikesh	A Comparative Study of Key Quality Performance Indicators in Anaesthesia and Surgery in Operation Theatre at a Tertiary Care hospital
Mirza Muhammad Faran Ashraf Baig	The Hong Kong University of Science and Technology	Recent Advances of Magnetic Gold Hybrids and Nanocomposites, and Their Potential Biological Applications
Mohammed S. Abu-Jafar	An-Najah N. University	The Structural, Electronic, Magnetic and Elastic Properties of Full-Heusler Co <sub>2</sub> CrAl and Cr <sub>2</sub> MnSb: ab Initio Study
Chandrakant Naikodi Poornima M R Pratyusha S Priyanka M	Davangere University	Introduction of Additional Name-Node for Cache Mechanism for Fast Read Operations in HDFS
Isiaka, Najeem Ayodeji	Department of Banking and Finance Federal Polytechnic	The Impact of Renewable energy on Carbon-dioxide: The Nigeria Experience
Abdurrahman, U. D Hafsat, A, L Kamaluddeen, A Garba, U. A Libata, A. H U. M. Doma	Kebbi University of Science and Technology	Status Of Gastrointestinal Trematodes Infections Among Ruminants Slaughtered In Yauri Emirate, Kebbi State, Nigeria
Chandrakant Naikodi Tousif Salt Venuprasad M Vidyashree R	Davangere University	Additional Namenode's Extended Caching For Improving Availability For Read-Only Transactions In Cap Theoram
Naseem Akhter	Shaheed Benazir Bhutto Women University	The Growing Ratio of Redemption (Khula) in the Current Situation: (From Islamic Perspective)
Khalid Benhssain Jamal Aabdousse Nora Salim Ilias Oussif M'hamed Ramchoun Younes Abbas Hicham Berrougui	Sulatan Moulay Slimane University Beni Mellal	Yield and secondary metabolite content of Moroccan Juniperus thurifera's extracts: case of three provenances

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-1 | HALL-1**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Prof. Dr. Ibrahim TEGIN**

Authors	Affiliation	Presentation title
Sankar Das	Vidyasagar University	Study On Picture Fuzzy Competition Graphs And Its Applications
Nayab Khan Michal Vik Assad Farooq Farida Irshad	University of Agriculture	Relationship Between Color And Strength Of Jute Fibre
Bishakha Rani Bhagwan Sahu	SRM Institute of Science and Technology	Optimization of Portfolio Rebalancing Model on an Extended Interval Vector Space
Bongumusa Mdluli	Khazar University	How government policies can support innovation development in South Africa
Joseph Ofonmbuk Udo Agbagwa Obakpororo Ejiro Frank-Peterside Nnenna	University of Port Harcourt	Antimycotic properties of <i>Diodia Sarmentosa</i> , and <i>Ocimum gratissimum</i> on nine fungal strains obtained from Children and Adults in Selected Communities of Akwa Ibom State, Nigeria
Mojtaba Ranjbar Seyed-Mohammad-Mahdi Kazemi Nazanin Tafakhori	Kharazmi University	Space-time radial basis function collocation method and variable shape parameter strategy for telegraph equation
K. Hamisu A.T. Lawal A.U. Shu'aib S.S Abdussalam H. Ali	Kano University of Science and Technology	Structural Analysis Of Wudil Cattle Market (Kara) Wudil Local Government Of Kano State-Nigeria
Mehrdad Karimimoshaver Alireza Gerami	Bu-Ali Sina University	Investigating Phase Change Materials, Their Performance and Types with the Approach of Sustainability and Reducing Energy Consumption
Navid Nouri Jafar Massah	University of Tehran	Evaluation Of The Performance Of Trimmer Robots: Review Study
AGBAKA Sourou Arsène SEGUEDEME Alexis Hergie	Maitre de Conférence	Vexillology And Terminologies

(All speakers required to be connected to the session 10 min before the session starts)  
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-1 | HALL-2**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Erhan AKIN**

Authors	Affiliation	Presentation title
Mohammed el amine ZENNAKI Lahcene TENNOUGA Brahim BOURAS Kouider MEDJAHED	Tlemcen University	Retention Of Dye By Waste-Derived Material (Polystyrene Sulfonate)
Priya Chaudhary Richa Gupta Neelam Kumari Shabila Wani	Lovely Professional University	Psychological Distress and Suicidal ideation among Adolescents: The Moderating Role of Social Support
Sadaf Mushtaq Nasti Priti Bhatt	Devi Ahilya Vishwavidyalaya Indore	Technosocial World: A Challenge to Gender Disparity
Nadia Khumairatun Nisa Abdul Syani Suwarno	University of Lampung	The Manifestation Of The Lampung Community Philosophy Of Life In The Traditional Architecture Of Lamban Gedung Paksi Buay Pernong
Feride Verdiyeva Tahira Aliyeva Mehseti Ismayilova	Azerbaijan Agricultural University	Gray-Brown Soils Of The Samukh District And Their Environs: Morphological Features
Parvez I Haris	De Montfort University	Survival and Continuity of "Rice and Fish Makes a Bengali" Culture Amongst British Bangladeshis
Ibrahim Khalil Saif Ahmed Binoy Chowdhury Rasheedul Haque	MAHSA University	Conduct Of Students In Financial Increase Towards Interest Of Social Entrepreneurship Improvement In Bangladesh
Wahyu Edi Chandra Pratama Christine Wulandari Zalfa 'Ayudha Putri Novriyanti Novriyanti Dian Iswandar	University of Lampung	Community Perceptions In Peatland Restoration Effort
Subhas Haldar Biplab Sarkar Archana Dixit	Saroj Gupta Cancer Hospital and Research Centre	Retrospective Dosimetric comparative study of Hybrid IMRT, 3DCRT, IMRT, treatment Planning for Left-sided chest wall irradiation

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-1 | HALL-3**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Cuneyt DEMIR**

Authors	Affiliation	Presentation title
Pitojo Budiono Nadia K Nisa Alfathan Harjuno Saputro Adella Putri Aprialiani	The University of Lampung	Policy Model for Utilizing Green Open Space in Bandar Lampung City Development
Pitojo Budiono Syarief Makhya Feni Rosalia Nadia K Nisa Alfathan Harjuno Saputro Adella Putri Aprialiani	The University of Lampung	Local Wisdom "Pi'il Pesengiri" from Lampung as a Filter for Radicalism
Bahaa Mousa Habeeb	University of Kufa	The role of women in social life in the country of Andalusia
Libina M H	University Of Kerala	Juvenile Crime in India: A Socio-Psychic Study

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-1 | HALL-4**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Ozen OZER**

Authors	Affiliation	Presentation title
Özen Özer	Kırklareli University	On The Non-Extendibility Of $D(2)$ Triples Determined With The Help Of Special Type $D(2)$ Pairs
Özen Özer	Kırklareli University	Some Numerical Results And Classifications On The $P_{-}(\overline{F} [19] ^2 )$ Diophantine Regular Quadruples
Erkan Köseadağ	Marmara University	Commercialization Of The Right To Water, One Of The Human Rights
Ibrahim Dolak	Dicle University	Enrichment of Fluorite from Eskişehir Bastnaesite Ore
Mehmet Fetih Yanardağ Fatih Arsoy	Kahramanmaraş Sütçü İmam University	Family In Rasim Özdenören's Stories
Perihan Hazel Kaya Orhan Kemal Kaplan	Selçuk University	Evaluation of the Relationship Between Tax Rates and Tax Revenues in Accordance with the Laffer Curve: The Case of Turkey
Betül Karakoyunlu	Konya Provincial Directorate of Youth and Sports	Dimensions Of Conflict In The Social Area Related To Alaevity: Example Of Youtube Comments
Özkan Aslan	Recep Tayyip Erdoğan University	Teaching Professional Law From Teachers' Eyes
Ismail Bakan Y. Sonay Yılmaz	Kahramanmaraş Sütçü İmam University	A Field Research On The Impact Of Ethical Leadership On Organizational Trust
Ismail Bakan Y. Sonay Yılmaz	Kahramanmaraş Sütçü İmam University	How Effective Is Whistleblowing On Work Alienation?

(All speakers required to be connected to the session 10 min before the session starts)

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**18.11.2022 | SESSION-1 | HALL-5**

Ankara Local Time: 10:00-12:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300:

**HEAD OF SESSION: Prof. Dr. Harun KAMAN**

Authors	Affiliation	Presentation title
Funda Terzi Ilayda Yildirim Ayşe Başak Kapçak	Kastamonu University	A Case of Benign Mixed Mammary Tumor in a Dog
Bariş Eren Fatih Demirel	Iğdır University	Bibliometric Analysis Of Stress-Based And Dna Methylation Studies In Wheat Plant
Harun Alptekin Abdullah Özkan Ramazan Gürbüz	Iğdır Universit	Determination Of Weed Problem And Chemical Control Status Of Şanlıurfa Province
Büşra Çil Neslihan Karavin	Amasya University	Effect Of Microplastics On Barley (Hordeum vulgare L.) Seed Germination Rate
Behzat Balci Hasan Kıvanç Yeşiltaş Zeynep Binnaz Zaimoğlu	Çukurova University	Turkey's Agricultural Drought Prevention Policies
Behzat Balci Hasan Kıvanç Yeşiltaş Zeynep Binnaz Zaimoğlu	Çukurova University	Water Quality Indexs In Determination Of Water Quality Of Aquatic Systems
Engin Gökhan Kulan Mehmet Demir Kaya Esra Yilmaztürk	Eskişehir Osmangazi University	The Toxicity Level Of Boron Dose And Form On Germination And Seedling Growth In Sugar Beet
Meral Doğan	Harran University	Sustainable Agriculture And Environmental Pollution
Harun Kaman	Akdeniz University	Assessment Of Performance Of Irrigation Areas
Harun Kaman	Akdeniz University	Partial Root-Zone Drying And Conventional Deficit Irrigation

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-1 | HALL-6**

Ankara Local Time: 10:00-12:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Omer SOZEN**

Authors	Affiliation	Presentation title
Ömer Kirgiz	Hatay Mustafa Kemal University	Craniotomy Operation And Evaluation In A Head-Injured Shepherd Dog
Azize Atik Ilker Atik Seda Yalçın	Afyon Kocatepe University	Gluten-Free Production And Cooking Properties Of Velense, A Local Product Of Afyonkarahisar
Azize Atik Ilker Atik Seda Yalçın	Afyon Kocatepe University	Sensory Characteristics Of Biscuits Produced Using Buffalo Milk And Cream
Ömer Sözen	Sivas Bilim ve Teknoloji University	A Research On The Determination Of The Quality Characteristics Of Some Dry Bean Genotypes Grown In Aksaray Ecological Conditions
Ömer Sözen	Sivas Bilim ve Teknoloji University	A Research On The Determination Of The Relationships Between Quality Parameters In Some Dry Bean Genotypes
Rojbin Çevik Semra Demir Şahimerdan Türkölmez Gökhan Boyno	Van Yuzuncu Yıl University	The Effect Of Clonostachys Rosea (SCH.) Schroers And Samuels Against Verticillium Wilt (Verticillium Dahliae KLEB.) And Early Blight [Alternaria Solani (ELL. AND G. MARTIN) SOR.] Diseases In Tomato Plants
Ömer Öztaş Fikret Yaşar Özlem Üzal	Van Yuzuncu Yıl University	Salt Stress And Nitrogen In Plants
Esin Deri H. Baki Ünal Turgay Taşkin	Ege University	Importance For Environmental Improvement And Animal Welfare Of Farm Animals
Emel Kaçar	Nevşehir Hacı Bektaş Veli University	Relationship Of Concentrations Of Some Heavy Metals With Fish Size In Tissues Of Fish From The Kızılırmak River (Turkey)
Hüseyin Çağlar Serap Kızıl Aydemir	Bilecik Şeyh Edebali University	The Effect Of Mixed Sowing Ratios In Different Locations Of Common Vetch (Vicia sativa L.) And Italian Grass (Lolium multiflorum L.) Planted As Mixed On Forage Yield

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**19.11.2022 | SESSION-2 | HALL-1**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Mehmet Ekici**

Authors	Affiliation	Presentation title
Rıdvan Bayram Cüneyt Temür	Van Yüzüncü Yıl University	Determination of the Effects of Cation-Anion Difference on Rumen Fermentation and Feed Digestion by In Vitro Method (DaisyII)
Abdurrahman Yamaç Cüneyt Temür	Van Yüzüncü Yıl University	The effects of plantain ( <i>Plantago lanceolata</i> ) extract on the true dry matter and organic matter digestibility of barley, vetch, safflower seeds, and rumen fluid in vivo
Burcu Tuncer Rabia Akbal	Van Yüzüncü Yıl University	Seed Education At Higher Education In Turkey
Aybüke Kaya Sude Tarakçı	Hatay Mustafa Kemal University	SOME LEADING AGRICULTURAL PRODUCTS IN TURKEY'S EXPORT
Aybüke Kaya Merve Ateş	Hatay Mustafa Kemal University	The Place Of Kıwı In The World And Turkish Economy
Mehmet Ekici	Sivas Cumhuriyet University	Investigation Of Some Hematological And Biochemical Changes In Cats Diagnosed With Acute Renal Failure
Utku Altunöz	Sinop University	Empirical Analysis Of The Relationship Between Consumer Price Index (Cpı) In Turkey And Producer Price Index (Ppı)
Ali Bayram	Muş Alparslan University	Major Pests In Sugar Beet; <i>Cassida</i> Spp. (Coleoptera: Chrysomelidae) Tortoise Beetles
Suat Dikel Ece Evliyaoğlu İbrahim Demirkale	Cukurova University	Application Of Blockchain Technology In Fisheries And Aquaculture Production Sector
Suat Dikel İbrahim Demirkale Ece Evliyaoğlu	Cukurova University	Digitalisation In Aquaculture Management

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**19.11.2022 | SESSION-2 | HALL-2**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Dr. Cumaali Demirtaş**

Authors	Affiliation	Presentation title
Irem Akpolat Hülya Kaya Meltem Şahinler Soylu Fatma Çelik	Memorial Diyarbakir Hospital	Adherence Of Nutritional Habits Of University Students To The Mediterranean Diet
Zafer Cengiz Er Fethi Sada Zekey Irfan Yildirim	Bozok University Şırnak University	Wound Healing and Effective Factors Be Attracted Of 'Being A Second Wife': Right Known Mistakes
Gülbahtiyar Demirel Feride Taşkin Yılmaz Feride Taşkin Yılmaz Gülbahtiyar Demirel	Sakarya Uygulamalı Bilimler University Sakarya Uygulamalı Bilimler University	Alexitimia Level And Related Factors In Pregnancy Determination Of Stress And Affecting Factors Of Pregnancy With Gestational Diabetes
Merve Ünlü Hande Şahin	Kırıkkale Üniversitesi	Comparison Of Attitudes Towards Working Mothers With Some Socio-Demographic Characteristics
Cumaali Demirtaş	Sağlık Bilimleri Üniversitesi	Comparison Of Status Epilepticus Animal Models For Experimental Epilepsy Studies
Ahmet Gezek	Yalova Üniversitesi	The Definitions and Classifications of Kināya in the Recent Arabic Rhetoric Books
Mehmet Emin Parlak	Adıyaman University	Investigation Of Home Accidents In Children Under 6 Years Old
Mehmet Emin Parlak	Adıyaman University	Clinical And Epidemiological Features Of Children Diagnosed With Atopic Dermatitis In Southeastern Anatolia Region

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**19.11.2022 | SESSION-2 | HALL-3**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Dr. Turan SAHMARAN**

Authors	Affiliation	Presentation title
Selda Doğan Çalhan Pelin Erođlu Hatice Fidan	Mersin University	Comparative Antioxidant Activity Studies On Ginkgo Biloba Extract
Senem Demirdel Nafiye Demirci	Gülhane Sağlık Bilimleri University	Psychometric Properties Of The 3-Meter Backward Walk Test In Different Adult Populations: Review
Turan Şahmaran	Hatay Mustafa Kemal University	Investigation Of The Radiological Properties Of Some Gel Dosimeters
Nermin Gürhan Tülay Yılmaz Bingöl Zeynep Özkök	Tokat Gaziosmanpaşa University	Substance Addiction As A Social Problem
Tülay Yılmaz Bingöl Nermin Gürhan Zeynep Özkök	Tokat Gaziosmanpaşa University	Social Problems That Threat Mental Health
Şule Gökçen Kirbaşlar Meltem Çakmaklı Hülya Tosun	Kütahya Sağlık Bilimleri University	Hpv (Human Papilloma Virus) Vaccines
Seda Sakarya İlbilge Gökçen Ceritođlu Ezgi Akinci Demirbaş	Kırıkkale University	Examination Of The Relationship Between High School Students' Internet Addiction And Prosocial Skills
Hacı Ali Çakici Kaan Karakuş Alparslan Ince	Ordu University	Examination Of Athletes' Levels Of Moral Disengagement
Kaan Karakuş Hacı Ali Çakici Alparslan Ince	Ordu University	Examination Of The Level Of Achievement Purpose In Athletes
Gökhan İpekođlu Nihan Bozkurt Alpay Bülbül Necdet Apaydın	Ordu University	Investigation Of Col3a1- Rs1800255 Gene Variant Distribution In Professional Male Football Players With Contact And Non-Contact Anterior Cruciate Ligament Injuries

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-2 | HALL-4**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Cuneyt DEMIR**

Authors	Affiliation	Presentation title
Ekundayo T. Areh Olubunmi Atolani Learnmore Kambizi Vidya Padmakumar	Confluence University of Science and Technology	In silico Evaluation of the Antimalarial Potential of the Phytoconstituents of the Azadirachta indica Plant
Manuel Thomas Rogimon P. Thomas Joby Paul	Bangalore University	Assessing The Toxicity Of Sertraline Hydrochloride, An Antipsychotic Drug, On Chlorella vulgaris
Strayker Ali Muda Benyamin Lakitan Andi Wijaya Susilawati	CMS College Kottayam (Autonomous)	Climate Change: A Major Driver In Zoonotic Disease Expansion
Omar Mardenli Khaled Al-Najjar Mahdi Saleh Mohammad Al- Kerwi Hussam Aryan Ioan Groza	Universitas Sriwijaya	Cultivation systems and growing media effect on microclimate during dry season and Brazilian spinach growth
Mohsen Mokhtarian Sheyda Tavakoli	University of Aleppo	A Review Of The Most Important Theories Related To Embryonic Implantation And Placental Immunity In Farm Animals
Okoro, John C Unuchi Maryann Agaba Juliet Ezema Chizoba Enemuo Judith Onah, S.O	Islamic Azad University	Reducing and managing energy consumption in the production of various foods
Tourabi Meryem Nouioura Ghizlane Lyoussi Badaia Derwich El Houssine	University of Nigeria	Farmers' Information Needs on Herbicide Usage in Enugu State, Nigeria
Igor Gennadievich Glamazdin Ilya Nikolaevich Medvedev Inura Ibragimovna Fayzullina Natalya Yuryevna Sysoeva Marina Mikhailovna Goryacheva Galina Mikhailovna Kryukovskaya Tatyana Olegovna Maryushina	Sidi Mohammed ben Abdellah University	Chemical Characterization, and Antioxidant activity of Bioactive Medicinal Plant Extracts
	Moscow State University of Food Production	Prevalence Of Fasciolosis In Cows In The Center Of Russia

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-2 | HALL-5**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Emrah YERLIKAYA**

Authors	Affiliation	Presentation title
Ümit Güler	Batman University	An Overview Of The Economic Relations Between Muslims And Non-Muslims In Ottoman Diyarbekir (1800-1853)
Ümit Güler	Batman University	Criminal Relations Between Muslim And Non-Muslim Communities In Ottoman Diyarbekir (1800-1853)
Resul Babaoğlu	İzmir Kâtip Çelebi University	A Leaf From Siirt Press History: Political Humor Journalism
Mansur Üstünsoy Erkan Dikici	Gümüşhane University	An Evaluation On Interventions To Child Neglect And Abuse
Erdal Yılmaz Tunay Aslan	Ondokuz Mayıs University	Assurance Audit In Sustainability Reports: A Research On Businesses In Bist Sustainability Index
Tugce Sensoz	Dokuz Eylül University	The Role Of The Virtue Of Justice In Realizing Human's Competencies In The Tradition Of Islamic Meshai Thought
Ismail Kaya	Harran University	Atatürk Dam Lake Set- Tunnel Region Copepoda Diversity, New Specieses, Seasonal And Monthly Cycle
Davut Ertem	District Directorate of National Education	Wine And Beloved In The Framework Of Tradition And Suffic At The Divan Owner Seyhulislamic Poets

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-2 | HALL-6**

Ankara Local Time: 12:30-14:30

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Melih KUNCAN**

Authors	Affiliation	Presentation title
Emin Yaşar Demirci	Van Yüzüncü Yıl University	Some Thoughts On The Problem Of Early Retirement In Turkey
Tekin ŞEKER	District Directorate of National Education	The Effect Of Religious Concepts On The Winning Of The Turkish National Struggle
Emin Yaşar Demirci	Van Yüzüncü Yıl University	The possibility Of A Native Sociology Or The Challenge Of Sociology With Theology
Gamze DURAK Faysal ÖZDAŞ	Mardin Artuklu University	Examination Of Teachers' Opinions On Development Of Critical Thinking Skills In Students
Buket Cihangiroğlu Özkan GÖRMEZ Belgin GÖZMEN	Mersin University	Treatment of Paper Industry Waste Water by Electrocoagulation Method
Selman ABLAK Alperen DUMAN	Sivas Cumhuriyet University	Yunus Emre'nin Risaletü'n Nüşhiyye Eserinde Yer Alan Değerlerin Sosyal Bilgiler Öğretim Programında Yer Alan Değerlerle Karşılaştırılması
Uğurcan AYIK	Gaziantep University	Gated Communities In Turkey: The Case Of Gaziantep
Mehmet Can DAL	Ministry of Education	Comparative Analysis Of 6 Type Linear Equations Of The Langmuir Isotherm Model On The Adsorption Of Cd (II) Ion By Siirt Kurtalan Koçpınar Clay
Hüseyin ÖZ	Hacettepe University	A Theater Game That Shows "Incompatibility" With Tradition Dikkat Köpek Var
Esmâ KILIÇ Mustafa UĞRAŞ	Fırat University	Examination Of Classroom Teachers' Opinions On Digital Qualification Levels

(All speakers required to be connected to the session 10 min before the session starts)

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**19.11.2022 | SESSION-3 | HALL-1**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Adnan ALKAN**

Authors	Affiliation	Presentation title
Osman UYANIK Nevbahar EKİN Nurten Ayten UYANIK Nevbahar EKİN	Süleyman Demirel University	The Anisotropy Of Concrete From Geophysical Methods
Selçuk USTA Cafer GENÇOĞLAN Serpil GENÇOĞLAN	Süleyman Demirel University	Determination Of Concrete Strength With Artificial Neural Networks (Ann) Dependent On Ultrasonic Data
Buse ÇAKIR Nazım İMAL	Van Yüzüncü Yıl University	Estimating Of Reference Evapotranspiration In Kahramanmaraş Conditions Using Jensen Haise Method
Fatih DENİZ Abdullah YASUBUĞA	Bilecik Şeyh Edebali University	Işık Kaynağı Esaslı Enerji Yayılım Analizleri
Fatih DENİZ Abdullah YASUBUĞA	Harran University	The Effects Of Synthetic Dye Pollution On The Aquatic Ecosystem And Human Health
Fatih DENİZ Abdullah YASUBUĞA Bedi ÇALIŞ	Harran University	Treatment Methods Using For Dyes Removal From Wastewater
Görkem Gedik	Pamukkale University	Smart Conveyor Belt That Changes Color With Bacterial Reproduction Manufacturing
Berkay KARAÇOR Ömer HÜKÜMDAR Serhat GÖKTEPE Ahmet Çağrı TOMBULOĞLU Mustafa ÖZCANLI	Çukurova University	A Case Study: Weight Reduction Studies On An Electric Micro Car Using Different Materials
Hasan Murat ÖZTEMİZ Şemsettin TEMİZ	Kahramanmaraş Sutçu Imam University	Three-Point Bending Behaviors Of S-Shaped Core Sandwich Composites With Different Core Heights
Muhammed Ömer BULAKÇIBAŞI Burak KURŞUN	Amasya University	Availability Of Energy Requirements Of Agricultural Enterprises With Photovoltaic Energy: Application In Van Province

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**19.11.2022 | SESSION-3 | HALL-2**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Mesut SOYALIN**

Authors	Affiliation	Presentation title
Yemen Kavun Yusuf Kavun	Kahramanmaraş Sütçü İmam University	Comparison Of The Effects Of Aggregate Particle Size And Borax Additive On The Radiation Absorption Properties Of Concrete
Yemen Kavun Yusuf Kavun	Kahramanmaraş Sütçü İmam University	Investigation Of The Effect Of Aggregate Grain Size In Concrete On Radiation Absorption
Emrah Turan Meral Oltulu M. Taha Keleşoğlu Serhan Yamaçlı	Atatürk University	Investigation Of High Temperature Performance Of Kaolin Clay Substitution To Cement Paste
Nilay Altuğ Mehmet Kaya	Fırat University	Investigation Of The Wideband Behavior Of A 2.4 Ghz Low Noise Microwave Amplifier
İkranur Felek Ebru Akkemik	Bingol University	Use Of Blockchain Technology In Electronic Health Registration Systems
Alev Akpınar Borazan Muhammed Yekta Gökalp	Bilecik Şeyh Edebali University	Production And Characterization Of Tarhana Soup Enriched With Pomegranate Peel Flour
Abdulatif Ahmed Ali Aboluhom İsmet Kandilli	Kocaeli University	Changes In The Contents Of The Secondary Metabolite During The Storage Of Iqf Applied Foods; Cherry, Peach, Pepper
Buket Kaya Muhammed Önal	Fırat University	Face Recognition System Using Deep Learning Techniques With Raspberry Pi
Can Atıla Arif Başgumus Mustafa Namdar	Bursa Uludağ University	Segmentation Of Non-Contrast Brain Ct Images For Brain Stroke Detection
		A System For Detecting Dangerous And Suspicious Human Behavior For Educational Institutions

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.



**19.11.2022 | SESSION-3 | HALL-3**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. F. Muge SAKAR**

Authors	Affiliation	Presentation title
Adnan Ayhanci Burak Birlik Mustafa Cengiz Canan Vejselova Sezer Ahmet Musmul Rıfat Ertekin Filiz Boğar Handan Çiftçi Ayşenur Halaç Bahri Gür Selin Önem Ece Nur Tunç Suzan Onur Namık Bilici	Eskişehir Osmangazi University	Protective Effects of Curcumin Against Metal Mixture-induced Hemotoxicity and Immunosuppression in Rats
Semin Paksoy Hande Şahin	Çukurova University	Comparison Of Ecosystem Protection Performances Of G20 Countries With Gray Analysis Method
Enver Ulaş Sabiha Beste Vangöl Gökhan Kalmış	İstanbul Sabahattin Zaim University Hatay Mustafa Kemal University	The Role Of Family Integrity On Personality Vitality And Positive Mental Health The Destroyed Ancient History Of Patnos
Murat Okur Ayşe Akyol	Sivas Cumhuriyet University	The Effect Of Brain-Based Learning On Students' Academic Achievement In Science Education Between 2005-2022: A Meta-Analysis Study
Murat Okur Sema Cansever	Sivas Cumhuriyet University	The Effect Of Laboratory Supported Education On Academic Achievement Of Students In Science Education: A Meta-Analysis Study
Canan Vejselova Sezer Hatice Mehtap Kutlu Özge Kaya	Eskişehir Teknik Üniversitesi	Apoptotic Effects of a Ceramidase Inhibitor on Resistant and Non-Resistant Breast Cancer Cells
Servet Şeker Inalcan İclal Aluçlu Havva Özyilmaz	Dicle University	Analysis Of Facades In Architecture With The Method Of Visual Perception; Example Of The Traditional Tillo Sheikh Nasrettin House And The Modern House
F. Müge Sakar	Dicle University	Meixner-Pollaczek Coefficient Estimate For A Class Of $B_1$ -Starlike Functions
Mehmet Fetih Yanardağ Seda Akbulut Sağır	Kahramanmaraş Sütçü İmam University	Building Theme In Cahit Uçuk's Three Novels

(All speakers required to be connected to the session 10 min before the session starts)  
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-4**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Enser YILMAZ**

Authors	Affiliation	Presentation title
Yusuf Bilgen	Batman University	Electrical Characterization of Al/VOx/p-Si/Al (MOS) Structure
Yusuf Bilgen	Batman University	Investigation of Structural, Surface and Optical Properties of VOx-based Thin Films
Mehmet Fetih Yanardağ Süleyman Ceyhan	Kahramanmaraş Sütçü İmam University	The National Factors Refik Halit Karay's In The "Memleket Hikâyeleri" Title Work.
Fatma Gündüz Utku Zeybekoğlu	Sinop University	Survey Of Precipitation Trends In The Hırfanlı Dam Basin
Fatma Gündüz Utku Zeybekoğlu	Sinop University	Survey Of Temperature Trends In The Hırfanlı Dam Basin
Büşra Özüdoğru	Trabzon University	Myths As A Social Concept And New Myths Of The Modern World
Aybike Tuba Özden	Ondokuz Mayıs University	The Relationship Of Materialist Values And Status Consumption: An Evaluation On The Case Of The Amish Community
Ömer Pektaş Burhan Akpınar	Fırat University	Analysis Of Teacher Views On Planning Mathematics Teaching According To Various Variables
Merve Güven	Ankara University	The Influence Of Emotions On Perception
Muhammed Ömer Türkoğlu	Yalova University	An Analysis And Evaluation On The Beled Surah: Reviewing Human Virtues

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-5**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Salih AKKANAT**

Authors	Affiliation	Presentation title
Mehmet Gökhan Genel Şahin Özdemir	Yalova University	Operative Conditioning Practices with Reward Size Used in Advertisements and The Effects of These Practices on Consumers
Mehmet Gökhan Genel Şahin Özdemir	Yalova University	The Use of Cartoons and Caps and Humor in Political Communication Campaigns: The Example of Istanbul Metropolitan Municipality Elections (31 March -23 June 2019)
İlkay Şeker Osman Kubilay Gül	Sivas Cumhuriyet University	According To The State Archives, An Evaluation On The Newspaper In The Middle East Press About Mustafa Kemal Atatürk Before His Death
Salih Akkanat	Gümüşhane University	Walter Benjamin's Political Thought: Thinking Of The Public Space On The Basis Of Experience
Salih Akkanat	Gümüşhane University	Active And Passive Equality: A Discussion For Justice In Contemporary Political Philosophy
Ebru Subaşı	Ardahan University	"Hayrat" (Charities) Carpet And Flat Weave Rug Tradition In Ardahan
Zekeriya Şahin Mehmet Niyazi Şahin	National Defense University	An Assessment Of The Relationship Between Employees' Moonlight Career Problem And Motivation
Zeynep Çoban Ahmet Çoban	Dicle University	Examination Of English Language Teaching Undergraduate Program In Terms Of Target Skills In The English Language Curriculum
Güllü Bektaş Gül den Doğan Yaş ar Kiran	Fırat University	Karyological Investigation Of Some Ornithogalum L. Species

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-6**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Yasin KAYA**

Authors	Affiliation	Presentation title
Iclal Aluçlu Cihat Irven	Dicle University	Linus Torvalds' Open Source Architecture And Researching Its Applicability
Iclal Aluçlu Cihat Irven	Dicle University	In Urban Transformation Structures Assessment On Architectural Identity
Fatih Ünsal Kerem Taştan	Gazi University	Numerical Simulation Of Critical Submergence For Multiple Intakes
Mehmet Emin Arslan Faysal Özdaş	Mardin Artuklu University	Investigation Of High School Students' Levels Of Benefiting From School Counseling Service
Süleyman Şahan	Gaziantep University	Alternative Quests on the Crisis of Neoliberal Democracy: An Effort to Develop a Postdemocratic Negotiation Discourse
Ömer Alkan Şeyda Ünver	Atatürk University	Socio-Demographic And Economic Determinants Of Non-Partner Economic Violence Against Women In Turkey
Sare Kiliç Emel Öz Sadettin Turhan Fatih Öz	Atatürk University	The Effect Of Sealing Process On Myofibrillar Protein Profile Of Meat
Mehmet Ozan Aşık	Bursa Uludağ University	The Relationship Between Political Environment And Audiences In The Reception Of Television Series
Derya Güven Hüseyin Çiçek	Burdur Mehmet Akif Ersoy University	Strategic Analysis In Cattle Farming Businesses: Example Of Karaman Province
Yasin Kaya	Dicle University	On Small Lebesgue Spaces

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-7**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assist. Prof. Dr. Ahmet KILINC**

Authors	Affiliation	Presentation title
Muhterem Altin	National Education Directorate	The Problem Of Dualities In Turkey's Education System
Mühibe Aslan Gönül Cengiz	Gaziantep University	Representation And The Other In Cinema: The Case Of The "Wonder" Movie
Melih Erzen Mehmet Halil Erzen	Hacı Bayram Veli University	In Terms Of Intertexts, Nabı's Hayrabad
Mehmet Vural	Hatay Mustafa Kemal University	On The Order-Theoretic Properties Of The Riesz Space $C\lambda(X, E)$
Ahmet Kiliç	Dicle University	The Effect And Importance Of The European Language Passport (Portfolio) In Education Of Turkish As A Foreign Language
Ömür Erbay	Bayburt University	İbn Sinan's Pendnâme
Ayşegül Alakaş İclal Aluçlu	Dicle University	Evaluation Of Building Facades In The Scope Of Visual Analysis: Case Study Malatya-Cinema Street

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-8**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. M. Firat BARAN**

Authors	Affiliation	Presentation title
Musa Ceylan Osman Kubilay Gül	Sivas Cumhuriyet University	Determining Secondary Students' Opinions On Historical Knowledge
Hilal Yilmaz Sipan Soysal Abdurrahim Yilmaz Vahdettin Çiftçi	Siirt University	Zinc (Zn) Biofortification in Field Crops
Abdurrahim Yilmaz Hilal Yilmaz Sipan Soysal Vahdettin Çiftçi	Siirt University	Effects of Exhaust Fumes on Agricultural Fields and Field Products
Yosra KHELIFI Safa BEJAoui Imene CHETOUI Sami EL MILI Nejla SOUDANI	Faculty of Science of Tunis El Manar	The potential adverse effects of Trifluralin on the oxidative stress response of <i>Mytilus galloprovincialis</i> digestive gland
Mahira Amirova Mahbuba Valiyeva Perviz Valiyev Huseynova Ellada	Azerbaijan Medical University	RESTORATIVE PROPERTIES of LICORICE
Radhiyah M. Aljarrah	Iraq/University of Kufa	Concentration of Spraying Solution Effect on the Structural, Morphological and Optical Properties of NiO Thin Films
Dr. Naseem Akhter	Shaheed Benazir Bhutto Women University	The Battle of Ahzāb (Trench) is a Great Military Strategy (In the Mirror of History)
DR. DNOOP K DR.SIM JOSEPH	IMPSS SIRP Kerala,India	Food Security System in India: A Comparative Analysis
Samyiah Hani Ajeel Prof. Dr Azhar Nima Abdul Zahra Assistant Professor Dr. Mariam Ibrahim Hammoud		E-learning and how to benefit from it as a strategic option in light of the Corona pandemic: An analytical study for faculty and students in Iraq
MSc ZHOU YuJie	Chang'an University	Research on load spectrum compilation method of excavator connecting rod based on mixed distribution

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-9**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Dr. Nihayet KOCYIGIT**

Authors	Affiliation	Presentation title
Gbenga Festus BABARINDE Matthew Oladapo GIDIGBI	University of Nigeria University of Ibadan	Nexus Between Digital Finance And Government Revenue In Nigeria
Dr. Imran Riaz Dr. Ijaz Ashraf Dr. Muhammad Usman Dr. Naima Nawaz	University of Agriculture Faisalabad	Impact Of Breakfast Habits On The Growth And Development Of Adolescent Girls In District Faisalabad
Manita Matharu	Amity School of Business, India	A Study On The Factors Determining Green Consumption
Dr. Komal Ms. Tanya Sharma	IP And Frontier Technologies	Future Implications Of Artificial Intelligence And Technology : Analysis Of The Current Intellectual Property Laws And Its Relationship With Artificial Intelligence
Hussen kreem Jasim	University of Kufa	Adoption Of American Auditing Standards As An Introduction To Professional Behavior In Iraqi Auditing Firms From The Viewpoint Of Their Auditors An Exploratory Study Of The Opinions Of A Sample Of Workers In Accounting Auditing Companies
Mr. Mohamed Lamine Benaissa Dr. Abdelkader Beladel Mr. Youcef Chouiha Mr. Djaloul Karboua Mr. Ben ouadeh Douara Mr. Mebkhouta Toufik	Djelfa University	Optimal Sizing Of Microgrid System For An Isolated Site With GPV/Wind/DG/Batteries Using HOMER
Yusuf Muhammad Sanyinna Daniel Dan-Inna Attah Victoria Ebere Ukatu	Nigerian Army University Kebbi State University of Science and Technology	Prevalence And Associated Risk Factors Of Strongyloidiasis Among Orphanages And Some Almajiri Schools In Sokoto Metropolis, Sokoto State, North- Western Nigeria
Sholpan Zharkynbekova	L.N. Gumilyov Eurasian National University	Speech Acts And Metacommunicative Attitudes As A Source Of Genre Formation And A Factor Of Genre Perception. Poetry Of Asana Kaigy
Edmund C. Mbegbu Rita I. Odo Tochukwu O. Ogbuka	University of Nigeria	Evaluation Of The Effects Of Bromelain And Pineapple Stalk Extract On Histomorphometry Of The Uterus In Female Albino Rats
Slimani Sami Zennir Youcef	University of 20 August 1956 Skikda	Analyze Of Oil And Gas Accident Associated With Drilling Operation Using Fishbone Diagram
Seyithan Seydosoglu Kağan Kokten	Siirt University Sivas Bilim ve Teknoloji Üniversitesi	Forage Production Under Drought Conditions: A Review
Kağan Kökten Seyithan Seydoşoğlu Ilknur Daş	Sivas Bilim ve Teknoloji Üniversitesi Siirt Üniversitesi	Determination Of Agricultural Production Status Of Sivas Province And Districts

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

**19.11.2022 | SESSION-3 | HALL-10**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Assoc. Prof. Dr. Nizamettin TURAN**

Authors	Affiliation	Presentation title
Asif Ali Fariq Ahmed	Government College University	A Systematic Analysis Of The Impact Of Covid-19 Lockdown On Sleep Health In Athletes
Samreen Lodhi Anam Qamar Afreen Essani	Jinnah University for Women	Time Series Analysis Of Gst Revenue, Expenditure Budget And Budget Deficit
Sobia Jamil Sania M.Ilyas	Jinnah University for Women	In The Way Of Organizational Development: Inevitable Changes In Kababjees, Pakistan
Fadia Riydh Mohammed Mohammed Yawuz Jamal	Senior Lecturer of Economics at Koforidua Technical University	Pattern Of Psychotropic Medication Among Inpatient Admitted To Psychiatric Ward In Alhussainy Teaching Hospital In Kerbala City
Mirela-Florentina Bălțatu	Univ.Prof. Eng. Alexandra Anca Purcarea	Entrepreneurial Skills Are Necessary For Professional Success In Today's Digital Era
Mehwish Darakhshan Zia	Jinnah University for Women	Minimum Capital Requirements, Corporate Restructuring And Banks Performance—An Empirical Analysis Of Merged Banks In Pakistan
Naseem Akhter	Shaheed Benazir Bhutto Women University	The Battle Of Ahzāb Is A Great Military Strategy Of The Holy Prophet (Pbuh) (The Actual Facts Of The History)
Naseem Akhter	Shaheed Benazir Bhutto Women University	Peace Is A Basic Brick Of Developing Society (Under Islamic Directives)
Teodora FLORICĂ	Universitatea din Craiova	Terminology And Translation Relationship
Mohd Rihan Shahfahad Atiqur Rahman	Jamia Millia Islamia	Monitoring Pre And Post Monsoon Drought Pattern In A Semi-Arid Region Of Western India
Nizamettin Turan	Siirt University	Drought at <i>Medicago</i> spp: A Review

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.



**19.11.2022 | SESSION-3 | HALL-10**

Ankara Local Time: 15:00-17:00

Meeting ID: 864 8881 6529 / Zoom Passcode: 003300

**HEAD OF SESSION: Dr. Ayman EL SABAGH**

Authors	Affiliation	Presentation title
Shivam Priyadarshi Mainak Pal Lalawmpuia Manapuram Muralidhar	B.Tech. Mechanical Engineering	Studies On Engineering Application Domains Of Industry 5.0 In India
Yegnanarayanan Venkataraman	Kalasalingam Academy of Research and Education	Coloring R-Distance Graphs
Aamna Imran Yumna Ali	Jinnah University for Women	Production Of Bamboo Products To Encourage Sustainable Consumption For Environmental Protection
Muwafaq Mahdi Salih	University of Duhok	Topologically Regular Open Sets In Relator Spaces
Adane Obsie Bifa Mulugeta Soruma Guta	Wollega University	Factors Affecting Pedestrians' Free-Mobility And Social Distancing To Combat Covid-19: Evaluation Of Pedestrians' Mobility And Urban Space In Downtown Of Nekemte City, Ethiopia
Sanjay Kumar Stanzin Dolkar	Central University of Jammu	Special Composition Operator's Interaction Between Dirichlet Type Spaces And Bloch-Type Spaces
Asif Ali	Abdul Wali khan University Mardan	Energy Storage Characteristics Of 0.5 Ratio3 – Bixnax( Mg0.67nb0.33)1-Xnbx
Mourad Nahal Yacine Saharoui Omar Reffas Chaouki Moumeni Naziha Zerari	University of Souk Ahras	Bayesian Networks Effectiveness For Electrical Systems Maintenance Planning
Shagufta Noreen Suad Naheed	Jinnah University for Women	Biodegradation Of Azo Dyes By Halophilic Bacteria
Muhammad Ikram	GC University Lahore	Chitosan-Doped Strontium Oxide Nanocomposite To Remove Methylene Blue And Ciprofloxacin From Waste Water
Abdurrahim Yilmaz	Bolu Abant Izzet Baysal University	Effect of Heavy Metal Stress on Secondary Metabolite Profile in Plants

(All speakers required to be connected to the session 10 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

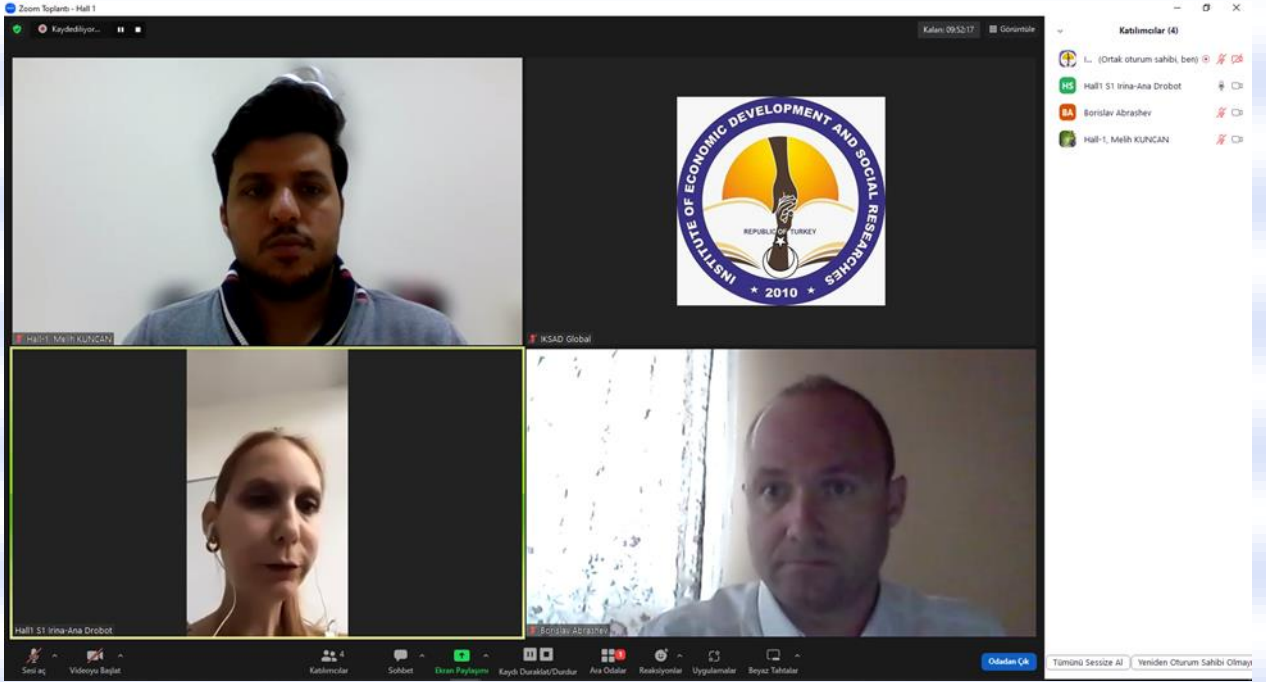
## CONFERENCE GALLERY












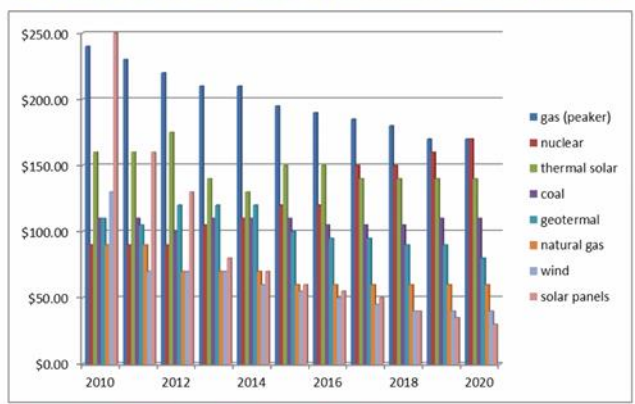
Kaydediyor... Kalan: 09:44:58







## INSTITUTE OF ELECTROCHEMISTRY AND ENERGY SYSTEMS

ACADEMICIAN EVGENI BUDEVSKI

### EU prices of the electricity by different sources (MW/h)


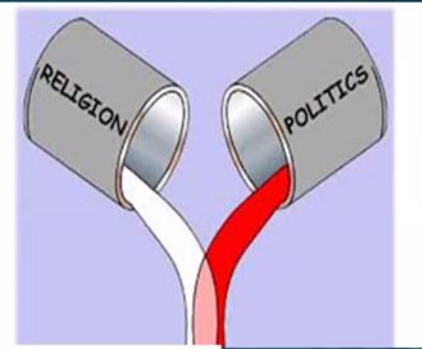



Source: <https://www.popsct.com/story/environment/cheap-renewable-energy-vs-fossil-fuels/>







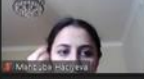

Zoom Toplam Kalan: 07:19:32

## Real or fake democracy









Ayoub CHAQUI



Zoom Toplantı

Kaydolmuş...

Kalan: 06:31:34





Figure 9. Multilingual



Kaydolmuş...

Ayub CHADLI ekran görüntüsünü göstermektedir

Sayınları Gözetile

Kalan: 04:32:20

Genişlet

**Clay Preparation**

**Dye used**

**Congo Red**

**INTRODUCTION**

**MATERIALS & METHODS**

**RESULTS & DISCUSSION**

**CONCLUSION**

Clay collection


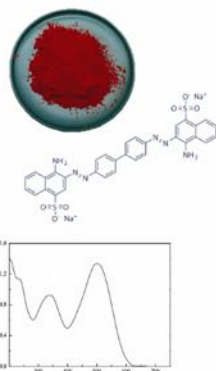
Grinding

Crushed Clay

Sieving

sieved clay (< 50 μm)

stockage

Hall- 1. Anna Ko...

Hall- 1. Anna Kopiczko

1 atamamsız katılımcı

Sesli Sesli

Videoya Katıl

Katılımcılar

Sohbet

Green Paylaşım

Kayıtlı Duraklat/Durdur

Ana Odalar

Reaksiyonlar

Uygulamalar

Beğen Tutarlar

Ödeme Gözet



Zoom Toplantı - Hall 1

SANKAR DAS ekran görüntüsünü

Katılımcı Görüntüle

Katılımcı: Kaydediliyor...

Katılımcı: Katerin 09:45:25

Görüntüle

## Picture Fuzzy Set

Including more possible types of uncertainty, Cuong [5] defined picture fuzzy set (PFS) in 2014 generalizing the concepts of fuzzy set and intuitionistic fuzzy set.

**Definition**

Let  $X$  be the universe. Then a PFS  $A$  is defined on  $X$  as  $A = \{r, (\mu_A(r), \eta_A(r), \nu_A(r)) : r \in X\}$ , where  $\mu_A(r), \eta_A(r), \nu_A(r) \in [0, 1]$  denote the degree of truth membership (DTMS), degree of abstention membership (DAMS), degree of false membership (DFMS) of  $r \in A$ , respectively with  $0 \leq \mu_A(r) + \eta_A(r) + \nu_A(r) \leq 1 \forall r \in X$ . Also  $\forall r \in X, D_A(r) = 1 - (\mu_A(r) + \eta_A(r) + \nu_A(r))$  represent denial degree of  $r \in A$ . Here,  $\mu_A(r), \eta_A(r), \nu_A(r)$  all are independent.

1 atamamı kutlamo

Ses aç

Videoyu Başlat

Katılımcılar

Sohbet

Ekran Paylaşımı

Kayıt Duraklat/Durdur

Ara Odalar

Reaksiyonlar

Uygulamalar

Boşuz Tahalar

Ödülleri Çık

10:03

19.11.2022

A

Alireza Gerami

INSTITUTE OF ECONOMIC DEVELOPMENT AND SOCIAL RESEARCHES  
REPUBLIC OF TURKEY  
2010

KSAD Global

Hall-1, Yasin Kaya

Hall-1, Yasin Kaya

SANKAR DAS

SANKAR DAS

Zoom Toplantı - Hall 1

Katılımcı: Kaydediliyor...

Katılımcı: Katerin 09:13:02

Görüntüle

Hall-1, Yasin Kaya

KSAD Global

Hall-1, AĞBAKA Sourou ANKARA, SESSION 1

SANKAR DAS

Hazrin Tafahon

Alireza Gerami

A

İbrahim TEĞİN

Hall-2, Yasin Kaya

İbrahim TEĞİN

Hall-2, Yasin Kaya

Sesimi Aç (Alt+A). Sesiz sessiz geçici olarak kapatılmak için Başlık kutusuna tıklanabilir.

Ses aç

Videoyu Başlat

Katılımcılar

Sohbet

Ekran Paylaşımı

Kayıt Duraklat/Durdur

Ara Odalar

Reaksiyonlar

Uygulamalar

Boşuz Tahalar

Ödülleri Çık

Kayıtlıdır... H1-Rıdvan Bayram ekranını görüntüleyorsunuz. Sonraki Gösterilecek

Kalan: 09:54:49 Görünümde

SİRT KONGRE SUNUMU - Microsoft PowerPoint

1 KATYON-ANYON FARKLIĞININ RUMEN FERMANTASYONU VE YEMLERİN SİNDİRİMİNE ETKİLERİNİN İN VİTRO YÖNTEMLERLE (DAİSYİ) TESPİTİ

RİDVAN BAYRAM CÜNEYT TEMÜR

Slayt 1 / 20 "Aktif"

2 atanmamış katılımcı

Hall-1, Mehmet EKICI

IKSAD GİĞİ

H1-Rıdvan Bayram

H1-Cüneyt Temür

Öğütmen Çık

Zoom Toplantı - Hall 1 H1-1 Burcu TÜNCER ekranını görüntüleyorsunuz. Sonraki Gösterilecek

Kalan: 08:59:13 Görünümde

Katılımcılar (9)

Ö. Katılımcı bul

L. (Ortak oturum sahibi, ben)

HB H-1 Burcu TÜNCER

AB ALI BAYRAM

HM H-1 Merve ATEŞ

H1 H1-Cüneyt Temür

H1-Rıdvan Bayram

H1 Hall 1

HM Hall-1, Mehmet EKICI

S Sude Tarakçı

4. TARTIŞMA VE SONUÇ

- ✓ Bu çalışmada, ülkemizdeki yükseköğretimdeki tohumculuk eğitiminin mevcut durumu ortaya konulmaya çalışılmıştır.
- ✓ Yapılan araştırmalar sonucunda, lisans düzeyinde eğitim verilen **Ziraat Fakültelerinin (36 adet)** tamamında tohumculukla ilgili dersler verildiği saptanmıştır. Günümüze kadar **toplam 84 adet meslek yüksek okulunda** tohumculukla ilgili derslerin verildiği program olduğu saptanmıştır.
- ✓ Ancak meslek yüksekokullarında farklı adlarla açılmış olan tohumculuk derslerinin (**organik tohumculuk ve fibbi aromatik bitkiler tohumculuğu programları hariç**) birçoğunun, ders içeriklerini incelendiğinde lisans düzeyinde verilen tek bir tohumculuk derslerine karşılık geldiği görülmüştür.
- ✓ Bu durumun tohumculuk sektörüne bir kazanım sağlamayacağı, gerek meslek yüksek okullarında gerekse Ziraat Fakültelerinde teorik derslerin yanı sıra, uygulamalı derslere de ağırlık verilmesi gerektiği bilinmektedir.

H-1 Mehmet EKICI

IKSAD GİĞİ

H1-Burcu TÜNCER

Sude Tarakçı

H-1 Merve ATEŞ

ALI BAYRAM

H1-Cüneyt Temür

H1-Rıdvan Bayram

H1-Cüneyt Temür

Hall 1

1 atanmamış katılımcı

Öğütmen Çık

Timini Sessize Al | Yeniden Oturum Sahibi Olmak

Zoom Toplantı - Hall 1

Kalan: 07:09:54

Katılımcılar (14)

Q: Katılımı bul

- L... (ortak oturum sahibi, ben)
- AA Adnan Allan
- HI H1-Osman UYANIK
- HS Hall-1, S.3, Selçuk USTA
- BA Berkay Karacor
- HY H1-Abdurrahman Yasubuğa
- HI H1-bedia çalis
- HM H1-hasan murat öztemiz
- HALL-1 MUHAMMED ÖMER BUL...
- HN Hall-1 Nevbahar EKİN
- OH Ömer Hükümdar
- B Salon-1, Buse ÇAKIR
- HA H1 Abdurrahman Yasubuğa
- HM H1-Hasan Murat ÖZTEMİZ

Zoom Toplantı - Hall 1

Kalan: 06:54:24

Katılımcılar (14)

Q: Katılımı bul

- L... (ortak oturum sahibi, ben)
- HS Hall-1, S.3, Selçuk USTA
- AA Adnan Allan
- HM H1-hasan murat öztemiz
- BA Berkay Karacor
- HY H1-Abdurrahman Yasubuğa
- HI H1-bedia çalis
- HI H1-Osman UYANIK
- HALL-1 MUHAMMED ÖMER BUL...
- HN Hall-1 Nevbahar EKİN
- OH Ömer Hükümdar
- B Salon-1, Buse ÇAKIR
- HA H1 Abdurrahman Yasubuğa
- HM H1-Hasan Murat ÖZTEMİZ

Zoom Toplantı - Hall 1

Kalan: 06:54:24

Katılımcılar (14)

Q: Katılımı bul

- L... (ortak oturum sahibi, ben)
- HS Hall-1, S.3, Selçuk USTA
- AA Adnan Allan
- HM H1-hasan murat öztemiz
- BA Berkay Karacor
- HY H1-Abdurrahman Yasubuğa
- HI H1-bedia çalis
- HI H1-Osman UYANIK
- HALL-1 MUHAMMED ÖMER BUL...
- HN Hall-1 Nevbahar EKİN
- OH Ömer Hükümdar
- B Salon-1, Buse ÇAKIR
- HA H1 Abdurrahman Yasubuğa
- HM H1-Hasan Murat ÖZTEMİZ

**Giriş (Introduction)**

Bitki - toprak sistemine Yağış (P) ile giren su miktarı kazanç olarak ifade edilmektedir. Yüzeysel akış (R), sızma (D<sub>s</sub>) ve evapotranspirasyon (ET) ile sistemden çıkan su miktarları ise kayıp olarak ifade edilmektedir. Sisteme giren (kazanc) ve çıkan (kayıp) su miktarlarını eşitlediğimizden yararlanılarak ET en doğru şekilde belirlenebilmektedir (Eşitlik 1). P ve D<sub>s</sub> parametreleri sırasıyla pluviyometre (Şekil 2) ve lysimetre (Şekil 3) kullanılarak ölçülebilmektedir. R ise yüzeysel akış katsayılarına dayalı bazı empirik yöntemler kullanılarak tahmin edilebilmektedir. Fakat bu ölçme ve tahmin işlemleri çok zor ve zaman alıcı olmaktadır.

Bu nedenle daha kolay ölçülebilir veya tahmin edilebilir parametreler olan hava sıcaklığı (T), nispetel nem (RH), solar radyasyon (R<sub>s</sub>) ve rüzgar hızına (U<sub>s</sub>) dayalı empirik yöntemler kullanılarak ET miktarının tahmin edilmesi yolu pratikte daha çok tercih edilmektedir.

$$P = R + D_s + ET \qquad ET = P - (R + D_s) \quad (1)$$

The amount of water entering the plant - soil system with precipitation (P) is expressed as gain. The amount of water leaving the system with surface runoff (R), infiltration (D<sub>s</sub>) and evapotranspiration (ET) are expressed as loss. ET can be determined most accurately by utilizing the equality of the amount of water entering (gain) and leaving (loss) water in the system (Equation 1). The P and D<sub>s</sub> parameters can be measured using the pluviometer (Figure 2) and lysimeter (Figure 3), respectively. R can be estimated using some empirical methods based on surface runoff coefficients. However, these measurement and estimation processes are very difficult and time consuming.

Therefore, in practice, it is more preferred to estimate the amount of ET using empirical methods based on air temperature (T), relative humidity (RH), solar radiation (R<sub>s</sub>) and wind speed (U<sub>s</sub>), which are more easily measurable or available parameters.

# ABSTRACTS

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**MİTOKONDRIYAL CO1 VE ND1 GEN MARKERLERİ KULLANILARAK İNSAN  
*ECHINOCOCCUS GRANULOSUS SENSU STRICTO* (G1 GENOTİP)'NUN  
FİLOGENETİK ANALİZİ VE HAPLOTİP ÇEŞİTLİLİĞİNİN İN-SİLİCO OLARAK  
BELİRLENMESİ**

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**ÖZET**

*Echinococcus granulosus* ve genetik varyantlarının neden olduğu kistik ekinokokkozis (CE), insanlarda önemli morbiditeye yol açan, ihmal edilmiş bir zoonotik hastalıktır. Bu çalışma ile farklı ülkelerden NCBI veri tabanına kayıt edilen insan *E. granulosus sensu stricto* (G1 genotipi) mitokondriyal CO1 ve ND1 gen sekanslarının filogenetik analizlerinin yapılarak genetik ve haplotip çeşitliliklerinin in-silico analiz yöntemi ile ortaya konulması amaçlanmıştır. Analizler için 401 bp uzunluğunda mt-CO1 (n=133) ve 407 bp uzunluğunda mt-ND1 (n=140) gen dizilerini içeren toplam 273 gen sekansı kullanıldı. Diziler hizalandıktan sonra filogenetik ve haplotip analizlerine tabi tutuldu. mt-CO1 gen dizilerinde 31 farklı noktada ve mt-ND1 gen dizilerinde 100 farklı noktada mutasyonlar gözlemlendi. Haplotip analizi

sonucunda mt-CO1 gen dizilerinde 34 haplotip, mt-ND1 gen dizilerinde ise 37 haplotip belirlendi. Tajima D ve Fu'nun Fs, Fu'nun LD değerleri hem mt-CO1 hem de mt-ND1 bölgelerinde yüksek negatiflik gösterdiği belirlendi. mt-CO1 veri seti incelendiğinde, en yüksek Fiksasyon indeksi (Fst) İspanya ve Finlandiya arasında (0,33333) bulunurken, en düşük Hindistan ve Çin arasında (-0,05120) bulundu. Ayrıca mt-ND1 veri seti incelendiğinde en yüksek Fst, İspanya ile Finlandiya arasında (0,33333), İspanya ile Peru arasında (0,33333), İspanya ile Polonya arasında (0,33333), İspanya ile Moğolistan arasında (0,33333), en düşük ise Irak ve İran (-0,00873) arasında bulundu. Bu çalışma ile *E. granulosus* s.s. G1 genotipinin dünya çapındaki epidemiyolojisi, dağılım modeli, bulaşma dinamikleri, popülasyon dağılımı ve haplotipleri hakkında gelecekte yapılacak çalışmalar için bir model olacak veriler elde edilmiştir.

**Anahtar Kelimeler:** *E. granulosus* s.s., G1, CO1, ND1, in-silico analiz

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**IN-SILICO DETERMINATION OF PHYLOGENETIC ANALYSIS AND  
HAPLOTYPE DIVERSITY OF HUMAN ECHINOCOCCUS GRANULOSUS SENSU  
STRICTO (G1 GENOTYPE) USING MITOCHONDRIAL CO1 AND ND1 GENE  
MARKERS**

**ABSTRACT**

Cystic echinococcosis (CE), caused by *Echinococcus granulosus* and its genetic variants, is a neglected zoonotic disease that causes significant morbidity in humans. In this study, it was aimed to perform phylogenetic analyzes of human *E. granulosus sensu stricto* (G1 genotype) mitochondrial CO1 and ND1 gene sequences registered in the NCBI database from different countries and to reveal genetic and haplotype diversity by in-silico analysis method. A total of 273 gene sequences including 401 bp long mt-CO1 (n=133) and 407 bp long mt-ND1 (n=140) gene sequences were used for analyses. After the sequences were aligned, they were subjected to phylogenetic and haplotype analyzes. Mutations were observed at 31 different points in the mt-CO1 gene sequences and at 100 different points in the mt-ND1 gene sequences. As a result of haplotype analysis, 34 haplotypes were determined in mt-CO1 gene sequences and 37 haplotypes in mt-ND1 gene sequences. It was determined that Tajima D and Fu's Fs and Fu's LD values showed high negativity in both mt-CO1 and mt-ND1 regions. When the mt-CO1 dataset was analyzed, the highest Fixation index (Fst) was found between Spain and Finland (0.33333), while the lowest was found between India and China (-0.05120). In addition, when the mt-ND1 dataset is examined, the highest Fst is between Spain and Finland (0.33333), between Spain and Peru (0.33333), between Spain and Poland (0.33333), between Spain and Mongolia (0.33333), the lowest was found between Iraq and Iran (-0.00873). With this study, *E. granulosus s.s.* Data on the worldwide epidemiology, distribution pattern, transmission dynamics, population distribution and haplotypes of the G1 genotype have been obtained, which will serve as a model for future studies.

**Keywords:** *E.granulosus s.s.*, G1, CO1, ND1, in-silico analysis

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**SIİRT İLİ KOYUNLARINDA ENDOPARAZİTLERİN ARAŞTIRILMASI**

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**ÖZET**

Paraziter hastalıklar, dünya üzerinde insan ve evcil hayvanlarda önemli bir problem olarak verim düşüklüğüne ve bazen de ölümlere sebep olmaktadır. Hayvanlarda verim düşüklüğüne neden olan helmint ve protozoon hastalıkları çoğu kez subklinik olarak seyrettiklerinden dolayı genç hayvanlarda gelişme geriliğine, yaşlı hayvanlarda ise et, süt, döl ve kalite bozukluklarına yol açmaktadır. Bu çalışmanın amacı, koyun yetiştiriciliğinde önemli bir potansiyele sahip olan Siirt ili koyunlarda endoparazitlerin yaygınlığının tespit edilmesidir. Bu amaçla, Siirt ili merkez ve Kurtalan, Baykan, Aydınlar, Pervari, Eruh, Şirvan ilçeleri olmak üzere 7 farklı lokasyonda otlatılan 1 yaşından büyük ve meraya çıkmış koyunlardan 250 adet dışkı örneği toplanmıştır. Bu örnekler Siirt Üniversitesi, Veteriner Fakültesi Parazitoloji Laboratuvarına soğuk zincir altında getirilerek muayene edilmiştir. Laboratuvara getirilen her bir koyun dışkı örneği, trematod, cestod ve nematod yumurtaları ile *Eimeria* ookistlerinin teşhisi amacıyla Fülleborn'un doymuş tuzlu su metodu ve Modifiye Benedek sedimantasyon yöntemleri kullanılarak muayene edilmiştir. Dışkı muayenesi yapılan 250 koyunun 62'sinde (% 24,8) *Eimeria* sp., 147'sinde (%58,8) ise helmint türleri tespit edilirken, 24'ünde (%9,6) de miks enfeksiyonlar (*Eimeria* sp. + Helmint türleri) görülmüştür. Yapılan dışkı muayenesinde helmint türleri olarak, *Fasciola* sp. (%1,2), *Dicrocoelium dentriticum* (%0,4), *Moniezia* sp. (%1,2), Trichostrongylidae sp. (%55,6), *Trichuris* sp. (%6,4) yumurtaları tespit edilmiştir. Ayrıca helmint türleri arasında da miks enfeksiyonlar görülmüştür. Sonuç olarak Siirt ve yöresinde yapılan bu çalışmada koyunlardan alınan dışkı örneklerinde endoparazitlerin yaygın olarak görüldüğü ve önemli bir problem teşkil ettiği saptanmıştır. Bu sebeple hem yetiştiricilerin paraziter hastalıklar konusunda bilinçlendirilmesi hem de bu hastalıklara karşı korunma ve kontrol programlarının geliştirilmesi önem arz etmektedir.

**Anahtar Kelimeler:** Siirt, koyun, dışkı, endoparazit



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**INVESTIGATION OF ENDOPARASITES IN SHEEPS OF SIIRT PROVINCE**

**ABSTRACT**

Parasitic diseases cause low productivity and sometimes death as an important problem in humans and domestic animals around the world. Since helminth and protozoan diseases, which cause low productivity in animals, often progress subclinically, they cause growth retardation in young animals and meat, milk, progeny and quality disorders in old animals. The aim of this study is to determine the prevalence of endoparasites in sheep in Siirt province, which has an important potential in sheep breeding. For this purpose, 250 stool samples were collected from sheep over 1 year old and grazed in 7 different locations, namely in the center of Siirt and in Kurtalan, Baykan, Aydınlar, Pervari, Eruh, Şirvan. These samples were brought to Siirt University, Faculty of Veterinary Medicine Parasitology Laboratory under cold chain and then examined. Each sheep fecal sample brought to the laboratory was examined using Fülleborn's saturated brine method and Modified Benedek sedimentation methods for the identification of trematode, cestode and nematode eggs and *Eimeria* oocysts. As a result of stool examination of 250 specimens; *Eimeria* sp. in 62 (24.8%) sheep, helminth species in 147 (58.8%) sheep, mix infection (*Eimeria* sp. + Helminth species) in 24 (9.6%) sheep were detected. As helminth species in the stool examination, *Fasciola* sp. (1.2%), *Dicrocoelium dentriticum* (0.4%), *Moniezia* sp. (1.2%), Trichostrongylidae sp. (55.6%), *Trichuris* sp. (6.4%) eggs were detected. Mixed infections were also observed among helminth species. As a result, in this study conducted in Siirt and its region, it was determined that endoparasites were widely seen in stool samples taken from sheep and constituted a significant problem. For this reason, it is important to raise awareness of breeders about parasitic diseases and to develop protection and control programs against these diseases.

**Keywords:** Siirt, sheep, faeces, endoparasite

**SIİRT'İN PERVARI YÖRESİNE AIT PROPOLIS EKSTRATI VE ARI SÜTÜNÜN  
*Brucella abortus* S19 SUŞUNA KARŞI ANTİBAKTERİYEL ETKİSİ**

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**ÖZET**

Dünya çapında gittikçe artan, hayvan ve insan sağlığını etkileyen antimikrobiyal dirençli mikroorganizmalar çok önemli bir sorun teşkil etmektedir. Mikrobiyal direncin üstesinden gelmek için yeni antimikrobiyal ajanlara ihtiyaç duyulmaktadır. Arı kovanlarından elde edilen propolis ve arı sütü antibakteriyel, antioksidan, antienflamatuar gibi birçok fonksiyonel özelliklere sahip kompleks bileşiklerdir. Bu çalışmanın temel amacı Siirt'in Pervari yöresine ait propolis ve arı sütünün *Br. abortus* S19 suşu üzerindeki antibakteriyel etkisini araştırmaktır. Bu amaçla propolisin çeşitli oranlardaki etanolik ekstrasyonları ile arı sütünün çeşitli oranlardaki dilüentleri tüp dilüsyon ve disk difüzyon yöntemleri ile *Br. abortus* S19 suşu için antimikrobiyal duyarlılık testleri yapıldı. Disk difüzyon için boş antibiyotik disklerine (5mm çaplı) %96'luk etanolün 50 mikrolitresinde sırasıyla 5 mg, 2,5 mg, 1,25 mg, 0,6 mg, 0,3 mg, 0,15 mg ve 0 mg (kontrol) propolis olacak şekilde 50 µL emdirildikten sonra diskler kurutuldu. Saf arı sütü distile su ile %100, %50, ... %3,12 şeklinde dilue edildi, diluentlerden 50 µL alınarak boş antibiyotik disklerine emdirilerek kurutuldu. Hazırlanan diskler 0.5 McFarland yoğunluğunda hazırlanmış *Br. abortus* S19 suşu inoküle edilmiş %5 fetal buzağı serumu içeren tryptic soy agar (TSA) besiyerlerine belli aralıklarla yerleştirildikten sonra 3 gün boyunca 37 °C'de mikroaerofilik ortamda inkübe edildi. Tüp dilüsyon için 2 mL %5 fetal buzağı serumu içeren tryptic soy brotha (TSB) 50 mg propolis içeren ekstrat ilave edilerek seri dilüsyonları yapıldı, arı sütü dilüsyonu için 1,5 mL TSB'a 0,5 mL saf arı sütü eklenip homojenize edilerek seri dilüsyonları yapıldı. Tüm tüplere 100 µL 0.5 McFarland yoğunluğunda hazırlanmış *Br. abortus* S19 suşu inoküle edilerek 3 gün boyunca 37 °C'de mikroaerofilik ortamda inkübe edildi. Tüp dilüsyonda propolisin minimal letal konsantrasyonu (MLK) 1,56 mg/mL bulunurken, arı sütünün MLK 125 µL/ mL olarak belirlendi. Propolis emdirilmiş disklerin zon çapları sırasıyla 5 mg-18 mm, 2,5 mg-16 mm, 1,25 mg-15 mm, 0,6 mg-13 mm, 0,3 mg-11 mm, 0,15 mg-9 mm ve sadece çözücü emdirilmiş disk çevresinde zon görülmedi. 50, 25 ve 12,5 µL arı sütü emdirilmiş diskler sırasıyla 16mm, 14mm ve 13mm çapında zonlar oluştururken devam eden konsantrasyonlarda zon görülmedi. Sonuç olarak propolis ekstraktı ve arı sütünün *Br. abortus* S19 suşu üzerine antibakteriyel etkili olduğu belirlendi.

**Anahtar kelimeler:** Antibakteriyel, propolis, arı sütü, *Brusella*

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**ANTIBACTERIAL EFFECT OF PROPOLIS EXTRACT AND ROYAL JELLY  
FROM THE PERVARI REGION OF SIIRT AGAINST *Brucella abortus* S19 STRAIN**

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**ABSTRACT**

Antimicrobial resistant microorganisms, which are increasing worldwide and affecting animal and human health, constitute a very important problem. New antimicrobial agents are needed to overcome microbial resistance. Propolis and royal jelly obtained from beehives are complex compounds with many functional properties such as antibacterial, antioxidant, anti-inflammatory. The main purpose of this study was to investigate the antibacterial effect of propolis and royal jelly from the Pervari region of Siirt on *Br. abortus* S19 strain. For this purpose, antimicrobial susceptibility tests were performed for *Br. abortus* S19 strain using ethanolic extractions of propolis at various rates and diluents of royal jelly at various rates by tube dilution and disc diffusion methods. After impregnating 50 µL of 5 mg, 2.5 mg, 1.25 mg, 0.6 mg, 0.3 mg, 0.15 mg and 0 mg (control) propolis in 50 microliters of 96% ethanol on empty antibiotic discs (5 mm diameter) for disk diffusion, respectively, the discs were dried. Pure royal jelly was diluted with distilled water as 100%, 50%, ... 3.12%, 50 µL of diluents was taken and dried by absorbing into empty antibiotic discs. The prepared discs were placed in tryptic soy agar (TSA) medium containing 5% fetal calf serum, prepared at 0.5 McFarland density, inoculated with *Br. abortus* S19 strain, and then incubated in a microaerophilic environment at 37 °C for 3 days. Serial dilutions were made by adding 50 mg of propolis extract to tryptic soy broth (TSB) containing 2 mL of 5% fetal calf serum for tube dilution. For royal jelly dilution, 0.5 mL of pure royal jelly was added to 1.5 mL of TSB and homogenized. dilutions were made. 100 µL of 0.5 McFarland concentration prepared *Br. abortus* S19 strain was inoculated into all tubes and incubated in a microaerophilic environment at 37 °C for 3 days. While the minimal lethal concentration (MLC) of propolis was found to be 1.56 mg/mL in tube dilution, the MLC of royal jelly was determined as 125 µL/mL. Zone diameters of propolis-impregnated discs are 5 mg-18 mm, 2.5 mg-16 mm, 1.25 mg-15 mm, 0.6 mg-13 mm, 0.3 mg-11 mm, 0.15 mg-9, respectively. mm and no zones were seen around the solvent impregnated disc only. While discs impregnated with 50, 25 and 12.5 µL royal jelly formed zones of 16mm, 14mm and 13mm in diameter, respectively, no zones were observed in continued concentrations. As a result, it was determined that propolis extract and royal jelly had antibacterial effect on *Br. abortus* S19 strain.

**Keywords:** Antibacterial, propolis, royal jelly, *Brucella*

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**BİR KÖPEKTE KONGENİTAL ANKİLOGLOSSİ OLGUSU VE TEDAVİSİ**

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**ÖZET**

Ankiloglossi (tongue-tie), ağız boşluğunun ventral kısmına yapışık olan, çoğunlukla kısa ve kalın bir frenulum lingua ile karakterize, köpeklerde nadiren karşılaşılan dilin konjenital bir anomalisidir. Bu sunumda; Siirt Üniversitesi Hayvan Sağlığı Uygulama ve Araştırma Merkezine kısırlaştırma isteği ile getirilen 2 yaşlı, 38kg ağırlığında, erkek, melez bir köpekte karşılaşılan kongenital ankiloglossi olgusuna yer verilmiştir. Kısırlaştırma isteğiyle getirilen hastada yapılan klinik muayeneler esnasında dilin frenulum lingua kısmının oral kavitenin ventraline tamamen yapışmış olduğu görüldü. Hastanın dilinin ağız boşluğundan dışarıya uç kısmı haricinde özellikle yan kısımlarının çok az bir miktarda sarkar vaziyette çıkabildiği ayrıca su ve gıda maddelerini ağzına alırken zorlandığı saptandı. Operatif tedaviye karar verilen hasta uygun şekilde genel anesteziye alındı. Yan vaziyette yatırılan hastanın ağzına uygulanan bir padan yardımıyla ağzın açık tutulmasına yardımcı olundu. Yapışık olan frenulum lingua, dilin apeks kısmından kaudale doğru horizontal ve vertikal düzlemlerden frenuloplasti tekniği ile makas yardımıyla kesilerek fazla parça çıkarıldı ve dil serbest hale getirildi. Oluşan az miktardaki kanama gazlı bez ile tampon yapılarak durduruldu. Ensizyon açıklığı polidiodoksanon (USP: 2/0, Alcadinone, Katsan®) sutur materyali ile basit sürekli dikişlerle kapatıldı. İşlem sonrası anestezi altındayken ve uyandıktan sonraki süreçte hastanın dilini normal şekilde hareket ettirebildiği görüldü. Post operatif dönemde hastaya antibiyotik, non-steroid antiinflamatuvar ve ağız antiseptikleri ile medikal tedavi başlandı. Yaş mama ile beslenmesi önerilen hastada 15 gün sonra kontrole çağırıldığında dikişlerin kendi kendine attığı ancak buna rağmen yara hattının tamamen yapıştığı gözlemlendi. Bu sunumda bir köpekte ankiloglossinin tedavisinde uygulanan frenuloplastinin hızlı ve başarılı sonuçlar veren kolay uygulanabilen bir operatif tedavi yöntemi olduğu gösterilmiştir.

**Anahtar kelimeler:** Köpek, Frenulum lingua, Frenuloplasti

**A CASE AND TREATMENT OF CONGENITAL ANKYLOGLOSSIA IN A DOG**

**ABSTRACT**

Ankyloglossia (tongue-tie) is a congenital anomaly of the tongue rarely encountered in dogs, which is characterized by a mostly short and thick frenulum lingua attached to the ventral part of the oral cavity. In this presentation; a case of congenital ankyloglossia encountered in a 2-year-old, weighted 38kg, male, mixed breed dog brought to Siirt University Animal Health Application and Research Center with a request for castrating was presented. During the clinical examinations performed in the patient who was brought for sterilization, it was observed that the lingua part of the frenulum of the tongue was completely adhered to the ventral part of the oral cavity. It was determined that the patient's tongue could protrude from the oral cavity in part, especially the lateral parts, except for the tip, and it had difficulty in taking water and food into its mouth. The patient, for whom surgical treatment was decided, was appropriately gone under general anaesthesia. In order to keep patient's mouth open, a pad applied to its mouth who was lying on his side. The adhered frenulum lingua was cut from the horizontal and vertical planes from the apex part of the tongue towards the caudal by means of frenuloplasty technique with the help of scissors, the excess parts were removed and the tongue was released. Small amount of bleeding that occurred was stopped by cushioning with gauze. The incision opening was closed with polydioxanone (USP: 2/0, Alcadinone, Katsan<sup>®</sup>) suture material by means of simple continuous sutures. After the procedure, it was observed that the patient was able to move its tongue normally while under anaesthesia and after it came from anaesthesia. In the post-operative period, medical treatment with antibiotics, non-steroidal anti-inflammatory and oral antiseptics were started for the patient. It was observed in the patient, who was recommended to be fed with wet food, that the stitches were removed themselves in the control after 15 days, however the wound line was completely adhered. In this presentation, it was demonstrated that frenuloplasty applied in the treatment of ankyloglossia in a dog is an easily applicable surgical treatment method having fast and successful results.

**Keywords:** Dog, Frenulum lingua, Frenuloplasty

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***Aspergillus flavus*'UN SAFRANIN BOYAR MADDESİNİN BİYOSORPSİYONUNUN  
ARAŞTIRILMASI**

**METİN KERTMEN**

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**ÖZET**

Atıksuların içerdikleri boyarmaddelerin birincil olarak alıcı ortamdaki ışık geçirgenliği azaltmaları nedeniyle bu ortamda bulunan bitkilerin fotosentez yapma hızının azalmasıyla doğal şekilde üretilen oksijen üretim miktarının düşmesine neden olur. İkinci olarak atıksuyla deşarj edilen kimyasal boyarmaddelerin belli bir derişim oranının üzerinde olması halinde suda yaşam süren canlıların zehirlenmeye sebep olabilmesi şeklinde iki tür etkisinin olması söz konusudur. Bu maksatla birçok yöntemler geliştirilmiştir. Biyosorpsiyon gerek ekonomik gerekse ekolojik açıdan oldukça önem arz etmektedir. Aktif kömür, perlit gibi kimyasal adsorbentler kullanılabildiği gibi, bir çok farklı biyolojik adsorbentler olan bakteri, mantar, alg ve bitkiler tekstil boyarmaddelerin gideriminde alternatif adsorbent olarak kullanımı araştırılmış ve bu yönde birçok çalışmalar yapılmıştır. Biyosorpsiyon deneyinde temas süresi, başlangıç boyar madde konsantrasyonu, sıcaklık ve pH'nın etkileri incelendi. Bulguların analizinin yapılırken fizikokimyasal parametreler olan; İzoterm, Termodinamik, Kinetik ve FT-IR spektrumları kullanılmıştır. Biyodegradasyon deneyinde biyosorbentten deney öncesi ve sonrası tam kuru ağırlıkların farkı dikkate alınarak hesaplanmıştır. Sonuç olarak *Aspergillus flavus* biyosorbenti üzerine Safranin boyarmaddesinin oldukça yüksek oranda adsorplandığı görülmüştür. Deneylerin sonunda başlangıç boyar madde konsantrasyonunun pH ve sıcaklığından etkilendiği görüldü. Düşük pH koşulunun en etkili parametre olduğu tespit edildi. Analiz değerlerinde Freundlich izotermine uyum olduğu, Kinetik modellemelere uyum sağladığı,  $\Delta G^\circ$ ,  $\Delta H^\circ$  ve  $\Delta S^\circ$  termodinamik parametrelerine göre sonuçlar pozitif olarak bulunmuş olup biyosorbent ile boyar madde arasında oldukça güçlü bir etkileşim olduğunu göstermektedir. FT-IR spektrumları irdelendiğinde çeşitli kimyasal grupların biyosorpsiyonun gerçekleşmesinde etkin rol oynadığı görülmüştür. Biyodegradasyon deneyinde boyarmadde ile temas eden örneklerde bozunma daha az bozunma gerçekleştiği tespit edilmiştir. Tüm veriler ışığında, üretimi kolay ve ekonomik olan, *Aspergillus flavus*'un yapılacak boyar madde biyosorpsiyonu çalışmalarında kullanılabilecek uygun biyosorbent olduğu sonucuna varıldı. Bu şekildeki çalışmaların yaygınlaşması çevre kirliliği üzerine hassasiyeti artırarak atıksuların daha etkili şekilde arıtılabilirliği üzerine daha etkili sonuçlar elde edilmesini sağlayacaktır.

**Anahtar Kelimeler:** *Aspergillus flavus*, Safranin, Biyosorpsiyon

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**INVESTIGATION OF THE BIOSORPTION OF SAFRANIN DYEING SUBSTANCE**  
**OF *Aspergillus flavus*****ABSTRACT**

Due to the fact that the dyestuffs contained in wastewater primarily reduce the light transmittance in the receiving environment, the rate of photosynthesis of the plants in this environment decreases, resulting in a decrease in the amount of naturally produced oxygen production. Secondly, if the chemical dyestuffs discharged with wastewater are above a certain concentration, there are two types of effects that can cause poisoning to the living creatures in the water. Many methods have been developed for this purpose. Biosorption is very important both economically and ecologically. Chemical adsorbents such as activated charcoal and perlite can be used, as well as their use as alternative adsorbents in the removal of many different biological adsorbents such as bacteria, fungi, algae and plants textile dyestuffs, and many studies have been carried out in this direction. The effects of contact time, initial dyestuff concentration, temperature and pH were investigated in the biosorption experiment. While analyzing the findings, the physicochemical parameters; Isotherm, Thermodynamic, Kinetic and FT-IR spectra were used. In the biodegradation experiment, the total dry weights of the biosorbent before and after the experiment were calculated considering the difference. As a result, it was observed that Safranin dyestuff was highly adsorbed on *Aspergillus flavus* biosorbent. At the end of the experiments, it was observed that the initial dyestuff concentration was affected by pH and temperature. It was determined that the low pH condition was the most effective parameter. The analysis values were found to be positive according to the Freundlich isotherm, kinetic modeling,  $\Delta G_0$ ,  $\Delta H_0$  and  $\Delta S_0$  thermodynamic parameters, indicating that there is a very strong interaction between the biosorbent and the dyestuff. When the FT-IR spectra were examined, it was seen that various chemical groups played an active role in the realization of biosorption. In the biodegradation experiment, it was determined that less degradation occurred in the samples that came into contact with the dyestuff. In the light of all the data, it was concluded that *Aspergillus flavus*, which is easy and economical to produce, is a suitable biosorbent to be used in dyestuff biosorption studies. The spread of such studies will increase the sensitivity on environmental pollution and provide more effective results on the treatment of wastewater more effectively.

**Keywords:** *Aspergillus flavus*, Safranin, Biosorption

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**CHALLENGES OF ELLIS TYPE 3 CORONARY PERFORATION COMPLICATION  
MANAGEMENT IN A CENTER WITHOUT CARDIAC SURGERY ON SITE**

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**ABSTRACT**

Ellis type 3 coronary perforation is one of the most feared complication in interventional percutaneous coronary procedures. Although it is rare, every cardiologist who performs coronary intervention should know the management of this complication well, as it can be fatal if not intervened early and may require urgent cardiovascular surgery. The most important risk factors for coronary perforation includes interventions for complex coronary artery stenosis and lesions with high calcification density in patients with hypertension and diabetes mellitus, use of atheroablative devices, aggressive oversized balloon dilatations, use of hydrophilic guidewire, advanced age and female gender. Despite the increasing number of coronary angiography units and centers capable of percutaneous coronary intervention, the lack of cardiovascular surgical support in some centers complicates the management of such rare but potentially fatal complication. With this point of view, we aimed to discuss the difficulties we experienced in the management of a Type 3 Ellis coronary perforation case that developed during emergency percutaneous coronary intervention performed at a hospital without an on-site cardiac surgery unit

**Keywords:** Coronary perforation, percutaneous coronary intervention, cardiovascular surgery, complex coronary artery stenosis



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**L – KARNİTİNİN ETLİK PİLİÇ DİYETLERİNE İLAVESİNİN BESİ  
PERFORMANSI ÜZERİNE ETKİLERİ**

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**ÖZET**

Dünya nüfusunun hızla arttığı bu dönemde insanların ucuz gıdaya ulaşılabilmesi için hayvansal ürünlerin ekonomik bir şekilde elde edilmesi gerekmektedir. Günümüzde dünyanın birçok bölgesinde insanlar açlık tehlikesiyle karşı karşıyadırlar. İnsanların hayvansal gıdaya kolay ve uygun bir bedelle ulaşabilmesi için üretilen ürünlerin birim maliyetlerinin düşük olması gerekmektedir. Kırmızı et fiyatlarının yüksek olmasından dolayı tüketiciler tavuk etine yönelmektedirler. Tavuk etinin ucuza mal edilmesi yem maliyetine bağlıdır. Hayvansal ürünlerin veriminin artırılmasında yem katkı maddeleri üzerinde çeşitli çalışmalar yapılmaktadır. Etlik piliç beslemede abdominal bölge ve karkastaki yağlanma üretim maliyetini artırmakta ve tüketici tercihleri üzerinde negatif bir etki oluşturmaktadır. Yem katkı maddelerinden biri olan L-Karnitin, etlik piliçlerde yukarıda bahsedilen problemleri ortadan kaldırmak için kanatlı rasyonlarına katkı maddesi olarak kullanılmaktadır. İnsan ve hayvanlarda katkı maddesi olarak kullanılan L-Karnitin, lizin ve metiyoninden sentezlenmektedir. L-Karnitin, sitoplazmadan mitokondriye nakil edilen uzun bir zincir yapısına sahip yağ asitlerinin iç mitokondriyal zardan geçişinde görev almaktadır. Bu sebepten dolayı enerji ihtiyaçlarını yağ asitlerini kullanarak elde eden dokularda L-Karnitin esansiyel bir madde olarak görev alır. L-Karnitin insan ve hayvanlarda yağları enerjiye dönüştürmede önemli fonksiyonlar yüklenmektedir. Etlik piliç diyetlerine yem katkı maddesi olarak L-Karnitin ilave edilmesi hayvanlarda yemden yararlanmada artma meydana getirmekte buna bağlı olarak ta canlı ağırlıkta artış meydana gelmekte, abdominal yağda azalma, but ve göğüs eti miktarında artış aynı zamanda bağışıklık sistemini güçlendirmektedir. Bu bildiride L-Karnitin etlik piliç diyetlerine eklenmesiyle besi performansı üzerine olan etkileri sunulmaktadır.

**Anahtar kelimeler:** Etlik piliç, L-Karnitin, Besi performansı

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**THE EFFECTS OF L-CARNITINE ADDITION TO BROILER DIETS ON THE  
FATTENING PERFORMANCE****ABSTRACT**

In this period when the world population is increasing rapidly, animal products need to be obtained economically for people to access cheap food. In many parts of the world today, people face the threat of hunger. In order for people to have easy and affordable access to animal food, the unit costs of the products produced must be low. Due to the high prices of red meat, consumers are turning to chicken meat. The cost of broiler meat depends on the cost of feed. Various studies have been carried out on feed additives to increase the yield of animal products. In broiler feeding, fat in the abdominal area and the carcass increases the cost of production and negatively affects consumer preferences. L-Carnitine, one of the feed additives, is used as an additive to poultry diets to eliminate the above-mentioned problems in broiler chickens. L-Carnitine, used as an additive in humans and animals, is synthesized from lysine and methionine. L-Carnitine is involved in the passage of fatty acids with a long chain structure across the inner mitochondrial membrane from the cytoplasm to the mitochondria. For this reason, L-Carnitine acts as an essential substance in tissues that obtain their energy needs using fatty acids. L-Carnitine has important functions in converting fats into energy in humans and animals. The addition of L-Carnitine as a feed additive to broiler diets increases feed utilization in animals, resulting in an increase in live weight, a decrease in abdominal fat, an increase in the amount of thigh and breast meat, as well as improving the immune system. In this presentation, the effects of L-Carnitine supplementation in broiler diets on fattening performance are presented.

**Keywords:** Broiler, L-Carnitine, Fattening performance

**ANTIOXIDANT, ANTI-ALZHEIMER, ANTIDIABETIC AND ANTIMICROBIAL EFFECTS  
OF ZIVZİK POMEGRANATE (*PUNICA GRANATUM* L.)**

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**ABSTRACT**

Pomegranate (*Punica granatum*) has recently sparked considerable interest due to its nutritional and antioxidant properties, helping to meet the rising demand for high-quality fruits for both fresh and processed consumption. To evaluate the antioxidant capacities of ethanol and water extract of Zivzik (*Punica granatum*), 2,2'-azino-bis-3-ethylbenzthiazoline-6-sulphonic acid radical (ABTS<sup>•+</sup>) and 1,1-diphenyl-2-picrylhydrazyl free radical (DPPH<sup>•</sup>), Fe<sup>3+</sup>-2,4,6-tris(2-pyridyl)-s-triazine (TPTZ), Fe<sup>3+</sup>, and Cu<sup>2+</sup> reducing assays were studied. The antioxidant and reducing capacity of Zivzik ethanol extracts were compared with the most commonly used synthetic antioxidants; BHA, BHT,  $\alpha$ -tocopherol and Trolox reference standards. The IC<sub>50</sub> values of ethanol extract of Zivzik pomegranate for ABTS<sup>•+</sup> and DPPH<sup>•</sup> scavenging activities were found higher than standards as 5.9  $\mu$ g/mL and 16.1  $\mu$ g/mL, respectively. Also, the phenolic and flavonoid contents in ethanol extract of Zivzik pomegranate peel were 0.95 mg GAE/g and 0.88 mg QE/g. Inhibitions of  $\alpha$ -glycosidase,  $\alpha$ -amylase, acetylcholinesterase, and carbonic anhydrase (CA II) enzymes were studied to investigate the effects of ethanol extract of Zivzik pomegranate on diabetes, Alzheimer, glaucoma, and bacterial diseases. Zivzik pomegranate peel extract of ethanol demonstrated IC<sub>50</sub> values of 28.8  $\mu$ g/mL against  $\alpha$ -glycosidase, 19,7  $\mu$ g/mL against acetylcholinesterase (AChE) and 106.3  $\mu$ g/mL against CA II enzymes. The antioxidant and inhibitory capacity of Zivzik pomegranate's various parts extracts are comparable effective, and in close range with the capacity demonstrated by the standards. *E. coli* and *S. aureus* bacteria were resistant to all four antibiotics used as standards in hospitals. In some Zivzik extracts, zones with 7-10 mm intervals, that is, areas where the extract has an antimicrobial effect, which destroyed bacteria. The 50  $\mu$ g extract and positive controls were transferred to each disc. The resulting 7-10 mm discs are very good when compared to standard antibiotics. The results clearly demonstrated that polyphenolic antioxidant-rich ingredients of the various parts of Zivzik pomegranate is a natural product has potential usage in the treatment of diabetes, Alzheimer's, glaucoma, epilepsy, microbial and cancerous diseases.

**Keywords:** Zivzik pomegranate; *Punica granatum*; antioxidant;  $\alpha$ -glycosidase; acetylcholinesterase; carbonic anhydrase; antimicrobial; phenolic compounds.

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**ELEKTRON TAŞIMA TABAKASI OLARAK KULLANILAN KALAY DİOKSİTİN  
İLETİM BANDI DÜZEYİNE PB KATKILAMA ORANININ ETKİSİNİN  
ARAŞTIRILMASI**

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**ÖZET**

Günümüzde perovskit tabanlı güneş hücreleri oldukça ilgi çekmektedir. Perovskit tabanlı güneş pilleri bir çok katmandan oluşabilmektedir. Bu katmanlardan biride elektron taşıma tabakasıdır (ETT). ETT ile kullanılan perovskit malzemenin iletim bandı seviyeleri uyumlu olmalıdır. Bu verimi etkileyen önemli bir faktördür. SnO<sub>2</sub>, ETT yapımında kullanılan önemli malzemelerden biridir. Bu çalışmada Pb iyonu kullanılarak SnO<sub>2</sub>'nin iletim bandının seviyesinin ayarlana bilirligi araştırılmış ve tartışılmıştır. Bu çalışmadan, elde edilen veriler SnO<sub>2</sub>'nin iletim bandın seviyesinin Pb katkı oranı ile belirli miktarlarda ağalanabileceğini göstermektedir. Bu teknolojik uygulamalar için önemli bir bulgudur.

**Anahtar kelimeler:** Perovskit, SnO<sub>2</sub>, elektron taşıma tabakası, DFT

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**INVESTIGATION OF THE EFFECT OF THE PB DOPING RATIO ON THE  
CONDUCTION BAND LEVEL OF TIN DIOXIDE, WHICH IS USED AS AN  
ELECTRON TRANSPORT LAYER**

**ABSTRACT**

Today, perovskite-based solar cells attract a lot of attention. Perovskite-based solar cells can consist of many layers. One of these layers is the electron transport layer (ETL). The conduction band levels of the perovskite material used with the ETL should be compatible. This is an important factor affecting efficiency. SnO<sub>2</sub> is one of the important materials used in ETL construction. In this study, the tunability of the conduction band level of SnO<sub>2</sub> using Pb ion was investigated and discussed. The data obtained from this study show that the level of the conduction band of SnO<sub>2</sub> can be adjusted in certain amounts by the Pb doping ratio. This is an important finding for technological applications.

**Keywords:** Perovskite, SnO<sub>2</sub>, electron transport layer, DFT

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**DOĞRU İLE YANLIŞ KAVRAMLARININ GÖRECELİĞİ VE KANT'TA AHLAK YASASININ TEMELİ OLARAK GÖREV KAVRAMI**

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**ÖZET**

Bu çalışma Kant'ın ahlak teorisindeki iki paralel konu ile ilgilidir: 'doğru ile yanlış' kavramlarının rölatifliği ve evrensel ahlak yasasının temeli olarak 'görev' kavramının neliği. Kant'a göre doğru ve yanlış apriori olarak mevcut olsa da yine de eylemin ahlakiliğini belirleyen, onun hangi amaçla yapıldığıdır. Bir eylemi doğru ya da yanlış yapan, onun içinde herhangi bir duygu ve çıkarın olmadığı görev anlayışıyla yapılıyor olmasıdır. Eğer bir eylem görev saikiyle yapılırsa doğru, yapılmıyorsa yanlıştır. Buna karşılık ahlaki eylem de doğru ve yanlışa denk düşen 'iyi ve kötü' eylemdir. Dolayısıyla Kant ahlaki eylemi, duygulardan soyutlanmış görev anlayışıyla yapılan 'iyi' eylem olarak tanımlamaktadır. Böylelikle Kant, görev anlayışıyla bir eylemin ahlak yasası olabileceğini ve buradan yola çıkarak onun evrensel bir ahlak yasasına dönüşebileceğinin altını çizmektedir. Ancak burada bir eylemin ahlaki olduğunu belirleyen 'görev' kavramı nedir? Ve bununla birlikte eylemlerimizin ahlakiliğinin temelinde yer alan 'doğru ve yanlış' kavramlarının bir kesinliği var mıdır? Çünkü ahlakiliğin temelinde yer alan 'doğru ve yanlış' kavramlarının çoğu kere kişiden kişiye ve hatta toplumdan topluma göreli olduğu aşikâr olmasına rağmen, bu kavramların içeriklerinin kesin olduğu varsayılarak onları ahlaki eylemin temeline yerleştirmek ne kadar geçerli olabilir? Bu soruları birlikte ele alırken ahlaki eylemin ne olduğunun bilinebilmesi için, öncelikle doğru ve yanlışın kesin olarak ne olduğunun ortaya konulmasını gerektirmektedir ve ancak doğru ve yanlış ortaya konulduktan sonra hangi anlayışla eylememiz gerektiği de bilinebilir. Daha en başından ahlak kavramıyla yakından ilişkili, en temel iki kavram olan 'doğru ve yanlış' kavramlarının içerik itibarıyla kesin olmaması nedeniyle Kant'ın ahlak anlayışının eksik olduğu söylenebilir. Bu nedenle Kant'ın görev anlayışının bizi evrensel bir ahlak yasasına götüremeyeceğinin ana hatları çıkarılmaya başlanacaktır. Bölüm 1'de Kant'ın ahlak anlayışının arka planında yer alan görev kavramı ile başlıyorum ve bölüm 2'de doğru ve yanlış kavramlarının ne olduğu ve bunların görev kavramı ile olan ilişkisine değiniyorum. Bölüm 3'te görev anlayışıyla evrensel ahlak yasasına ulaşamayacağını irdeliyorum.

**Anahtar kelimeler:** Kant, ahlak yasası, rölativizm, görev, doğru ve yanlış

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**THE RELATIVITY OF TRUE AND WRONG CONCEPTS AND THE CONCEPT OF  
DUTY AS THE FOUNDATION OF MORAL LAW IN KANT****ABSTRACT**

This study is about two parallel issues in Kant's moral theory: The relativity of the concepts of 'right and wrong' and the nature of the concept of 'duty' as the basis of the universal moral law. According to Kant, although right and wrong exist a priori, what determines the morality of the action is the purpose for which it is done. What makes an action right or wrong is that it is done with a sense of duty, in which there is no emotion or interest. An action is right if it is done with a duty motive, and wrong if it is not done. On the other hand, moral action is good and bad action corresponding to right and wrong. Therefore, Kant defines moral action as a 'good' action done with a sense of duty isolated from emotions. Thus, Kant underlines that an action can be a moral law with a sense of duty, and from there it can turn into a universal moral law. But what is the concept of 'duty' here that determines that an action is moral? And yet, is there any certainty in the concepts of 'right and wrong' that underlie the morality of our actions? Because although it is obvious that the concepts of 'right and wrong', which are at the base of morality, are often relative from person to person and even from society to society, how valid is it to place them at the basis of moral action, assuming that the contents of these concepts are certain? While addressing these questions together, in order to know what moral action is, first of all, what is right and wrong needs to be revealed precisely, and only after the right and wrong are revealed, we can also know with what understanding we should act. From the very beginning, it can be said that Kant's understanding of morality is incomplete since the concepts of 'right and wrong', which are the two most fundamental concepts closely related to the concept of morality, are not precise in terms of content. For this reason, the main lines will be drawn that Kant's understanding of duty cannot lead us to a universal moral law. In Chapter 1, I begin with the concept of duty, which is in the background of Kant's understanding of morality, and in Chapter 2, I touch on what the concepts of right and wrong are and their relationship to the concept of duty. In Chapter 3, I argue that a universal moral law cannot be achieved with a sense of duty.

**Keywords:** Kant, moral law, relativism, duty, right and wrong

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**OKUL MÜDÜRLERİNİN DÖNÜŞÜMCÜ LİDERLİK DAVRANIŞLARINA İLİŞKİN  
ÖĞRETMEN GÖRÜŞLERİ: NİTEL BİR ARAŞTIRMA**

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**ÖZET**

Bu araştırmanın amacı, okul müdürlerinin dönüşümcü liderlik davranışlarına ilişkin öğretmenlerin görüşlerini belirlemektir. Araştırmada nitel araştırma desenlerinden biri olan olgubilim (fenomoloji) deseni kullanılmıştır. Araştırmanın çalışma grubunu 2021-2022 eğitim-öğretim yılında Siirt ilinde görev yapan 40 öğretmen oluşturmaktadır. Araştırmada, kolaylıkla bulunabilen/ulaşılabilen örnekleme yöntemi kullanılmıştır. Araştırmanın verileri yarı yapılandırılmış görüşme formları aracılığıyla toplanmıştır. Verilerin analizi için içerik analizi yöntemi kullanılmıştır. Yapılan araştırma sonucuna göre okul müdürlerinin dönüşümcü liderliğin idealleştirilmiş etki alt boyutunda "güven oluşturma", "saygı görme", "ihtiyaç ve beklentileri karşılama", "rol model olma", "ahlaki ve etik açıdan değerlendirme yapabilme" şeklinde davranışlar sergilediği belirlenmiştir. Dönüşümcü liderliğin ilham verici motivasyon alt boyutunda "sorun çözmede cesaretlendirme", "vizyona ulaşmada ilham kaynağı olma", "moral ve motivasyon kaynağı olma" gibi davranışların belirginleştiği ortaya çıkmıştır. Dönüşümcü liderliğin entelektüel uyarım alt boyutunda "değişim ve yeniliklere açık olma", "yenilikçi yaklaşımlarla problem çözme", "yenilikçi ve üretken olabilmek için çaba gösterme" gibi davranışlar sergiledikleri tespit edilmiştir. Dönüşümcü liderliğin bireysel ilgi alt boyutunda ise "bireysel farklılıklara bağlı ihtiyaçları karşılama", "farklılıkları zenginlik kaynağına dönüştürme", "mesleki gelişime yardımcı olma" ve "etkili iletişim kurma" gibi davranışları sergiledikleri ortaya çıkmıştır. Araştırmada, bu sonuçlara bağlı olarak bazı önerilerde bulunulmuştur.

**Anahtar kelimeler:** Liderlik, dönüşümcü liderlik, okul müdürü, öğretmen görüşleri



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**TEACHERS' VIEWS ON THE TRANSFORMATIONAL LEADERSHIP  
BEHAVIORS OF SCHOOL PRINCIPALS: A QUALITATIVE RESEARCH**

**ABSTRACT**

The purpose of this research is to determine the opinions of teachers about the transformational leadership behaviors of school principals. The phenomenology design, which is one of the qualitative research designs, was used in the research. The study group of the research consists of 40 teachers working in Siirt in the 2021-2022 academic year. In the research, easily available/accessible sampling method was used. The data of the research were collected through semi-structured interview forms. Content analysis method was used for the analysis of the data. According to the results of the research, it was determined that school principals exhibit behaviors such as "building trust", "respecting", "meeting needs and expectations", "being a role model", "being able to evaluate morally and ethically" in the idealized influence sub-dimension of transformational leadership. In the inspirational motivation sub-dimension of transformational leadership, behaviors such as "encouragement in solving problems", "inspiring in reaching the vision", "being a source of morale and motivation" became evident. It has been determined that in the intellectual stimulation sub-dimension of transformational leadership, they exhibit behaviors such as "being open to change and innovation", "problem solving with innovative approaches", "striving to be innovative and productive". In the individual attention sub-dimension of transformational leadership, it was revealed that they exhibit behaviors such as "meeting the needs based on individual differences", "turning differences into sources of wealth", "assisting professional development" and "communicating effectively". In the research, suggestions are available in relation to these findings.

**Keywords:** Leadership, transformational leadership, school principal, teachers' views.

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**SÜRDÜRÜLEBİLİR KALKINMA VE ÇEVRESEL GÜVENLİK SİYASASI  
BAĞLAMINDA MERKEZ-ÇEVRE OLGUSU VE EKOLOJİK ÖRSELENME**

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**ÖZET**

Sürdürülebilirlik, kalkınma ve çevresel güvenliğe yönelik siyasal politikalar arasındaki ilişkiyi irdeleyen bu çalışmada, merkez-çevre olarak adlandırılan ülkelerin bağımlılığı ile ekolojik örselenme arasındaki bağlam ortaya konulmuştur. Sürdürülebilir kalkınma ilk olarak Birleşmiş Milletler tarafından 1987 yılında yayımlanan Brundtland Raporu'nda çevresel ve ekolojik tahribatla ilişkilendirilmiştir. Doğanın ve ekolojik düzenin kapitalist üretim ilişkileri karşısındaki örselenmesi 1990'lı yıllara kadar süregelen kalkınma anlayışının sorgulanmasına ve sürdürülebilir kalkınma kavramının gelişmesine olanak sağlamıştır. Merkez ülkelerin çevre ülkelerine yönelik siyasetinin bir sonucu olarak ortaya çıkan kalkınma politikaları, gerek merkez gerekse çevre ülkelerde ciddi ekolojik sorunlara ve eşitsizliklere yol açmıştır. Kalkınma politikaları daha çok merkez ülkelere çevre ülkelere yönelik siyaset olması merkez-çevre arasındaki bağımlılığa süreklilik sağlamıştır ve çevre ülkelerin merkeze olan bağımlılığında da kritik etkileri olmuştur. Nitekim ilk olarak 1950'li yıllarda başlayan çevre ülkelere yönelik kalkınma siyaseti 1980'li yıllarda neo-liberal politikalar bağlamında sürdürülmüştür. Neo-liberalizmin ve neo-liberal politikaların sermayenin ulus-devlet sınırlarını aşmaya yönelik girişimleri merkez ülkelerde gelişen sermayenin çevre ülkelere yönelmesini amaçlamıştır. Buna göre çevre ülkeler uluslararası sermaye için yeni yatırımların ve üretimin mekânsal coğrafyası olmuştur. Merkez ülkelerin çevreye yönelmesi çevre ülkelerinde çevresel ve ekolojik yapının tahribatına neden olmuştur. Çevrenin örselenmesi ve ekolojik tahribat sürdürülebilir kalkınma siyasetinin merkez ülkelere çevre ülkelere yönelik uygulanması gereken çevresel, ekolojik, toplumsal, iktisadi gibi bir dizi politikayı içermektedir. Bu bağlamda merkez-çevre arasındaki olgusal gerçeklik ekolojik tahribatın derinleşmesine ve bu doğrultuda sürdürülebilir kalkınma ve çevrenin korunmasına yönelik güvenlik politikaları arasında dönüşümsel bir ilişki olduğunu söylemek mümkündür. Çalışmada eleştirel teori bağlamında merkez-çevre olgusunun sürdürülebilir kalkınma ve çevresel-ekolojik örselenme arasındaki ilişki incelenmiştir. 1980'li yıllardan günümüze kadar olan süreci kapsayan bu çalışmada nitel araştırma tekniği kullanılmış ve elde edilen verilerin derlemesi yapılmıştır.

**Anahtar kelimeler:** Çevre, Ekoloji, Merkez-Çevre, Sürdürülebilir Kalkınma.

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**THE CENTER-PERIPHERY PHENOMENON AND ECOLOGICAL DESTRUCTION  
IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL  
SECURITY POLICIES****ABSTRACT**

In this study, which produce the relationship between political policies for sustainability, development and environmental security, the context between the dependency of the countries refer to center-periphery and ecological destruction is revealed. Sustainable development was first associated with environmental and ecological destruction in the Brundtland Report released by United Nations in 1987. The destruction of nature and ecological order against capitalist production relations has enabled the questioning of the development of the concept of sustainable development. The development policies that arised as a result of the policies of the central countries towards the pripheral countries have led to serious ecological problems and inequalities in both the central and peripheral countries. The fact that the development policies are mostly from the core countries to the peripheral countries has provided continuity to the dependency between the center and the periphery and has had critical effects on the dependence of the peripheral countries on the center. As a matter of fact, the development policy towards pripheral countries, which first started in the 1950s, continued in the 1980s in the context of neo-liberal policies. Attempts by neo-liberalism and neo-liberal policies to transcend the nation-state borders of capitali aimed to direct the capital developed in the central countries to the peripheral countries. Accordingly, peripheral countries have become the spatial geography of new investments and production for international capital. The direction of the central countries to the environment has caused the destruction of the environmental and ecological structure in the peripheral countries. The environmental degradation end ecological destruction included a series of policies such as environmental, ecological, social and economic, which should be implemented from the central countries to the peripheral countries of the sustainable development policy. In this context, is possible to say that there is a transformational relationship between the factual reality between the center and periphery, the deepening of ecological destruction and, in this direction, the security policies for sustainable development and environmental protection. In the study, the reationship of the center-periphery phenomenon between sustainable development and environment-ecological trauma was examined in the context of critical theory. In this study, which covers the period from the 1980s to the present, qualitative research technique was used and the data obtained were complied.

**Keywords:** Environmental, Ecology, Central-Peripheral, Sustainable Development.

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**Al-Cu ÖTEKTİK ALAŞIMINA KATKI ELEMENTLERİNİN MİKROYAPI VE  
TERMAL ÖZELLİKLERİ ÜZERİNE ETKİSİ**

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**ÖZET**

Bu çalışmada, Al-Cu ötektik alaşımında katkılama elementlerinin (Co, Sb ve Bi) mikroyapı ve termal özellikler üzerindeki etkileri araştırılmıştır. Bu amaçla, Al-Cu-x üçlü alaşımları, sabit bir sıcaklık gradyanında farklı katılaştırma hızı ile doğrusal olarak katılaştırıldı. Kontrollü olarak katılaştıran alaşımların mikroyapıları, taramalı elektron mikroskobu (SEM) kullanılarak analiz edildi. Doğrusal olarak katılaştırmış alaşımların termal özellikleri ölçülmüştür. Katılaştırma hızı, mikroyapı ve termal özellikler arasındaki ilişki belirlendi. Bu sonuçlara göre, mikroyapı değerlerinin artan katılaştırma hızı oranları ile azaldığı tespit edilmiştir. Al-Cu ötektik alaşımının termal özelliklerini katkılama elementlerinin etkilediği tespit edilmiştir. Bu çalışmada elde edilen deneysel sonuçlar, literatürde daha önce benzer deneysel sonuçlarla karşılaştırılmıştır.

**Anahtar Kelimeler:** Doğrusal katılaştırma, Termal özellikler, Entalpi.

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**EFFECT OF CONTENT MATTERS ON MICROSTRUCTURE AND THERMAL PROPERTIES IN THE Al-Cu EUTECTIC ALLOY****ABSTRACT**

In this study, the effects of content elements (Co, Sb and Bi) on the thermal properties in the Al-Cu eutectic alloy were investigated. For this purpose, Al-Cu-x ternary alloys were directionally solidified with growth rates at a constant temperature gradient. Microstructures of directionally solidified alloys were analyzed by using scanning electron microscopy (SEM). Thermal properties of directionally solidified alloys were measured. The relationship among the growth rate, eutectic spacings and thermal properties were determined. According to these results, it has been found that the values of eutectic spacing decrease with the increasing values of growth rates. It was found that content elements effected on thermal properties of Al-Cu eutectic alloy. The experimental results obtained in this study have been compared with the previous similar experimental results in the literature.

**Keywords:** Directionally solidification, Thermal properties, Enthalpy.

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**ANADOLU’NUN İSLAMLAŞMASI SÜRECİNDE ALİ SEMERKANDİ’NİN SOSYO-İKTİSAT ANLAYIŞI**

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**ÖZET**

Kuruluşu 8. yüzyıla uzanan tekkeler; kurumsal tekke hareketleri ile iktisadi faaliyetleri çeşitlendirerek yeni üretim teknikleri ve üretim planlaması gibi yöntemlerle çalışmışlardır. İslâm bilim, ahlâk ve sanatının öğretilip tatbik edildiği bu yerler, Anadolu’da iktisadi açıdan toplumu yönlendiren manevi kurumlar olmuşlardır. Bu çalışma Anadolu’nun İslamlaşması sürecinde Ali Semerkandi tekkesinin iktisadi yapısını ve etkilerini araştırmak amacıyla yapılmıştır. Anadolu’nun Türkleşmesi ve İslamlaşması yolunda büyük rolü olduğuna inanılan Ali Semerkandi, İran’ın kavşak noktalarından biri olan İsfahan’da dünyaya gelmiş manevi hüviyete sahip büyük velilerden biridir. Hz. Ömer’in soyundandır ve babası Hz. Ömer’in torunudur. Dini ilimler ve tasavvufta kendini geliştirmiş, uzun süre Kabe’de imamlık yapmış, oradan da Medine’ye geçip, Ravza-ı Mutahhara’da 7 yıl türbedarlık yapmıştır. Daha sonra himayesindeki insanlarla birlikte Anadolu’ya hareket edip önce Konya’ya, sonra da Alanya’ya yerleşmiştir. Gördüğü rüya üzerine bugünkü Ankara’nın Çamlıdere havâlisine gelmiş, Anadolu’da İslâmiyeti yaymak için çalışmış, dinî-tasavvufî hayatı şekillendirmiştir. Ali Semerkandî, tamamen ıssız ve insansız bir yer olan Kuzviran’da ilk olarak bir tekke binası yapıp, buraya ailesi ile birlikte yerleşmiştir. Tekkesinin iktisadi finansmanını sağlamak üzere değirmen ve arazi satın almış, burada tekkesinin ihtiyaçlarını karşılamış, ürün fazlasını ise sermaye yapmıştır. Ali Semerkandî Hazretlerinin gelmesiyle bölge zenginleşmeye başlamış, halk ticaret yaparak geçimini temin etmiştir. Yaptığı değirmenin geliri ile kendisinden sonra, soyundan gelenlerin bu gelire tekkesinin giderlerini karşılamalarını vasiyet etmiştir.

**Anahtar kelimeler:** Ali Semerkandi, İslamlaşma, Tekke, İktisadi Finansman, Anadolu

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**ALI SEMERKANDI'S SOCIO-ECONOMIC UNDERSTANDING IN THE PROCESS  
OF ISLAMIZATION OF ANATOLIA****ABSTRACT**

Tekkes dating back to the 8th century; They diversified economic activities with institutional tekke movements and worked with methods such as new production techniques and production planning. These places, in which Islamic science, morality and art were taught and practiced, has become the spiritual institutions that directed the society economically in Anatolia. This study was conducted to investigate the economic structure and effects of the Ali Semerkandi lodge during the Islamization process of Anatolia. Ali Semerkandi, who is believed to have a great role on the Turkification and Islamization of Anatolia, is one of the great guardians with a spiritual identity who was born in Isfahan, one of the intersection point of Iran. He was a descendant of Umar and grandson of his father, Umar. He developed himself in religious sciences and Sufism, worked as an imam in the Kaaba for a long time, then went to Medina and worked as a tomb keeper in Ravza-ı Mutahhara for 7 years. Later, he moved to Anatolia with the people under his protection and settled first in Konya and then in Alanya. Upon his dream, he came to the Çamlıdere airport of today's Ankara, worked to spread Islam in Anatolia and shaped the religious-mystical life. Ali Semerkandi first built a lodge building in Kuzviran, which is a completely uninhabited and unmanned place, and settled here with his family. He bought mills and land to provide economic finance of his lodge, where he met the needs of his lodge and made the surplus capital of the product. With the arrival of His Majesty Ali Semerkandi, the region began to get prosper and the people supply their livelihood by trading. With the income of his mill, he bequeathed to his descendants that would meet the expenses of his lodge with this income.

**Keywords:** Ali Semerkandi, Islamization, Tekke, Economic Finance, Anatolia

**13011 NUMARALI EVKAF DEFTERİ IŞIĞINDA SIİRT VAKIFLARINA İLİŞKİN  
BAZI DEĞERLENDİRMELER (1848-1861)**

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**ÖZET**

Tarihi ve kültürel özellikleri ile dikkat çeken Siirt, kadim şehirlerden biridir. Mezopotamya ile Anadolu'nun kesiştiği bir alanda kurulan ve tarihi süreç içerisinde birçok devletin egemenliğine giren Siirt'te cami, mescit, hamam, han, medrese, çeşme, zaviye gibi pek çok dini, sosyal ve ekonomik yapı inşa edilmiştir. Şehirdeki bu yapıların uzun yıllar ayakta kalmasında İslâm ve Osmanlı dünyasında etkili olan vakıfların büyük bir payı olmuştur. İyilik ve yardımlaşma gibi esaslara dayanan vakıf sistemi sayesinde Siirt'teki bu yapılar için çok sayıda mülk vakfedilmiş ve buralarda birçok personel istihdam edilmiştir. Vakfedilen mülklerden elde edilen gelirler ile bu yapıların personel ücretleri ve diğer masrafları karşılanmıştır. Siirt'teki vakıflarla ilgili bilgi alınabilecek en önemli ana kaynaklardan biri evkaf defterleridir. Bu defterler sayesinde vakıfların isimlerini, personellerini, gelir ve gider kalemlerini tespit etmek mümkündür. Bunlardan biri de bu çalışmanın kaynağı olan 13011 numaralı evkaf defteridir. Osmanlı arşivinde yer alan bu defterde Siirt merkez kaza vakıflarının 1848-1861 yılları arasındaki bilgileri kayıtlıdır. Defterdeki bilgiler incelendiğinde Siirt merkez kazada cami, mescit, han, zaviye, ziyaret ve çeşme gibi yapılara ait vakıfların mevcut olduğu belirlenmiştir. Ayrıca defterde Bitlis, Mardin ve Muş vakıfları ile Siirt'in Şirvan kazasındaki vakıflara dair bilgiler de bulunmaktadır. Defterde yer alan veriler ışığında hazırlanan bu çalışmada 1848-1861 yılları arasında Siirt merkez kazada bulunan vakıflar üzerinde durulmuştur. Çalışmada öncelikle Siirt merkez kazadaki vakıfların isimleri ortaya konulmuştur. Ardından bu vakıfların gelir ve gider kalemlerinin nelerden oluştuğuna dair bilgi verilmiştir. Son olarak bu vakıflarda görev yapan personellere ilişkin bilgiler ele alınmıştır.

**Anahtar kelimeler:** Siirt, evkaf defteri, vakıf



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**SOME ASSESSMENTS ON SIİRT WAQFS IN THE LIGHT OF 13011 NUMBERED  
WAQF BOOK (1848-1861)**

**ABSTRACT**

Siirt, attracting attention with historical and cultural features, is one of the ancient cities. In Siirt, which is established in the area where Mesopotamia and Anatolia intersect and which has been dominated by a number of states throughout the history, many religious, social and economic structures such as mosques, masjids, baths, inns, madrasas, fountains and hermitages were built. For the survival of these buildings in the city for years, the waqfs, effective in Islamic World and Ottoman State, had great share. Thanks to waqf system based on the rules such as benefaction and solidarity, many estates were donated for the survival of these buildings in Siirt; and many personnel were employed there. With the revenues obtained from the estates donated to the waqfs, the salaries of the employees and other expenses were paid. One of the most important sources that information about waqfs in Siirt can be obtained is waqf books. Thanks to these books, it is possible to find out the names of waqfs, staff, and income and expense items. One of these books is 13011 numbered waqf book, the source of this study. In this book kept in Ottoman archive, waqf information of Siirt centre and provincial towns between 1848 and 1861 are recorded. When information in the book is examined, it can be found out that there were waqfs for mosque, masjid, inn, hermitage, shrine and fountain in Siirt central town. In addition, there is information in the book about presence of waqfs in Bitlis, Mardin and Muş and waqfs in Şirvan, a provincial town of Siirt. In this study prepared in the light of information taking place in the book, waqfs located in Siirt city centre between 1848 and 1861 were investigated. In the study, initially, waqf names in Siirt central town were put forth. Then, information was given about income and expenditure items of these waqfs. Finally, information about staff working for these waqfs was studied.

**Keywords:** Siirt, waqf book, waqf

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**ZÜLFÜ LİVANELİ’NİN BALIKÇI VE OĞLU ROMANINDA GÖÇ UNSURU**

**Fatma ÇAVDAROĞLU**

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**ÖZET**

Göç, yüzyıllar boyu süregelen bir unsur olarak insanlığın hayatında var olmuştur. Göç unsuru, kişilerin yaşadıkları yerlerden gitmeye karar verdikleri anda başlayarak göç sonrasında hayatlarını devam ettirdikleri yerlerde de kendisini hissettiren ve bireyi ve toplumu etkileyen bir duygu, olgu olarak karşımıza çıkar. Göçü ve göç eden kişileri tanımlamada, iç-dış göç, ekonomik-siyasi göç, sürekli-geçici göç, gönüllü-zorunlu göç gibi değişik göç tanımları yapılabilir. Göçün ekonomik, sosyolojik, psikolojik nedenleri ve sonuçları vardır. Göç etmek kişisel bir eylem gibi görülecek olsa bile ortaya çıkışı, arada geçen süreç ve sonucu bakımından muhakkak toplumsallığa bağlanır. Birey, toplumun en önemli parçalarındandır. Göç olgusu bireyin ve toplumun konu alındığı bütün bilimlerin konusu haline gelmiştir. Sanat da bireyin olduğu her yerdedir denilebilir. Bu nedenle insana bağlı ve insan merkezli eylem olan göç unsuru da edebiyatın dışında tutulmamıştır. Geçmişten günümüze toplumun bir parçası olan sanatçılar gerek konu gerek tema olarak göç unsuruna eserlerinde yer vermişlerdir. Türkiye’den Almanya’ya yapılan göçler sonucunda ortaya çıkan “göçmen edebiyatı” terimi ve bu edebiyat içine dahil edilen eserler veren yazarlar karşımıza çıkmaktadır. Günümüzde ise başta Suriye olmak üzere Orta Doğu’dan gelen göçmenler gerek transit geçiş noktası olarak gerekse yerleşmek üzere Türkiye’yi seçmeleri Türk edebiyatında son yıllarda daha fazla göç konulu eserler verilmesini etkilemiştir. Buradan toplumsal olayların edebiyatı etkilediğini görmek mümkündür. Kendisi de göç etmek zorunda kalan ve hayatının bir dönemini göçmen olarak geçiren Zülfü Livaneli son zamanlarda göç mücadelesinin ağır sonuçlarına, göçün hayatlara etkisine Balıkçı ve Oğlu adlı romanında yer verir. Bu bilgiler doğrultusunda yapılan çalışmada Balıkçı ve Oğlu adlı romanında göç olgusu üzerine inceleme yapılmak istenmiştir.

**Anahtar Kelime:** Göç, göçmen, Zülfü Livaneli, Balıkçı ve Oğlu

**ABSTRACT**

Migration has existed in the life of humanity as an ongoing element for centuries. The element of migration emerges as a feeling and phenomenon that makes itself felt in the places where people continue their lives, starting from the moment they decide to leave their place of residence, and affecting the individual and the society. Different definitions of migration such as internal-external migration, economic-political migration, permanent-temporary migration, voluntary-forced migration can be made to define migration and people who migrate. Migration has economic, sociological and psychological causes and consequences. Even though migrating may be seen as a personal act, it is bound to be social in terms of its emergence, intervening process and outcome. The individual is one of the most important parts of society. The phenomenon of migration has become the subject of all sciences that deal with the individual and society. It can be said that art is wherever the individual is. For this reason, the element of migration, which is a human-based and human-centered action, has not been excluded from literature. Artists, who have been a part of society from past to present, have included the element of migration in their works, both as a subject and as a theme. The term "immigrant literature", which emerged as a result of the migrations from Turkey to Germany, and the authors who wrote works included in this literature, appear before us. Today, immigrants from the Middle East, especially Syria, choosing Turkey both as a transit point and to settle, have affected the publication of more migration-themed works in Turkish literature in recent years. From here, it is possible to see that social events affect literature. Zülfü Livaneli, who had to immigrate herself and spent a period of her life as an immigrant, has recently included the heavy consequences of the migration struggle and the effects of migration on lives in her novel *Balıkçı ve Oğlu*. In line with this information, in the study, it was desired to examine the phenomenon of migration in his novel *Balıkçı ve Oğlu*.

**Keywords:** Migration, migrant, Zülfü Livaneli, *Balıkçı ve Oğlu*

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**SOSYO KÜLTÜREL FARKLILIĞIYA SIİRT'in GÜNDELİK HAYAT İLİŞKİLERİ**

**Murat TOPRAK**

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**ÖZET**

Kentler farklı sosyo kültürel yapılara sahip olması onların gündelik hayatta önemli insan ilişkilerini bünyesinde barındırmasına sebep olmaktadır. En yalın, sade, rutin durumdan karmaşık olana dek ilişkiler, değişik etkileşim örüntüleriyle kendisini göstermektedir. Yüz yüze etkileşimlerin yoğun olduğu kentsel mekânlarda farklı sosyo kültürel topluluklar arasında söz konusu etkileşim örüntüsü anın içinde farklılaşarak süreç haline gelmektedir. Zamandan ve mekândan bağımsız olmaksızın gündelik hayattaki insan ilişkilerinde bütünleşmenin temel dinamiklerinden olan etkileşim örüntüleri arasında çatışma, rekabet, uyum, işbirliği ve asimilasyon/benzeş(tiril)me dikkat çekmektedir. Etkileşim örüntülerinin yoğun olarak yaşandığı Siirt ilinin “Helvacılar Çarşısı”ndaki insan ilişkileri bu çalışmanın konusunu oluşturmuştur. Ayrıca bu çalışma, çarşı içinde bulunun esnafın sosyo kültürel aidiyetleri ve özellikleri, komşuluk ve müşteri ilişkilerinin gündelik hayatta nasıl inşa edildiğini açıklamayı amaçlamıştır. Bunu yaparken kuramsal açıdan gündelik hayat konusunda kavramsal repertuvarlarıyla katkıda bulunan önemli isimler göz önünde bulundurulmuştur. Henri Lefebvre ve Michel De Certeau'nun doğrudan gündelik hayat ve mekân ilişkisine, Pierre Bourdieu ve Erving Goffman'da ise bireyler arası etkileşimde belirleyici etmenlere dikkat edilmiştir. 1990'lardan bu yana demografik açıdan önemli bir değişim yaşayan Siirt'in mekânları belirgin farklılaşmayla karşı karşıya kalmıştır. Göçle beraber şehre yerleşme telaşında olan Kürtler ve Koçerler<sup>1</sup> merkezde Araplarla bir araya gelerek zorunlu bir birliktelik artık kaçınılmaz olmuştur. Helvacılar Çarşısı, bir arada yaşamının zorunluluğunun olduğu çarpıcı mekânların başını çekmiştir. Buradan hareketle çalışmada yeni hayata adapte olma sürecinin nasıl, topluluklar arasında etkileşimde belirleyici unsurların neler olduğuna yönelik sorulara yorumlayıcı bir perspektifle cevaplar aranmıştır.

**Anahtar Kelimeler:** Siirt, Helvacılar Çarşısı, Gündelik Hayat.

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<sup>1</sup> Koçer, yerel dilin tanımlama şeklidir. Yaylalarda yaşayan insanların çeşitli sebeplerle şehir merkezine göç etmiştir. Yerleşik hayata geçen bu topluluklar etnik kimlik olarak kendilerini genellikle Kürt olarak tanımlasalar da kültürel anlamda ayrıştığı görülmüştür. Dolayısıyla ayrı bir araştırma nesnesi olması gerektiği düşünülmüştür.

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**EVERYDAY LIFE RELATIONS of SIIRT'S with ITS SOCIO CULTURAL  
DIFFERENCE****ABSTRACT**

The fact that cities have different socio-cultural structures causes them to contain important human relations in everyday life. From the simplest, simplest, routine to the most complex, relationships show themselves through different interaction patterns. In urban spaces where face-to-face interactions are intense, the interaction pattern between different socio-cultural communities differentiates in the moment and becomes a process. It draws attention to conflict, competition, harmony, cooperation and assimilation/similarity among the interaction patterns, which are the basic dynamics of integration in human relations in everyday life, regardless of time and space. The human relations in the "Helvacilar Bazaar" of Siirt province, where interaction patterns are experienced intensively, constituted the subject of this study. In addition, this study aims to explain the socio-cultural affiliations and characteristics of the tradesmen in the bazaar, and how neighborly and customer relations are built in everyday life. While doing this, important names who contributed with their conceptual repertoires on everyday life theoretically were taken into consideration. Attention was paid to the direct relationship between everyday life and space in Henri Lefebvre and Michel De Certeau, and the determining factors in the interaction between individuals in Pierre Bourdieu and Erving Goffman. Siirt, which has undergone a significant demographic change since the 1990s, has faced significant differentiation. Kurds and Koçers, who were in a hurry to settle in the city with the migration, came together with the Arabs in the center and a compulsory union became inevitable. Helvacilar Bazaar has taken the lead among the striking places where it is necessary to live together. From this point of view, in the study, answers were sought with an interpretive perspective to the questions about how the process of adapting to the new life and what the determining factors are in the interaction between communities.

**Keywords:** Siirt, Helvacilar Bazaar, Everyday Life

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**SERDAR ÖZKAN'IN “KAYIP GÜL” ADLI ROMANININ İZİNDE ARKETİPSEL  
BİR YOLCULUK**

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**ÖZET**

Edebi metinleri farklı araştırma metotlarıyla incelemek, böylece eserin görünmeyen kısımlarını gün yüzüne çıkarmak mümkündür. Her disiplin kendi içinde tutarlı olmakla birlikte diğer alanlarla da temas halindedir. Psikoloji biliminde kullanılan metotlar, insanı anlama ve anlatmaya yöneliktir. Edebi metin incelemelerinde kullanılan psikoloji bilimi ise edebi ürün ve yazarına dair tahlilleri içermesi bakımından önemlidir. Edebî metinlerde insanlığın bilinç dışında asırlardır devam ettirdiği yaşamın ilk izlerini bulmak mümkündür. Bu izlerin edebî ürünlerdeki yansımaya “arketip” (ilk örnek) adı verilir. Yazarın eserinde kullandığı arketiplerin peşinde olan arketipçi eleştiri anlayışındaki hedef ise arketiplerin tespit edilerek bunların işlevini metnin estetik yönünü zedelemekten değerlendirmeyi ve edebî metni yeniden anlamlandırmaktır. 20. yüzyılda ortaya çıkan Arketipsel Eleştiri, C. Gustav Jung’un kurduğu ve sistemleştirdiği analitik psikolojinin temelleri üzerine inşa edilir. Bu çalışmada, Serdar Özkan’ın *Kayıp Gül* adlı romanı arketipsel eleştiri bağlamında tahlil edilmektedir. Romanın anlamlandırılması ve karanlıkta kalan yönlerinin ortaya çıkartılması noktasında arketiplerin etkisi incelenmektedir. Bu arketiplerin romanın kurgu ve yapısına olan etkisi karakterlerin diyalog ve eylemlerinden anlaşılmaktadır. Türk edebiyatında en çok okunan romanların başında yer alan *Kayıp Gül* romanında Diana’nın kendini keşfetme serüveni anlatılmaktadır. Diana’nın kendi menkıbesinin izinde çıkacağı yolculukta yazar, okura kurmaca ile gerçek arasında bir dünya sunmaktadır. Bu romanda kahramanın kendini keşfetme serüveni, Jung’un arketipsel eleştirisi ekseninde “anima-animus”, “persona”, “gölge”, “bilge kişi”, arketipleri bağlamında değerlendirilmiştir. *Kayıp Gül* romanı Bu belirgin arketipler ışığında arketipsel eleştiri bağlamında tahlil edilirken roman kurgusunun da daha açık hale geldiği görülmektedir.

**Anahtar Kelimeler:** C. G. Jung, Arketip, Arketipsel Eleştiri, Serdar Özkan, Kayıp Gül

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**FOLLOWING SERDAR ÖZKAN'S NOVEL TITLE "KAYIP GÜL" AN  
ARCHETICAL JOURNEY****ABSTRACT**

By examining the literary texts with different research methods, it is possible to reveal the invisible parts of the work. While each discipline is coherent within itself, it is also in contact with other fields. The methods used in psychology are aimed at understanding and explaining people. The science of psychology, which is used in the analysis of literary texts, is important because it contains analyzes about the literary product and its author. In literary texts one can find the first traces of the life that mankind has unconsciously continued for centuries. The reflection of these traces in literary products is called "archetype" (first example). The goal in the understanding of archetypal criticism, which is after the archetypes used by the author in his work, is to identify the archetypes and evaluate their function without damaging the aesthetic aspect of the text and to re-interpret the literary text. The archetypal criticism, which emerged in the 20th century, is based on the foundations of analytical psychology, which was founded and systematized by C. Gustav Jung. This study analyzes the novel *The Lost Rose* by Serdar Oezkan in the context of archetypal criticism. The effect of archetypes is examined at the point of making sense of the novel and revealing its obscure aspects. The effect of these archetypes on the fiction and structure of the novel can be understood from the dialogues and actions of the characters. Diana's adventure of self-discovery is recounted in the novel *The Lost Rose*, which is one of the most widely read novels in Turkish literature. In Diana's journey in the footsteps of her own legend, the author presents the reader with a world between fiction and reality. In this novel, the hero's adventure of self-discovery is evaluated in the context of the archetypes "anima-animus," "persona," "shadow," and "wise person" in the axis of Jung's archetypal criticism. While the novel *The Lost Rose* is analyzed in the light of these characteristic archetypes in the context of archetypal criticism, it becomes apparent that the fiction of the novel has also become clearer.

**Keywords:** C. G. Jung, Archetype, Archetypal Criticism, Serdar Özkan, Lost Roses

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**YOUTUBE SPAM FİTRELEME İÇİN YENİ ÇERÇEVE**

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**ÖZET**

YouTube dünya genelinde video paylaşma platformların başında gelmektedir. Milyonlarca kullanıcıya sahiptir. YouTube'de aynı zamanda videolar hakkında yorumlar yapılmaktadır. Ancak bu yorumların büyük bir çoğunluğunu istenmeyen yorumlar oluşturmaktadır. Bu çalışmada videolar hakkında istenmeyen (spam) yorumların filtrelenmesi için yeni bir çerçeve önerilmiştir. Çerçeve, en iyi bilinen öznitelik seçme yaklaşımlarından bilgi kazanı (ig), ki-kare testi (chi2) ve gini index (gi) yardımı ile ayırt ediciliği en yüksek öznitelik alt kümesi belirlenir. Daha sonra destek vektör makineleri (SVM), en yakın k-komşu (KNN) ve Naive Bayes (NB) sınıflandırıcılar kullanılarak spam yorumlar tespit edilir. Çerçeve, meşru ve spam yorumlardan oluşan büyük bir veri kümesi üzerinde değerlendirilmiştir. Deneysel çalışmalarda dikkat çekici derecede doğru sınıflandırma sonuçları elde edildiği görülmüştür.

**Anahtar Kelimeler:** YouTube spam, spam filtreleme, metin sınıflandırma, metin madenciliği



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**NEW FRAMEWORK FOR YOUTUBE SPAM FILTERING****ABSTRACT**

YouTube is one of the leading video-sharing platforms worldwide. It has millions of users. There are also comments on videos on YouTube. However, the vast majority of these comments are unwanted (spam) comments. In this study, a new framework is proposed for filtering spam comments about videos. The framework determines the feature subset with the highest distinctiveness with the help of the best-known feature selection approaches information gain (ig), chi-square test (chi2) and gini index (gi). Then, spam comments are detected using support vector machines (SVM), K-Nearest Neighbor (KNN) and Naive Bayes (NB) classifiers. The framework was evaluated on a large dataset of legitimate and spam comments. It has been observed that remarkably accurate classification results have been obtained in experimental studies.

**Keywords:** YouTube spam, spam filtering, text classification, text mining

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**ÇOCUK BAKIMINDA ÇARESİZLİK ÖLÇEĞİNİN TÜRKÇEYE UYARLAMA  
ÇALIŞMASI**

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**ÖZET**

Bakım veren ile çocuk arasında kurulan güçlü duygusal ilişki olarak ifade edilen bağlanma araştırmalarının büyük bir çoğunluğu çocuğun bağlanma sistemi üzerine yoğunlaşmıştır. Bu araştırmalar güvenli, kararsız, kaçınan ve düzensiz/dağınık bağlanma türlerinin öncülleri ve sonuçları hakkında önemli bilgiler vermektedir. Bunun yanı sıra çok az araştırma çocuğun bağlanma sistemini tanımlayan bakıcıların davranış sitemlerini ele almıştır. Özellikle önemli bir bağlanma figürü olarak kabul edilen babaların davranış sistemleri ve bakıcı olma konusundaki duygularını karakterize eden süreçler hakkında çok az bilgimiz bulunmaktadır. Ayrıca düzensiz/dağınık bakım vermenin ölçümü genel olarak uzun süren ve yoğun emek gerektiren görüşmeler ve gözlemlerle sınırlı kalmıştır. Bu çalışmada, bakım vermede çaresizlik, rol değiştirme ve korkmuş/korkulu bakım verme gibi düzensiz/dağınık bakım vermenin farklı yönlerini değerlendirmek için ebeveyn algılarına dayalı olarak tasarlanan Çocuk Bakımında Çaresizlik Ölçeği (ÇBCÖ)'nin Türk babalar için tekrarlanabilirliği ve psikometrik özellikleri araştırılmıştır. Araştırmaya 12-36 ay arası çocuğa sahip 817 baba katılmıştır. Ölçeğin Türk babalar için

geçerliliğini değerlendirmek amacıyla yapılan açımlayıcı ( $N=272$ ) ve doğrulayıcı ( $N=545$ ) faktör analizi sonuçları 17 maddelik ve iki boyutlu bir yapıyı göstermektedir. Ölçeğin orijinalinde yer alan “baba çaresizliği” ve “baba-çocuk korkusu” birleşerek birinci faktörü (Cronbach’s alpha .73) oluştururken, “bakım veren olarak çocuk” ise ikinci faktör (Cronbach’s alpha .73) olarak belirlenmiştir. Ölçeğin zamandaş geçerliliğini değerlendirmek amacıyla katılımcı babalar Ebeveynlik Stres Ölçeği ( $N=92$ ), Sosyal ve Duygusal Değerlendirme Ölçeği ( $N=187$ ) ve Kısa Semptom Envanteri’nin Depresyon ( $N=169$ ) ve Anksiyete ( $N=198$ ) alt ölçeklerini tamamlamışlardır. Çocuk Bakımında Çaresizlik Ölçeği’nin “baba çaresizliği ve baba-çocuk korkusu” alt boyutu ile ebeveynlik stresi, anksiyete ve depresyon arasında pozitif yönlü ilişkiler belirlenirken, “bakım veren olarak çocuk” alt boyutu ile anlamlı herhangi bir ilişki belirlenmemiştir. Bunun yanı sıra Sosyal ve Duygusal Değerlendirme Ölçeği’nin problem alt boyutu ile “baba çaresizliği ve baba-çocuk korkusu” ve yeterlik alt boyutu ile “bakım veren olarak çocuk” alt boyutları arasında pozitif yönlü anlamlı ilişkiler bulunmuştur. Ayrıca çalışmaya katılan 157 baba üç hafta arayla ÇBÇÖ’yü tekrar tamamlamışlardır. Bulgular test-tekrar test güvenilirliğinin “baba çaresizliği ve baba-çocuk korkusu” için .480 ve “bakım veren olarak çocuk” için .551 olduğunu göstermektedir. Sonuç olarak ÇBÇÖ, 2 boyutlu ve 17 maddeli olarak erken çocuklukta babaların yaşadıkları çocuk bakımında çaresizlik özelliklerini belirlemek için geçerli ve güvenilir bir ölçme aracı olarak Türk kültürüne uyarlanmıştır.

**Anahtar kelimeler:** Bağlanma, çocuk bakımında çaresizlik, baba, ölçek uyarlama,

\*Bu çalışma 121K470 No’lu Tübitak 1001 projesi kapsamında gerçekleştirilmiştir.

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**ADAPTATION OF THE CAREGIVING HELPLESSNESS SCALE TO TURKISH**

**ABSTRACT**

The majority of attachment research, which is expressed as the strong emotional relationship between the caregiver and the child, has focused on the child's attachment system. These studies provide crucial information about the antecedents and consequences of secure, anxious, avoidant, and disorganized/scattered attachment types. Additionally, little research has addressed the behavioral systems of caregivers that define the child's attachment system. Especially, to the best of author's knowledge, little report about the behavioral systems of fathers, who are considered to be an important attachment figures, and the processes that characterize their feelings about being caregivers. Moreover, the measurement of disorganized/scattered care has generally been limited to long and labor-intensive interviews and observations. In this study, the repeatability and psychometric properties of the Child Care Helplessness Scale (CCHS) for Turkish fathers, which was designed based on parental perceptions, were investigated to evaluate different aspects of disorganized/scattered caregiving, such as helplessness in caregiving, role switching, and scared/fearful caregiving. Participants were gathered among 817 fathers with children aged 12-36 months. The results of the exploratory (N=272) and confirmatory (N=545) factor analysis performed to evaluate the validity of the scale for Turkish fathers show a two-dimensional structure with 17 items. Father helplessness in the original scale and father-child fear combined to form the first factor (Cronbach's alpha .73), while the child as a caregiver was determined as the second factor (Cronbach's alpha .73). In order to evaluate the concurrent validity of the scale, the fathers completed the Parenting Stress Scale (N=92), Social and Emotional Evaluation Scale (N=187), and Depression (N=169) and Anxiety (N=198) subscales of the Brief Symptom Inventory. While there were positive relationships between father helplessness and fear of the father-child sub-dimension of the Caregiving Helplessness Scale and parenting stress, anxiety, and depression, no significant relationship was found with the child as the caregiver sub-dimension. Additionally, significant positive relationships were found between the problem sub-dimension of the Social and Emotional Evaluation Scale and the sub-dimensions of father helplessness and fear of father-child, and efficacy and child as caregiver sub-dimensions. Moreover, the gathered 157 fathers re-completed the CCHS at three-week intervals. Results show that test-retest reliability was .480 for the father's helplessness and fear of the father-child, and .551 for the child as a caregiver. As a result, CCHS has been adapted to Turkish culture as a valid and reliable measurement tool in order to determine the helplessness characteristics experienced by fathers in early childhood as a 2-dimensional and 17-item.

**Keywords:** Attachment, caregiving helplessness, father, scale adaptation

\*The current study was accomplished within the call of Tübitak 1001 project no 121K470.

## İBN HALDUN'A GÖRE KAMU HARCAMALARININ İKTİSADİ HAYATA ETKİSİ

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### ÖZET

On dördüncü yüzyıl İslam dünyasının en parlak ve sıra dışı ismi olan İbn Haldun, modern maliye politikasının kurucusu olarak kabul edilen Keynes'ten yaklaşık 600 yıl önce kamu harcamalarının önemine vurgu yaparak, maliye politikasının ilk örneğini ortaya koyma başarısı göstermiştir. Devleti en büyük ve en önemli harcama birimi olarak tanımlayan İbn Haldun'a göre, maliye politikası aracı olarak kamu harcamaları, ekonomi için kritik öneme sahiptir. Ona göre kamu harcamaları, iktisadi hayatın canlandırılması ve üretimin geliştirilmesi noktasında önemli bir yere sahiptir. Öyle ki onun, devletin iktisadi hayattaki rolüyle ilgili en çarpıcı tespiti, kamu harcamalarının toplam talep içindeki ağırlığının yanı sıra, iktisadi faaliyetleri ve üretim hızını artırıcı fonksiyonuna dair görüşüdür. İbn Haldun'a göre kamu harcamalarının teşvik edici ve yönlendirici rolü göz ardı edilemeyecek kadar önemlidir. Kamu gelirleri ve harcamalarında meydana gelen bir azalma tüm ekonomiyi olumsuz yönde etkilerken, bilhassa toplam talebi oluşturan en önemli parametre olan kamu harcamalarında bir düşme, ekonomide bir daralmaya ve durgunluğa yol açacaktır. Kamu harcamalarının, iktisadi faaliyetlerle olan ilişkisini nehir metaforuyla açıklayan İbn Haldun, devleti bit nehir gibi tasavvur ederken iktisadi faaliyetleri bitkilere benzetir. Tıpkı nehirden uzaklaştıkça cılızlaşan bitkiler gibi, devletin merkezinden uzak ve kamu harcamalarından mahrum iktisadi faaliyetlerin cılız kaldığını söyler. Ayrıca devletin hazinede altın ve para biriktirmesine şiddetle karşı çıkarak, bunun ekonomiyi daraltacağını savunur. Ona göre servet saklanarak değil harcanarak çoğalır. Bu yüzden devlet, malı hazinede toplamamalı, dağıtmalıdır; zira iktisatta dolaşım esastır. İbn Haldun'a göre devletin harcamalar kalemini oluşturan ihsan ile devletin gelir kalemini oluşturan vergiler doğru orantılıdır. Dolayısıyla ihsan azalırsa vergiler de azalır. Kalkınma ve kamu harcamaları arasında da bir bağ kuran İbn Haldun'a göre, mülkle beraber gelen zenginliğin asıl kaynağı vergilerdir. Mülk ne kadar geniş ve refah seviyesi ne kadar yüksek olursa, vergi gelirleri de o kadar çok olur. Bu da mülkün yani devletin harcamalarını ve ihsanlarını artırır. Artan devlet gelirin harcamaya dönmesiyle giderlerin de artacağını ve gelir-gider dengesinde, gelirden meydana gelecek artışın harcamaları aynı oranda artacağını, dolayısıyla meydana gelecek genişlemenin refah artışına yol açacağını söyler.

**Anahtar Kelimeler:** İbn Haldun, Mukaddime, Kamu Harcamaları, Maliye Politikası

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**THE EFFECT OF PUBLIC EXPENDITURES ON ECONOMIC LIFE ACCORDING TO IBN HALDUN****ABSTRACT**

Ibn Khaldun, the most brilliant and extraordinary name of the fourteenth century Islamic world, has succeeded in presenting the first example of fiscal policy by emphasizing the importance of public expenditures about 600 years before Keynes, who is regarded as the founder of modern fiscal policy. According to Ibn Khaldun, who defines the state as the largest and most important expenditure unit, public expenditures as a fiscal policy tool have a critical importance for the economy. According to him, public expenditures have an important place in the revival of economic life and the development of production. So much so that his most striking determination about the role of the state in economic life is his view of the weight of public expenditures in total demand, as well as his function of increasing economic activities and production rate. According to Ibn Khaldun, the stimulating and guiding role of public expenditures is too important to ignore. While a decrease in public revenues and expenditures will affect the entire economy negatively, a decrease in public expenditures, which is the most important parameter that constitutes the total demand, will lead to a contraction and recession in the economy. Explaining the relationship between public expenditures and economic activities with the metaphor of a river, Ibn Khaldun, while imagining the state as a river, likens economic activities to plants. He says that economic activities far from the center of the state and deprived of public expenditures become weaker, just like plants that become weaker as they move away from the river. He also strongly opposes the state's saving of gold and money in the treasury, arguing that this will shrink the economy. According to him, wealth increases not by hiding, but by spending. Therefore, the state should not collect the goods in the treasury, but should distribute them; because circulation is essential in economics. According to Ibn Khaldun, *ihsan*, which constitutes the expenditure item of the state, and taxes, which constitute the revenue item of the state, are directly proportional. Therefore, if *ihsan* decreases, taxes also decrease. According to Ibn Khaldun, who also establishes a link between development and public expenditures, the main source of wealth that comes with property is taxes. The larger the property and the higher the welfare level, the greater the tax revenues. This increases the expenditures and grants of the property, that is, the state. He says that expenditures will increase with the period of increasing government income to expenditures and that the increase in income in the income-expenditure balance will increase the expenditures at the same rate, so the expansion that will occur will lead to an increase in welfare.

**Keywords:** Ibn Khaldun, The Muqaddimah, Public Expenditures, Fiscal Policy

**“TAŞTAN ADIMLAR: BİR MÜLTECİ AİLENİN YOLCULUĞU” ADLI KİTAPTA  
YER ALAN PSİKOLOJİK DAYANIKLILIK ÖĞELERİNİN PSİKODRAMATİK  
BAKIŞ AÇISINDAN İNCELENMESİ**

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**ÖZET**

Savaşın hükmettiği topraklardan yeni ülkeye göç eden bir ailenin öyküsünü ele alan kitapta göç ve sağkalım olguları ailenin kız çocuğu Rama'nın gözünden aktarılmaktadır. Kitabın görselleri mülteci sanatçı Nizar Ali Badr'ın taşlar kullanarak yarattığı, mülteci olma hikayelerini anlatan eserlerinden oluşmaktadır. Görsellerde acı ve hüznün psikodramanın temel kavramlarından eylem ve yaratıcılık aracılığıyla insan öykülerine dönüşmüştür. Bu çalışmada kitaptaki psikolojik dayanıklılık öğelerinin psikodramatik bakış açısından incelenmesi amaçlanmıştır. İçerik incelenirken tarama modeli ve içerik çözümleme yöntemi kullanılmıştır. Öykü, ailenin göç öncesi sürecini betimleyerek başlamış, çatışma ve sınırlamalar “Şarkılarımızı söyleyip dans edemiyorsak gerçekten özgür sayılır mıydık” ifadesiyle görünür olmuştur. “Savaş gelip kapımıza dayandı,... Zamanı geldi o insan nehrine karışmanın, ...Herkes karaya varacak kadar şanslı değildi,...Sadece anıları taşıyordum yüreğimde.” ifadeleriyle savaş kaynaklı duygular ve zorunlu göç yaşantıları vurgulanmıştır. Yeni ülkelere ulaştıklarında, Rama'nın anne ve babası özgürlüğe kavuşmadan ölenlerin anısına çiçek tohumları ekmişlerdir. Ekilen tohumlar tanıdık olanla vedalaşmayı, yeni olanla tanışmayı ve geri dönmeye ilişkin umudu temsil etmekteyken, zor dile gelen travma, yas ve vedanın tohum ekme eylemiyle yaşama geçirilmesi psikodramadaki eylem kavramının gücünü göstermektedir. Öykü dayanıklılık vurgusu ile sonlanmış; göç sonrasındaki psikolojik dayanıklılığı destekleyen güvende hissetme, göç edilen ülkede algılanan sosyal destek ve geleceğe yönelik umut öğelerine yer verilmiştir. Hem kitabın yazarının hem de öyküsü aktarılan kahramanın “mülteci olmaya” ilişkin ortak teması, yazarın bu katılımcı rolünün de yaratıcılık ve eylemde bulunma çerçevesinde değerlendirilebileceğini gösterir niteliktedir.

**Anahtar kelimeler:** Psikodrama, göç, psikolojik dayanıklılık, eylem

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**EXAMINING THE PSYCHOLOGICAL RESILIENCE ELEMENTS FROM A  
PSYCHODRAMATIC POINT OF VIEW IN THE BOOK TITLED “STEPS OF  
STONE: THE JOURNEY OF A REFUGEE FAMILY”****ABSTRACT**

In the book that tells story of a family that migrated from the lands ruled by the war to the new country, migration and survival phenomena are conveyed through the eyes of Rama. Visuals are the works of a refugee artist Nizar Ali Badr, he used stones for telling stories of being a refugee. In these images pain and sadness turned into human stories through action and creativity. It is aimed to examine psychological resilience elements in book with psychodramatic perspective. Survey research model and content analysis method<sup>4</sup> were used while analyzing content of the book. Story begins with describing family's pre-immigration process, conflicts and restrictions have been visible with expression “If we could not sing and dance our songs, would we really be considered free”. With expressions “War came to our door, ...It was time to get involved in that river,...Everyone wasn't lucky enough to be stranded,...I was carrying only memories in my heart” feelings of war and forced migration experiences were emphasized. When reached their new country, her parents planted flower seeds in memory of those who died before couldn't get freedom. These seeds represent goodbye to familiar, meeting the new, and hope. Implementing trauma, grief and farewell with action of sowing seeds shows the power of action in psychodrama. Story ended with an emphasis on resilience; items supporting psychological resilience after migration such as feeling safe, perceived social support in the immigrant country and hope for the future are included. The common theme of "being a refugee" of both the author of the book and the hero whose story is told, shows that this participatory role of the author can also be evaluated within the framework of creativity and taking action.

**Keywords:** Psychodrama, immigration, resilience, action



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**TERM-STRUCTURE OF FOREIGN DIRECT INVESTMENT INTO VIETNAM  
ECONOMY**

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**ABSTRACT**

**Objective:** The paper investigates the term structure of foreign direct investment into Vietnam economy by dividing medium-term with long-term contribution on the domestic economic growth. The data is an annual sample of Vietnam economy over 2007-2021. **Methodology:** The research methodology is first based on the recent literature review on the impact of foreign direct investment on the economic growth rate of the host economy. Then, the paper examines the contribution of foreign direct investment into the Vietnam's economic growth by the term structure. **Findings:** The empirical evidence records that the foreign direct investment stimulates the domestic economic growth by promoting the net exports in the medium-term and by the capital accumulation process in the long-term. Therefore, the foreign direct investment is a crucial growth engine for the Vietnam economy. **Implications:** The evidence suggests that the foreign direct investment can be a priority for the public policy to enhance the domestic economic growth rate. Beside the domestic sector, including the state-owned firms and private firms, the foreign direct investment needs to be managed so that its contribution to domestic economic growth is maximized.

**Keywords:** Foreign Direct Investment; Term-Structure; Qualitative Analysis; Quantitative Analysis; Vietnam Economy

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**ATTITUDE TO THE SOCIAL UPRISING OF THE " IRANIAN WORLD  
MOVEMENT WOMEN'S " AND THE "WOMEN'S REVOLUTION" OF THE  
IRANIAN PEOPLE IN IRAN AND WORLD WITHIN THE FRAMEWORK OF THE  
NEIL SMELSER THEORY TO FORM A COMPREHENSIVE AND  
TRANSFORMATIVE SOCIAL MOVEMENT**

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**ABSTRACT**

At this time, cyberspace has collapsed all the walls and everything is accessible to everyone. So this message is quickly conveyed to everyone and brings a group with it, just like a stone that throws a person in the middle of a quiet pond, starts from the same point ... when the Backgrounds of dissatisfaction are in a favorable community and in fact people with People with restrictions and deprivation. They are restrictions and deprivation; they cannot express their hearts thought as they wish. They inevitably resort to a device that can express their opinion. The best and most accessible option is to resort to these challenges. In more democratic societies, these challenges may not be objected to by the social system of that society, but in a traditional and conservative society, every move is considered by the modernists, because that society is not willing to undermine its traditional values, it does not want to change society within society. The death of zhina (Mahsa) Amini, a Kurdish woman who was arrested by the guidance patrol and died, at the same time as the economic collapse, poverty and marginalization and destruction of the country's ecosystem, we also witness the devastating policies of the Islamic Republic. The subjugation of half of the country's population with anti -feminine and patriarchal laws is one of the strong and highly protected policies of the Islamic Republic, with the character of the gender apartheid appearance of more than four decades of anti -female rule of the Islamic Republic. So, reacts. We also see the devastating policies of the Islamic Republic. The subjugation of half of the country's population with anti - women's and patriarchal laws is one of the strong and highly protected policies of the Islamic Republic, with the character of the gender apartheid appearance of more than four decades of anti - women's rule of the Islamic Republic. We are the devastating policies of the Islamic Republic. The subjugation of half of the country's population with anti - women's and patriarchal laws is one of the strong and highly protected policies of the Islamic Republic, with the character of the gender apartheid appearance of more than four decades of anti - women's rule of the Islamic Republic. The national uprising of the Iranian people in hundreds of cities of Iran and the world in September is a huge and multilateral political event that has transformed the Iranian public arena. Its geographical area learned at least hundreds of Iranian cities and the world and had a significant appearance in the capital. The wave of recent popular protests against the current sovereignty in Iran has shown the biggest point of view: Forty - three years after the revolution, the government has not yet been able to provide an efficient economic model. The protests, the widespread and largest scene of opposition to the regime ruling Iran, has been to express public dissatisfaction since the Green Movement to the present day. The Slogans of " *Women, Life, Freedom* " and "*Death on the Dictator*" of the demonstrators have specifically targeted the undisputed power of Ayatollah Ali Khamenei and the Velayati -e Faqih. The issue of compulsory hijab became a window for the widespread emergence of accumulated dissatisfaction and demands that had not been answered. In the public space of the country, there is no opportunity to provide alternative views for running the country such as the mandatory Hijab

(veil) of separation of religion and government, referendum, and ending regional military interventions. The uprising of November and October 2019, like the recent uprising, was the accumulation of a collection of economic, political, social, cultural, environmental and international people that led the country to a compound crisis, which is virtually impossible to get rid of the existence of the Islamic Republic. Thus, the most important factor that created the recent explosive conditions was nothing more than a comprehensive bankruptcy of the Islamic Republic and the overwhelming majority of the Iranian people from the public right and the pervasive calamities that require this hellish system. It has become a spark of explosion and a turning point in social uprisings against the Islamic Republic throughout its life. This is a promise of transition from single -case and separate street movements, though the former chain and destructive to the first "super movement" and "women's revolution" in Iran. The recent movements of the Iranian people are highly motivational and activated, with more warrior and militancy that, overall, makes it more radical and puts more pressure on the political system. But organizing and leadership does not work effectively and relies on the short -term and short -term field forces. Thus, it does not have the essential characteristics of the social movement. So, the main question of the article is whether the social uprisings of the Iranian people with the spark of the "super movement" and the " women's revolution" in Iran lead to the revolutionary and transformative social movement? In order to answer the research question, In considers the framework of the theory of the Neil Smelser (sociologist) for six stages to form a revolutionary and transformative social movement: out of the six essential stages that Neil Smelser is for the formation of a pervasive and transformative social movement. , Of the six essential stages that Neil Smelser considers to form a pervasive and transformative social movement, recent protests have taken the four steps of "structural background, structural pressure, expansion of generalized beliefs and accelerator factors", but still in the fifth stage. The formation of a coordinated group for political and social mobilization has not been reached that the boundary between the social movement with "social uprisings, street riots and violent conflicts" is considered. The research question is how social movements can be correlated and more effective in social change in a country such as Iran, where neither the presence of democracy nor the presence of powerful news parties, and the economic and class divisions and other social breaks have expanded sharply, and more effective in social change. Find? The answer to the question of the article is here in a country such as Iran, where neither the presence of democracy nor the presence of powerful news parties, and economic and class divisions and other social ruptures have expanded sharply, how social movements can be correlated and more effective in an effective role in Find social developments? In Iran today, along with classical social movements such as the labor movement, modern social movements such as the environment movement, women, youth, and oppressed ethnic movement. Movements that are generally unique, non -ideological, demand -based, anti -power and supernatural and do not necessarily derive from the position of individuals in production and have a horizontal, fluid, and jelly structure, but a religious and chain, and without centralized leadership and duality. Revolutionary or reformist is raised against structures. Pandemic Corona and imperialist crippling sanctions are not only the factors that have brought the country's economy to the catastrophe, but the deeply corrupt structure of the Islamic Republic itself is one of the main causes of the current deep economic crisis. The fierce collapse of the Rial rate against the Dollar, part of which is due to increased liquidity inhibition, monetary inflation caused by non -supportive printing, psychological factors resulting in large policies such as the continuation of nuclear gambling and its resulting sanctions, or other harmful economic policies, or other economic policies. There are a few rates of the Dollar, threw the Rial out of value. The single case of most of the demands of these movements, although reflects a kind of kinetic pluralism and their independence that enhances their ability to mobilize and dynamism, also limits their universality. But in a situation where not only the necessity but also the transformations of the liberation of a real possibility, and the developments ahead, not the calendar that will be historical, this uprising must become an organized and efficient force with a song commensurate with the rapid developments of the present fateful era. If the Iranian popular uprising in the current historical opportunity fails to overcome the barriers to their organization, change in the Islamic Republic will at best lead to a "Passive Revolution" and conservative, and the formation of an alternative democratic system will emerge. It will be impossible to do so...

**Keywords:** Islamic Republic of Iran, Iranian people's, pervasive, social uprisings, Iranian world movement women's, women's Revolution, Mandatory Hijab (veil), Neil Smelser Revolutionary, transformative social movement.

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**İŞ YERİNDE TİTREŞİMLER İÇİN PORTEKİZ MEVZUATININ İLGİLİ  
GERÇEKLERİ**

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**ÖZET**

Bu makale, iş yerindeki titreşimler için Portekiz mevzuatının en alakalı gerçeklerini özet olarak sunmaktadır.

2002 yılında, Avrupa Parlamentosu, topluluk düzeyinde, çalışmalarını sırasında maruz kalan işçilerin korunması için asgari gereklilikleri getirmeyi amaçlayan, işçilerin titreşimlerden kaynaklanan risklere maruz kalmasına ilişkin bir yönergeyi onayladı. titreşimlerden kaynaklanan riskler. Avrupa Birliği'nin tüm ülkeleri, mevzuatlarını bu direktifte belirtilen asgari gerekliliklere uyarlamak zorunda kaldı. İşçilere iletilen titreşimler el-kol sistemi ile, elin avuç içi ve parmakları aracılığıyla olabileceği gibi, işyerinde makine veya araçlarla koltuk veya ayaklar aracılığıyla tüm vücuda iletilebilir. Elleri düzenli olarak el-kol titreşimine maruz kalan işçiler, topluca el-kol titreşim sendromu olarak bilinen semptomlara neden olan el ve kol dokusu hasarına maruz kalabilirler. El-kol titreşim tehlikeleri birçok endüstri ve meslekteki insanları etkiler. Daha yüksek titreşimli ekipmanların kullanımı ve bu tür ekipmanların uzun süreli ve düzenli kullanımı ile riskler büyük ölçüde artar. Yüksek düzeyde tüm vücut titreşimine maruz kalmak sağlık ve güvenliği tehlikeye atabilir ve sırt ağrısına ve diğer hastalıklara neden olduğu veya bunları şiddetlendirdiği bilinmektedir. Titreşimlerin genliği yüksek olduğunda, maruz kalma süreleri uzun, sık ve düzenli olduğunda ve titreşimler şiddetli şoklar ve sarsıntıları içerdiğinde riskler daha fazladır. İyi yönetim uygulamaları yoluyla titreşim tehlikeleri ortadan kaldırılabilir ve riskler kontrol edilebilir ve kabul edilebilir seviyelere indirilebilir. Titreşim kontrol önlemleri birçok durumda verimliliğin artmasına yol açmıştır. Portekiz mevzuatı, el-kol ve tüm vücut sistemlerine iletilen titreşimlerden kaynaklanan risklerin kontrolü için minimum standartlar belirler. Ulusal mevzuat, Direktifin gerektirdiğinden daha elverişli hükümler uygulayabilir ve önceden var olan herhangi bir ulusal mevzuatın işçilere sağladığı korumayı azaltmamalıdır.

**Anahtar Kelimeler:** İşyerinde titreşimler, Portekiz mevzuatı, Çalışma koşulları

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**RELEVANT FACTS OF PORTUGUESE LEGISLATION FOR VIBRATIONS AT  
WORK****ABSTRACT**

This article presents, in summary form, the most relevant facts of the Portuguese legislation for vibrations in the workplace. In 2002, the European Parliament approved a directive on the exposure of workers to the risks arising from vibrations, which aims to introduce, at the community level, minimum requirements for the protection of workers who, in the course of their work, are exposed to risks due to vibrations. All the countries of the European Union had to adapt their legislation to the minimum requirements set out in this directive. The vibrations transmitted to workers can be by the hand-arm system, through the palm and fingers of the hand, or to the whole body, transmitted through the seat or feet by machines or vehicles in the workplace. Workers whose hands are regularly exposed to hand-arm vibration can suffer hand and arm tissue damage that causes symptoms collectively known as hand-arm vibration syndrome. Hand-arm vibration hazards affect people in many industries and occupations. The risks increase greatly with the use of higher-vibration equipment and with prolonged and regular use of such equipment. Exposure to high levels of whole-body vibration can endanger health and safety, and is known to cause or aggravate back pain and other diseases. The risks are greater when the amplitude of the vibrations is high, the periods of exposure are long, frequent, and regular, and the vibrations involve violent shocks and jolts. Vibration hazards can be eliminated and risks controlled and reduced to acceptable levels through good management practices. Vibration control measures have, in many cases, led to improved efficiency. Portuguese legislation establishes minimum standards for the control of risks resulting from vibrations transmitted to hand-arm and whole-body systems. National legislation may apply more favorable provisions than those required by the Directive and must not reduce the protection afforded to workers by any pre-existing national legislation.

**Keywords:** Vibrations at work, Portuguese legislation, Worki

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**INVESTIGATING INDOOR AND AMBIENT AIR POLLUTION OF RESIDENTIAL  
HOUSES WITH MICROPLASTIC PARTICLES**

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**ABSTRACT**

Plastic particles are everywhere in the living environment and food chain. These new yet pervasive materials have changed the way we live and revolutionized the modern world. Recent research has highlighted the possible adverse effects of exposure to microplastics on humans and the environment. The measurement of the data was done based on the sedimentation rate of particles in one square meter. In this study, the distribution, composition and morphology of microplastics in indoor air and residential environment were done. The data from this research showed that the main microplastics found in the indoor air samples were pieces or polyethylene fibers that were different from the particles in the outdoor air. The amount of microplastic particles in the indoor environment was significantly higher than the outdoor air.

**Keywords:** microplastic, air pollution, air quality

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**OSTEOPOROSIS BURDEN IN LOW SOCIOECONOMIC STRATA IN KARACHI,  
PAKISTAN**

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**ABSTRACT**

Osteoporosis is a devastating disease affecting approximately 10 million people in the United States , 80% of whom are women . The prevalence of osteoporosis in different settings ( India , Saudi Arabia) varies between 24 -9% . Similarly, in Pakistan prevalence for osteopenia and osteoporosis is 27- 44 % although it varies in different settings.

We conducted this cross-sectional study in a tertiary care hospital in Karachi catering lower and lower middle income population using convenient sampling technique. Demographic information is taken, weight and height measured and a questionnaire is used after informed consent to identify the risk factors like smoking or/and alcohol intake, menstrual history , family history of fractures , endocrine disorders , sedentary life style , rheumatic disorders , previous history of fractures , intake of medication for any chronic illness .Bone Mineral density is recorded by using Quantitative Ultrasound Scan of patients heel by a portable instrument (Hologic ) . Results are compiled in SPSS version 16 for statistical analyses. A total of 313 subjects were enrolled in the study with 33 males and 280 females with a male to female ratio of 1: 8 . 25(8%) subjects had normal BMD , 187(60%) had osteopenia and 101 (32%) had osteoporosis Age range is categorized in 15-30yrs , 31-45 yrs, 46-60 yrs and > 60 yrs . All age groups have shown a very high prevalence of osteopenia which is very alarming since the majority of subjects belonged to young- middle aged productive individuals which were students and mothers.

**Conclusion:** The prevalence of osteoporosis and osteopenia is alarmingly high in this study and needs immediate facilitation in health system planning and policymaking to reduce the morbidity and mortality related to this hidden condition .



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**SUSTAINABLE ENERGY SOLUTIONS IN A CHANGING WORLD**

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**ABSTRACT**

The energy transition is deploying in an accelerated way giving broad access to renewable energy opportunities faster and easier. The energy sector faces real challenges in terms of diversification of energy sources and supply. Moreover, conversion and storage of energy are directly connected to the growing potential and use of renewable energy sources (RES) and the developed breakthrough technologies. Fuel Cell and Hydrogen (FCH) energy systems are regarded as one of the best paths for the energy transition, providing multiple prospects for resilience and improvement of the economics of energy supply systems. FCH technologies and large scale battery development emphasizes on particular social goals and market drivers, such as reducing carbon emissions, reducing dependability on supply and dropping consumption of fossil fuels. Furthermore, various aspects have to be addressed in a straightforward way for the accelerated deployment and market penetration of breakthrough innovations, such as policy issues, evaluation and barriers to deployment, market potential, alternative applications. FCH technologies systems and innovative batteries are considered to be one of the best paths to store, convert and exploit the energy generated from intermittent renewable sources. The aim of the present research is to give an overview of the existing clean technologies for production, conversion and storage of energy in line with the circular economy objectives.

**Keywords:** Fuel cells and hydrogen, batteries, energy storage, hydrogen economy, circular economy

**ACKNOWLEDGMENTS**

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**THEORETICAL PREDICTION AND AGING EXPERIMENTAL VERIFICATION  
OF THE SERVICE LIFE OF VACUUM INSULATION PANELS**

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**ABSTRACT**

Under the background of "double carbon" target, the Vacuum Insulation Panel (VIP), the new high-efficiency thermal adiabatic material, has been widely concerned all over the world. The excellent performance is the advantage, but the service life is the key consideration to its application and promotion. The components and insulation mechanism of VIP was introduced. And the numerical prediction model of service life, based on Schwab, was established. The influence of temperature, humidity, size and other factors on service life were involved and analyzed. Experimental VIP with glass fiber core, polyester based composite membrane barrier was prepared. The change rule of thermal conductivity of VIP versus temperatures, humidity, alternating high and low temperatures and sizes were experimentally explored. The results shew that, the thermal conductivity changed sharply while the temperature exceeded 97 °C, and it increased with the temperature increased. While the range of relative humidity was 30% RH to 50% RH, the thermal conductivity changed flatly. The thermal conductivity increased with the relative humidity (over 50%RH) increasing. In the alternating high and low temperature experiments, it has been found that the growth rate of thermal conductivity of vacuum insulation panel was large at high and small at low temperatures. The experimental measured values were compared with the model calculated values. The results shew that the change pattern was consistent overall, and the error was within 0.6%. The reliability of this numerical prediction model was verified. The article also proposes a performance optimization scheme for studying the influential factors of service life.

**Keywords:** Vacuum insulation panel, Thermal conductivity, Service life, Predictive models, Aging experiments.

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**IN SILICO MODELING STUDIES OF CYCLIC SULFONAMIDE DERIVATIVES AS  
POTENT INHIBITORS OF SARS-COV-2 VIA 2D-QSAR**

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**ABSTRACT**

At the end of 2019, a cluster of pneumonia cases occurred in Wuhan, China. It then quickly spread to other parts of the world causing a pandemic situation popularly termed as Coronavirus (CoV) Disease-2019 (COVID2019). It has highlighted an urgent need for the development of new antiviral drugs. In this investigation, in silico studies were performed using the quantitative structure-activity relationship (QSAR) between biological activity against SARS-CoV-2 and the molecular structures of twenty-nine cyclic sulfonamide derivatives to predict the anti-SARS-CoV2 activity. The quantum chemistry DFT-B3LYP/6-31G method was used to optimize the complete set of cyclic sulfonamide derivatives, then various classes of molecular descriptors have been generated using the Chem3D software. The principal component analysis (PCA) was used to eliminate redundant and non-significant descriptors. After that, statistically robust models were developed using multiple linear regression (MLR) techniques, corresponding to the rigorous Organization for Economic Co-operation and Development (OECD) requirements. Furthermore, all derived models were subjected to thorough external and internal statistical validations, Y-randomization, and applicability domain. The drug-likeness properties of the compounds with the greatest activity value were also calculated using Lipinski rules properties.

**Keywords:** SARS-CoV-2, QSAR, MLR, cyclic sulfonamide

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**THE NEUROBIOLOGY OF READING FICTION****Mereke Zeinollakizi**

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**ABSTRACT**

Literature and neurobiology seem to be two completely different fields of science. Literature is the world of works of art, and neurobiology is a branch of science that studies the function, development, genetics, pathology of the human nervous system, in short, the human brain. This article analyzes two objects at the same time: the object of literary study - the influence of the reception of a work of art on human cognition, intuition and consciousness, the object of the neurobiology of reading - a description in the scientific language of the changes that occur in the human brain when reading a work of art. The neurobiology of reading as a field of science has been actively analyzed and discussed in the scientific works of American linguists and literary critics, in articles by cognitive scientists and literary critics over the past twenty years. The purpose of the article is to take a step towards the introduction of the neurobiology of reading into the Kazakh literature. In the course of writing the article, such scientific methods as the comparative historical method, observation, compilation, clarification, hypothesis, analysis and compilation are used. Reading is a complex set of all verbal and non-verbal human cognitive skills: planning, planning, forecasting, critical thinking, memory, grammatical literacy, retention of new words in long-term memory and productivity, recognition of the content of what has been read. At present, the neurobiology of reading is not only an automatic mechanism for text recognition, but has also taken a course in recognizing cognitive functions carried out in the right and left parts of the human cerebral cortex. Since the neurobiology of reading is a new concept in the science of Kazakh literary study, the results of this scientific article allow using the book as a new teaching method, a different way of perceiving the artistic world, not only in the process of teaching fiction, but also in higher educational institutions.

**Keywords:** literature, neurobiology of reading, cognitive skills, consciousness, human brain

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**SENIOR HOUSING COMMUNITIES IN ALBERTA: INDEPENDENT AND ASSISTED LIVING**

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**ABSTRACT**

Canada's fourth most populous province is Alberta. An estimated 4.4 million people live in Alberta (Kertis, 2022). Alberta is a landlocked province with various climates. The older population in Alberta is growing, which will be one in five by 2046. <sup>2</sup>Estimated 715,000 Albertans are now over 65 and have become senior as of June 30, 2022. In Alberta, retirement living provides excellent opportunities for aging adults. (Kertis, 2022) Edmonton and Calgary are the most common cities in Alberta for retirement living. These cities have more options for choosing old houses, city life attractions, lifestyles etc.; when selecting the best kind of retirement houses, the level of care needs to be reminded during choosing retirement houses in Edmonton or Calgary or anywhere in Alberta. Many services are available that improve the feeling of well-being and make the place livable. The average monthly cost of senior housing in Alberta is estimated at \$2500 per month (Kertis, 2022). The Alberta Senior Citizens Housing Association represents all residents and communities in taking care of Alberta's senior citizens. The article discusses the seniors in Alberta and their safe and accessible accommodation after retirement for lonely seniors. The article's outcome is to understand the scenarios of Alberta senior housing and their protection through resilience. The methodology has been conducted by documentary analysis. The feature question is, why do seniors want to stay in their own houses even in old age?

**Keywords:** Senior, Housing, Resilience, Retirement Accommodation, Alberta, Freedom, Independent Living, Amenities, Safety and Security, Community Living, Care and Well-being, Assisted Living.

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<sup>2</sup> Resources to help seniors age in their community. Alberta's aging population. Paragraph 1<sup>st</sup>.

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**COMPARATIVE STUDY OF COMPRESSIVE AND FLEXURAL STRENGTH OF M30  
GRADE OF CONCRETE USING COCONUT SHELL AS COARSE AGGREGATE  
REPLACING MATERIAL**

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**ABSTRACT**

It is found that so many wastes which can be used in traditional concrete as replacement of original constituent. The coconut shell is also a main waste which can be used in traditional concrete. Generally, coconut shells are used in traditional concrete in the form of coconut shell aggregate and coconut shell fibre. This paper describes coconut shell used as replacement of coarse aggregates. The compressive and flexural strength test were conducted based on 10%, 20% and 30% replacement of coarse aggregate to coconut shells. It is observed that the compressive strength of concrete is reduced in some extent and the flexural strength also reduced as replacement of coconut shell is increased, but the 10% replacement is possible to use in construction work and 20% and 30% replacement are possible to use for less important construction work under some conditions. It is found that, workability of concrete is increased than traditional concrete as percentage replacement is increased. Total cost of concrete is get reduced by replacement of coarse aggregate to coconut shells. The volume of concrete is also increased as replacement is increased, hence, the total quantity of concrete required is getting reduced and the cost is again getting reduced. Finally, this paper concluded that, the possibility of using coconut shell as a replacement of coarse aggregate is economical

**Keywords:** Coconut shell, compressive strength, flexural strength, workability, waste material, coarse aggregate.

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**APPLICATION OF GEERT HOFSTEDÉ'S MODEL; ASSOCIATION BETWEEN  
CULTURE AND MANAGEMENT PRACTICES WITH REFERENCE TO RIO  
GRANDE DO SUL, BRAZIL**

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**ABSTRACT**

In the globalized world, people have to work with people of different cultural heritages. Cultural differences should be taken in to account when communicating and interacting across nations and across cultures within nations. Understanding the cultural traits is regarded as the starting point for managers working across cultures. Cultural differences should be taken in to account when communicating and interacting across nations and across cultures within nations. The live socio-cultural experiences of the author gathered through interaction with Brazilians when she went through Group Study Exchange Programme of Rotary International is the spotlight of the paper. Learning different cultures and languages help us appreciate diversified cultures and enable us to overcome culture shock successfully when we visit foreign country or when the foreigners visit us. It is very difficult to create a cultural framework which succeeds in being diverse to capture all the differences between cultures with universal application. Cultural adaptation though difficult is not impossible.

**Keywords:** Power distance index, Uncertainty Avoidance Index, proxemics, Collectivism, Masculinity, Femininity



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**COUNTING OF SOME CLASSES OF LATTICES ON UPTO THREE  
REDUCIBLE ELEMENTS****A. N. Bhavale****B. P. Aware****ABSTRACT**

In 2002, Ern  et al. counted distributive lattices with  $k$  elements. In 2012, Cz dly et al. counted recursively number of slim, semimodular lattices of given size. In 2019, Kohonen counted modular lattices upto 30 elements. In 2020 Bhavale and Waphare counted RI lattices (The class of lattices in which all the reducible elements are comparable) on  $n$  elements for arbitrarily large  $n$ . In this paper we are going to count the classes of modular, distributive, slim, semimodular lattices, which are RI lattices containing three reducible elements.

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**INNOVATION OF LIGHTERING SEMICONDUCTOR REFRIGERATION  
CONTAINER WITH VACUUM INSULATION PANELS EMBEDDED IN  
ENVELOPES**

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**ABSTRACT**

Research and application of thermal insulation materials have become an important way for global energy conservation and CO<sub>2</sub> emission reduction. Vacuum insulation panels (VIPs) with excellent adiabatic properties attract worldwide attention. VIPs are widely used in building insulation, household appliances, cold chain logistics, and other fields. The study of VIPs in China started at the beginning of the 21st century. There are a lot of research achievements on VIPs packaging, internal core material, and microscopic scale. In fact, VIPs are installed as an envelope structure. The thermal insulation effect is not only affected by the performance of VIPs, but also by different installation sequences. In cold chain transportation, the relative position between cold source and VIPs has an important influence on the overall thermal insulation. In this paper, the influence of the relative position of VIPs and refrigeration devices on the insulation effect was studied. Two installation positions were designed. One was “VIPs -temperature guide plate - refrigeration device”, defined as internal insulation (INI), in which the VIPs were placed on the innermost side, wrapped with the temperature guide plate, and the refrigeration device was placed close to the temperature guide plate. The other was “temperature guide plate - refrigeration device - VIPs, described as external insulation (EXI). Thermo Electric Cooler (TEC) was adopted as a refrigeration device. The physical model and numerical heat transfer model were established. The results of the experiment and simulation are analyzed synthetically. It was found that the insulation effect was much better when the VIPs were in INI design, and the maximum duration was 35 hours. Moreover, the internal temperature distribution of the collector was more uniform, and the cold quantity was not easy to dissipate. In a word, experimental results provide a practical reference for applying VIPs coupled semiconductor refrigeration in cold chains.

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**A STUDY ON GREEN VACUUM INSULATION PANEL PREPARED WITH RECYCLED COTTON CORE**

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**ABSTRACT**

Vacuum insulated panels (VIP) are considered to be the most promising super insulation material to date. It has the double advantage of saving energy and improving space utilization. However, the high cost of core limits its application. With the continuous promotion of the national carbon neutral strategies, energy-saving and emission-reduction technologies have gained worldwide attention. A new type of VIP with recycled and economical cotton fiber core material was innovated in this paper. The thermal conductivity was experimentally and mathematically analyzed. A vacuum measurement device was designed to analyze the variation of thermal conductivity of VIP under different pressure conditions. Three typical barrier envelopes were presented and their performance parameters were measured to investigate their adiabatic properties. Three typical barriers, respectively AF, MF-I, MF-II, were involved to investigate the effect of sustainability. The results showed that the VIP with AF as the barrier layer may perform well than other VIP considering the service life and thermal conductivity. The VIP with cotton fiber core material not only have good thermal insulation performance but also have the characteristics of low price and environmental protection. As a potential candidate for the VIP core material, the recycled wasted cotton fiber core material is a new development direction.

**Keywords:** Vacuum insulation panels, Effective thermal conductivity, Recycled cotton core, Fibrous cotton core, gas pressure, predicting model

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**A REAPPRAISAL OF KARL MARX'S CRITIC OF CAPITALISM: GLOBAL  
SYSTEM FOR MOBILE COMMUNICATION (GSM) NETWORK PROVIDERS IN  
NIGERIA AS CASE STUDY****Olubanjo-Olufowobi, Olufunso***Philosophy/Religion Department**Mountain Top University***ABSTRACT**

Communication which is the exchanging of information is fundamental to the existence and survival of humans as well as to an organization for it involves the process of creating and sharing ideas, information, views, facts, and feelings from one place, person or group to another. *Of a significant form of electronic media is the telecommunication which is a range of information-transmitting technologies and communications infrastructures, such as wired phones; mobile devices, for example cellphones; microwave communications; fiber optics; satellites; radio and television broadcasting; the internet; and telegraphs.* The quantum development in the telecommunication industry all over the world is very rapid as one innovation replaces another in a matter of weeks. A major breakthrough is the wireless telephone system, which comes in either fixed wireless lines or the Global System for Mobile Communication. With the introduction of GSM, Nigerians have access to different services which have helped to stimulate the Nigerian economy. In Nigeria, telecommunication has been made efficient and cost effective through the private sector in the last twenty-one years. Prior to these years, telecommunication sector which was owned, managed and controlled by government player called Nigerian Telecommunication Limited (NITEL) was inefficient. Yet, people like Karl Marx are against private ownership of property. This work with the use of pragmatic method aims at discussing the roles of capitalism in telecommunication sector in Nigeria with particular reference to global system for mobile communication (GSM) network providers' roles in the socio-political and socioeconomic development of the country. Hence, advocates for the adoption of humanistic capitalism; a form of capitalism that gives priority to human dignity and well-being above profit/market.

**Keywords:** Capitalism, Communication, Economy, Humanistic, GSM, Karl Marx

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**CAN BLENDED LEARNING STRATEGY HELP BRIDGE THE GENDER GAP IN  
BIOLOGY CLASSROOMS?****Umar Ayotunde Adam***Department of Science and Technology Education, Lagos State University***Soladoye Lameed***Department of Science and Technology Education, Lagos State University***Uthman Mariam***Department of Science and Technology Education, Lagos State University***Benjamin Benson Ayodele***Department of Science and Technology Education, Lagos State University***ABSTRACT**

The performance gap between male and female students in biology have been acknowledged by science educators around the world, and there have been several attempts and interventions through research and workshops to overcome these gaps. This study examined whether using blended learning strategy as an intervention would improve the performance of female students relative to male students in senior school biology in Alimosho, Nigeria. A total of 75 biology students in senior secondary year two (SS2) comprising 42 males and 33 Females participated in the study. The average age of the students was 14 years. The research design was quasi-experimental (a pre-test post-test non-equivalent group) design. The instrument used to gather data was the variation and evolution achievement test (VEAT) which had a reliability coefficient of 0.76. The experimental group was taught with the blended learning strategy while the control group was taught with the conventional lecture method. The data (pre-test and post-test scores) collected were analysed using ANCOVA since the participants were not randomly assigned to the groups. The study found no statistically significant difference between the performance of the male and female students [ $F(1,37) = .46; p > .05$ ]. While there was a statistically significant difference in the achievement of students taught using the blended learning and those taught using the conventional lecture method [ $F(1,72) = .00; p < .05$ ]. Hence, the study concluded that the use blended learning strategy can help bridge the gap between male and female students' performance in biology and overall, boost the performance of the students. Recommendations which concern the government, school owners and biology teachers for the implementation of the findings of this study and further research were made

**Keywords;** Gender, Biology, Blended learning strategy, Achievement

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**INSIGHTS ON PROSPECTS OF NOVEL NSAID PRODRUGS IN THE  
MANAGEMENT OF GASTROINTESTINAL TOXICITY**

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**ABSTRACT**

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly used therapeutic groups of agents in the world for the treatment of pain, inflammation and fever. However, their utility is inadequate due to a higher prevalence of gastrointestinal damage such as gastric ulceration, perforation and their allied complications. These findings suggested that the safety of these agents in long-term usage is questionable, and some of these therapeutic agents have been withdrawn from the market. As a result, the preliminary enthusiasm for development of selective COX-II inhibitors has been distressed, but the prerequisite for safer design and development of NSAIDs remains. For a long time, it has been recognized that the involvement of several reactive oxygen species (ROS) and free carboxylic acid (-COOH) groups are accountable for gastric ulcer formation accompanied by long-term NSAIDs usage. These findings suggest that antioxidant compounds may be beneficial in preventing NSAID-induced gastric ulcers. It has been anticipated that the concomitant usage of NSAIDs and antioxidant compounds may reduce the peril of gastrointestinal (GI) toxicity, and make the remedy harmless. These conjugated NSAIDs liberate the parent molecules after absorption by enduring chemical or enzymatic hydrolysis. Thus, the synthesis of these hybrid compounds with/without spacer groups as gastrosparring agents would likely found to be chemically stable, biolabile, and show retention of analgesic and anti-inflammatory potential while having significantly lower ulcerogenicity. The lack of ulcerogenicity of these hybrid molecules can be accredited to the antioxidants and enhanced physicochemical characteristics.

**Keywords:** NSAIDs, prodrugs, gastric ulcers, ulcerogenicity, inflammation, reactive oxygen species.

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**GENETIC ALTERATION AND ROLE OF MELATONIN IN THE MANAGEMENT OF  
ALZHEIMER**

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**ABSTRACT**

Approximatley 47 million individuals are suffering from dementia all across the globe and it is expected to increase by three times i.e., about 131 million by 2050. The most important causes of dementia are Alzheimer's disease (AD). AD is a severe age-related neurodegenerative disorder characterized by short-term memory loss, aphasia, mood imbalance, and executive function. Although the etiology of AD is still unknown, and the exact origin of the disease is still under review, the major hypothesis behind development of AD is an aggregation of Amyloid  $\beta$  ( $A\beta$ ) plaques or neurotoxic  $A\beta$  oligomer outside the neuron. Current evidence showed that the processing of amyloid precursor protein (APP) by  $\beta$  secretase and  $\gamma$  secretase leads to the production of abnormal  $A\beta$  monomer. This aggregation of  $A\beta$  and NFT is promoted by various genes like BACE1, ADAM10, PIN1, GSK-3, APOE, PPAR $\alpha$ , etc. Identification of these genes can lead to discover a number of therapeutics targets that have been useful to study the pathogenesis and underlying treatments. From recent studies, it can be concluded that melatonin modulates the activities of these gene thereby reducing  $A\beta$  production and increasing its clearance. Melatonin also reduces the expression of APP by attenuating cAMP thereby enhancing the non-amyloidogenic process. In the present manuscript, author explore and discuss the neuroprotective role of melatonin against  $A\beta$ -dependent AD pathogenesis. Authors also discussed the potential molecular and genetic mechanism of melatonin on the production and clearance of  $A\beta$  that could ameliorate neurotoxicity.

**Keywords:** neurological disorder; Alzheimer disease; melatonin; genetic manipulation; hormonal disbalance; biochemical

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**BÖLGESEL OKULLARDA EĞİTİM ÖRNEKLERİ ANALİZİ**

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**ÖZET**

Çevrenin insan algısı, insan yaşamına "kalkınma için sürdürülemez" olarak katkıda bulunmuştur. Kaynakları sürdürmek yerine çevreyi manipüle eden insan faaliyeti nedeniyle insan varlığının istikrarsız olduğu bir durum. İnsanlar, çevreyi korumayı görmezden gelmenin yanı sıra artan bir kullanım haline gelebilir, bu da muhtemelen böyle bir çevresel felakete neden olabilir. Bakış açısı farklılıkları gerçekten de insanın ekolojik bütünlüğünü azaltabilir, ki bu o zaman aslında doğayla hem mekansal hem de zamansal bağlantıya sahiptir. İnsanlar, doğayla ilişki kurmaya istekli katılımcılar olarak varoluşta bir etkiye sahiptir. İnsanlar hala doğayı istedikleri gibi kullanabilirler ya da sürdürülebilirlik, sükunet ve canlı bir uyum sağlamak için doğayı bilincine göre denetleyebilirler. Bu çalışmanın amacı, bir banliyö okulunda eko pedagojik okulların nasıl yapılandırıldığını bilmek ve anlamak olacaktır. Bu tür araştırmalar, böyle bir durum çalışması yöntemiyle nitel bir araştırma yaklaşımı kullanır. İkincil veri toplama yöntemleri, mevcut literatür ve dokümantasyon çalışmaları ile gözlemler ve görüşmeler gibi veri toplama yöntemlerini kapsar. Elde edilen bulgulara göre, banliyö okullarında kullanılan eğitim dizisi rasyonalist bir eğilim, dini bir örüntü ve ilerlemeci bir örüntüdür. Konu alanlarının ve öğrenme destek işlevlerinin dahil edilmesi yoluyla öğrencilerin potansiyel büyümesine odaklanan eğitim eğilimi.

**Anahtar Kelime:** Ekopedagojik, Eğitsel Örüntüler; sürdürülebilir kalkınma.



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**EDUCATIONAL PATTERNS IN SUBURBAN SCHOOLS ANALYSIS****ABSTRACT**

Human perception of the environment has contributed to human life as "unsustainable for development." A circumstance wherein human existence is unstable because of human activity which manipulate the environment instead of sustaining the resources. Humans can become increasingly use as well as ignore to maintain the environment, likely to result in such an environmental catastrophe. Viewpoint discrepancies could indeed reduce the human ecological integrity, which then in fact have such both spatial and temporal connection with nature. Humans have an impact in existence as participants with eagerness to engage with nature. People can still use nature according to their will, or they may oversee nature to his\her consciousness in order to achieve sustainability, tranquility, as well as living harmony. The goal of this study would be to know and understand how the configuration of eco pedagogic schools in a suburban school. Such research uses a qualitative research approach with such a method of case study. Secondary methods for data collection encompass existing literature and documentation studies, as well as methods for collecting data such as observations and interviews. As according to findings, the education sequence being used suburban schools is a rationalist trend, a religious pattern, and a progressive pattern. The educational trend which concentrates on students' potential growth thru the inclusion of subject areas and learning support functions.

**Keywords:** Ecopedagogic, Educational Patterns; sustainable development.

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**THE ROLE OF ORAL LITERATURE IN CHILD EDUCATION**

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**ABSTRACT**

This article demonstrates Kazakh folklore in animated films, which are directly related to children's education today. It is a bitter truth that in the civilized age, where science and technology have developed together, we have begun to lose touch with our common Turkish values of yesteryear. One of the reasons for this is that the Kazakh folklore heritage does not take its proper place on the internet, the internet space. Therefore, to instil this folklore heritage in the younger generation, it is necessary to study their portraits in one way or another. In the course of the study, it was proved in detail that along with mythical characters in prose folklore, it is necessary to create a unified list of heroic poems, love poems, and historical poems that are valuable exhibits of Kazakh folklore. In particular, in the performance of the popular images of the Kazakh people, such as "ER Tostik and The Dragon", "Karazhay batyr", "Koblandy batyr", as well as Aldar Kose, various genres of folk prose, in particular fairy tales, mythical stories, are filtered, which prove that the heroes have a lot to give to the younger generation. The purpose of the article is to instil in the minds of Kazakh children and Kazakh society as a whole the characters of our native oral literature, to prove the importance of their unification. In the course of the study, the authors of the article prove as much as possible that this gap should be filled by creating a gallery of folklore characters using the achievements of innovative technologies. The result of this issue will be interesting not only for young people but also for anyone who wants to learn about the spiritual heritage of the nation. When the art of speech takes its place in the minds and thoughts of our people, the demand of young people for folklore heritage and the desire for knowledge increases.

**Keywords:** Oral literature, child rearing, animated films, unification, character, innovative technologies, the younger generation, multi-faceted.

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**DESIGN OF NEW ANTI-BREAST CANCER INHIBITORS VIA COMPUTER-AIDED  
DRUG DISCOVERY (CADD)**

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**ABSTRACT**

New anti-breast cancer drug research is known to be a difficult, costly, time-consuming and challenging project. Recently, computer-aided drug discovery (CADD) and computational methods have emerged as a potent and promising tool for faster, less cheap and more efficient drug design. This research tried to enhance and suggest novel anti-breast cancer drugs by studying the 3D-QSAR and molecular docking of thioquinazolinone derivatives with the aromatase enzyme (PDB ID: 3S7S). The best model with high  $r^2$  values has been built using comparative molecular similarity indices analysis (CoMSIA). The fitted model's predictive ability was checked using an external validation strategy based on a test set. The results indicated that the electrostatic, hydrophobic, and hydrogen bond donor/acceptor fields all had a vital role in the treatment of breast cancer. In light of these results, we developed a number of new potent aromatase inhibitors and used the most promising model to predict their inhibitory activities. Furthermore, the pharmacokinetic properties of drug candidates were analyzed using ADMET investigations.

**Keywords:** CADD; Cancer; Thioquinazolinone; QSAR; Molecular docking; ADMET.

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**KEY PERFORMANCE INDICATORS FOR ASSESSING FACULTY AND STAFF****Baan Jafar Sadiq***Prof. Dr. at College of Education for Women/ Baghdad University***ABSTRACT**

A key performance indicator (KPI) is a type of performance measurement that helps to understand how the organization, department, or institution is performing and allows one to understand if the institution is headed in the right direction or not. The current paper aims at assessing the faculty and staff by using metrics of KPI through analyzing the data collected from Baghdad University/ College of Education – Departments of English. Finally, the paper reveals the wrong direction of Baghdad University in managing the faculty and staff category by loading the staff with more hours without any rewards or even research grants and training broad thus, these reasons affect the learning process and the whole performance of the university. The Baghdad University would pay more attention to its staff by increasing the number of instructors and employees and sending the staff for training and rewarding the production staff for improving the performance of the university. Baghdad University is one of the ancient universities and it should keep the attention to the global list of universities.

**Keywords:** KPI, faculty and staff, Assessing, performance measurement

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**SOME BASIC PROPERTIES AND CONNECTIVITY INDICES  
OF WEAKLY ZERO-DIVISOR GRAPH OF A RING****SHABIR AHMAD MIR***Department of Mathematics, Aligarh Muslim University, Aligarh-  
202002, India***NADEEM UR REHMAN****ABSTRACT**

Consider  $R$ , a commutative ring with unity  $1 = \{0\}$ ,  $Z(R)$  denotes the set of zero-divisors of  $R$  and  $Z^*(R) = Z(R) \setminus \{0\}$ . The notion of weakly zero-divisor graph, denoted by  $W\Gamma(R)$ , was given by Mohammad et al. [?] in which the vertex set is the set of nonzero zero-divisors of  $R$  and adjacency relation is followed by two distinct vertices  $u$  and  $v$  if and only if there exists  $r \in \text{ann}(u)^*$  and  $s \in \text{ann}(v)^*$  such that  $rs = 0$ , where  $\text{ann}(u) = \{v \in R; uv = 0, \text{ for } u \in R\}$ . It can be note that  $\Gamma(R)$  is a spanning subgraph of  $W\Gamma(R)$ . In this paper, we study some basic properties of weakly zero-divisor graph of the ring  $Z_p \times Z_q \times Z_r$ , denoted by  $W\Gamma(Z_p \times Z_q \times Z_r)$ , where  $p$ ,  $q$  and  $r$  are prime numbers greater than 2 and not necessarily distinct. Further, we discuss about Weiner index, Gutman index, first K Banhatti index, second K Banhatti index, Forgotten topological index, Forgotten topological coindex and degree distance index of  $W\Gamma(Z_p \times Z_q \times Z_r)$ .

**Keywords:** Weakly zero-divisor graph, topological indices, graph parameters**Subject Classification:** 05C10, 05C12, 05C25.**YONCA HORTUMLU BÖCEĞİ ZARARLISI BİYOLOJİK YAŞAM DÖNGÜSÜ VE  
MÜCADELESİ**

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**ÖZET**

Yem bitkileri ekolojik istekler açısından çok seçici olmayan, protein ve karbonhidrat içerikleri dengeli kaliteli ve ucuz kaba yem kaynaklarıdır. Yem bitkileri içerisinde dünyanın hemen hemen her yerinde yetişme alanı bulabilen, Dünya’da ve Türkiye’de yem bitkileri içerisinde en fazla yetiştiriciliği yapılan yonca uzun ömürlü çok yıllık bir bitkidir. Geniş uyum yeteneği, yüksek ot verimi ve besleme değeri, uzun ömürlülüğü, biçim sayısının yüksekliği gibi özellikleri ile yem bitkileri arasında çok önemli bir yer almaktadır. Yonca tarımında biyotik ve abiyotik birçok etmen büyük ölçülerde ekonomik kayıplar meydana getirmektedir. Bu biyotik etmenlerden birisi olan Yonca hortumlu böceği, *Hypera postica* (Gyllenhal, 1813) yonca üretim alanlarının başlıca zararlıları arasındadır. Yonca tarımında önemli ekonomik kayıplara neden olan zararlıların biyolojisi, tanımlanması uygun mücadelenin başlatılmasında büyük önem arz etmektedir. Bu çalışmada, zararlıların biyolojik yaşam döngüsü, şeker pancarındaki zarar semptomları ve ekonomik zarar eşiği altında tutmak için uygun mücadele yöntemleri incelenmiştir.

**Anahtar Kelimeler:** Yonca hortumlu böceği, *Hypera postica*, yonca zararlıları

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**BIOLOGICAL LIFE CYCLE AND CONTROL OF THE CLOVER PEST****ABSTRACT**

Forage crops are low-quality and inexpensive roughage sources that are not very selective in terms of ecological demands and whose protein and carbohydrate contents are balanced. Alfalfa is a long-lived perennial plant that can be grown in almost every part of the world among forage crops and is the most cultivated among forage crops in the world and in Turkey. It has a very important place among forage crops with its wide adaptability, high forage yield and nutritional value, longevity, high number of forms. Many biotic and abiotic factors in alfalfa cultivation cause economic losses to a large extent. Alfalfa proboscis beetle, *Hypera postica* (Gyllenhal, 1813), which is one of these biotic factors, is among the main pests of alfalfa growing areas. The biology and identification of the pest, which causes significant economic losses in alfalfa cultivation, is of great importance in initiating appropriate control. In this study, the biological life cycle of the pest, the damage symptoms in sugar beet and the appropriate control methods to keep it under the economic damage threshold were examined.

**Keywords:** Alfalfa proboscis beetle, *Hypera postica*, clover pests

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**THE USE OF DIFFERENT RESTRICTION ENZYMES FOR REDUCED-REPRESENTATION SEQUENCING IN CHICKPEA****Duygu SARI**

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**ABSTRACT**

Reduced-representation sequencing (RRS) is a next-generation sequencing technology (NGS) platform which plays important roles in genetic diversity, gene/QTL mapping, linkage map construction, marker assisted selection (MAS) studies on a genome-wide scale. In different NGS platforms, RRS is more feasible for high diversity and large genome species. It provides low-cost adapters and highly multiplexed system for SNP discovery. In this approach, genome complexity is reduced by one or two restriction enzymes to produce multiplex sampling for lower cost sequencing. The type of restriction enzymes affects the number and position of fragments represented in RRS libraries, which in turn influences the number and genomic position of SNPs. Here we reported optimum restriction enzyme within *silico* distribution of digested fragments suitable for sequencing among the *ApeKI* (partially methylation sensitive), *PstI-MspI* (methylation sensitive-partially methylation sensitive) and *PstI-TaqI* (methylation sensitive-methylation insensitive) enzymes across the chickpea reference genome with the GBSX toolkit integrated Galaxy™ which is web-based cloud computing system. Results revealed that *ApeKI*, *PstI-TaqI* and *PstI-MspI* enzymes created approximately 266917, 540627 and 84129 fragments varied from 100 to 1000 bp. Genome reduction with double digestion system provides the higher number of fragments and also potentially more SNPs in chickpea.

**Keywords:** chickpea, restriction enzyme, RRS, SNPs



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**ŞIRNAK İLİ SÜT SIĞIRI İŞLETMECİLERİ ÜZERİNE BİR ARAŞTIRMA**

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**ÖZET**

Bireylerin yaşamı için gerekli hayvansal gıdalardan olan et ve süt ürünlerinin %85-90'ı sığır grubu çiftlik hayvanlarından elde edilmektedir. Ülkemizde üretilen sütün %90'ı ineklerden, %9'u koyun ve keçilerden, geriye kalanı ise mandalardan elde edilmektedir. Süt üretiminin büyük paydaşı olan süt sığırlarının strese girmeden verimli olabilmesi için barınak yapısının elverişli olması, hayvanların bakımın ve beslenmesinin uygun olarak yapılması gerekmektedir. Şırnak İli genelinde süt sığırcılığının mevcut durumunun belirlenebilmesi için bölgeyi temsil edebilecek 20 adet süt sığırı işletmesinde anket ve saha çalışması yürütülmüştür. İşletmeler aile bireyleri tarafından yönetilmekte, iş ve işlemlerin tamamı kendilerince yerine getirilmektedir. Etüt edilen işletmelerin tamamı bağlı duraklı barınaklar halinde planlanmıştır. Araştırma yapılan işletmelerin çoğunluğu işletme sahiplerinin ikamet ettiği konutun altında veya çok yakınında konumlandırılmış ev tipi işletmelerdir. Bu tip işletmelerde barınakların konut biçiminde olmasından dolayı yetersiz havalandırma ve alan yetersizliği gibi yapısal eksikliklerle karşılaşabilmektedir. Etüt edilen işletmeler arasında işletme bünyesinde çalışan sorumlu bir veteriner hekim bulunmamaktadır. İşletmelerin tamamı merkeze yakın bir konumda bulunduğundan il ve ilçe merkezinde bulunan veteriner kliniklerinden veteriner hekim hizmetine ulaşabilmektedirler. İşletmelerde hayvanların suni tohumlama uygulamalarında veterinerlik hizmeti alınırken, koruyucu hekimlik uygulamaları konusunda yeterli düzeyde bir hizmet alınmadığı gözlemlenmiştir. İşletme sahiplerinin hayvancılık konusunda bir eğitim alma durumları sorulduğunda herhangi bir eğitim alınmadığı, geleneksel yöntemler ile hayvancılık yaptıkları görülmektedir. İşletme sahiplerinin ortalama yaşı 44 olarak bulunmuştur. İşletmecilerin eğitim düzeyleri ise %85 oranında ilk ve ortaokul, %10 oranında lise ve %5 oranında ise lisans seviyesi olduğu ortaya çıkmaktadır. İşletme sahiplerinin %5'i 10 yıl ve altı bir süredir hayvancılık faaliyeti yürütmekteyken, %25'i 11-15 yıl arası, %40'ı 16-20 yıl arası ve %30'u ise 20 yıl ve üstü zamandır hayvancılık faaliyeti yürütmektedir. İşletme sahiplerinin hayvancılık yapma süreleri, yaş ortalamaları ve eğitim durumları göz önünde bulundurulduğunda bölgedeki genç ve eğitilmiş bireylerin iş alanı olarak hayvancılığa yönelimlerinin oldukça az olduğu sonucu ortaya çıkmaktadır. İşletmelerde genellikle Simental ırkı hayvanlar yetiştirilmekte ve hayvan başına elde edilen süt verimi ise günlük ortalama 15,3 lt olarak ortaya çıkmaktadır. İşletmeler hayvan refahı yönünden değerlendirildiğinde yapısal ve beslenme ve bakım konusunda eksiklikler olduğu gözlemlenmiştir. İşletme sahiplerinin hayvancılık konusunda eğitim almaları, veteriner hizmetlerinin yaygınlaştırılması, yapısal eksikliklerin tamamlanmasının bölgede hayvancılığın geliştireceği ve hayvan başına süt veriminin yükseleceği öngörülmektedir.

**Anahtar kelimeler:** Tarımsal yapılar, süt sığırcılığı, süt sığırı işletmeciliği

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**A RESEARCH ON DAIRY CATTLE OPERATORS IN ŞIRNAK PROVINCE**

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**ABSTRACT**

85-90% of meat and dairy products, which are essential animal foods for the life of individuals, are obtained from cattle group farm animals. 90% of the milk produced in our country is obtained from cows, 9% from sheep and goats, and the rest from buffaloes. In order for dairy cattle, which is a major stakeholder in milk production, to be productive without stress, the shelter structure must be suitable, and the animals must be properly cared for and fed. In order to determine the current situation of dairy cattle in Şırnak Province, a survey and field study were carried out in 20 dairy cattle enterprises that could represent the region. Businesses are managed by family members, and all work and transactions are carried out by them. All of the surveyed enterprises were planned as shelters with connected stops. The majority of the surveyed businesses are home-type businesses located below or very close to the residence of the business owners. In this type of establishments, due to the fact that the shelters are in the form of housing, they can be met with structural deficiencies such as inadequate ventilation and lack of space. There is no responsible veterinarian working within the enterprise among the enterprises studied. Since all of the enterprises are located close to the center, they can access veterinary services from the veterinary clinics located in the city and district centers. It has been observed that while veterinary services are received in artificial insemination practices of animals in enterprises, an adequate level of service is not received in preventive medicine practices. When the owners of the enterprises are asked whether they have received training on animal husbandry, it is seen that they do not receive any training and they do animal husbandry with traditional methods. The average age of business owners was found to be 44. The education level of the operators is 85% primary and secondary school, 10% high school and 5% undergraduate level. While 5% of the business owners have been carrying out livestock activities for 10 years or less, 25% of them have been carrying out livestock activities for 11-15 years, 40% for 16-20 years and 30% for 20 years or more. Considering the length of time, average age and education level of the owners of the enterprises, it is concluded that the young and educated individuals in the region tend to animal husbandry as a field of work. Generally, Simmental animals are raised in the farms and the milk yield per animal is 15.3 liters on average per day. When the enterprises are evaluated in terms of animal welfare, it has been observed that there are deficiencies in structural and nutrition and care. It is foreseen that the owners of the enterprises should receive training on animal husbandry, expand the veterinary services, and complete the structural deficiencies, which will improve the animal husbandry in the region and increase the milk yield per animal.

**Keywords:** agricultural structures, Dairy cattle, Dairy cattle management

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**KEDİLERDE KASTRASYON OPERASYONUNDA İNTRATESTİKÜLER  
UYGULANAN LİDOKAİN VE BUPİVAKAİNİN ETKİNLİĞİNİN  
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**ÖZET**

Bu çalışmada kedilerde kastrasyon operasyonunda intratestiküler uygulanan lidokain ve bupivakainin etkinliğinin karşılaştırmalı olarak değerlendirilmesi amaçlandı. 20 kedi ırk ve yaş ayrımına bakılmaksızın iki gruba ayrılarak sedasyon amacıyla 80 mikrogram/kg medetomidin enjeksiyonu uygulandı. İlk gruba 4 mg/kg lidokain ikinci gruba 1 mg/kg bupivakain her iki testise eşit miktarda intratestiküler olarak enjekte edildi. Rutin yöntemlerle yapılan operasyonda hayvanların ensizyona ve funikulus spermaticusun çekilmesine verdiği tepkiler kaydedildi. Operasyon bittikten sonra hayvanlara atipamezol uygulanarak uyandırıldı ve 6 saat boyunca yarım saat aralıklarla hayvanların nabız sayıları, solunum sayıları ve ağrı skorları değerlendirilmeye alındı. Ağrı skorlarını değerlendirmek amacıyla UNESP-Botucatu kedi ağrı skalası, Grimace kedi ağrı skalası ve Glasgow kedi ağrı skalası kullanıldı. Grimace ve Glasgow ağrı skorunda postoperatif 150.dk ve 180.dk'da ki değerlendirmede gruplar arasında istatistiksel olarak anlamlı bir fark bulundu ( $p < 0.05$ ). Botucatu ağrı skorunda 60.dk, 90.dk, 150.dk, 180.dk, 300.dk ve 330.dk'da ki değerlendirmede gruplar arasında istatistiksel olarak anlamlı bir fark bulundu ( $p < 0.05$ ). Nabız ve solunum değerlerinde istatistiksel olarak anlamlı bir fark belirlenmedi ( $p > 0.05$ ). Sonuç olarak, kedi kastrasyon operasyonunda lidokainin analjezik etkinliğinin intraoperatif olarak daha güçlü olduğu, ancak uzun etkili bir lokal anestezi olan bupivakainin postoperatif analjezik etkisinin lidokainden daha güçlü olduğu sonucuna varıldı.

**Anahtar Kelimeler:** kedi, analjezi, lidokain, bupivakain, kastrasyon

**COMPARISON OF THE EFFICACY OF INTRATESTICULAR LIDOCAINE AND  
BUPIVACAINE DURING CASTRATION IN CATS**

**ABSTRACT**

In this study, it was aimed to evaluate the effectiveness of intratesticularly administered lidocaine and bupivacaine in castration in cats. 20 cats were divided into two groups regardless of breed and age. 80 microgram/kg medetomidine injection was administered for sedation. 4 mg/kg lidocaine and 1 mg/kg bupivacaine were injected intratesticularly in lidocaine and bupivacaine groups respectively. Castration operation was performed with routine methods. The reactions of the animals to the incision and the extraction of the funiculus spermaticus were recorded. After the operation, the animals were awakened by atipamezole. The pulse rate, respiratory rate and pain scores of the animals were evaluated for 6 hours at half-hour intervals. UNESP-Botucatu cat pain scale, Grimace cat pain scale and Glasgow cat pain scale were used to evaluate pain scores. A statistically significant difference was found between the groups in Grimace and Glasgow pain scores at the 150th min. and 180th min. postoperative evaluations ( $p < 0.05$ ). A statistically significant difference was found between the groups in Botucatu pain score at the 60th, 90th, 150th, 180th, 300th and 330th min. evaluation times ( $p < 0.05$ ). No statistically significant difference was found in the pulse and respiration values ( $p > 0.05$ ). As a result, it was concluded that the analgesic efficiency of lidocaine was stronger intraoperatively, on the other hand the postoperative analgesic effect of bupivacaine, a long-acting local anesthetic, was stronger than lidocaine in intratesticular use in the cat castration operation.

**Keywords:** cat, analgesia, lidocaine, bupivacaine, castration.

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**TERMİK SANTRALLERDEN ÇIKAN ATIK ENERJİ İLE SEBZE SERALARININ**  
**ISITILMASI**

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**ÖZET**

Elektrik enerjisi elde etmek için çeşitli enerji kaynakları kullanılmaktadır. Bunlar, termik kaynaklar, hidrolik kaynaklar, nükleer kaynaklar, güneş, rüzgâr, jeotermal gibi diğer kaynaklardır. Termik santraller, enerji santrallerinin bir türüdür. Kömür, fuel-oil, motorin veya doğalgaz gibi fosil yakıtların yakılması yoluyla elektrik üretirler. Bu tip santraller, birçok ülkede olduğu gibi ülkemizde de enerji açığını kapatmakta görev üstlenmeye devam etmektedir. Termik santralın bilançosu incelendiğinde, üretilen bir kilowatt için 4000 kilojoule'dan fazla bir enerjinin soğutma suyuna harcandığı bildirilmektedir. Soğutma suyu bir akarsudan alınırsa, bu suyun en çok 7-10°C arasında ısıtılmasına izin verilmektedir; bu da büyük bir debi gerektirmektedir. Bu nedenlerden ötürü, büyük santraller ancak debisi yüksek akarsuların üzerinde ya da deniz kıyısında kurulmaktadır. Bu durumda, termik santrallerin soğutma nedeniyle yol açtığı ısı artışı, su bitkileri hayvanları ve diğer canlılar için ciddi sorunlar yaratmaktadır. Termik santrallerin soğutulması amacıyla çıkan enerji seraların ısıtılmasında kullanılabilir. Böylece termik santrallerin soğutulma sorunu çözüldüğü gibi, seralarda en önemli girdi olan ısıtma masrafları da daha uygun bir şekilde çözülebilecektir. Bu bildiriye, termik santrallerin atık enerjisinin sera ısıtılmasında kullanılması anlatılacaktır

**Anahtar kelimeler:** Atık enerji, sera ısıtması, termik santral

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**HEATING VEGETABLE GREENHOUSES WITH WASTE ENERGY FROM  
THERMAL ENERGY CENTRALS****ABSTRACT**

Various energy sources are used to obtain electrical energy. These are other sources such as thermal, hydraulic, nuclear, solar, wind, geothermal. The thermal energy central generates electricity by burning fossil fuels such as coal, fuel-oil, diesel or natural gas. Such power centrals continue to undertake the task of closing the energy deficit in our country, as in many other countries. In a thermal energy central in order to produce one kilowatt energy, more than 4000 kilojoules of energy is spent for cooling water. If the cooling water is taken from a stream, this water is allowed to be heated to a maximum of 7-10°C; this requires a large flow rate. For these reasons, large energy centrals are only built on rivers with high flow rates or on the seaside. In this case, the increase in water temperature of lake or river caused for the cooling of thermal energy centrals creates serious problems for aquatic plants, animals and other living organisms. The waste energy of the thermal centrals can be used to heat greenhouses. Thus, the cooling problem of thermal centrals will be solved, and the heating costs, which are the most important inputs in greenhouses, will be solved more appropriately. In this paper, the use of waste energy of thermal centrals for the greenhouse heating will be investigated.

**Keywords:** Waste energy, thermal central, greenhouse heating

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**AKUT BÜLLÖZ KERATOPATİLİ BİR KEDİDE MEDİKAL TEDAVİNİN UZUN  
SÜRELİ SONUÇLARININ DEĞERLENDİRİLMESİ**

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**ÖZET**

Akut büllöz keratopati, genç erişkin kedilerde nadir görülen, hızla ilerleyen bir kornea hastalığıdır. Bu hastalık akut bir ödem alanının varlığı ile karakterizedir ve birkaç milimetre çap ile tam korneaya kadar değişebilen ödem (veya kabarcık) ile kendini gösterir. Birkaç küçük vezikül birleşerek daha büyük bir kabarcık oluşturabilir. Kedilerde büllöz keratopatinin etiyojisi ve patogenezi bilinmemektedir. Ancak klinik ve histopatolojik bulgular bir stromal defektin sorumlu olduğunu düşündürmektedir. Klinik olarak; hızlı kornea ödemi oluşumu, korneada büyük büllöz lezyonlar, kornea yumuşaması ve bazen kornea perforasyonu ile karakterizedir. Tanı, klinik semptomlar ve oftalmolojik muayene temeline dayanır. Tedavi edilmeyen kedi akut büllöz keratopatisi, hızla kornea perforasyonu ve göz küresinin yırtılmasına yol açtığından dolayı oftalmolojik aciller arasında yer alır ve sağaltım cerrahi müdahale gerektirir. Cerrahi sağaltım ile keratopatiye sebep olan kornea üzerindeki kabarcıkların uzaklaştırılması ve kornea ödeminin azaltılması amaçlanır. Bu çalışma akut büllöz keratopatiye sahip bir kedinin Hatay Mustafa Kemal Üniversitesi Veteriner Sağlık Uygulama ve Araştırma Merkezi Hastanesi'ne getirilmesi ve hasta sahibinin cerrahi müdahaleyi kabul etmemesi sonucu medikal tedavi yapılması ile bu tedavinin uzun süreli sonuçlarının değerlendirilmesini kapsamaktadır. Bu çalışma ile genel durum bozukluğu, kronik hastalık gibi nedenlerle anesteziye alınamayan ve bu yüzden cerrahi tedavi yapılamayan akut büllöz keratopatiye sahip kedilerde uygulanacak medikal tedavi prosedürü ve sonuçları ortaya konmuş olup hem klinisyen hekimlere hem de literatüre katkı sağlaması amaçlanmıştır.

**Anahtar Kelimeler:** Akut Büllöz Keratopati, Kedi, Medikal Tedavi, Prognoz

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**EVALUATION OF LONG-TERM RESULTS OF MEDICAL THERAPY IN A CAT  
WITH ACUTE BULLOUS KERATOPATHY**

**ABSTRACT**

Acute bullous keratopathy, a rare disease in young adult cats, is rapidly progressive a corneal disease. This disease is characterized by the presence of an acute area of edema and is manifested by edema (or bulla) ranging from a few millimeters in diameter to a complete cornea. Several small vesicles may coalesce to form a larger bulla. The etiology and pathogenesis of bullous keratopathy in cats are unknown. However, clinical and histopathological findings suggest that a stromal defect is responsible. Clinically; It is characterized by rapid formation of corneal edema, large bullous lesions on the cornea, corneal softening, and sometimes corneal perforation. Diagnosis is based on clinical symptoms and ophthalmologic examination. Untreated feline acute bullous keratopathy is among the ophthalmological emergencies because it rapidly causes corneal perforation and eyeball rupture and treatment requires surgical intervention. With surgical treatment, it is aimed to remove the bulla on the cornea leading to keratopathy and to reduce the corneal edema. This study includes the evaluation of the long-term results of a cat with acute bullous keratopathy brought to Hatay Mustafa Kemal University Veterinary Health Application and Research Center Hospital and medical treatment after the owner did not accept surgical intervention. In this study, the medical treatment procedure and results to be applied in cats with acute bullous keratopathy who cannot be anesthetized for reasons such as general condition disorder or chronic disease and therefore cannot be surgically treated, are presented and it is aimed to contribute to both clinicians and the literature.

**Keywords:** Acute Bullous Keratopathy, Feline, Medical Treatment, Prognosis



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**TRANSMİSSİBLE VENEREAL TÜMÖRE (TVT) BAĞLI OLARAK ŞEKİLLENEN  
ÜRETRAL RUPTURUN CERRAHİ OLARAK SAĞALTILMASI**

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**ÖZET**

Trafik kazaları, ateşli silah yaralanmaları, ısırık yaraları ve iyatrojenik yaralanmalar üretral yırtılmalara neden olabilmektedir. Üretrostomi, üretral lümen açığa çıkarıldıktan sonra penil mukozanın deriye dikilmesiyle kalıcı bir idrar saptırma işleminin oluşturulduğu cerrahi bir prosedürdür. Köpeklerde üretrostomi için en yaygın endikasyonlar arasında üretral travmalar, taş tıkanıklığı, stenoz, konjenital anomaliler ve neoplaziler bulunmaktadır. Üretrostomi erkek köpeklerde preskrotal, skrotal, perineal, transpelveik veya prepubik olmak üzere 5 farklı bölgeden uygulanabilmektedir. Üretrostominin tipini ve yerini ise üretral lezyonun yeri belirlemektedir. Enfeksiyöz sarkom veya venereal granuloma olarak ta bilinen Transmissible Venereal Tumor (TVT), her iki cinsiyette de görülen köpekler arasında çiftleşme yoluyla kontrolsüz bir şekilde yayılan iyi huylu retiküloendotelial tümördür. Tümör erkeklerde genellikle penisin kaudal kısmında dişilerde ise vajinal kanal içerisine yerleşir ve burada gelişim gösterir. Tümör lezyonları karnabahar görünümündedir ve üreme organından kan gelmesi ile klinik bulgu gösterir. Bu vaka çalışmasında penis bölgesinde kanama şikayeti ile Hatay Mustafa Kemal Üniversitesi Veteriner Sağlık Uygulama ve Araştırma Merkezi Hastanesi'ne getirilen 8 yaşında, melez ırkı, erkek köpeğin teşhisi ve tedavisi hakkında değerlendirmelere yer verildi. Sitolojik analiz sonucu TVT teşhisi konulan hastanın yapılan kan muayenesinde değerlerin çok düşük olmasından dolayı kemoterapiye hemen başlanamadı. Bölgedeki neoplaziye bağlı olarak şekillenen üretral kanalın rupturu sonucu zorunlu olarak perineal üretrostomi operasyonu uygulandı. Kan değerlerindeki düşüklük sebebiyle yara iyileşmesi gecikse de hasta tamamen sağlığına kavuştu. Bu vaka çalışmasında, TVT ye bağlı olarak meydana gelen üretral rupturun üretrostomi operasyonu yapılarak sağaltımının sunulması amaçlanmaktadır.

**Anahtar Kelimeler:** Köpek, Üretrostomi, Penis Amputasyonu, TVT

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**SURGICAL TREATMENT OF URETHRAL RUPTURE DUE TO TRANSMISSIBLE  
VENEREAL TUMORE (TVT)****ABSTRACT**

Traffic accidents, gunshot wounds, bite wounds and iatrogenic injuries can cause urethral ruptures. Urethrostomy is a surgical procedure in which a permanent urinary diversion is created by suturing the penile mucosa to the skin after exposing the urethral lumen. The most common indications for urethrostomy in dogs include urethral trauma, stone obstruction, stenosis, congenital anomalies, and neoplasia. Uretrostomy can be performed in 5 different regions in male dogs: prescrotal, scrotal, perineal, transpelvic or prepubic. The type and location of the urethrostomy is determined by the location of the urethral lesion. Transmissible Venereal Tumor (TVT), also known as infectious sarcoma or venereal granuloma, is a benign reticuloendothelial tumor that spreads uncontrollably through coitus between dogs of both sexes. The tumor is usually located in the caudal part of the penis in males and in the vaginal canal in females and develops here. Tumor lesions have the appearance of cauliflower and show clinical signs with blood coming from the reproductive organ. In this case study, evaluations were made about the diagnosis and treatment of an 8-year-old cross breed male dog brought to Hatay Mustafa Kemal University Veterinary Health Application and Research Center Hospital with the complaint of bleeding in the penile region. The patient, who was diagnosed with TVT as a result of cytological analysis, could not start chemotherapy immediately because the values were very low in the blood examination. Perineal urethrostomy operation was performed as a result of the rupture of the urethral canal due to the neoplasia in the region. Although the wound healing was delayed due to low blood values, the patient regained his full health. In this case study, it is aimed to present the treatment of urethral rupture due to TVT by urethrostomy operation.

**Keywords:** Dog, Urethrostomy, Penile Amputation, TVT

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**EVALUATION OF EFFICIENCY AND EFFECTIVENESS OF INTEGRATED  
VIRTUAL INSTRUCTION DURING LOCKDOWN CAUSED BY COVID-19  
PANDEMIC OUTBREAK IN SOKOTO STATE UNIVERSITY**

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**ABSTRACT**

The COVID-19 pandemic forced learning institutions across the world to employ virtual education during lockdown. Some of these virtual learning platforms can be found free on the Internet, while the most advanced ones are developed by the institutions themselves. These advanced platforms were made up of learning management systems that were used to integrate virtual instruction through audio, video, and text, e-mail, live chat sessions, online discussions, forums, quizzes, and assignments. Through these kinds of electronic systems, the delivery of instruction and discourse between teachers and learners can be accomplished. Thus, this study aims to assess the integration of virtual education at Sokoto State University. The study employs a survey research design. An online questionnaire made from Google forms was shared on all students' social media platforms, including WhatsApp groups, the Facebook handle of the university and the Student Union Government (SUG), and their Telegram groups. A total of 629 responses were retrieved and used for further analysis. The result reveals that there is poor enrolment for the online instructions of the university. Except for the multimedia, the results show that more than half of the 2.5% of respondents agreed with the quality of the online materials suited for successful learning. Finally, the results reveal that the quality of instruction offered by the teachers is viewed favourably by the respondents. The study concludes that tertiary institutions in Sokoto state need training in online, mobile, and web-based learning to enable them to compete with other universities in the world.

**Keywords:** Learning Management System, Virtual education, Covid-19, Online learning.

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**STRATEGIZING LEARNING AND UNDERSTANDING OF CHEMICAL BONDING  
AND STRUCTURE FOR EFFECTIVENESS WITH THE AID OF PHET  
INTERACTIVE SIMULATIONS****Hassan ALIYU**

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**ABSTRACT**

Chemical bonding is one of the key and basic concepts in chemistry, on which most of the understanding of the fundamental ideas of chemistry is based. Unfortunately, this chemical concept is perceived as difficult by both teachers and students due to its abstract nature, leading to misconceptions. The task of learning chemistry at the macroscopic, microscopic, and symbolic levels by the chemistry triplet requires the student to make use of subject-specific as well as highly abstract verbal and nonverbal thinking skills. Visual understanding, a conceptual competence based on verbally mediated sense-making processes, is critical because it influences both theoretical and experimental concepts of the subject. These representational competences are essential for assigning the correct meaning to abstract chemical content through visualization and generating correct mental models, and they cannot be overlooked. The PhET Interactive Simulations Project focuses on understanding and leveraging the potential for improving science education with interactive simulations through research and development. Thus, the study investigated the effectiveness of PhET interactive simulation in facilitating learning of chemical bonding and structures and compared the students' performance between instruction with and without the aid of PhET interactive simulation. The researchers adopt a quasi-experimental design. Two instruments were designed to gather data from 54 SS1 "A" and "B" students of Nagarta College, Sokoto. The result reveals that about 80% of the participants who learned chemical bonding with the aid of technology believed that PhET interactive simulation is "very effective," while 20% say it is "effective". Similarly, all of them were "very satisfied" with the instruction aided by the PhET interactive simulation. Finally, Spearman's rho correlation analysis reveals that the correlation coefficient of  $r_s = .786$  indicates that there is no relationship between the chemical bonding instruction aided by PhET Interactive Simulation and the instruction without PhET Interactive Simulation. The study concluded that PhET interactive simulation is very effective in facilitating learning and understanding of chemical bonding.

**Keywords:** Chemical bonding, Chemical structures, Ionic bonding, PhET Interactive, Simulation, Chemistry, Students.

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**OBESITY AND ITS TREATMENT BY MORINGA HERBS**

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**ABSTRACT**

In recent years, obesity has become a major health problem worldwide, affecting people across all ages, sex, ethnicities, and races, and its prevalence has been increasing at an alarming rate and it is known to be linked to cardiovascular and cerebrovascular diseases. Appropriate lifestyle and behavior interventions are still the crucial cornerstone to weight loss success, but maintaining such a healthy lifestyle is extremely challenging. In addition to this, obesity causes or is closely linked with a large number of health conditions, including heart disease, stroke, diabetes, high blood pressure, unhealthy cholesterol, asthma, sleep apnea, gallstones, kidney stones, infertility, and as many as 11 types of cancers, including leukemia, breast, and colon cancer and ultimately death. The safety of these medications requires improvement. Herbal medicine has been used for treatment of disease for more than 2000 years, and it has proven efficacy. In conclusion, Moringa leaf extract controlled body weight gain when given concurrently with HFD, which indicates a lower obesity state. This effect was accompanied with improvements in serum lipid fractions, glucose, metabolic hormones and lower oxidative stress and liver function. Many studies have confirmed that herbal medicine is effective in the treatment of obesity,

**Key words:** obesity ,disease ,herbs

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**THE EFFECT OF LEARNING MOTIVATION AND SELF-EFFICACY ON  
ACADEMIC PROCRASTINATION OF VOCATIONAL STUDENTS**

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**ABSTRACT**

The purpose of this study was to determine the effect of learning motivation (X1) and self-efficacy (X2) with academic procrastination (Y) on students. This study uses quantitative methods with measurements using a Likert scale. In this study, class XI students of SMKN 14 Jakarta were selected as the population with a sample of 161 students. Proportional random sampling technique is a technique used for sampling. This study obtained the results of the hypothesis on the T test and F test. This study obtained the results of the hypothesis on the T test and F test. In the T test results it can be concluded that there is a negative and significant influence between learning motivation and academic procrastination. Furthermore, there is a negative and significant influence between self-efficacy and academic procrastination. Then, the F test resulted between learning motivation and self-efficacy there is a simultaneous influence on academic procrastination.

**Keywords:** Learning Motivation, Self-Efficacy, Academic Procrastination.

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**WILDLIFE BIODIVERSITY IN PERAMUN HILL, BELITUNG REGENCY,  
INDONESIA**

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**ABSTRACT**

Peramun Hill is one of the geo-sites in Belitong Geopark, Belitung Regency, with a 1.15 km<sup>2</sup> range area and 22 mdpl. Peramun Hill has unique biodiversity in the environment. Therefore, carrying out an inventory to obtain basic data that can be used as guidelines for managing conservation areas is necessary. This study aims to obtain basic data on wildlife biodiversity in the Peramun Hill area. Purposive sampling methods were used in this study and analysed with richness index, diversity, evenness and Kruskal-Wallis test. As many as 12 species of Pisces, six species of amphibians, eight species of reptiles, 18 species of aves, and seven species of mammals were recorded, including the endemic species *Cephalopachus bancanus saltator*. Three species are categorised as endangered, two species are categorised as vulnerable, seven species are categorised as near threatened, and two species are declared data deficient by the IUCN and no informative data in Indonesia. Four species are protected in Indonesia. Based on the above results, Peramun Hill still has a representative wildlife habitat.

**Keywords:** endemic, mammals, purposive sampling, vertebrate biodiversity

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**PREDICTION AND OPTIMIZATION OF POWER CONSUMPTION AND CUTTING ENERGY DURING DISCONTINUOUS MACHINING OF STEEL FOR COLD WORK (SKD1)**

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**ABSTRACT**

Sustainable development requires us to do what it takes to rationalize energy consumption, minimizing the latter has become an industrial issue with the traditional issues (quality and price). The objective of this work is to propose mathematical models to predict the power consumed ( $P_c$ ) and the cutting energy ( $E_c$ ). the exploitation of these models leads us to make a multi-objective optimization of these two factors during the intermittent machining of SKD1 steel, a difficult manufacturing process because of the discontinuity in cutting of a steel intended for the cold work SKD1 which has special characteristics, Experimental tests are made to study the influence of four 04 cutting parameters, namely tool nose radius ( $r$ ), cutting speed ( $V_c$ ), feed per revolution ( $f$ ) and depth of cut ( $a_p$ ) on the two performance parameters: power consumption ( $P_c$ ) and cutting energy ( $E_c$ ). A triple CVD coated carbide cutting tool ( $Al_2O_3/TiC/TiCN$ ) was used, adopting a Taguchi L9 ( $4^3$ ) experimental design. Response surface method (RSM) and analysis of variance (ANOVA) were exploited to propose predictive models. A multi-objective optimization to minimize ( $P_c$ ) and ( $E_c$ ) simultaneously was done by exploiting the desirability function (DF) method.



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**MATERIAL'S ELECTRIC FIELD AND THICKNESS EFFECT ON  
SURFACE POTENTIAL DECAY**

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**ABSTRACT**

Historically, surface potential studies and their modelling have been carried out mainly in connection with several fields of applied research. A dielectric, charged at the surface, has a local surface potential. In the course of time, this potential value decreases and this fact clearly represents the ability of the material to evacuate, by several mechanisms, this deposited charge. The work presented in this paper consists in studying, by non-contact measurements of the material surface potential, the flow of electric charges deposited by corona discharge on the PET surface for two different thicknesses (0.1mm, 1mm). The influence of the electrical parameters (initial voltage and thickness) on this charge flow is analysed. Furthermore, the influence of the wettability of PET allowed us to show the importance of water absorption on the DPS. This work allowed us to highlight the cohabitation of two processes: surface conduction and charge injection. We show that the surface potential decay is strongly conditioned by the electric field and the thickness of the sample.

**Keywords:** Surface Potential Decay, Corona Discharge, PET, Charge Injection, Surface Conduction

**EEG BASED AUTISM SPECTRUM DISORDER (ASD) DETECTION: A  
BIBLIOMETRIC ANALYSIS****Ilker TURKER***Department of Computer Engineering, Karabuk University, Karabuk, Turkey***Ehssan ALJANABI***PhD Student, Karabuk University, Karabuk, Turkey***ABSTRACT**

Autism Spectrum Disorder (ASD) is a common disease in society. Many parents suffer from ignorance of these disorders. Despite the wide prevalence and severity of these disorders, we know little about the neurological basis of the interventions for the purpose of identifying these disorders. One of popular method to detect ASD is the Electroencephalography (EEG) signal analysis. Due to non-invasive, inexpensive and accessible compared to other neuroimaging technologies. This paper contains an overview of detecting ASD with EEG in a bibliometric analysis on the publication statistics provided from the Web of Science database. This analysis includes basic statistical inferences on the publication counts, yearly distributions, citation performances, distribution on indexing, publication title, countries etc., in a comparative manner to outline how EEG based diagnosis differs from the general ASD detection studies.

**Keywords:** Autism Spectrum Disorder, ASD, EEG, Autism Detection, Deep Learning.

**ON CENTRAL IDENTITIES EQUIPPED WITH SKEW LIE PRODUCT INVOLVING  
GENERALIZED DERIVATIONS****MOHAMMED ALI AYEDH***Department of Mathematics, Aligarh Muslim University, 202002 Aligarh, India*  
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Let  $R$  be a  $*$ -ring. For any  $x, y \in R$ , we denote the skew Lie product of  $x$  and  $y$  by  $\nabla[x, y] = xy - yx^*$ . An additive mapping  $F: R \rightarrow R$  is called a generalized derivation if there exists a derivation  $d$  such that  $F(xy) = F(x)y + xd(y)$  for all  $x, y \in R$ . The objective of this paper is to characterize generalized derivations and to describe the structure of prime rings with involution  $*$  involving skew Lie product. In particular, we prove that if  $R$  is a 2-torsion free prime ring with involution  $*$  of the second kind and admits a generalized derivation  $(F, d)$  such that  $\nabla[x, F(x^*)] \pm \nabla[x, x^*] \in Z(R)$  for all  $x \in R$  then  $R$  is commutative or  $F = \pm I_R$  where  $I_R$  is the identity mapping of  $R$ . Moreover, some related results are also obtained. Finally, we provide two examples to prove that the assumed restrictions on our main results are not superfluous.

**Keywords:** Prime ring, involution, skew Lie product, generalized derivation.

**LUNG SEGMENTATION ACCOMPLISHMENT BASED ON U-NET ARCHITECTURE AND MORPHOLOGICAL OPERATIONS.**

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**ABSTRACT**

Automated lung segmentation is a critical step in computer-aided diagnosis of chest X-rays. It is critical to build an effective automated lung segmentation model because to rib cages and the distinct modalities of each person's lungs. This study proposes a dependable approach for segmenting Chest radiographs show the lungs. The majority of existing lung segmentation techniques are accomplished by a succession of methods, with each stage requiring manual empirical parameter changes My model overcomes the difficulties by learning to disregard unnecessary parts of the original Chest Radiograph and stress key traits for lung segmentation. I have tested my model on publicly available datasets. The proposed model has a DICE coefficient of 98.3%, demonstrating its dependability.

**Keywords.** Medical image segmentation, Image segmentation , Lung segmentation , U-Net architecture

**ON COMPLETENESS IN *QTAG*-MODULES****Ayazul Hasan***College of Applied Industrial Technolgy, Jazan University, Jazan  
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Aligarh, India**ORCID ID: <https://orcid.org/0000-0001-6843-9798>***ABSTRACT**

The purpose of this paper is essentially to study some elementary concepts of completeness in *QTAG*-modules. We introduce the notion of completeness, which we term semi-complete modules and obtain some interesting results. Certain basic properties of *h*-purecomplete modules are investigated with the help of *h*-pure submodules and socles. Also, we define totally quasi-complete modules and study the inter relations between various type of completeness.

**Keywords:** *QTAG*-modules, semi-complete modules, *h*-pure-complete modules, totally quasi-complete modules.

**ANALYSIS OF FACTORS AFFECTING THE COMPOSITE STOCK PRICE INDEX  
OF CONSUMPTION GOODS IN THE INDONESIA STOCK EXCHANGE****Salwan Hanafi**

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**ABSTRACT**

Uncertainty in the world economy has and will continue to overshadow any composite stock price index anywhere. This study aims to examine the effect of domestic inflation, the Fed's interest rate and the volume of stock transactions on the composite stock price index of the Consumer Goods Sector in Indonesia for the period January 2018 – April 2021, a period before the Russia-Ukraine war. Multiple linear regression equations were used to analyze the data, sourced from Bank Indonesia, the Indonesia Stock Exchange, and The Federal Reserve. The results showed that all proposed variables had a significant effect on the composite stock price index of the consumer goods sector. These results provide an indication that the inflation rate in a country and the interest rate policy of the United States Central Bank, its can affect a country's composite stock price index, while the volume of consumer goods stock transactions also affects its stock price index.

**Keywords:** The composite stock index of the Consumer Goods; Inflation; the Fed Interest Rate; Stock Transaction

**ANALYSIS OF CONSUMER AND BUSINESS CONFIDENCE, EXPORTS, AND GOVERNMENT EXPENDITURE RELATED TO ECONOMIC GROWTH IN ASIA****Vicri Rahmatin Qadri**

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**ABSTRACT**

Economic growth is still the main indicator to see the development of economic activity. This study aims to determine the effect of consumer confidence, business confidence, government spending, and exports on economic growth in Asian countries, before the Covid pandemic occurred. Panel data were collected during the period 2015 - 2019 in Asian countries, which were analyzed using multiple linear regression equations. The results show that all the proposed variables have a positive effect on economic growth in Asia, except for the Government Expenditure factor. These results also show that before the Covid pandemic, consumer confidence, business confidence and exports in each country still contributed to economic growth, although based on the determination test, only 50.27% of these variables explained the movement of economic growth in Asia.

**Keywords:** Economic Growth; Consumer Confidence; Business Confidence; Government Expenditures; Export.

**NUMERICAL SIMULATIONS OF MHD BOUNDARY LAYER STAGNATION  
POINT FLOW OF CASSON FLUID OVER A NON - LINEAR STRETCHING SHEET  
WITH SUCTION****Ramya Dodda***Pallavi Engineering College***Sravani Ittedi***Pallavi Engineering College***ABSTRACT**

Magneto hydrodynamics, stagnation point of non-Newtonian Casson fluid and heat transfer towards a nonlinear stretching sheet is studied in this paper. The effect of suction or injection is also investigated. Implementing similarity transformations, the governing momentum, energy and concentration equations are transformed to self-similar nonlinear ODEs and numerical computations are performed to solve those. The investigation reveals many important aspects of flow and heat transfer. If velocity ratio parameter ( $B$ ) and magnetic parameter ( $M$ ) increase, then the velocity boundary layer thickness becomes thinner. On the other hand, for Casson fluid it is found that the velocity boundary layer thickness is larger compared to that of Newtonian fluid. The magnitude of wall skin-friction coefficient reduces with Casson parameter ( $\beta$ ). The velocity ratio parameter, Casson parameter, and magnetic parameter also have major effects on temperature distribution. The heat transfer rate is enhanced with increasing values of velocity ratio parameter. The rate of heat transfer is enhanced with increasing magnetic parameter  $M$  for  $B > 1$  and it decreases with  $M$  for  $B < 1$ . Moreover, the presence of thermal radiation reduces temperature and thermal boundary layer thickness. The results are benchmarked with previously published results.

**Keywords:** stagnation point, Casson nano fluid, Boundary layer, stretching sheet.



**PHYSIOLOGICAL STATE OF THE YOUTH ORGANISM IN THE CONDITIONS  
OF CENTRAL RUSSIA****Anastasia Vyacheslavovna Makhova***Faculty of Medicine, Russian State Social University, 129226, Moscow, Russia***ABSTRACT**

Adolescence implies the optimal functioning of the whole organism and high resistance to any adverse environmental factors. The place of residence of young men in some cases can affect the state of their body. **The purpose of the study:** to evaluate the functional characteristics of seventeen-year-old boys in the Moscow region of Russia. **Methodology and organization of the study.** Clinically healthy 22 young men aged 17 years who lived in Moscow and the Moscow region of Russia during their life were examined. All surveyed were first-year university students. They evaluated the results of the main functional tests. The results obtained in the work were processed statistically. **Research results.** Young men who lived in the Moscow region of Russia during their life had low coordination abilities, average motor abilities and a low level of general vestibular stability. In the presence of low general physical fitness, the observed young men were capable of a slight clarity in the execution of movements. The emerging situation was associated with the high involvement of the surveyed young men in the process of studying at the university. **Conclusions.** First-year male students of the University of Moscow, due to their high involvement in educational activities, have low indicators of strength, endurance, coordination and speed characteristics.

**Keywords:** young men, Moscow region, physiology, physical development, physical training.

**ON CLOSEDNESS OF SOME PERMUTATIVE POSEMIGROUP IDENTITIES****RIZWAN ALAM***Aligarh Muslim University, Faculty Of Science, Department Of Mathematics, Aligarh, India.**ORCID ID: <https://orcid.org/0000-0003-3162-6885>***ABSTRACT**

A partially ordered semigroup, briefly posemigroup is a pair  $(S, \leq)$  comprising a semigroup  $S$  and a partial order  $\leq$  on  $S$  that is compatible with its binary operation, i.e. for all  $s_1, s_2, t_1, t_2 \in S$ ,  $s_1 \leq t_1$  and  $s_2 \leq t_2$  implies that  $s_1 s_2 \leq t_1 t_2$ . If  $S$  is a monoid, we call  $(S, \leq)$  a partially ordered monoid, shortly pomonoid. Further, we call  $(U, \leq_U)$  a subposemigroup of a posemigroup  $(S, \leq_S)$  if  $U$  is subsemigroup of the semigroup  $S$  and  $\leq_U = \leq_S \cap (U \times U)$ . The corresponding notion of a subpomonoid is defined analogously. As we know that all non-trivial permutation identities are not preserved under epimorphisms of partially ordered semigroups. In this paper towards this open problem, first we show that certain non-trivial identities in conjunction with the permutation identity  $z_1 z_2 \cdots z_n = z_1 z_2 \cdots z_n$  ( $n \geq 2$ ) with  $i_1 \neq n$  [ $i_1 \neq 1$ ] are preserved under epimorphisms of partially ordered semigroups. Further, we extend a result of Ahanger and Shah which showed that the center of a partially ordered semigroup  $S$  is closed in  $S$  and show that the normalizer of any element of a partially ordered semigroup  $S$  is closed in  $S$ . Let  $U$  be a subposemigroup of a posemigroup  $S$  and  $d \in S$ . We say that  $U$  dominates  $d$  if for all  $\alpha, \beta : S \rightarrow T$  posemigroup morphisms, such that  $\alpha(u) = \beta(u)$  for all  $u \in U$ , one has  $\alpha(d) = \beta(d)$ . The set of all elements of  $S$  that are dominated by  $U$  is called the posemigroup dominion of  $U$  in  $S$  and is denoted by  $\text{Dom} [(U, S)]$ . An identity  $u = v$  is said to be preserved under posemigroup epis if for all posemigroups  $U$  and  $S$  with  $U$  as a subposemigroup of  $S$  and such that  $\text{Dom} [(U, S)] = S$ ,  $U$  satisfies  $u = v$  implies,  $S$  also satisfies  $u = v$ . A variety  $\mathcal{U}$  of posemigroups is said to be epimorphically closed if for all  $U \in \mathcal{U}$  and for any posemigroup  $S$  containing  $U$  properly as a subposemigroup such that  $\text{Dom} [(U, S)] = S$  implies,  $S \in \mathcal{U}$ .

**Keywords:** Posemigroups; Dominion; Zigzag; Variety

## **THE POWER OF MICRONUTRIENTS THROUGHOUT LIFE**

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### **ABSTRACT**

Micronutrient deficiency, commonly referred to as "hidden hunger," is a type of undernutrition that happens when vitamin and mineral intake or absorption are insufficient to maintain optimal health children's growth and typical physical and mental development adults. Micronutrient deficiency, is a serious public health issue in underdeveloped nations brought on by a diet low in vital nutrients like vitamin A, zinc, iron, and iodine. People who experience concealed hunger consume inadequate amounts of micronutrients in their meals. Poor diet, illness, or increased micronutrient intake are potential causes unmet requirements during lactation and pregnancy. The symptoms of this type of malnutrition are frequently "hidden," since people may "appear fine" but experience highly detrimental effects on their health and wellbeing. Children could have stunted growth, poor night vision, or a history of illness. For instance, adults may also succumb to illness and exhaustion more frequently. Hidden hunger, especially among women and children in underdeveloped nations, can result in disease, blindness, premature death, decreased productivity, and hampered mental development. Children's stunting and related micronutrient deficiencies are serious health issues. Patients between the ages of 13 and 24 months are more undernourished and more affected by micronutrient deficiencies. The most prevalent micronutrient deficiency in malnourished children is anaemia, which was diagnosed in 78% of patients, 88% of whom had iron deficiency. They frequently consume significant quantities of calories-dense, low-micronutrient staple foods like corn, wheat, and rice as well as little amounts of foods high in micronutrients including fruits, vegetables, animal, and fish products.

**Keywords:** Undernutrition, Micronutrients, Hidden hunger, Stunting Children, Women, Anaemia,

**ON PRIME IDEALS WITH GENERALIZED DERIVATIONS-II****Hafedh M. Alnohashi***Department of Mathematics, Aligarh Muslim University, 202002 Aligarh, India**ORCID ID: <https://orcid.org/0000-0003-0253-6573>***ABSTRACT**

Let  $R$  be any arbitrary ring and  $P$  any prime ideal of  $R$ , the purpose of this work is to examine the structure of quotient rings  $R/P$ . In particular, we will show that the behavior of generalized derivations fulfilling algebraic identities involving prime ideals and the structure of this class of rings are related. In certain instances, it has also been possible to establish the characteristics of the quotient ring  $R/P$ .

**Keywords:** Prime ideal, derivation, generalized derivation.

**MICROWAVE ASSISTED SYNTHESIS OF Ag<sub>2</sub>O NANOPARTICLES: A STUDY  
AGAINST *S. INCERTULAS*, *C. MEDINALIS* AND *S. MAURITIA***

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**ABSTRACT**

Due to good affordability and safety, the plant mediated metal nanoparticles synthesis has been gaining more attention. The synthesis of silver oxide nanoparticles was done using the dried fruit extract of *Carissa edulis*. Utilizing Box-Behnken Design, the microwave extraction procedure was optimized. It was discovered that 400 W, 70 °C, and 30 mL of solvent were the best optimization settings. This yielded 0.17 g of extract. Several analytical techniques were used to examine the green synthesized Ag<sub>2</sub>O NPs. Ag<sub>2</sub>O NPs formation is confirmed by the absorption peak at 420 nm. Furthermore, the SEM and TEM results revealed cube and ellipsoid shapes with 1.5-2 nm dimensions. The photocatalytic activity of Ag<sub>2</sub>O NPs demonstrated 95.8% Congo red degradation with a rate constant of 0.0233 min<sup>-1</sup>, and the antibacterial activity of Ag<sub>2</sub>O NPs demonstrated a high zone of inhibition (10 mm) against *E. coli*. Also, the synthesized Ag<sub>2</sub>O NPs showed good insecticidal activity against *C. medinalis*, *S. incertulas*, and *S. mauritia* with LC<sub>50</sub> values are 42.13 ± 0.6, 30.17 ± 1.2 and 36.38 ± 0.56 ppm respectively. As a result, *Carissa edulis* extract-mediated Ag<sub>2</sub>O NPs can be used in future environmental and biotechnology research.

**Keywords:** *Carissa edulis*, Ag<sub>2</sub>O, Dye degradation, Antibacterial, Insecticide.

**SELLING TO STUDENTS: A SIGN LANDSCAPE IN AN INDONESIAN COLLEGE  
CONTEXT**

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**ABSTRACT**

The study is to (1) identify the distribution of top-down and bottom up signs in a campus area, (2) find out the language choices there, and (3) describe the functions of the signs. This is case study done in a specific area of a private college in a small town in Indonesia. The data were taken by surveying and taking shots of all signs visible in the area. Then, the data were looked closely to categorize according to the objectives. The data were then analyzed based common theories in such an investigation. Based on the analysis, the bottom-up signs are more dominant than the top-down. For such a specific complex, the top-down here refers to the college as the central institution, while others only stand and live by. The finding implies that the space is being dominated by the peripheral entities, mostly are business selling goods and services for the students living in the area. From the languages used there, bilingual signs are dominant, with the national language and English. In fact, geographically the community there is a local language speaker, Javanese; people speak this in their daily. Thus, it seems to us that Javanese has a limited domain of use. The national is chosen for its lingua franca and information delivery. Meanwhile, English is adopted for its commercial and prestige values, though the meaning can be blurry for most audience. Seen from their function, the signs are informative, instruction, warning notices and prohibition, building name, advertising, and direction.

**Keywords:** *top-down, bottom-up, linguistic landscape, languages, signs*

## **NONVERBAL BARRIERS IN SOCIAL WORK COMMUNICATION**

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### **ABSTRACT**

Communication is essential in social work both for building a functional relationship between social worker and client, and for the success of the intervention. That is why different communication techniques are used in order to build and maintain efficient relationships between those who communicate in social work and contribute, in this way, to the fulfilment of the proposed objectives of the intervention. However, sometimes communication is disrupted by various factors and obstacles, referred to as communication barriers. These can be both verbal and nonverbal. The more such disruptive factors are in social work communication, the more the outcomes in this field are affected. Therefore, it is recommended that the typical communication barriers are known by social workers in order to avoid them. This paper deals with the most common nonverbal barriers that can affect communication in social work. In addition to defining and discussing them, various examples from the practice of social work are provided, as well as several suitable recommendations for avoiding them.

**Keywords:** social work communication, communication barriers, nonverbal communication barriers.

**FACTORS INFLUENCING VIOLENT BEHAVIOR IN FOOTBALL STADIUMS IN  
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Kenitra, Morocco.***Miloud Chakit***Biology and Health Laboratory, Department of Biology, Faculty of Sciences, Ibn Tofail University,  
Kenitra, Morocco.***Ahmed O. T. Ahami***Biology and Health Laboratory, Department of Biology, Faculty of Sciences, Ibn Tofail University,  
Kenitra, Morocco.***ABSTRACT**

The violent behaviors developed by football fans, traditionally known as hooliganism, are deeply rooted in history and widely spread geographically. They relate to the physical aggression and vandalism of the spectators. In Morocco, hooliganism has undergone a considerable evolution. To study the factors involved in the violence at the football stadium, questionnaires were written and filled out to the spectators of the Boutola football matches. The questionnaire include questions about age, socio-occupational status and drug use. The results showed a relationship between age and socio-economic level and soccer stadium violence. A significant difference in the number of cases of violence ( $p < 0.5\%$ ) between drug users and non-users was shown. According to these results, it seems necessary to Sensitize the young people on the negative effects of violence, bring together sports leaders, former athletes, representatives of supporters' groups (Ultras) and relevant government departments and integrate young people into society.

**Key words:** Violence, behavior, spectators, soccer, Kenitra.



**DEVELOPMENT OF DEXIBUPROFEN LOADED SOLID LIPID NANOPARTICLES  
TO ENHANCE ORAL BIOAVAILABILITY****Muhammad Jawad***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Fakhar Ud-Din***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Sibgha Batool***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Aimen Saleem***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***ABSTRACT**

Dexibuprofen (DBPN), a non-steroidal anti-inflammatory drug (NSAID), exhibits its action by inhibiting COX enzymes. It belongs to BCS class II drugs, owing to its poor dissolution and reduced oral bioavailability. Herein, solid lipid nanoparticles (SLNs) were prepared by modified micro emulsion method followed by their optimization via Design-Expert® (version 12). The optimized formulation was evaluated using various techniques including, Transmission electron microscopy (TEM), Fourier transform infrared spectrophotometer (FTIR), Powder x-ray diffractometer (PXRD) and Dynamic scanning calorimeter (DSC). In-vitro release and pharmacokinetic studies of DBPN-SLNs were executed and compared with drug suspension. A 12-weeks stability study was performed at 4 °C and 40 °C. Optimized formulation has spherical morphology including particle size (PS) of 213.8 nm, polydispersity index (PDI) of 0.201, zeta potential (ZP) of -33.6 mV and %EE of 92%. FTIR analysis showed no chemical interaction of the constituents of SLNs, whereas XRD and DSC respectively demonstrated the conversion of crystalline drug to amorphous and thermal behavior of the optimized formulation. In-vitro dissolution data indicated that SLNs has momentarily retarded the drug release at various pH levels when compared with drug suspension. Pharmacokinetic study revealed a significantly enhanced (9-fold) oral bioavailability of DBPN-SLNs than DBPN suspension. Moreover, DBPN-SLNs were stable for at-least 12 weeks. Hence, it can be concluded that incorporation of DBPN into SLNs produce sustained release behavior with improved bioavailability.

**Key words:** Dexibuprofen, Solid lipid nanoparticles, Bioavailability, Pharmacokinetic study

**ON NORMALIZED DISTANCE LAPLACIAN EIGENVALUES OF  
THE RING  $Z_n$** **Nadeem ur Rehman***Department of Mathematics Aligarh Muslim University Aligarh, India***Nazim ur Rehman***Department of Mathematics Aligarh Muslim University Aligarh, India***ABSTRACT**

Let  $R$  be a commutative ring with identity  $1 \neq 0$  and  $Z(R)$  denotes the set of zero-divisors of  $R$ . The zero-divisor graph of  $R$ , denoted by  $\Gamma(R)$ , is a simple undirected graph having vertex set  $Z(R)^*$  (set of nonzero zero-divisors of  $R$ ) and two distinct vertices  $x$  and  $y$  are joined by an edge if and only if  $xy = 0$ . In this paper, we describe the normalized distance Laplacian spectrum of the graph  $\Gamma(Z_n)$ , where  $n = p^S q^T$ ,  $p$  and  $q$  are primes ( $p < q$ ) and  $S, T$  are positive integers.

**Keywords:** Zero-divisor graph, normalized distance Laplacian matrix, normalized distance Laplacian spectrum

2020 Mathematics Subject Classification: 05C50, 05C12, 15A18.

## PHYSIOLOGICAL FEATURES OF BLOOD IN COWS DURING THE FIRST PREGNANCY

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### ABSTRACT

Pregnancy greatly affects the health of young cows, especially before their first calving. This greatly affects hematological parameters, which are a reflection of the oxidant-antioxidant balance, metabolic rate and overall viability. **Purpose:** to find out the hematological features of first-calf heifers 2 weeks before calving. **Materials and methods.** 22 first-calf heifers were examined. The animals were crossbreds - 50% blood of the Black-and-White breed and 50% blood of the Holstein breed. Inspection and blood sampling was performed from them 2 weeks before calving. The content of formed elements, levels of glucose, total protein, albumin, cholesterol, triglycerides, globulin, non-esterified fatty acids, haptoglobin, malondialdehyde, and total antioxidant capacity were determined in the blood of first-calf heifers using traditional methods. Mathematical processing of the received results is carried out. **Results.** First-calf heifers two weeks before calving had all the indicators taken into account at the normal level. The content of total protein in their blood was  $68.1 \pm 0.92$  g/l. The amount of albumin and globulin they also had was optimal. The content of haptoglobin in their blood at the time of observation was  $2.3 \pm 0.22$  mmol/l. The glucose level in the animals was within the normal range, indicating the normal functioning of carbohydrate metabolism. The amount of non-esterified fatty acids in their blood was found to be low, with average levels of cholesterol and triglycerides. The total antioxidant capacity of blood in first-calf heifers was low -  $0.66 \pm 0.11$  mmol/l, which provided a slightly increased content of malondialdehyde in their blood. The amounts of erythrocytes and hemoglobin in the blood of first-calf heifers were quite high with a high content of total leukocytes, lymphocytes and neutrophils in it. This indicated a very high resistance of their organism against various infections. **Conclusion.** For first-calf heifers, 2 weeks before calving, the perfection of metabolic and oxidative processes in their body is characteristic. The optimal level of their hematological parameters shows their high viability and overall resistance to any infectious agents. The found levels of malondialdehyde and antioxidant activity in first-calf heifers confirm their metabolic health and readiness of their body for calving.

**Key words:** cattle, blood, heifers, pregnancy, protein, lipids, lipid peroxidation.

**PHYSIOLOGICAL CAPABILITIES OF PLATELETS FOR HEIFERS AGED OVER ONE YEAR****Maya Dmitrievna Shumova***Russian State Social University, 129226, Moscow, Russia**Department of Epizootology and Microbiology, Vologda State Dairy Farming Academy named after N.V. Vereshchagin, Vologda, Russia***ABSTRACT**

Animal husbandry is a profitable branch of agriculture, strategically important for many countries of the world. Increasing demand for milk and beef requires close attention to the health status of replacement young animals. For this, it is necessary to monitor its hematological parameters, which are a marker of the state of the entire animal organism. An important component of maintaining the overall viability of the body of heifers is the hemostasis system. Platelets are a very physiologically significant component of it. The state of their activity in growing heifers with different ways of keeping remains poorly studied, which dictates the need to close this gap in scientific knowledge. **Purpose:** to assess the state of platelet activity in heifers on growing at the age of 12 months. **Materials and research methods.** 35 heifers aged 12 months, tethered, were examined. The body was examined once. They underwent a series of hematological tests. The platelets of the observed heifers were subjected to a standard washing and resuspension procedure. In platelets of animals, the concentration of cholesterol, the levels of malondialdehyde and acyl hydroperoxides were determined by traditional methods, the content of actin and myosin, the content of adenosine diphosphate and the intensity of its secretion were determined. In all cases, platelet aggregation in response to its main inducers was assessed using a visual micromethod. The results were processed by Student's t-test. **Research results.** The platelets of heifers showed a low content of cholesterol. In heifers in blood platelets, the intensity of lipid peroxidation was low. The amount of actin and myosin in their inactive platelets was optimal. Their additional formation under conditions of platelet aggregation was small. The platelets of the examined animals showed an average level of ADP with a low level of its secretion. In rearing heifers, platelet aggregation in response to collagen, ADP, ristomycin, and thrombin occurred within the standard time, which is considered optimal for this process. **Conclusion.** At the age of 12 months, the hemostatic capabilities of platelets in growing heifers were optimal. This is due to the normal functioning of their membrane receptors and intracellular hemostatic mechanisms, which ensures the optimum of their viability, growth and maturation.

**Key words:** heifers, rearing, platelets, hemostasis, physiology.

**PLATELET FUNCTIONS IN PIGLETS BEGINNING TO CONSUME VEGETABLE FEED****Elena Sergeevna Tkacheva***Department of Epizootology and Microbiology, Vologda State Dairy Farming Academy named after N.V. Vereshchagin, Vologda, Russia***ABSTRACT**

The growing demand of society for pork dictates the need to improve approaches to accelerating the cultivation and improvement of the bulk of pigs. This can be ensured by obtaining new knowledge of animal physiology. This can help improve the conditions for breeding and raising pigs. The hemostasis system is considered to be very significant for maintaining the overall viability of young pigs. Its extremely important component are platelets. Changes in their activity can affect the state of microcirculation, and hence the severity of anabolism in the growing body of animals, including piglets during the phase of milk and vegetable nutrition. **Purpose:** to reveal the dynamics of platelet activity in piglets during the phase of milk and vegetable nutrition. **Materials and research methods.** 37 piglets of the Large White breed were examined at the age of 21 days, 25 days, 30 days, 35 days and 40 days. Their platelets were washed and resuspended. In their membranes, the amount of cholesterol, malondialdehyde and acyl hydroperoxides, actin, myosin, ADP was estimated by traditional methods, and the severity of adenosine phosphate secretion was taken into account. Using a visual micromethod, platelet aggregation was recorded in response to standard inducers in plasma standardized by the number of platelets in it (up to  $200 \times 10^9$  platelets/l). The results obtained were processed by Student's t-test. **Research results.** In the platelets of piglets during the phase of milk and vegetable nutrition, the cholesterol level gradually increased, reaching  $0.62 \pm 0.009$   $\mu\text{mol}/10^9$  platelets by the 40th day of life. Lipid peroxidation gradually decreased in their platelets. The content of actin and myosin in inactive platelets in piglets increased during the observation period. Their additional formation during platelet aggregation increased. In the platelets of animals during the observation period, the level of ADP increased by 12.5% with an increase in its secretion by 14.1%. At the first examination in piglets, collagen platelet aggregation on average occurred within  $29.0 \pm 0.08$  s. As their age increased, this indicator accelerated, reaching the level of  $24.5 \pm 0.05$  s by the end of the observation. A similar acceleration of platelet aggregation in animals was found in response to ADP (by 15.2%) and to ristomycin (by 13.3%). Somewhat later, platelet aggregation with thrombin (by the end of the phase  $36.0 \pm 0.07$  s) and platelet aggregation with adrenaline (by the end of the phase  $85.0 \pm 0.06$  s) occurred. **Conclusion.** Piglets develop an increase in the hemostatic function of platelets during the lacto-vegetarian nutrition phase. This is due to their membrane-receptor changes and increased intracellular mechanisms that ensure the participation of platelets in hemostasis.

**Key words:** phase of milk and vegetable nutrition, piglets, platelets, hemostasis, physiology

## **PLATELET FUNCTIONS IN YAROSLAV CALVES IN THE MIDDLE OF EARLY ONTOGENESIS**

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*All-Russian Research Institute of Physiology, Biochemistry and Nutrition of Animals, Institute of Village, Kaluga region, Borovsk, Russia*

### **ABSTRACT**

The purpose of the study is to determine the state of platelet functions in young animals of the Yaroslavl breed during the phase of milk and vegetable nutrition. 42 calves of the Yaroslavl breed, born as a result of normal pregnancy from cows of optimal functional status, were examined. In calves, there was an acceleration of the onset of platelet aggregation with all used aggregation stimulators by the age of 45 days of life. She returned to the outcome by the end of the third phase of early ontogenesis. In animals, by day 45, the total number of activated platelets in varying degrees increased by 27.9% in the blood for a short time. The found short-term increase in the severity of platelet function by the age of 45 days developed due to an increase in the synthesis of thromboxane molecules by 30.3%. Also, in platelets of calves, a short-term increase in the content of adenosine phosphate in platelets and an increase in its secretory release were found. In animals, by day 45, an increase in platelet activity was also caused by a short increase in the amount of actin and myosin in them by 35.7% and 43.0%. Their content in platelets returned to the outcome at the end of the study. During the implementation of platelet aggregation in calves by the 45th day of life, an additional increase in the synthesis of actin and myosin by 35.7% and 43.0% was noted, disappearing by the end of the third phase of early ontogenesis.

**Key words:** Yaroslavl breed, calves, phase of milk and vegetable nutrition, physiology, platelets, hemostasis.

## **PHYSIOLOGICAL REACTION OF ASTENIZED ORGANISM TO MODERATE PHYSICAL LOADS**

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### **ABSTRACT**

Systematic physical activity as a whole strengthens the body due to the general stimulation of all internal organs. Of great importance are the consequences of playing basketball in relation to the state of the body of astenized young men. **The purpose of the study:** to trace the effect of regular basketball training on the body of astenized young men. **Methodology and organization of the study.** 26 young men aged 18 were observed, who had an acute respiratory viral infection about 2 weeks ago. They were divided into a main group of 12 people who started playing basketball, and a control group consisting of 13 young men who retained their previous lifestyle. Conducted a number of conventional functional tests to assess the state of the organism. The results obtained were processed using Student's t-test (t). **Research results.** Regular basketball lessons eliminated asthenia, improved coordination, motor characteristics and vestibular stability of the body. Young basketball players showed an increase in the level of general physical fitness and an increase in the clarity of sports movements. In the boys of the control group, all parameters taken into account remained unchanged. **Conclusions.** Regular basketball training increases the main functional indicators, endurance level, coordination and speed parameters in astenized young men.

**Key words:** Adolescence, asthenia, consequences, acute respiratory viral infection, basketball training, physical activity.

**PSYCHO-SOCIAL PROBLEMS OF JUVENILE DELINQUENCY AMONG MINORS  
AND ADOLESCENTS**

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Romania*

**ABSTRACT**

In We decided to research the deviant phenomenon and juvenile delinquency to have a better understanding of teenagers who resort to acts that violate social and legislative norms. It is becoming a common phenomenon among the middle and poor society, where there are no suitable inclinations and models for future young people. Among the psycho-social problems, some theories support the juvenile behaviors of minors, in addition to the cases studied during the work. The seriousness of delinquency in Romania is increasing every year, thefts and rapes are present in almost every county and must be combated. We proposed, first of all, to seek an understanding of their behavior, and why they resort to criminal acts if there is someone behind the actions if there is blackmail or some type of abuse in their families. There is a large increase in crimes after 1989 in cases of school dropouts, lack of parental supervision, and precarious or disorganized families that become criminals. The work is divided into several general chapters, the theory, and the research part. In theory, we mentioned the legislative norms, normative acts, and the Penal Code, together with theories that help us better understand the factors of juvenile influences on minors and adolescents.

**Keywords:** deviant, juvenile, behavior, society, minors, delinquency.



## **METHODOLOGY OF TEACHING ENGLISH FOR SPECIFIC PURPOSES: UNIQUE OR GENERAL**

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### **ABSTRACT**

Language teaching has a long history; however, the method era of teaching English dates back to the beginning of the 20<sup>th</sup> century. Within this period of more than a century, the pendulum concerning the ways English can be taught and learnt has swung. In these fluctuations, extremes, due to the effect of various schools of psychology resulting in newer perspectives of language learning, have been significant. Audio-lingual Method is known as the first language teaching method affected by an established psychology, i.e., behaviorism. When behaviorism gradually swayed away, cognitive psychology took its place and, partly because of socio-cultural theory, the approach of language teaching shifted to communicative. In between, some so-called methods, i.e., suggestopedia, the silent way, and total physical response, mainly developed by psychologists, found some proponents. In was in mid-1960s when, due to the change in linguistics, the needs of language learners in academic contexts and business as well as the promises of the new industrial world, teaching English for Specific Purposes (ESP) emerged. The issue at hand is whether innovative teaching methodology had to be developed or the existing methods could be used. From one standpoint, ESP was language teaching, but the specialized language, and from another perspective, it had its own demands. What is observed in the short history of ESP is not specific methodology but just a list of trends: ‘register analysis’, ‘rhetorical analysis’, ‘study skills and needs analysis’, and ‘genre analysis’ What makes ESP methodology different from that of English Language Teaching (ELT) are mainly ‘scaffolding’ and ‘consciousness-raising’. The present paper intends to deal with these methodological options.

**Keywords:** Teaching methodology, ESP, ELT, scaffolding, consciousness-raising

**TRANSFORMATIVE HIGH ENTROPY ALLOYS FOR ADDITIVE MANUFACTURING****Dhanesh G. Mohan***Department of Material Processing Engineering, Zhengzhou Research Institute of Harbin Institute of Technology, Zhengzhou, China.**ORCID: <https://orcid.org/0000-0002-4652-4198>.***Anatoliy Zavdoveev***Paton Electric Welding Institute of NAS of Ukraine, K.Malevicha 11, 03150 Kiev, Ukraine..**ORCID ID: <https://orcid.org/0000-0003-2811-0765>***Jacek Tomków***Faculty of Mechanical Engineering and Ship Technology, Gdańsk University of Technology, Poland.**ORCID: <https://orcid.org/0000-0003-1096-7779>***ABSTRACT**

Materials scientists have worked hard to find a solution to the problem of a sudden deterioration in engineering materials while they are in use. This served as inspiration for the development of several types of alloys, including stainless steel, deformed and partitioned steels, metastable Ti alloys, and recently created high entropy alloys (HEAs). They demonstrated outstanding work hardenability as a result of continuous evolution from single-phase to multi-phase HEAs, which is necessary for increased failure resistance in metallic systems. Accordingly, newly created transformational high entropy alloys (T-HEAs) showed intriguing results in enhanced damage tolerance (UTS 1.2 GPa and ductility 20% with 1.5% defect density) during normal processing, significant deformation, and laser-assisted 3D printing. Due to the activation of the transformation-induced plasticity (TRIP) effect close to the defects, these results were attributed to the localised WH activity within the stress concentration zones. On the other hand, due to their flaws, these T-HEAs exhibit a strong transformation-induced crack retardation (TRICR) effect, which delays the onset of damage and increases failure resistance while in use. In conclusion, the design of transformative high entropy alloys (T-HEAs) has shown to be a very effective method for achieving flexible microstructural evolution and encouraging unexpected strength-ductility synergy at ambient temperature. Additionally, these transformative high entropy alloys' tailored metastability made them more likely to possess outstanding qualities such as a high damage tolerance and tolerable printability in additive manufacturing. The synergistic activation of numerous deformation modes, including transformation-induced plasticity, non-basal slip-assisted plasticity in the phase, and stacking fault (SF) strengthening at various stages of deformation, is thought to be the cause of this cocktail effect in T-HEAs. Therefore, T-HEAs can be viable candidates for creating stronger, printable, and damage-tolerant materials for future environmentally friendly metal additive manufacturing.

**Keywords:** High entropy alloys; Transformative high entropy alloys; Additive manufacturing; Damage tolerant material; Stacking fault; Titanium alloys.

**DOES BIG DATA USE IMPACT FIRM EXPORT PERFORMANCE? INVESTIGATING THE  
JOINT MODERATIONG ROLES OF ENTREPRENEUR ORIENTATION AND RESOURCE  
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Due to the emergence of technological development, small and medium enterprises (SMEs) are adopting different innovative technological methods to enhance their productivity. Big data use (BDU) is one of the information-oriented method that assists the SMEs to increase their process and export performance. Therefore, the purpose of this papers is to predict textile SMEs export performance via BDU in the light of resource based view theory. Moreover, this research seeks to explore the moderating role of entrepreneur's orientation (EO) and resource coordination (RC) in the association between BDU and SME export performance. Using the survey methods, we recruited the SMEs entrepreneurs from textile sector located in the region of Punjab, Pakistan and tested the proposed model and associations in Mplus 7.4. The findings suggest that BDU is positively linked to business process performance (BPP) and SMEs export performance (SEP). EO and RC moderates the association between BDU and BPP and BDU and SEP. Our study assists the SMEs entrepreneurs to enhance their textile SEP through proper adoption of big data in their production system. Moreover, individuals with high EO in SMEs will stronger the association between BDU and BPP, and BDU and SCP. Finally, we discuss the research discussions, implications, limitations and future research directions.

**Keywords:** Big data use, SMEs export performance, Business process performance, Entrepreneurs orientation, and Resource coordination.

**ASSESSMENT OF LIVESTOCK FEED RESOURCES AVAILABILITY, FEEDING PRACTICES AND CONSTRAINTS TO LIVESTOCK PRODUCTION IN DIFFERENT AGRO-ECOLOGICAL ZONES IN GERA DISTRICT, JIMMA ZONE, OROMIA REGIONAL STATE, SOUTHWEST ETHIOPIA**

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**ABSTRACT**

The study was conducted to assess feed resources, feeding practices and major constraints to livestock production in Gera district of Jimma Zone, oromia Regional State, Ethiopia. A baseline survey was conducted to obtain the information at three agro-ecological zones (AEZs), viz., highland (> 2300 masl), midland (1500-2300 m) and lowland (<1500 m). A total of 190 (80, 60 and 35 in highland, midland and, lowland, respectively) smallholder livestock keeping households were randomly selected for the study. Primary data were collected using a pre-tested semi-structured questionnaire through face-to-face interviews, focus group discussions, key informant interviews and field observations. The data collected were analyzed using Statistical Package for Social Sciences (SPSS) to generate descriptive statistics. Descriptive analysis and Chi-square were used to test the statistical significance of categorical and continuous data respectively. Weighted average index (WAI) was also used to rank farmers' perceived available feed resources in dry and wet seasons and constraints to livestock. The results revealed that the overall average herd/flock size per household was 7.29±0.16 cattle, 6.08±0.20 sheep, 2.08±0.19 goats, 0.26±0.04 donkeys and 1.52±0.07 horses, and differed significantly ( $p<0.05$ ) between the AEZs, except for mules. The primary reason for keeping cattle was for draught power while sheep and goat were kept mainly for income generation and equines for transportation. The main sources of household income were livestock (64.6%), cereal crops (25.46%), coffee (9.5%) and honey (1.3%) sales. The predominant breeding method was natural/bull service (85.6%) followed by both natural and artificial insemination services (14.4%). No respondent reported using AI in the lowland. River (93%) was the main source of livestock drinking water. About 100% and 82.4% of respondents watered their animals once and twice a day in wet and dry season, respectively. The main types of livestock housing were family dwelling, separate sheds, family backyard, and open air. External and internal parasites, black leg, bloat, lumpy skin diseases, and trypanosomiasis were reported as the most common animal health

problems in the study area. Feed resources availability varied according to season. Natural pasture (mean rank = 0.384) was ranked as the major livestock feed resource available during the wet season. Private (64.3%) and communal (35.7%) pasture were the main sources of natural pasture. In the dry season, natural pasture (mean rank = 0.395) followed by crop residues (mean rank = 0.331) were ranked as the main feed resources available. The major sources of crop residues were barley, maize, sorghum, teff and wheat. Free grazing (54.5%) was the dominant livestock feeding system followed by tethering (34%). Of the respondents, few (11.5%) practiced improved forage production. The main supplementary feeds provided to their animals were household leftovers (35.7%), cereal mill house leftovers (*Bullullee*, 19.8%) maize (16.5%), household leftovers and maize (11.1%), *Atella* (traditional brew by-product, 9.52%), *bullulle* and *atella* (7.14%). None of the respondents used mineral supplements, except common salt (71.8%). The major constraints to livestock production identified by respondents were shortage of feed, limited grazing land, high incidences of diseases and parasites, water scarcity, poor access to veterinary services, inadequate extension services, low prices of livestock, in that order of importance. Based on the findings of this study, efficient utilization of the locally available feed resources, forage production, intensive feed-food production, strategic supplementary feeding, improved access to veterinary, extension and market services, and water development would be essential interventions as long-term strategies to improve feed supply and enhance livestock productivity thereby household income in the study area.

**Keywords:** Constraint, crop residue, disease, feed resources, feeding system, mixed farming system, natural pasture, smallholder livestock production, Gera district, Oromia

**INSIGHTS INTO THE TURNING PROCESS CUTTING PERFORMANCE WITH  
COTTON SEED OIL ENRICHED WITH NANO-ADDITIVE****Nishant Kumar Singh***Department of Mechanical Engineering, Harcourt Butler Technical University, Kanpur, UP, India***Yashvir Singh***Department of Mechanical Engineering, Graphic Era Deemed to be University, Dehradun,  
Uttarakhand, India***Virendra Kumar***Department of Mechanical Engineering, Harcourt Butler Technical University, Kanpur, UP, India***ABSTRACT**

Vegetable oil functions poorly in terms of high resistance, viscosity, and friction when compared to mineral oil; thus, it has been combined with various types of additives to enhance its qualities. The goal of this study is to evaluate the machining performance of modified Cotton Seed oil (MCSO) with zinc oxide (MCSOz) and Activated Carbon (MCSOc) at 0.20, 0.40, and 0.60 wt. percent, respectively. The machining efficacy of nanofluids (MCSOz1, MCSOz2, MCSOz3, MCSOc1, MCSOc2, and MCSOc3) was evaluated to that of a commercial synthetic ester (SE) in terms of cutting temperature, chip thickness, and tool chip contact length during the turning process with the minimal quantity lubrication (MQL). In terms of machining performance, the outcomes show that MCSOc surpasses MCSOz. In terms of cutting temperature, chip thickness, and tool chip contact length, the MCSO + 0.40wt. percent activated carbon demonstrated the best machinability. Additionally, (MCSO + 0.20wt. percent ZnO) has superior machining performance among MCSOz. Finally, the best individual machining performance is found in MCSOc2 (MCSO + 0.40 wt. percent Activated Carbon). In the context of ecological and energy efficiency, this has the potential to be a lubricant industry player.

**Keywords:** Modified cotton seed oil; Nanofluid; Nanoparticles; Metalworking Fluid; turning; Zinc oxide; Activated Carbon

**AN EMPIRICAL STUDY ON COMMUNITY CAPACITY BUILDING AND  
PROMOTION OF TRIBAL TOURISM IN KBK DISTRICTS OF ODISHA**

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**ABSTRACT**

Local capacity becomes an essential component in the sustainability of tourism resource management. Local capacity is an instrument of social aspects that can organize complexity, through regulation, cooperation and empowerment of the parties involved. Comprising 22.85% population of Odisha, tribal people constitute the lowest strata of the informal economy in the state. Faced with development challenges on account of social, economic, and geographic exclusion, a steadily depleting livelihood based, illiteracy, and lack of awareness of their rights and the market potential of their skills and resources, they are particularly vulnerable to exploitation, distress migration, and the debt trap. The growth rate of tourism has become stagnant in developed countries, while it is increasing in developing countries. Apart from that tourism also accounts for 10.6% of the world's employment and 10.4% in total, i.e., the sum of all direct, indirect, and induced employment (World Travel & Tourism Council, 2020). Besides the above-said facts, tourism has been seen as a panacea to eradicate poverty, inequality, and conflicts (Scheyvens, 2007). Tourism also can create more jobs for each unit of capital invested in tourism than for the similar capital invested in any other industry (Andriotis, 2002). The proposed study on will address the important objectives of assessing the perceptions the indigenous communities about capability building for promoting tribal tourism the study area i.e. KBK districts of Odisha. A structured questionnaire is used to collect primary data from the respondents. Statistical package like SPSS is used to analyze of data. A purposive sampling technique used to draw a sample of 250 respondents. The outcomes of the study will help in formulating and suggesting an indigenous tourism model for the sustainable development of tourism in the KBK districts of Odisha.

**Keywords:** Tribal, Tourism, capacity building, sustainability

**THERMAL RADIATION AND VISCOUS DISSIPATION EFFECTS ON HYBRID  
NANOFLUID OVER STRETCHING SHEET****Misbah Fareed***Department of Mathematics, Division of Science and Technology, University of Education, Lahore,  
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54000, Pakistan***Amir Abbas***Department of Mathematics, Faculty of Science, University of Gujrat, Sub-Campus, Mandi Bahauddin  
50400, Pakistan***ABSTRACT**

Hybrid nanofluid has been commercialized as the advancement of traditional nanofluid. The present research work aims to investigate the significance of thermal radiation and viscous dissipation effects on hybrid nanofluid over stretching sheet. The mixture nanofluid involves copper (Cu) and iron oxide ( $\text{Fe}_3\text{O}_4$ ) nanoparticles which are diluted into  $\text{H}_2\text{O}$  to form  $\text{Cu-Fe}_3\text{O}_4/\text{H}_2\text{O}$  hybrid nanofluid. This mixture is irrotational, incompressible and electrically conducting. The appropriate similarity transformations are applied to reduce the partial differential equation into the system of nonlinear ordinary differential equation, which is solved numerically. The Runge-Kutta-Fehlberg method is used to obtain the numerical solutions for velocity and temperature field. The performance of well-known parameters against velocity and temperature field has been visualized graphically. The temperature distributions declared low performance for increasing value of Eckert number. Temperature field increases with increasing values of magnetic field and radiation parameters. The obtained results demonstrated the effective application of hybrid nanofluids.

**Keywords:** Hybrid nanofluid; thermal radiation; viscous dissipation; magnetic field.



**A BRIEF PERSPECTIVE OF ELECTROMAGNETIC BAND GAP STRUCTURES  
LOADED ON MICROSTRIP ANTENNA FOR DUAL BAND APPLICATIONS**

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**ABSTRACT**

Electromagnetic Band Gap (EBG) Structures are periodic/non periodic structures which have attractive feature of suppressing surface waves in antennas which leads in enhancing the antenna parameters such as impedance bandwidth, gain, directivity etc. Many researchers have shown immense interest in designing these structures for various fields of communication due to its attractive features. This paper gives a review of various designs of EBG structures which are implemented on microstrip antenna for dual band applications.

**DO ACADEMIC SPIN-OFF PERFORM BETTER THAN OTHER FIRMS?  
EVIDENCE FROM ROMANIA****Roxana Sirbu***"1 Decembrie 1918" University of Alba Iulia, Faculty of Economics, Alba Iulia, Romania;***Lavinia Maria Mihali***Politehnica University of Timisoara, Faculty of Management in Production and Transportation,  
Management Department, Timisoara, Romania;  
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The spin-off phenomena in East and Central Europe is not so much analysed, and there is a big gap in the literature regarding the mechanism of survival and performance of this atypical ventures. The study aims to compare the economic performance of academic spin-off companies formed in Romania using European funds during a 15 years period with companies operating in the same economic sector. A database of 119 academic spin-offs founded from 2006-2013, was created and the variables analyzed for the economic performance with specialized statistical program were: number of employees, profit, economic rentability, company turnover. A comparison of the receivables, liabilities and expenses shows that the companies have managed to maintain their receivables generally at a lower level than their turnover. The results in the case of academic spin-offs reveal that after the 10<sup>th</sup> years of functioning the liabilities increased, presumably due to an increase in fixed assets for the modernization of production/services. But, after the 12<sup>th</sup> year of operation, the liabilities increased sharply without a similar increase in fixed or current assets. As this has occurred in the same time with a mild increase in turnover and a simultaneous decrease of profit, it can be surmised that the liabilities have increased due to unpaid dues accumulated from the previous period, or new loans for covering production costs. The chronological period covers the years 2018-2020. The return on assets rate is a measure of the efficient use of assets (both fixed and current). It does not take into consideration the financing of the assets and therefore is not dependent on the financing strategy of the company. The indicator should be positive and the higher the value of ROA, the better the assets are managed (bringing profit to the company). For academic spin-offs a negative mean ROA is common for the analyzed companies with only 3 exceptions (year 3, 11, 13 and 15 of operation) with very high negative values in the first 2 years of operation. A negative value of ROA shows that either the assets are not properly managed or that the assets acquired are not adequate; meaning the the company is not able to acquire or use the assets to generate a profitable return. It may take time for a company to make proper use of the acquired assets, which would explain the very high negative ROA in the first years of operation; however a steady negative ROA shows that assets' management is faulty. As the causes can be multiple and variate, a more in-depth study of management decisions is necessary. Using the t-test for single sample, the values were compared separately (on years), but the study revealed that academic spin-offs have reached a higher turnover than the average for the same type of companies (similar number of employees and the same turnover). During the 15 years period analyzed, spin-off companies founded in Romania through the Operational Program for Competitiveness 2007-2013 have shown an economic performance that is similar and in some aspects superior (e.g. turnover) to the economic performance of companies acting in similar fields (NACE codes) and of similar class (microenterprises).

**Keywords:** academic spin-offs; technology transfer; performance

**ACCURACY OF AGE AND SEX ESTIMATION OF NIGERIAN IGBO  
POPULATION USING AURICULAR MORPHOMETRICS****Gabriel Sunday Oladipo***University of Port Harcourt, Faculty of Basic Medical Sciences, Department of Anatomy, Port Harcourt, Nigeria.*ORCID ID: <https://orcid.org/0000-0002-1780-8992>**Oghenefego Michael Adheke***University of Port Harcourt, Faculty of Basic Medical Sciences, Department of Anatomy, Port Harcourt, Nigeria.*ORCID ID: <https://orcid.org/0000-0002-6306-279X>**Janet Nneoma Eke***University of Port Harcourt, Faculty of Basic Medical Sciences, Department of Anatomy, Port Harcourt, Nigeria.***ABSTRACT**

The human ear (auricle) is an important body component in biometric studies and forensic identification. The purpose of this study was to examine the accuracy of prediction of age and sex of selected Nigerian Igbo population using auricular morphometrics for forensic applications. 300 participants (142 males to 158 females) in the age range of 16 – 65 years were randomly recruited from settlements in the South-Eastern states of Nigeria. The participants were made to sit in a Frankfurt horizontal position and auricular measurements such as, total ear height (TEH), ear width (EW), lobule height (LH) and lobule width (LW) were obtained using a digital vernier caliper (validated by calibrating to 0.01mm). The ear index (EI) and lobule index (LI) were calculated using the measurements. Data obtained were analyzed using the Statistical Package for the Social Sciences (SPSS version 23.0). Age was estimated from auricular dimensions using Multivariate Regression Analysis (MRA), while sex estimation was carried out using Discriminant Function Analysis (DFA). The following mean values were recorded for males: TEH [Right (R) = 47.01±6.30, Left (L) = 46.24±5.85], EW (R = 25.06±4.14, L = 24.68±4.32), LH (R = 13.92±2.61, L = 13.99±2.18), LW (R = 12.99±2.30, L = 13.30±1.94), EI (R = 53.47±7.23, L = 53.28±6.69) and LI (R = 95.17±18.12, L = 96.80±18.56). For females, TEH (R = 48.25±6.83, L = 48.25±6.24), EW (R = 25.19±3.93, L = 24.57±4.21), LH (R = 14.44±2.67, L = 14.89±2.55), LW (R = 13.37±2.26, L = 13.78±2.04), EI (R = 52.50±6.85, L = 50.93±7.05) and LI (R = 94.60±19.59, L = 94.30±16.63). Sexual differences were highly significant in total ear height, lobular length and width, as well as the ear index of the left auricle. Age was estimated from auricular dimensions in Igbos with just 7% accuracy in males and 13% accuracy in females. Using discriminant function analysis, there was a moderate accuracy of 56.7% for the right and 61.7% for the left ear respectively, with females better assigned than males. Conclusively, this study has provided a baseline data for auricular morphometrics of Nigerian Igbos in the age range of 16 – 65 years. Although, the accuracy in predicting age using these ear measurements in the given population is no yet reliable for forensic identification, we can say that they could be relied upon during sexual dimorphism.

**Keywords:** Auricle, morphometrics, sex, age, prediction, Igbo

**FRESH WATER FUNGI IN NATURAL AND MAN-MADE LAKES IN INDONESIAN  
TOURIST DESTINATION AREAS****Nampiah Sukarno**

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**ABSTRACT**

Water recreational activities are getting popular in the country. Excessive recreational activities in the areas can cause negative effects on microbial diversity. Freshwater fungi are the fungi that all or part of their life cycles in freshwater habitats. Freshwater fungi have an important role as decomposers, endophytes, and pathogens in animals, aquatic plants, and humans. We compared the diversity of freshwater fungi in the natural and man-made lakes in the tourist destination areas. The natural lake is located in the natural forest, whereas the man-made lake is located in residential area. The different locations were selected based on differences in abiotic and biotic conditions in the two lakes. The fungal isolation was conducted by collecting lake water using sterile bottle at 20 cm depth. Fungal isolation was carried out by using serial dilution method and incubated on Potato Dextrose Agar (PDA) growth medium. Fungal identification was done by combining fungal morphology and molecular characteristics. Molecular analysis was carried out based on DNA sequences of ITS1-5.8S-ITS2 rDNA sequences. The results showed that both lakes are habitats for water fungi. The number of fungal species isolated from natural forest was higher than that of man-made lake. The number of species was almost double in the first area. Ten species of freshwater fungi were successfully isolated from natural lake, and 5 fungal species was obtained from man-made lake. The fungi isolated from Natural lakes were *Aspergillus* spp., *Parengyodontium album*, *Penicillium citrinum*, *Pestalotiopsis microspora*, *Phialemoniopsis pluriloculosa*, *Sarocladium terricola*, *Talaromyces aculeatus*, and *Trametes polyzona*. The fungi isolated from man-made lake were identified as *Acremonium polychromum*, *Fusarium proliferatum*, *Penicillium citrinum*, *Stachybotrys chlorohalonata*, and *Talaromyces pinophilus*. Most of them are of different species, except one species namely *Penicillium citrinum* obtained from both lakes. This may indicate that microclimate surrounding the area and recreation activities influence the diversity of water fungi.

**Keywords:** ITS rDNA, natural forest, PDA, *Penicillium citrinum*, residential area

**COMBINATION OF URBAN AND RURAL GEOSITES IN GEOTOURISTIC  
ROUTES FOR GEOTOURISM VALORISATION IN BENI MELLAL province  
(CENTRAL HIGH ATLAS, MOROCCO)**

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**ABSTRACT**

Geotourism is a sector that has recently gained importance in the field of tourism. It is based mainly on the promotion of geological and geomorphological features, sites and processes, and abiotic landscapes as tourist attractions. The urban commune of Beni Mellal and its neighbouring communes of Foug Oudi and Foug El Anceur are located at the foot of the Middle Atlas and High Atlas Mountains junction largely known as Atlas of Beni Mellal. They belong administratively to the province of Beni Mellal, which is part of the Beni Mellal-Khenifra Region in central Morocco. These communes contains a number of geomorphological forms and geological objects, with a high value for reconstructing the geological and geomorphological history of this part of the Atlas mountains, which can be qualified as geosites and geoheritage elements. Moreover, due to their outstanding landscape integrity and beauty, these geosites have excellent potential for geotourism development. For this purpose, the inventory was made reveals the presence of geosites that are both numerous and diversified in this territory. In total, of 32 geosites resulting from geological processes such as magmatic, sedimentary and structural phenomena as well as geomorphological processes mainly fluvial and karstic. However, these geological and geomorphological richness are generally unknown to the general public and overshadowed by local actors. The aim of this work is twofold; the first objectives was the inventory and description of these geosites which represent an indispensable step to involves local actors and community in the geoconservation strategy. The second objectives is the realisation of the geotourism map where these geosites are used to establish geotourism routes which could serve as a tool to increase sustainable tourism attractivity of the geopatrimoine of this part of the Moroccan Atlas.

**Keywords:** geotourism, geosites, geoconservation, geoheritage, Beni Mellal Atlas, Morocco.

**SPATIAL VARIABILITY OF PHYSICAL AND HYDRAULIC PROPERTIES  
AGRICULTURAL SOILS IN A SEMI-ARID ENVIRONMENT; CASE OF THE BENI  
MOUSSA IRRIGATED PERIMETER IN THE TADLA PLAIN, MOROCCO**

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**ABSTRACT**

The present study has for objective to assess the spatial distribution of Ks soils the beni Moussa and its relationship with soil properties, including intrinsic silt and clay contents, organic carbon and water content in the dry, total porosity and bulk density in the surface. The links between water, soils and therefore agriculture, are inseparable, indeed, water in the soil is essential for plant growth and therefore plays a major role in the productivity of agricultural systems. The optimization of water management in agriculture is essential in semi-arid areas in order to preserve this resource which is already low and erratic due to human actions and climate change. The saturated hydraulic conductivity (Ks) is the main parameter used to determine the spatial distribution of water infiltration in soils. The saturated hydraulic conductivity of 70 samples from different soil units in the Beni Moussa irrigated perimeter, and according to the land use, was measured using an in situ method by near-test. These measurements revealed a significant spatial variability of Ks values (32-680 mm/h) in relation to the hydrodynamic properties of the soil, its texture and structure, EC (102.3 -2360  $\mu\text{S}/\text{cm}$ ) pH water (6.89- 9.31), its relationship with other soil characteristics. The IDW interpolation method is reliable.

**Keywords:** saturated hydraulic conductivity; spatial correlation;beni moussa.

**THE QUANTIFICATION OF HEMATITE AND GOETHITE IN HYDROMORPHIC SOILS USING THE SENTINEL-2 SENSOR AND XRF IN THE BENI MOUSSA PERIMETER, TADLA PLAIN, MOROCCO.**

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**Mohammed Al Baghdadi**

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**ABSTRACT**

The focus of this research is to assess the Sentinel-2 sensor bands ability to detect and quantify ferrous products in soil using specific spectral indices and iron absorption characteristics in the visible and near-infrared, as well as to propose a method for quantifying ferrous products in ppm using the Sentinel-2 sensor bands in combination with iron content determined by X-ray fluorescence. The hematite index (IHm) developed by Madeira Netto (1993) for the Landsat TM-5 sensor bands, as well as the ferric index (RHGt PF) developed by Baptista and Débora Teobaldo (2017) for the WorldView-2 sensor bands, were adjusted for Sentinel-2 to see if the super-spectral sensor bands of Sentinel-2 could cover the absorption characteristics of ferrous products. To examine the usefulness of Sentinel-2 data in measuring hematite and goethite minerals in Beni Moussa soils using continuum-suppressed spectral feature analysis, organic matter, carbonate, and iron concentrations were measured in soil samples to demonstrate links between them and the spectrum responses measured by the sensor on the soil sample regions. With the deployment of the Sentinel 2 super-spectral sensor bands, the spectral features of goethite, centered at 0.48 m, and hematite, centered at 0.53 m, can now be distinguished; this was previously unachievable with other multispectral data. Pearson correlation coefficient indicates that the iron content determined by X-ray fluorescence is positively correlated with the redness index ( $r = 0.9485$ ) and ferruginous minerals determined by the technique based on the depth of spectral characteristics for hematite ( $r = 0.8939$ ) and for goethite ( $r = 0.8301$ ). The redness index is positively correlated with ferruginous minerals determined by the technique based on the depth of spectral characteristics ( $r = 0.8499$ ) for goethite and ( $r = 0.8969$ ) for hematite, but it's negatively correlated with organic matter ( $r = -0.5715986$ ) and  $\text{CaCO}_3$  ( $r = -0.7796$ ), indicating that these two elements have a significant impact on the iron concentration and electrometric spectrum of the soil. The strong correlation between the concentrations ratio (hematite/hematite + goethite) given by the iron index ( $r = 0,74$ ) and the ratio (hematite/hematite + goethite) calculated by the concentrations of hematite and goethite estimated by the proposed method shows that the results obtained are more or less representative.

**Keywords:** Sentinel-2 Sensor, Hydromorphic Soils, Quantification, iron content

**IRON BEHAVIOR AND THEIR RELATION TO THE PHYSICO-CHEMICAL PROPERTIES IN THE HYDROMORPHIC SOILS OF BENI MOUSSA PERIMETER, TADLA PLAIN, MOROCCO: INSIGHT FROM THE MULTIVARIATE STATISTICAL ANALYSIS.****Abdessalam Salmi***Sultan Moulay Slimane University, Faculty of Science and Technology, Beni Mellal, Morocco***Mohammed Al Baghdadi***Sultan Moulay Slimane University, Faculty of Science and Technology, Beni Mellal, Morocco***Atika Mouaddine***Sultan Moulay Slimane University, Faculty of Science and Technology, Beni Mellal, Morocco***ABSTRACT**

This study aims to determine the iron behavior in the hydromorphic soil in the Beni Moussa perimeter. The hydromorphic soil was sampled at 17 collected sites in February 2020 to perform analysis of pH, organic matter (OM), Cation Exchange Capacity (CEC), Electrical Conductivity (EC), extractable iron, carbonate content (CaCO<sub>3</sub>), granulometry, magnetic susceptibility, and heavy metals content. The results attest that the organic matter shows very high values because the samples collection sites represent the sewerage network. The mass magnetic susceptibility measurements show that all the samples have positive and low values with an abundance of paramagnetic minerals (ilmenite, siderite, and clay minerals, etc.). The iron concentration in hydromorphic soils increases from the top to the bottom of the valleys which shows that the iron migrates in reduced form. Interrelationships between the analyzed parameters and the different samples were investigated by multivariate analyses, principal component analysis (PCA), and hierarchical cluster analysis (HCA). Pearson correlation coefficient indicates that the organic matter (OM) is positively correlated with cation exchange capacity (CEC) ( $r = 0.83$ ) and electrical conductivity CE ( $r = 0.85$ ), but it's negatively correlated with mass magnetic susceptibility high and low frequencies (MSLF and MSHF) ( $r = -0.57$ ) and iron oxide measured by X-ray fluorescence (XRF) ( $r = 0.42$ ). Calcium carbonate content (CaCO<sub>3</sub>) is positively correlated with sand ( $r = 0.49$ ), but it's negatively correlated with MSLF and MSHF and frequency dependence (FD) ( $r = -0.7$ ). Fe is positively correlated with FD ( $r = 0.7$ ), but it's negatively correlated with Sand ( $r = -0.608$ ). clay is strongly negatively correlated with silt ( $r = -0.88$ ) and FeO ( $r = -0.55$ ), respectively. All of these findings suggest that the physicochemical features of Beni Moussa hydromorphic soils are strongly linked and that iron in the soil is required for the stability of specific soil components.

**Keywords:** Physico-Chemical Properties, Multivariate Statistical Analysis, Third Keyword, Beni Moussa perimeter, Hydromorphic Soils.



**SOME CONNECTEDNESS PROPERTIES OF  
RELATOR SPACES****MUWAFIQ MAHDI SALIH***Department of Mathematics, College of Basic Education, University of  
Duhok, Iraq***ABSTRACT**

Motivated by some ordinary and extreme connectedness properties of topologies, we introduce several reasonable connectedness properties of relators (families of relations). Moreover, we establish some immediate connections among these properties. More concretely, we investigate relationships among minimalness (well-chainedness), connectedness, hyper- and ultra-connectedness, door, superset, submaximality and resolvability properties. Since most generalized topologies and all proper stacks can be derived from preorder relators, the results obtained greatly extends some former results on topologies. Moreover, they are also closely related to some former results on well-chained and connected uniformities.

**Keywords:** Generalized uniformities, connectedness properties

**LA STABILITE DU CARBONE ORGANIQUE ET LA DYNAMIQUE DE LA  
MATIERE ORGANIQUE DU SOL DE BENI MOUSSA  
(LA PLAINE DE TADLA, MAROC)**

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**RÉSUMÉ**

Le carbone organique du sol (COS) joue un rôle majeur dans le maintien des propriétés du sol, il constitue un important réservoir de carbone à l'échelle planétaire et il est très sensible au mode de gestion des terres. L'accroissement du stockage de carbone sous forme de matière organique des sols pourrait jouer un rôle important dans la lutte contre l'augmentation des gaz à effets de serre dans l'atmosphère et donc dans la prévention du changement climatique. Ce carbone se minéralise et retourne à l'atmosphère avec des durées de vie très variables, qui dépendent de nombreux facteurs, dont les occupations des sols et les pratiques agricoles. Il est donc important de connaître le potentiel offert par ce « puits » selon le type du sol. À cet égard, L'objectif global de cette étude est d'évaluer le potentiel de stockage du carbone des différents types de sol des Beni Moussa en milieu semi aride afin de déterminer les types de sol dont le potentiel de stockage du carbone est élevé et ceux qui contribuent le moins à la séquestration du carbone au niveau de la plaine de Tadla. La combinaison entre deux méthodes de travail analytique et géomatique permettra de déterminer la variation du stockage du carbone en fonction de la profondeur, et l'interaction avec les autres caractéristiques du sol.

**Mots clés :** sol, stockage du carbone, les changements climatiques

**IMPORTANCE OF THE PEACEFUL ENVIRONMENT IN THE DEVELOPMENT  
OF SOCIETY  
(FROM ISLAMIC TEACHINGS)**

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**ABSTRACT**

The concept of peace is defined as the absence of violence in any society or a healthy, positive international or inter-human relationship. In this situation, all members of society enjoy social, economic, equality, political rights, and protection. Peace is considered an essential component of the well-being of society. Historically speaking, anarchy reigned worldwide before the advent of Islam. That illiterate culture lacked any understanding of law and order. The introduction of Islam brought about a period of social stability and protection for all of humanity. But regrettably, we have lost sight of Islam's teachings throughout time, and as a result, society today still suffers from many of the same issues that existed before the arrival of Islam. So that a peaceful society can be built, people must abide by Islamic precepts. In terms of its research, this research study may be exceptional and useful to others due to its specific field.

**Keywords:** Islam, Humanity, Peace, Society, Violence

**EXPANDING THE UTILIZATION OF SUSTAINABLE PLANT PRODUCTS AND  
DIETARY SUPPLEMENTS IN FISH DIETS: ISSUES AND SOLUTIONS**

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**ABSTRACT**

The goal of this talk was to summarize the current state of knowledge about using plant by-products and supplements in aquafeed, as well as their potential for further use in aquaculture production. Fishmeal (FM) has been used as the primary protein source in aquaculture because of its beneficial necessary amino acids, high digestibility, and palatability. Between now and 2030, fishmeal costs are predicted to grow by 20% due to rising demand and greater output. This requires the search for better FM alternatives for long term aqua-feed production. Plant by-products appear to be the most viable protein source for replacing fish meal. Different types of plant-based ingredients have been assessed in a number of nutritional studies for aquaculture e.g. *Moringa oleifera* leaf meal, *Moringa oleifera* seed meal, Canola meal, Sunflower meal, and Cottonseed meal. Feed additives and supplements are one solution to reduce the negative effects of plant-based proteins. Many studies have been conducted to prove that the use of feed additives increases performance. In short, use of plant by-products may lead to a way for better coordination of fisheries with agriculture and can achieve a goal of better aquaculture production in an eco-friendly, cost effective and more sustainable way.

**Keywords:** plant by-products, replacement, feed formulation, cost effective, environment friendly

**KINETICS OF THE BIOSORPTION OF RH-B IN AQUEOUS MEDIUM**

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**ABSTRACT**

Rhodamine-B is one of the synthetic organic dyes with a high stability and bright color that is widely used in the textile, paper, leather, stained glass, and many other industries. For this reason, it is crucial to either remove it or lower its concentration before releasing it into aquatic streams in order to lessen or limit the cause of numerous diseases. Diverse physical and chemical strategies have been explored to remove pollutants/dyes from wastewater; nevertheless, adsorption is one of the best ways currently in use because of its high efficiency and low cost. In this context, we have employed a plant based biosorbent to remove RhB from an aqueous solution, which under optimized conditions resulted in almost 86% dye adsorption. Kinetic studies show that adsorption happens via pseudo-second-order kinetics. Therefore, the chosen biosorbent can be applied in its practical applications.

**PERCEPTION OF SECONDARY EDUCATION TEACHERS ABOUT THE  
KNOWLEDGE AND USE OF ACTIVE METHODOLOGIES****Andrea María González López***University of Oviedo, Faculty of Teacher Training and Education, Department of Educational  
Sciences, Oviedo, Spain.**ORCID ID: <https://orcid.org/0000-0001-9088-8047>***María Ángeles Pascual Sevillano***University of Oviedo, Faculty of Teacher Training and Education, Department of Educational  
Sciences, Oviedo, Spain.**ORCID ID: <https://orcid.org/0000-0001-6942-6198>***ABSTRACT**

The teaching methods used in the classroom are undergoing profound changes, moving from more traditional models to more active ones, in which the student body becomes the protagonist of their teaching and learning process. They allow the development of skills and abilities that favor their academic, social and emotional involvement, achieving comprehensive development. In addition, they take into account the pace of learning, abilities and interests, favoring the inclusion of all students in the classroom. The main objective is to explore the conceptions of the teaching staff in relation to the knowledge and use of active methodologies and ICT tools used in the classroom, as well as to detect training needs in the teaching staff. The methodology of this research is the qualitative-quantitative analysis, where a descriptive study has been chosen through the application of a questionnaire. The sample is made up of 148 teachers from 6 centers in the Compulsory Secondary Education stage of the Principality of Asturias, Spain. The questionnaire collects information on active methodologies, addressing aspects related to assessment, digital resources, development of skills and training needs. It consists of 16 questions, which are multiple choice, open response, and have a five-level Likert-type scale. For the analysis, the atlas.ti software has been used for the open questions and the SPSS 27 statistical package were used to calculate the frequency, contingency and descriptive statistics tables. In addition, an analysis of variance has also been carried out to find out if there are statistically significant differences in terms of gender, teaching experience, subject and age, as well as a correlational analysis. The results point to favorable steps in the methodological transformation and pedagogical renewal that is being developed in the current educational system, where many teachers already include these aspects in their classroom programming. Specifically, it should be noted that teachers consider that active methodologies and the use of ICT improve the teaching and learning process, where they indicate that they have a good knowledge of the variety of methods, digital resources and evaluation tools that they can apply. In addition, they regularly use active methodologies and digital resources to develop skills in students and perceive the need to change the evaluation systems in accordance with the methodologies used. Lastly, teachers perceive that they need more training in active methodologies, ICT and alternative assessment systems.

**Keywords:** teachers, secondary education, innovation, active methodologies, ITC.

**EFFECTS OF ALOE VERA SUPPLEMENTATION ON OVERALL PERFORMANCE OF CATLA CATLA FINGERLINGS FED CANOLA MEAL BASED DIETS****ZEESHAN YOUSAF**

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**ABSTRACT**

The purpose of this particular study was to evaluate and determine the effect of *Aloe vera* supplementation on overall performance of *Catla catla* fingerlings fed with canola meal based diets. A total of 270 fingerlings ( $6.50 \pm 0.03$  g fish<sup>-1</sup>) were randomly divided into six dietary groups and tested in triplicates and fed on diets containing equal amount of canola meal and graded levels of *A. vera* supplementation viz., 0%, 1%, 2%, 3%, 4% and 5%. Feeding rates for fingerlings were 5% of their live wet weight. Analysis revealed that fish fed 3% of supplemented *A. vera* diet enhanced the weight gain (13.46g), weight gain % (206.14%) and feed conversion ratio (1.23) in a significant ( $p < 0.05$ ) manner. Highest apparent digestibility coefficient of nutrients in terms of gross energy (67.44%), crude protein (77.67%) and crude fat (82.20%) were also noted on 3% supplementation level. Carcass analysis showed that maximum crude protein (19.57%) and fat content (3.95%) were found at same level of *A. vera*. It was concluded that *A. vera*, especially at a level of 3% supplementation in the diet, significantly affects the growth, nutrient utilization, and carcass composition *C. catla* fingerlings.

**Keywords:** *Catla catla*, growth performance, carcass composition, nutrient digestibility

## **ENDONEZYA'DAKİ KÜÇÜK ADALARIN KIYI SULARINDAKİ ÇEŞİTLİ TÜRLERDE KARBON İÇERİĞİ**

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### **ÖZET**

Küresel ısınma, CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CFC'ler, SF<sub>6</sub>, HFC'ler ve PFC'ler gibi artan sera gazı emisyonları nedeniyle atmosferin, okyanusların ve toprağın ortalama sıcaklığındaki artıştır. Deniz çayırları, kıyı bölgelerinde atmosferden CO<sub>2</sub> gazını emme yeteneğine sahip ekosistemlerden biridir. Bu çalışmanın amacı, Kuzey Maluku ilindeki küçük adaların kıyı bölgelerinde deniz otu türleri *Enhalus acoroides*, *Thalassia hemprichii* ve *Cymodoceae rotundata*'nın biyokütle içeriği, karbon içeriği ve CO<sub>2</sub> absorpsiyon kapasitesini analiz etmektir. Örnekleme, sırasıyla 2 gözlem noktası ile Ternate ve Maitara Adası olmak üzere iki küçük adada gerçekleştirilmiştir. Sonuçlar, en yüksek deniz yosunu biyokütlesinin, karbon içeriğinin ve deniz yosununun CO<sub>2</sub>'ye absorpsiyon kapasitesinin deniz otu türü *Enhalus acoroides*'te bulunduğunu ve en düşük türün *Cymodoceae rotundata* olduğunu gösterdi. Deniz otunun en yüksek biyokütlesi, karbon içeriği ve emme kapasitesi sırasıyla 3943.52 g/m<sup>2</sup>, 1853.46 g/m<sup>2</sup>, 6802.13 g/m<sup>2</sup> değerleriyle Maitara Adası, Pasimayou Köyü'nde, en düşük ise Ternate Adası, Muhajirin Köyü'nde elde edilmiştir. , sırasıyla 1053,32 g/m<sup>2</sup>, 495,05 g/m<sup>2</sup>, 1816,88 g/m<sup>2</sup> değerleriyle. Ternate Adası'ndaki deniz otunun ortalama karbon içeriği, Maitara Adası'nda 789.875 gC/m<sup>2</sup> veya 7898.75 tonC/ha ve 1409.15 gC/m<sup>2</sup> veya 14091,5 tonC/ha idi. Regresyon analizinin sonuçları, deniz otu biyokütlesi, deniz otu yaprak uzunluğu ve deniz otu yaprak genişliğinin çalışma alanındaki deniz yosununun karbon içeriği üzerinde önemli bir etkiye sahip olduğunu göstermiştir.

**Anahtar Kelimeler:** mavi karbon, deniz otu, küçük adalar, Ternate ve Maitara, Kuzey Maluku.



**CARBON CONTENT IN SEVERAL SPECIES IN COASTAL WATERS OF SMALL ISLANDS IN INDONESIA****ABSTRACT**

Global warming is an increase in the average temperature of the atmosphere, oceans and land due to increased emissions of greenhouse gases such as CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CFCs, SF<sub>6</sub>, HFCs and PFCs. Seagrass meadows are one of the ecosystems in coastal areas that have the ability to absorb CO<sub>2</sub> gas from the atmosphere. The purpose of this study was to analyze the biomass content, carbon content, and CO<sub>2</sub> absorption capacity of seagrass species *Enhalus acoroides*, *Thalassia hemprichii*, and *Cymodoceae rotundata* in the coastal areas of small islands in North Maluku Province. Sampling was carried out on two small islands, namely Ternate and Maitara Island with 2 observation points respectively. The results showed that the highest seagrass biomass, carbon content, and absorption capacity of seagrass to CO<sub>2</sub> were found in the seagrass type *Enhalus acoroides* and the lowest type was *Cymodoceae rotundata*. The highest biomass, carbon content, and absorption capacity of seagrass were obtained on Maitara Island, Pasimayou Village with values of 3943.52 g/m<sup>2</sup>, 1853.46 g/m<sup>2</sup>, 6802.13 g/m<sup>2</sup>, respectively, and the lowest was on Ternate Island, Muhajirin Village, with values of 1053.32 g/m<sup>2</sup>, 495.05 g/m<sup>2</sup>, 1816.88 g/m<sup>2</sup> respectively. The average carbon content of seagrass on Ternate Island was 789,875 gC/m<sup>2</sup> or 7898.75 tonC/ha and 1409.15 gC/m<sup>2</sup> or 14091,5 tonC/ha on Maitara Island. The results of the regression analysis showed that seagrass biomass, seagrass leaf length, and seagrass leaf width had a significant effect on the carbon content of seagrass in the study site.

**Keywords:** blue carbon, seagrass, small islands, Ternate and Maitara, North Maluku.

**THERMAL PERFORMANCE ANALYSIS OF VACUUM INSULATION PANEL  
WITH AEROGEL COMPOSITE CORE****Ankang Kan***Merchant Marine College, Shanghai Maritime University, Shanghai 201306, P. R. China***Qiaoling Zhang***Merchant Marine College, Shanghai Maritime University, Shanghai 201306, P. R. China***Zhaofeng Chen***College of Material Science and Technology, Nanjing University of Aeronautics and Astronautics,  
211106, P. R. China***Jiaxiang Zhang***Merchant Marine College, Shanghai Maritime University, Shanghai 201306, P. R. China***Dan Cao***Merchant Marine College, Shanghai Maritime University, Shanghai 201306, P. R. China***ABSTRACT**

With excellent thermal insulation, vacuum insulation panel has already been extensively used for insulation purpose in many fields such as refrigerators, cold storages and buildings industry. Nanoporous aerogel has a very low thermal conductivity, which is regard as optimal materials for VIP core. Vacuum degree is a vital parameter affecting thermal conductivity. In this paper, a device was designed and verified to accurately collect the internal pressure of vacuum insulation panel. A theoretical model was developed and the accuracy of the model was verified through experiments to analyze the effective thermal conductivity of vacuum insulation panel. The density, temperature, and pressure effects on the thermal conductivity were investigated. It was found that density had a remarkable effect on effective thermal conductivity. A minimum density of  $120 \text{ kg/m}^3$  at a temperature 300K resulted in the lowest thermal conductivity. The increase in temperature caused an increase in the radiative thermal conductivity. At  $\rho_a=100 \text{ kg/m}^3$ , the gas conduction contribution became the predominant part influencing ETC when  $P>3 \text{ kPa}$ . And at  $\rho_a=200 \text{ kg/m}^3$ , gas conduction became the major part only when  $P>50 \text{ kPa}$ . As pure aerogels are fragile, the thermal conductivity of aerogel composite core with additive fibers was investigated in this paper. It was indicated that the optimal fiber content is about 5% when  $T < 550 \text{ K}$  and about 25% when  $T > 550 \text{ K}$ . At temperature  $T>400 \text{ K}$ , the total thermal conductivity increases significantly versus fiber diameter.

**THERMAL RADIATION AND VISCOUS DISSIPATION EFFECTS ON HYBRID  
NANOFLUID OVER STRETCHING SHEET****Misbah Fareed***<sup>1</sup>Department of Mathematics, Division of Science and Technology, University of Education, Lahore,  
54000, Pakistan***Abid Hussanan***<sup>1</sup>Department of Mathematics, Division of Science and Technology, University of Education, Lahore,  
54000, Pakistan***Amir Abbas***Department of Mathematics, Faculty of Science, University of Gujrat, Sub-Campus, Mandi Bahauddin  
50400, Pakistan***ABSTRACT**

Hybrid nanofluid has been commercialized as the advancement of traditional nanofluid. The present research work aims to investigate the significance of thermal radiation and viscous dissipation effects on hybrid nanofluid over stretching sheet. The mixture nanofluid involves copper (Cu) and iron oxide ( $\text{Fe}_3\text{O}_4$ ) nanoparticles which are diluted into  $\text{H}_2\text{O}$  to form  $\text{Cu-Fe}_3\text{O}_4/\text{H}_2\text{O}$  hybrid nanofluid. This mixture is irrotational, incompressible and electrically conducting. The appropriate similarity transformations are applied to reduce the partial differential equation into the system of nonlinear ordinary differential equation, which is solved numerically. The Runge-Kutta-Fehlberg method is used to obtain the numerical solutions for velocity and temperature field. The performance of well-known parameters against velocity and temperature field has been visualized graphically. The temperature distributions declared low performance for increasing value of Eckert number. Temperature field increases with increasing values of magnetic field and radiation parameters. The obtained results demonstrated the effective application of hybrid nanofluids.

**Keywords:** Hybrid nanofluid; thermal radiation; viscous dissipation; magnetic field.

**VALORIZATION OF B-CHITIN EXTRACTION BYPRODUCT FROM  
CUTTLEFISH BONE AND ITS APPLICATION IN FOOD WASTEWATER  
TREATMENT**

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**ABSTRACT**

The nontoxicity, worldwide availability and low production cost of cuttlefish bone products qualify them an excellent biocoagulant to treat food industry wastewater. In this study, cuttlefish bone liquid waste from the deproteinization step was used as a biocoagulant to treat food industry wastewater. This work concerns a waste that has never before been investigated. The objectives of this work were: the

recovery of waste resulting from cuttlefish bone deproteinization, the replacement of chemical coagulants with natural ones to preserve the environment, and the enhancement of the value of fishery byproducts. A quantitative characterization of the industrial effluents of a Moroccan food processing plant was performed. The physicochemical properties of the raw cuttlefish bone powder and the deproteinization liquid extract were determined using specific analysis techniques: SEM/EDX, FTIR, XRD and <sup>1</sup>H-NMR. The protein content of the deproteinization liquid was determined by OPA fluorescent assay. The zeta potential of the liquid extract was also determined. The obtained analytical results showed that the deproteinization liquid waste contained an adequate amount of soluble chitin fractions that could be used in food wastewater treatment. The effects of the coagulant dose and pH on the food industrial effluents were studied to confirm the effectiveness of the deproteinization liquid extract. Under optimal conditions, the coagulant showed satisfactory results. Process optimization was performed using the Box–Behnken design and response surface methodology. Thus, the optimal removal efficiencies predicted using this model for turbidity (99.68%), BOD<sub>5</sub> (97.76%), and COD (82.92%) were obtained at a dosage of 8 mL biocoagulant in 0.5 L of food processing wastewater at an alkaline pH of 11.

**Keywords:** cuttlefish bone; β-chitin; fish byproducts; industrial; biocoagulant; effluents; Box–Behnken experimental design.

**RURAL WOMEN INFORMATION SEEKING BEHAVIOUR ON HERBICIDE  
USAGE IN NSUKKA AGRICULTURAL ZONE, ENUGU STATE, NIGERIA**

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**ABSTRACT**

This research assessed the information seeking behaviour of rural women farmers on herbicide usage in Nsukka agricultural zone of Enugu state, Nigeria. A structured interview schedule was to collect data from 80 respondents. Data collected were analyzed using frequency, mean, percentage and standard deviation. Result shows that the major crops grown by the respondents included cassava (76.3%), yam (55%) and cocoyam (55%). Paraforce ( =1.95) was the most frequently used herbicide among the respondents. For the herbicide practices, the results also indicates that the farmers: clean and rinse knapsack sprayer after use ( =2.95), use a separate utensil for mixing herbicide( =2.32), washed clothes used for spraying chemical separately ( =2.91), The major types of information sought by the respondents on herbicide use include: quantity of herbicide to be mixed in a sprayer (88.8%), entry period after herbicide application (81.3%), type of herbicide for land clearing (78.8%), type of post emergence herbicide for weed control (70.0%) among others. The result shows that farmers preferred information from herbicide dealers ( =2.90), previous experiences ( =1.79) and co-farmers ( =2.31). Financial constraints ( =2.15) and illiteracy ( =1.77) were the major challenges faced by the respondents on seeking information on herbicide use. The study recommends that rural women farmers in the study area should be sensitized and encouraged to source and seek agricultural information from institutional sources such as the extension agent. Herbicide dealers should be properly trained on the necessary information that farmers need to know about herbicide usage.

**Keywords:** information seeking behavior, rural women, herbicide usage

**PROVERBS 28:20, 22 AND NIGERIAN YOUTHS' DRIVE FOR RAPID MONEY****Favour C. Uroko***Department of Religion and Cultural Studies, Faculty of the Social Sciences  
University of Nigeria, Nsukka***ABSTRACT**

While in the last decade, the Nigerian youth quest for wealth has entered into the mainstream of Old Testament studies, Proverbs 28:20,22 have remained largely unexplored from this perspective. To address this omission, I intend to draw attention to the value of looking at the unbridled quest to get-rich-quick by Nigerian youth through the lens of the pericope. Many investors fall prey to ponzi schemes, which are a type of investment scam. They are duped into believing that their money would return 100% in a short amount of time. Many ambitious investors have lost their money as a result of such schemes, which are unlawful and offer unrealistic profits. Proverbs 28:20,22 exist in a cultural context and communicate common values and beliefs in a community such as Nigeria. The rhetor encourages his audience to be faithful so that in the short and long run they will enjoy the needed blessings. The rhetor encourages his audience to be faithful so that in the short and long run they will enjoy the needed blessings. This article explores the significance of using Proverbs 28:20,22 for interpreting youth participation in ponzi schemes. Furthermore, I demonstrated that greed and lack of patience are the remote causes of youth falling prey to ponzi schemes. The rhetoric analysis was used as the methodology due to the various rhetoric axioms that the rhetor employed in the pericope. It is believed that the pericope will speak anew to the youth quest for quick money.

**Keywords:** Proverbs, youth, Greed, Ponzi Schemes, Old Testament

**DEVELOPMENTS IN STEM CELL THERAPY FOR THE MANAGEMENT OF DIABETES**

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**ABSTRACT**

About 5% of the population has diabetes mellitus, a metabolic condition. Potentially curing diabetes through transplanting isolated islets of Langerhans from the donor pancreas is complicated by a lack of suitable transplantation material and the need for lifelong immunosuppressive treatment. A sustainable cell supply, such as islet cells made from stem cells, could be the solution to these issues. One characteristic that sets stem cells apart from other cell types is their capacity to generate new cells and develop them into many specialized cell types. This means that differentiation can be used to cultivate these cells either in a living organism or in a laboratory setting. There is a wide variety of stem cells, from embryonic to germ to cancer to adult, in which pluripotent cell lines can be created in a lab setting. Methods of in vitro differentiation and selection have made it possible to steer embryonic stem cell differentiation toward desired endpoints and then genetically select for those lines. Cell transplants generated from embryonic stem cells that produce insulin have corrected blood sugar levels in diabetic mice. Recent research has suggested suggesting there is greater flexibility in adult stem cells than previously thought in terms of their ability to change their functions. Using embryonic stem cells for cell transplantation is morally problematic, but adult stem cells solve this problem. In light of the findings of these analyses, hope has grown that cell treatment may be a part of the diabetes solution.

**Keywords:** stem cells; diabetes; insulin; patient care; advanced health management; endocrine disorder



**POTENTIAL OF STEM CELLS IN TREATING BREAST CANCER**

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**ABSTRACT**

There has been a lot of interest in stem cell therapy as a means of curing disease in recent years. Despite stem cell therapy's extensive usage in the treatment of a wide range of medical diseases, it has been hypothesised that these cells play a key part in the progression of cancer. Breast cancer is still the most frequent malignancy in women globally, but newer treatments, such as stem cell targeted therapy, are considered to be more effective in preventing recurrence, metastasis, and chemoresistance than older methods like chemotherapy and radiation. This comprehensive study explains all you need to know about stem cells, normal human breasts, and how to use stem cells to treat breast cancer.

**Keywords:** breast cancer; stem cells; targeted therapy; tumor microenvironment; molecular pathway; inhibitors

**IMPROVED BIOAVAILABILITY OF LEVOSULPIRIDE USING SOLID LIPID NANOPARTICLES AS DRUG DELIVERY SYSTEM****Aleena Maryiam***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Fakhar ud Din***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Zakir Ali***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Uswa Shafique***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***ABSTRACT**

The aim of this study was to develop levosulpiride-loaded solid lipid nanoparticles (SLNs) with enhanced solubilization and bioavailability. The levosulpiride loaded-SLNs were composed of levosulpiride, stearic acid, and tween 80 in their respective weight ratios of (1, 5, 1.5 mg) dissolved in 1 ml distilled water. Physicochemical properties of the SLNs such as particle size, shape, crystallinity and chemical interaction were evaluated. Further, the *in-vitro* drug dissolution, pharmacokinetic and stability studies of the SLNs were performed. The SLNs were rounded shaped stable nanoparticles with average diameter of 200 nm. They demonstrate 1.5 and 3-fold better drug dissolution when compared with the commercial product and levosulpiride powder, respectively. The SLNs enhanced the bioavailability of levosulpiride 3~times and 7~times respectively, when compared with the commercial product and levosulpiride powder. It can be concluded that SLNs are capable to improve the dissolution and bioavailability of levosulpiride, even more than the commercial product.

**Keywords:** Solid lipid nanoparticles; Levosulpiride; Bioavailability; Levopraid

## A COSTRUCTIONIST ACCOUNT OF THE PERSIAN CONSTRUCTIONAL IDIOM [PA ('LEG') TO [N] [LV]]

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This paper aims to bring to light the [pa ('leg') to [N] [LV]] construction in Persian, as in *pā be toup šodan* (lit. leg to ball become, 'to start playing football') from a constructionist perspective.

(1) <i>Pā</i>	<i>be</i>	<i>tup</i>	<i>šodan-e-</i>	<i>Setāre-ye</i>	<i>sābeq-e</i>	<i>Perspolis</i>
foot	to	ball	become-EZ	star-EZ	former-EZ	Perspolis

'The starting to play football of the former Perspolis's star'

It is argued that the leg to constructional idiom has some phonological, syntactic, semantic, and discursive properties distinguishing it from a regular syntactic structure. Besides, innovative uses of this idiom suggest this construction is entrenched and, therefore, productive in Persian. The LV slot in the construction can be only filled with the verb *šodan* ('to become') and this, in turn, determines the type of the noun in N slot and also molds the polysemy links of the construction. A need for rethinking metaphorical extension links emerges as it is shown that metaphonymy, rather than mere metaphor, is of noticeable importance in the development of the constructional network of this idiom. In this paper, Using a variety of evidence from different levels of linguistic analysis, we try to show that *leg to* construction or the elicited response construction can not be regarded as a regular syntactic pattern. This and other characteristics such as having a pragmatically-constrained holistic meaning would provide safe justifications to categorize this construction as a constructional idiom. This construction also involves a schema that sanctions all its instances, including newly developed compounds of this type in modern Persian. These data- derived findings can be summarized in the following form:

[leg to [N] [LV *šodan*]] Semantics: 'to start playing with ball'

Pragmatics: the SEM is an elicited response to an urgent need in the context

Aided by palpable evidence, we argue that this schema involves one sub- schema. Without a doubt, to grasp the full understanding of such a network, one needs to synchronically and diachronically study the link of this construction to the possible upper nodes in the network. We will not consider this issue here since it goes well beyond the objectives and limits of the current paper. However, it seems plausible to hypothesize that such a construction has been diachronically generated from [[N] be ('to') [N] [V]], probably through noun incorporation, as a mechanism of compound verb development in Persian This syntactic construction permits different nouns, including body part nouns to fill its first N position. However, even a body part noun like *pa* ('leg'), when used in this construction, only allows a literal reading while it conveys a metonymic meaning in *the leg to* construction.

Thus said, we can provide a very partial network of this construction in figure (2).

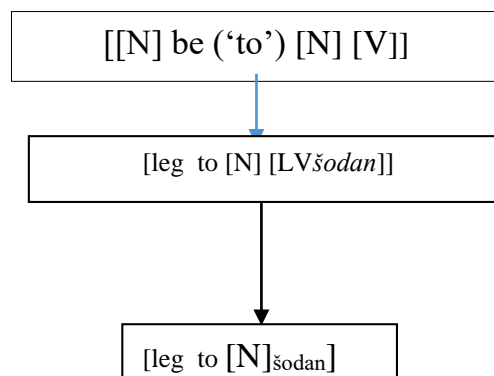


Figure (2). [leg to [N] [LVšodan]] partial construction network

The *leg to* construction is linked to the upper node through a metaphorical extension link. As an instance, *pa be toop šodan* (lit. leg to ball become, 'to start playing football') is a metaphorical extension of construction like *pa be dar šodan* (lit. leg to door hit, 'to kick the door'). As we saw earlier, in the latter construction, the metonymy part as whole goes hand in hand with metaphor to construct meaning, in contrast to the literal reading of the words in the former. The interaction of metaphor and metonymy in the network, thus, set the ground for us to tentatively propose the need for redefining the metaphorical extension links to include the cases of metaphonymy. Our analysis, somewhat, revealed that both the meanings of the components and the constructional meaning are significant in building the final meaning of the constructional idiom. This can be a provisional answer to the question as 'whether the meaning of the LVC is only dependent on the (probable figurative) meaning of its component, or whether the construction has a particular semantic as well'. In other words, the *leg to* constructional idiom, stands somewhere on the continuum of idiomaticity and compositionality. This complicated and dual nature has made complex predicates in Persian an interesting challenge for linguistics.

**Keywords:** constructional idiom; Persian language; the *leg to* construction; metaphorical extension; constructional meaning

**DETECTION TECHNIQUES FOR EXAMINEE CHEATING: A TEN-YEAR SURVEY (FEATURES AND SOLUTIONS)**

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**ABSTRACT**

Exam cheating is among the most important productivity and efficiency problems that exist in all educational levels, from elementary to post-secondary. This survey will provide methods for spotting exam fraud or cheating in order to deter test-taking misconduct. In order to stop cheating, this research looks into methods for spotting unusual behavior or feelings in students throughout an exam. Systems for detecting abnormalities in videos react to cheating alarms before they become serious. Supervisors would profit from these techniques in this situation. Additionally, it provides proof of cheating and helps identify the peculiar examiner. Therefore, the goal of this essay is to identify various forms of cheating and to lessen cheating during tests.

**Key word:** Cheating Detection, Object Detection, Deep learning, CNN, Machine learning

**TAUBERIAN THEOREMS VIA THE GENERALIZED NÖRLUND MEAN FOR SEQUENCES IN 2-NORMED SPACES****Valdete Loku***University of Applied Sciences, Rr. Universiteti, p.n. 70000 Ferizaj, Kosovo***ABSTRACT**

In this paper, we will show Tauberian conditions under which ordinary convergence of the sequence  $(x_n)$  in 2-normed space  $X$ , follows from  $T_{p,q}$   $n$ -summability. In fact we give a necessary and sufficient Tauberian condition for this method of summability. Also, we prove that Tauberian Theorems for these summability methods are valid with Schmidt-type slowly oscillating condition as well as with Hardy-type “big O” condition

**CHEMICAL COMPOSITION AND CONSUMER ACCEPTABILITY OF MAIZE FLOUR-BASED COOKIES SUPPLEMENTED WITH AFRICAN YAM BEAN AND ORANGE-FLESHED SWEET POTATO FLOUR BLENDS**

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**ABSTRACT**

The utilization of indigenous crops as a partial or total substitute for wheat is progressively expanding to solve issues including malnutrition, food allergies, and the increased price of food products. One such crop that is being investigated more and more is maize because it is widely grown in Nigeria. This study focuses on the effect of African yam bean and orange-fleshed sweet potato flour blend supplementation on the antioxidant properties and consumer acceptability of malted yellow maize flour-based cookies. The three flours were blended together using a D-optimal mixture design of response surface methodology (RSM). Sixteen (R1-R16) runs were generated and cookies were produced and evaluated for proximate analysis. Two cookie samples were selected based on higher protein and crude fibre content. The selected samples with control (100% whole wheat flour cookies) were evaluated for antioxidant properties and sensory characteristics. The incorporation of African yam bean and orange-fleshed sweet potato flours significantly ( $p < 0.05$ ) enhanced the crude protein, crude fibre, and energy value of all the formulated cookies ranging from 7.31-10.39%, 0.76-2.56%, and 486.09-508.38 kcal, respectively. Sample with orange-fleshed sweet potato show higher antioxidant properties. The fortified cookie samples were accepted by the panelists although control (100% wheat cookie) was more preferable.

**Keywords:** Supplementation, indigenous crops, antioxidant properties, acceptability, cookies

**OPTIMUM PARAMETERS FOR PHYTOPATHOGENIC FUNGUS DETECTION USING  
NANOSENSING TECHNIQUE**

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**ABSTRACT**

Nanosensing techniques have been used for the detection of various analytes in different fields such as health care system, environmental pollutants as well as plant pathogenic fungi in agricultural sector. Nanosensor simply makes use of nanomaterial as integral part for its construction. Here in, we report the optimum parameters such as temperature, pH, and applied potential among others that used for the construction of the present nanosensor for detection of phytopathogen (*C.falcatum*) in sugarcane. The parameters that used for this sensing technique were investigated and optimized. Conclusively, it was also found that the optimized parameters can be used for a simple, cost effective, non-time consuming method for the detection of *C.falcatum* (fungus that causes sugarcane cancer) via sensing method.



**MACHINE LEARNING ARCHITECTURE FOR COVID-19 DETECTION USING SYMPTOMS AND LOCATION (MARCUS)****Rohith Gangaraju***B.tech Computer Science, VIT-AP University, Amaravathi- 522237***Amara Santosh Jayanth***B.tech Computer Science, VIT-AP University, Amaravathi- 522237***Dr. Karthika Natarajan***Assistant Professor, VIT-AP University, Amaravathi- 522237***ABSTRACT**

Covid-19 is a major crisis which is infecting exponentially across the human community in various blocks called waves. Advancement in Machine Learning algorithms made tremendous changes in detection of recently emerged Coronavirus. It helps to detect faster and very efficiently. Due to speed processing of data, recovery of the patient will be faster compared to traditional methods used by hospitals. The data used for processing contains the symptoms of the patients who suffered with Coronavirus. The symptoms clearly state the health status of a person. The dataset has seven major features which clearly impact their coronavirus positivity. It also contains 5 major symptoms specified by the WHO i.e.,(Fever, Tiredness, Difficulty in breathing, Dry cough, and sore throat). The proposed model MARCUS (Machine Learning Architecture for Covid-19 detection Using Symptoms and Location) helps us to fastly identify covid-19 verdict based on the symptoms mentioned above. Usage of different weights to each and every symptom gives more accurate results than existing models. This efficient algorithm is very helpful in any future crisis as this model can add up different possibilities of symptoms for a person in the upcoming waves. Our proposed model can predict coronavirus by considering many other factors like recent location of the patient, which can give more accurate spread detection on location wise too compared to existing algorithms. Using this algorithm and model, we can make people get aware earlier than they usually get to know about the severity of their suffering from coronavirus.

**Keywords:** Machine Learning Algorithms, Data processing, Detection, Covid-19

**THE EFFECT OF DUST PARTICLES ON THE EVOLUTION OF WEAK DISCONTINUITY  
IN TWO-DIMENSIONAL SUPERSONIC FLOW OF VAN DER WAALS GAS**

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**ABSTRACT**

The motive of this study is to investigate the impact of the dust particles on the shock formation in two-dimensional steady supersonic flow of the composition of van der Waals gas and small solid dust particles for the planar, cylindrically symmetric and spherically symmetric cases. It is shown that the governing equations describing the van der Waals gas with dust particles is hyperbolic in nature. Further, by employing the method of wavefront analysis, we derived the transport equations for shock wave which lead to the derivation of shock formation distance and also, provide the relations of shock formation. Also, it is determined as how to the shock formation distance is affected by the presence of dust particles, parameter of van der Waals gas and upstream flow Mach number ( $M_0 > 1$ ) by using MATHEMATICA 11 software.

**Keywords:** Quasilinear PDEs · Shock wave · Van der Waals gas · Dusty gas

## **SOLVING A COUNTERINTUITIVE PROBABILITY PROBLEM**

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### **ABSTRACT**

The traditional study of probabilities mainly focuses on the application of algorithms (Batanero, Green & Serrano, 1998), however, it is widely documented that, this approach does not prepare students to solve non-routine problems, nor to develop probabilistic reasoning that allows them to face situations that conflict with their intuition. Since the wrong intuitions associated with probabilistic interpretation do not disappear with spontaneous cognitive development, it is essential that students are confronted with counterintuitive situations, otherwise the errors will remain unchanged (Leviatán, 2002). In the teaching of probability, the use of counter-intuitive problems is a constructivist pedagogical strategy that allows approaching situations with a high incidence of errors in a challenging and motivating way (Contreras, Batanero, Arteaga & Cañadas, 2011). To encourage students to reflect on their thinking processes, promoting the development of mathematical abstraction skills, the resolution of these counterintuitive tasks must be complemented with discussion and in-depth analysis of the reasoning necessary for successful resolution, but also of the reasons for the mistakes made, to make students aware of the counterintuitive nature of certain probability problems and of correct strategies. The “Bertrand Box” problem is one of the most famous probability problems where our intuition leads us to ignore or misinterpret additional information we have. The use of this problem as a probabilistic intuition strengthening task is interesting due to its simplicity and challenging nature. Also, other more complex variants of the problem, such as the “Monty Hall” Problem, can be used to teach students how to make decisions in the face of uncertainty.

This work addresses the advantages of “Bertrand Box” and “Monty Hall” problems as didactic tools.

**WORK LIFE BALANCE AMONG LEBANESE WORKING MOTHERS**

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**ABSTRACT**

Work Life Balance means the state of equilibrium attained in an individual's personal life and professional accomplishments. Commitment is the psychological connection that binds an employee to an organization. It is a set of values, principles or beliefs towards the organization; constituting a determining factor of an organizational success. The importance of balancing work and life is becoming a key issue in the modern society, specifically with the increase of female participation in work force. This study will shed a light on the degree of work to life conflict among Lebanese working mothers. The question rose "How does Work Life Balance affect organizational commitment?" The results of this study would be helping the mothers to achieve a satisfactory Work Life Balance, which would directly influence their work performance. Internet search has been used to obtain secondary data and information. The primary data was collected through a questionnaire method survey among the Lebanese working mothers. The results have revealed no significant relationship between the Work Life Balance and Organizational commitment. The outcome shows that the Lebanese working mothers have an average WLB but clearly have a high work commitment. In light of this result, we recommend for future investigation about the reasons behind such findings and identifying other factors affecting work commitment among Lebanese working mothers. Work Life Balance, organizational commitment, Lebanese working mothers, and challenges.

**A NOTE ON GENERALIZED  $(m, n)$ -JORDAN  $*$ -DERIVATIONS IN PRIME RINGS****RAOF AHMAD BHAT***Department of Mathematics Aligarh Muslim University Aligarh, India***ABBAS HUSSAIN SHIKEH***Department of Mathematics Aligarh Muslim University Aligarh, India***ABSTRACT**

Let  $A$  be a prime ring equipped with an involution  $*$  of order 2 and let  $m = n$  be some fixed positive integers such that  $A$  is  $2mn(m+n)|m-n|$ -torsion free. Let  $Q_{ms}(A)$  be the maximal symmetric ring of quotients of  $A$  and consider the mappings  $F$  and  $G : A \rightarrow Q_{ms}(A)$  satisfying the relations  $(m+n)F(a^2) = 2mF(a)a^* + 2naF(a)$  and  $(m+n)G(a^2) = 2mG(a)a^* + 2naG(a)$  for all  $a \in A$ . Using the theory of functional identities and the structure of involutions on matrix algebras, we prove that if  $F$  and  $G$  are additive, then  $G = 0$ . We also show, in case  $*$  is any non identity anti-automorphism, that the same conclusion holds if either  $*$  is not identity on  $Z(A)$  or  $A$  is a PI-ring.

**EFFECTS OF APPLIED MAGNETIC FIELD AND PRESSURE ON THE  
DIAMAGNETIC SUSCEPTIBILITY AND BINDING ENERGY OF DONOR  
IMPURITY IN A CIRCULAR QUANTUM DISK MADE OUT OF GAAS****Ibrahim Maouhoubi***LPS, Department of physics, Sidi Mohamed Ben Abdellah University, BP 1796 Fez, Morocco***Izeddine Zorkani***LPS, Department of physics, Sidi Mohamed Ben Abdellah University, BP 1796 Fez, Morocco***ABSTRACT**

In this article, we investigate the influence of the hydrostatic pressure, magnetic field, and conduction band non-parabolicity on both the diamagnetic susceptibility and the binding energy of shallow donor impurity in a quantum disk made out of GaAs. The Hamiltonian of the investigated problem has been solved within the framework of the effective-mass approximation. The energy minimization has been performed using variational approach. Our results reveal that both the diamagnetic susceptibility and binding energy have been reduced with increasing the disk size. Moreover, the diamagnetic susceptibility increases as the impurity moves from the extremity to the center of the disk. However, both the diamagnetic susceptibility and binding energy have been improved under applied magnetic field, hydrostatic pressure, and by considering the conduction band non-parabolicity model as well. We hope that the reported results will be a modest contribution to further theoretical research in the field of nanostructures.

**Keywords:** Quantum disk; Hydrostatic pressure; Magnetic field; Non-parabolicity; Diamagnetic susceptibility; Binding energy.

**ON THE CHARACTERIZATION OF CERTAIN MAPS IN PRIME  
 $\mathbb{Z}$ -RINGS****ABBAS HUSSAIN SHIKEH***Department of Mathematics Aligarh Muslim University Aligarh, India***RAOF AHMAD BHAT***Department of Mathematics Aligarh Muslim University Aligarh, India***ABSTRACT**

Let  $S$  be a noncommutative prime ring with maximal symmetric ring of quotients  $Q_{ms}(S)$ . Consider the additive maps  $F$  and  $H : S \rightarrow Q_{ms}(S)$ . Using the theory of functional identities and the structure of involutions on matrix rings over fields, we prove that if  $F$  and  $H$  are additive such that  $2F(a^2) = F(a)a^* + aF(a)$  and  $2H(a^2) = H(a)a^* + aH(a)$  hold for all  $a \in S$ , then  $F = H = 0$  unless  $\dim_C AC = 4$ ,  $\text{char}(A) = 2$  and  $*$  is of the first kind. We also provide an example to show that  $H$  may be nonzero if  $\dim_C AC = 4$ ,  $\text{char}(A) = 2$  and  $*$  is of the first kind

**USEFULNESS OF AGRICULTURAL INFORMATION SHARED AMONGST  
ACTORS IN THE POULTRY VALUE CHAIN OF THE COMMERCIAL  
AGRICULTURAL DEVELOPMENT PROJECT IN ENUGU STATE, NIGERIA**

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**ABSTRACT**

The study assessed usefulness of agricultural information shared among actors in the poultry value chain of the Commercial Agricultural Development Project (CADP) in Enugu State. Seventy-one core actors (service providers, producers, processors and marketers) in the poultry value chain were randomly selected for the study. Data was collected using structured interview schedule. Data was analysed using percentage, mean score and standard deviation. Results show that all (100%) the service providers (input dealers) of CADP were female. The service providers trust the information communicated with fellow service providers (M=3.50) and banks (M=3.00) while marketers trust information communicated with service providers (M=3.50) and fellow marketers (M=3.00) with the exception of consumers (M= 1.67). Service providers' useful sources of information communication include: fellow input dealers (M=4.00) and bank (M=3.00) while the producers' useful sources of information include: extension (M=3.45) and service providers (M=3.35). Actors trust the information sourced from actors of the same link as well as information sought from actors directly upstream or downstream of the poultry value chain. Also, the actors perceived the information sought from actors of the same or different link to be useful. Government and non-governmental organizations should embrace the value chain approach as a means for sustainable agricultural production.

**Keywords:** CADP, Value chain, Poultry, Information



**QSAR AND DOCKING STUDIES ON THE PYRIMIDINE DERIVATIVES  
ANALOGS WITH ANTILEISHMANIAL ACTIVITY**

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**ABSTRACT**

Leishmaniasis is a disease caused by a number of species of protozoan parasites belonging to the genus *Leishmania*, is recognized as an important public health problem throughout the world. In a search of newer and potent antileishmanial drug, a series of 30 pyrimidine derivatives analogs were subjected to a quantitative structure activity relationship (QSAR) analysis, for studying, interpreting, and predicting

activities and designing new compounds by using several statistical tools, such as principal components analysis (PCA), multiple linear regression (MLR) and non-linear regression (RNLM). The statistical results of the MLR and MNLR indicate that the determination coefficients  $R^2$  were 0.824 and 0.870, respectively. Internal and external validations were used to determine the statistical quality and predictive power of QSAR of the two MLR and MNLR models. The applicability domains of MLR and MNLR models were investigated using William's plot to detect outliers and outside compounds. Also the most active compounds were docked into the active site of the protein (PDB entry code: 2JK6) to confirm those obtained results from QSAR models and identify the binding interactions responsible for antileishmanial activity of those analogs.

**Keyword:** Leishmaniasis, Pyrimidine derivatives, QSAR model, MLR, MNLR, Molecular modeling

**ADSORPTION OF AN ANIONIC DYE WITH RAW CLAY MATERIAL FROM THE  
SOUTH OF MOROCCO: CHARACTERIZATION, KINETICS****Ayoub Chaoui***Laboratoire matériaux et environnement (LME), Université Ibn Zohr, cité Dakhla, 80000, Agadir,  
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Maroc.***Noureddine El Alem***Laboratoire matériaux et environnement (LME), Université Ibn Zohr, cité Dakhla, 80000, Agadir,  
Maroc.***ABSTRACT**

It is well-recognized that the exponential growth of the world's population, along with industrial activities, has a significant impact on the natural interface of water and soil. Synthetic dyes are important water pollutants, Congo red (CR), an anionic dye causes serious eye, skin, and respiratory irritation and is a carcinogen and mutagenic. This research had as its objective the removal of this dye from an aqueous solution on Raw Moroccan Clay by adsorption. The structure and the morphology of the natural clay were characterized by X-ray diffraction (XRD), Fourier Transform Infra-Red (FT-IR) spectroscopy, Scanning Electron Microscopy (SEM), Energy Dispersive Analysis of X-rays (EDAX), thermogravimetric analysis (TGA) and differential thermal analysis (DTA), fluorescence X-rays absorption spectroscopy (FXAS). The influence of several factors such as the pH, adsorbent dosage, contact time, initial dye concentration, and the temperature was investigated. The optimal adsorption conditions were a pH of 2 and a contact time of 10 min, an initial concentration of adsorbate of 420 mg.l<sup>-1</sup>, and an adsorbent dose of 0.4 g.l<sup>-1</sup>. The adsorption capacity for the RC was found to be 518 mg/g at 45 °C. The Langmuir isotherm and pseudo-second-order kinetic model best explained the Red Congo dye adsorption process onto this natural clay. From the adsorption temperature effect study, the thermodynamic parameters, such as  $\Delta G$ ,  $\Delta H$ , and  $\Delta S$  were assessed, and their values revealed that the adsorption reaction was spontaneous, endothermic and resulted in an increase of the RC adsorbed molecules randomness on the adsorbent surface.

**Keywords:** Raw clay, Characterization, Anionic dyes, Congo red, Adsorption

**DIPLOMATIC RELATIONS BETWEEN VIETNAM AND CAMPODIA (1979 -2020)**

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**ABSTRACT**

Vietnam and Cambodia are two countries with long-standing diplomatic relations. Vietnam and Cambodia are closely linked through many historical periods, especially during the first and second Indochina wars. After the end of the war in 1975, Cambodia fell into the Polpot genocidal regime, Vietnam actively helped in political and military matters, abolished this genocidal regime and supported the construction of a new Cambodian state. develop. By 2020, Vietnam and Cambodia will increasingly develop diplomatic relations between the two countries, and Vietnam will support Cambodia in economic, political, social and educational development. Cambodia regularly supports Vietnam at international and ASEAN forums. It can be said that the relationship with Cambodia is one of the pillars of Vietnam's foreign policy. However, in that diplomatic relationship, there are still some issues between Vietnam and Cambodia that need to be resolved in order to promote the two countries' diplomatic relations more and more friendly, making useful contributions to the common development of the two countries. This article aims to study the diplomatic relations between Vietnam and Cambodia with the approach to international relations and the system of diplomatic documents of the two countries, thereby clarifying this diplomatic relationship.

**Keywords:** Vietnam, Campodia, the Diplomatic

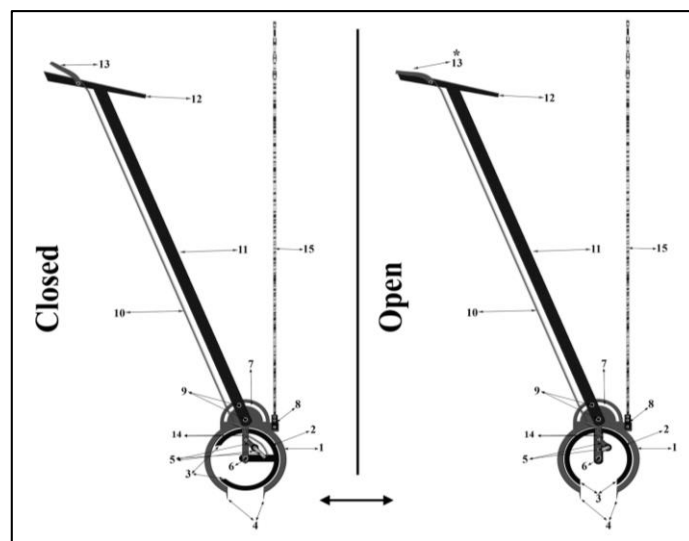
## CONSTRUCTION OF A NOVEL SAMPLER FOR THE SIMPLE COLLECTION OF SLUDGE AND SEDIMENT IN WASTEWATER TREATMENT PLANT PONDS

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**Fig 1.** Sampler scheme and components. right: when the sampler is open, left: when the sampler is closed

### ABSTRACT

Challenges such as the inability to take wastewater samples at a certain depth without mixing the sample with the upper wastewater components, as well as the loss of the sludge sample under the influence of the sample container lid, which is not closed when taking it out of the sewage basin, insufficient safety for the sampling operator, The absence of a tool to detect the depth of sampling, the health risk for the sampling worker and other obvious issues led to the design and patenting of an innovative sampler to collect sludge and sediment from the bottom of the wastewater treatment plant ponds (Fig 1). The invention consists in two concentric cylinders (parts 1 and 2), the metal handle angle (Part 11) can be modified using the axial arm (Part 7). The inner cylinder is the transportation chamber for sludges and sediments. The opening of the outer cylinder has a blade-shaped outer edge (Part 4), which causes the sludge to penetrate into the inner cylinder after the contact of the sampler with the sludge in the depths of the pond. The inner cylinder is movable and the outer cylinder is fixed. The inner cylinder is movably connected to the lever (part 13) installed in the sampler steering wheel (part 12) by means of a wire (part 10). When the operator has not applied pressure to the lever connected to the handle, the wire is not pulled, and the opening of the inner cylinder (part 3) is not parallel to the opening of the outer cylinder, in this case, the entrance of the sludge to the inner cylinder is completely closed. When the sampler is

placed in the depth of the tube in the sewage basin, at this time the operator puts pressure on the lever of the wire, the movable inner cylinder rotates counterclockwise due to its connection with the wire, in this case the opening of the inner cylinder and the outer cylinders are exactly aligned. An indicator (part 15) is also installed on the sampler container with the help of a clip (part 8), through which the depth of the sampler cylinder is controlled in the sewage. This tool can be widely used to sample sludge and sediment at the desired depth in wastewater treatment facilities. The availability of raw materials and high efficiency are prominent features of the sampler and it can be used for sludge sampling. This tool is highly necessary in the science of sewage treatment.

**BONE MINERAL DENSITY, ACTIVE SMOKING AND ENVIRONMENTAL  
TOBACCO SMOKE AMONG YOUNG WOMEN: CROSS- SECTIONAL  
OBSERVATIONAL STUDY****Anna Kopiczko**

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**ABSTRACT**

The aim of the study was to evaluate the relationships of active smoking (AS), and environmental tobacco smoke exposure (ETS) with frequency of low forearm bone mineral density (BMD) in young women Caucasians of European origin. The study involved 657 women aged 26.0±4.9 years. The densitometry (DXA) method was used in the forearm bone. The Global Adult Tobacco Survey questionnaire was used in interviews. Smoking women had significantly lower bone parameters in two parts of the forearm (large effect:  $d > 0.8$ ) compared to non-smoking women. The predictor of interactions of three variables: physical activity (MET), BMI (positive direction), and years of ETS exposure (negative direction) were significant for BMD dis and BMC dis. The predictor of interactions of physical activity (MET), BMI (positive direction), and active smoking in numbers of cigarettes per day and years of ETS exposure (negative direction) was significant for BMD prox. The predictor of interactions of MET, BMI (additive direction), age of starting smoking, and years of ETS exposure (negative direction) was significant for BMC prox. Physical activity in MET (positive direction), years of active smoking, and ETS exposure (negative direction) were significant predictors for T-score dis. The predictor of interactions of five variables: physical activity (MET), BMI, age of starting smoking (positive direction), active smoking in numbers of cigarettes per day, and years of ETS exposure (negative direction) was significant for T-score prox. Cigarette smoking and ETS are modifiable determinants of low BMD in young Caucasian women of European origin. The results expand the knowledge of the multifactorial determinants of forearm bone mineral density.

**Keywords:** bone mineralization, bone mineral content, active smoking, environmental tobacco smoke, metabolic equivalent of task, body mass index

**THE TREATMENT OF ENVIRONMENTAL POLLUTION CAUSED BY MERCURY IONS BY ADSORPTION METHOD USING AGRICULTURAL RESIDUES OF VIGNA PEEL**

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**ABSTRACT**

Vigna peel (VP) was employed in this study as a novel technique to remove Hg(II) from its aqueous solutions. For this study, vigna peel (VP) was changed chemically with 25% by volume H<sub>2</sub>SO<sub>4</sub> and ultrasonication at a frequency of 20 kHz to make a high-efficiency adsorbent. The material found was used to remove Hg(II) from the sample. The SEM and BET methods were used to figure out what the VP material was like. There were different amounts of Hg(II) (10–50 mg/L), pH (1–10), time (5–60 min), and VP dosages (50–1000 mg/50 ml). Maximum Hg(II) removal was found to be 98.6% at pH 5 with 50 mg/L of Cd(II) and 250 mg/50 ml of VP for 15 minutes. Pseudo-first-order, pseudo-second-order, and intraparticle diffusion kinetic models provided the best explanations for the equilibrium data.

**Keyword:** Environmental Pollution, Vigna Peel, Mercury Ion, Adsorption, Kinetic, Equilibrium.



**ORAL ADMINISTRATION OF COPPER OXIDE NANOPARTICLES (CUO NPS) TO  
MATURE FEMALE ALBINO RATS LEADS KIDNEY DAMAGE**

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**ABSTRACT**

CuO NPs had previously been found to be hazardous to a variety of cell cultures. Metal catalysts, semiconductors, heat transfer fluids in machinery, and even antibacterial drugs all make extensive use of copper nanoparticles. Here, we look at the molecular processes that influence the toxicity of copper in its nanoparticle size. We demonstrate that the production of ROS (Reactive Oxygen Species) is essential. In the current study, 20 adult, healthy Albino rats were divided into two groups at random (n = 10 rats/group). Group I (G1) was preserved as the control group, while Group 2 received oral injections of CuO NPs for nine days at doses of 10 mg /kg body weight. Rats were slaughtered, and the organs' livers and kidneys were removed, examined histopathologically, and immunohistochemically. Additionally, our kidney-level examination revealed significant renal corpuscle and tubule degenerations, as well as glomerulus edoema and congestion, as well as mild vacuolations in the renal tubule lining epithelium. The liver of treated group revealed severe hepatocyte necrosis with completely disorganised hepatic rays, loss of hepatic architectures, severe steatosis, severe hemosiderosis, sinusoidal dilatations with congestions, as well as severe fibrous tissue proliferation with anti-inflammatory cell infiltrations specifically around portal triad with hyperplasia of bile duct. According to the results of the current work, CuO NPs may have toxicological effects on the liver and kidney tissues that could affect how well they operate.

**Keywords:** CuO NPs, nanoparticles, renal toxicity, hepatotoxicity, steatosis, and necrosis

**DEVELOPMENT OF CARBAMAZEPINE LOADED NANOSTRUCTURED LIPID CARRIERS FOR BRAIN DELIVERY TO ENHANCE IN-VIVO ANTICONVULSANT & ANXIOLYTIC ACTIVITY****Asma Tahir. Fakhar ud Din***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Kanwal Shabbir***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Mohsin Fawad***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***Faisal Ghani***Nanomedicine Research Group, Department of Pharmacy, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan***ABSTRACT**

The limited brain delivery of carbamazepine (CBZ) presents a major hurdle in the successful epilepsy treatment. The potential of carbamazepine-loaded nanostructured lipid carriers (CBZ-NLCs) for improved brain delivery is investigated in the current study. CBZ-NLCs were prepared by using binary mixture of trilaurin and oleic acid as a lipid core stabilized with Poloxamer 188, Tween 80 and Span 80. CBZ-NLCs were evaluated for physicochemical properties, in vitro release, in vivo brain kinetics, anticonvulsant and anxiolytic activities. The optimized CBZ-NLCs demonstrated nanometric particle size (97.7 nm), surface charge of  $-22$  mV and high drug incorporation (85%). CBZ-NLCs displayed biphasic release pattern with initial fast followed by sustained drug release. CBZ-NLCs significantly enhanced the AUC of CBZ ( $520.4 \mu\text{g}\cdot\text{h}/\text{mL}$ ) in brain compared with CBZ dispersion ( $244.9 \mu\text{g}\cdot\text{h}/\text{mL}$ ). In vivo anticonvulsant activity of CBZ-NLCs in PTZ-induced seizure model showed a significant increase in the onset time (143.0 sec) and reduction in duration (17.2 sec) of tonic-clonic seizures compared with CBZ dispersion (75.4 and 37.2 sec). The anxiolytic activity in light-dark box and elevated-plus maze models also demonstrated superiority of CBZ-NLCs to CBZ dispersion. From the results, CBZ-NLCs present a promising strategy to improve brain delivery and therapeutic outcomes of CBZ in epilepsy.

**Keywords:** Carbamazepine; Nanostructured lipid carriers; Brain delivery; Anticonvulsant activity; Anxiolytic activity

## **FUNCTIONAL PROPERTIES OF PLATELETS IN VEGETABLE CALVES**

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### **Introduction**

The final stage of the early ontogenesis of the calf is the phase of plant nutrition, during which the final maturation of all its organs and systems occurs. At the same time, platelet activity remains insufficiently studied in calves at this age. **The purpose of the study:** to establish the functional characteristics of platelets in healthy calves during the phase of plant nutrition. **Methodology and organization of the study.** Under supervision were calves of vegetable nutrition with a total number of 17, the condition of which was taken into account on the 91st day and at 6 months, 9 months. and 12 months. life. In all animals, the biochemical properties of platelets and their hemostatic activity were evaluated, followed by statistical processing of the results. **Research results.** All calves that made up the study group were under dynamic control of their condition. At each blood sampling for a planned study, the main physiological parameters were evaluated in animals and general and biochemical blood tests were performed, which gave normal values of the parameters taken into account. The content of acyl hydroperoxides in platelets of calves decreased with increasing age, as a result of increased antioxidant defense enzymes in them, primarily catalase and superoxide dismutase. Their functions increased and reached a maximum by the end of the observation. During the observation period, the content of ATP and ADP in the platelets of healthy calves gradually increased with an increase in their secretion from the composition of platelet granules. The amount of actin and myosin in intact and stimulated platelets in healthy calves gradually increased during the observation, reaching a maximum by the age of one. In the observed calves aged between 91 days and a year, a gradual reduction in the time of development of platelet aggregation with various inducers and their combinations was noted. This was accompanied by an increase in platelet activity in vivo. This was manifested in the blood of calves during the observation period by a decrease in discoid platelets and an increase in their activated varieties. In addition, during the phase of plant nutrition in the blood of calves, the number of freely moving small and large platelet aggregates gradually increased with an increase in the level of involvement in platelet aggregates, which reached the highest level by the end of the considered phase. **Conclusions.** In calves, during the plant nutrition phase of early ontogenesis, the ability of platelets to aggregate gradually increases in vitro and in vivo, which is a consequence of the interaction of environmental influences on the body with its adaptive mechanisms.

**Key words:** calves, plant nutrition phase, platelets, aggregation, secretion.

**SIGNIFICANCE OF CATTANEO-CHRISTOV HEAT FLUX ON CHEMICALLY  
REACTING NANOFUIDS FLOW PAST A STRETCHING SHEET WITH JOULE  
HEATING EFFECT**

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**ABSTRACT**

This paper examined the significance of Cattaneo-Christov theories on the flow of chemically reacting fluid past a stretching surface with thermophysical parameters. The mathematical modeling of the physical problem was represented by partial differential equations. The set of partial differential equations was simplified by employing a suitable similarity variables to obtain system of coupled nonlinear ordinary differential equations. The transformed equations was later solved using the spectral relaxation method. The spectral relaxation method employs the basic concept of the Gauss-Seidel relaxation techniques. The outcome from this method was presented in graphs and tables. The thermal radiation parameter was found to enhance the velocity and temperature distributions. Also, the effect of magnetic field parameter was found to decline the velocity profile. It was found that the Brownian motion parameter greatly influences the velocity as well as temperature profiles.

**Keywords:** MHD; Thermal radiation; Cattaneo-Christov heat model; skin friction.

**HISTOPATHOLOGICAL MODULATIONS IN THE LIVER OF HYPERGLYCEMIC RATS TREATED WITH GREEN SYNTHESISED ZINC OXIDE NANOPARTICLES**

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**ABSTRACT**

India has the highest rate of diabetes problems globally, but China has an even higher rate, according to the International Diabetes Foundation. According to recent data, diabetes negatively impacts the health of more than 50 million Indians. 7.1% of adults in India's population, or 1 million people, die each year. Diabetes is a chronic disease that develops when the body cannot create enough insulin or use it efficiently. Plants are also thought to be a source of novel chemical compounds that could be exploited to create brand-new medications. Zinc is an essential trace element for all living things, including humans, animals, plants, and microorganisms. In recent years, substantial research has been done to understand how zinc functions physiologically and biochemically. For the present study, hyperglycemia was induced in albino rats with a high sugar diet. Leaves of the *Abroma augusta* plant were collected for the preparation of ZnO nanoparticles. Blood glucose levels were measured after the treatment of nanoparticles. Several changes were observed in the liver of albino rats. Histopathological changes were observed. There was a significant difference in the blood glucose level, SGPT, SGOT of the female rats. Pyknosis, karyorrhexis, minor haemorrhage, destruction in lymphocytes was observed in the liver of albino rats.

**Keywords:** Hyperglycemia, Haemorrhage, Histopathological changes, chronic, pyknosis.

**PRIMARY SCHOOLS, AND TRANSPARENT ORGANIZATIONS, OPEN TO  
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**ABSTRACT**

The world is in a special situation, war, migrations, a global pandemic... We are all obliged to collaborate in resolving these conflicts. More research is needed to open avenues for such international collaboration. Thus, from the University of Oviedo (Spain), we launch a project to show our educational system to foreign students, and to any other person interested in learning about Spanish primary schools. This is the free platform <https://www.orgtransparente.uniovi.es/en> or [www.orgtransparente.org/en](https://www.orgtransparente.org/en). The platform helps people and students who come from outside of Spain, and who are unaware of our educational system. It is an open window, a transparent organization. There we show the case of an elementary school through forty short videos. This project has been one of the 2 best educational innovation proposals of the University of Oviedo in the 2021 edition. This website is freely accessible and has no commercial or economic interests. There, in each interaction, users can analyze the differences between the information in the videos and what is happening in their previous experience. That is, they comment on the similarities between their educational life in their country and the Spanish educational system. We want to contribute to social and educational progress through trust in institutions. Our strategy shows the operation of schools using visual communication techniques. We have followed the Web Content Accessibility Guidelines (WCAG) to make this platform as accessible as possible for people with disabilities. For example, the platform is accessible to people with hearing disabilities, since the contents are mainly visual. It is also accessible for blind people since the full written transcript availability of videos, and all graphics contents have their corresponding alternative textual descriptions. Although these guidelines cover a wide range of issues, they cannot address the needs of people with all types, degrees, and combinations of disabilities.

**Keywords:** primary school, spanish education, educational website.

**APPLICATION OF EXERGY ANALYSIS IN A MOROCCAN DAIRY PROCESS****Najwa Jbira**

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**ABSTRACT**

This paper presents the exergy analysis of dairy plant for the production of milk and its derivatives, located in the region of Beni Mellal / Kenifra, specifically in the province Fqih Ben saleh, the system consists of three processes, the first for the production of pasteurized milk, the second for the production of sterilized milk and the third for the production of yagurt, all these processes are fed with steam and ice water by a boiler and refrigeration system. Exergy destruction rate and exergetic efficiency are calculated for each component of each process. The results obtained show that the boiler is the first element that has a high exergetic destruction rate with a value of 6402.40 kW, followed by the sterilization line, the element that has a high exergetic destruction rate is the multi-section sterilizer of the sterilization room, then the refrigeration system, the yagurt line and finally the pasteurization line with percentages of 87.6%, 6.12%, 2.9%, 1.76%, 1.61% respectively.

**Keywords:** Energy efficiency, Exergy analysis, Exergy destruction, dairy process, process

**CONFLICT AND SOLIDARITY IN REFUGEE CAMPS: MHPSS THEORY AND PRACTICE**

**Beatriz de Barros Souza**

**ABSTRACT**

Currently, there are over 25 million people who are recognized as refugees by some country, usually underdeveloped or developing. Some 40% live in precarious camps or arrangements, where the “humanitarian aid” actions predominate. In recent years, special attention has been paid to “mental health and psychosocial support” (MHPSS) within the scope of this aid. This article derives from a thesis regarding different MHPSS actions or programs and its reflexes upon the interpersonal relations of refugees within camps and/or in similar arrangements. In addition to a literature review on the subject, ten episodic interviews were carried out with practitioners over their published field reports. The interviews were later translated by the authors for a theoretical discussion in the light of Hinde's contributions for the interpersonal relations studies in Psychology, as well as of Honneth's Hegelian theory of recognition. All interviews were exempted from analysis by an Ethics Committee, as long as respecting every participant's anonymity and privacy, in the light of the current Brazilian norm on the issue (Res. CNS 510/2016). It is hoped herein to provide analytical tools of how humanitarian aid is provided, along with its main challenges, mostly in regard to the refugees' interpersonal relationships of either conflict and/or solidarity in these camps.

**Keywords:** Interpersonal relationships, Mental health and psychosocial support, Recognition, Refugees



**TAKING INTO ACCOUNT THE SOIL INFLUENCE AS THE ELASTIC WINKLER FOUNDATION DURING THE CYLINDRICAL TANK OSCILLATIONS UNDER SEISMIC LOADS**

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**ABSTRACT**

Petroleum products storage tanks, which are widely used in the urban economy and industry, are ecologically dangerous sources of technogenic influence on the environment, acting as objects of uncontrolled emissions of vapor-air or vapor-gas-air mixtures and spills of petroleum products with subsequent fires and explosions. Properly designed oil storage facilities could prevent leakage and potential contamination of soil, surface or groundwater.

The destruction of reservoirs is possible as a result of the sudden action of seismic loads of various strengths. The liquid stored in the tanks begins to sense intense sloshing. The phenomenon of sloshing in partially filled tanks could lead to high pressure on the tank walls, collapse of its structure or loss of stability and could cause leakage of hazardous liquid [1-4].

The tank model has been built in the research as a rigid cylindrical shell of radius  $R$  with an elastic bottom on the elastic Winkler base. It has been considered that the tank is partially filled with the ideal incompressible liquid to a height of  $H$ , Fig. 1. It has been denoted  $S_0$  as the free surface of the liquid,  $S_1$  as the rigid cylindrical surface, and  $S_{bot}$  as the elastic surface of the bottom.

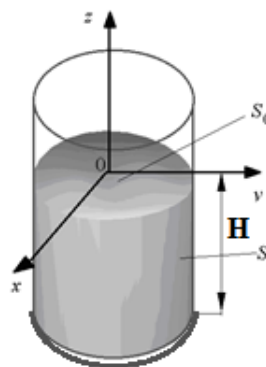


Figure 1. Cylindrical tank with the elastic bottom on the Winkler elastic base.

The Table 1 shows the lowest frequencies of axially symmetric oscillations of the elastic shell ( $n = 0$ ) on the elastic Winkler base.

Table 1. Frequencies of axially symmetrical oscillations of the elastic shell on the elastic Winkler base [5-8]

$J$	Empty shell, Hz				Shell with liquid, Hz			
	$h, m$							
	0.01	0.005	0.003	0.0015	0.01	0.005	0.003	0.0015
6	25.336	13.254	12.692	18.353	6.381	3.330	3.305	4.634
7	42.132	21.793	15.852	15.558	15.974	8.0714	5.8718	5.7621
8	92.081	47.429	29.406	23.073	43.769	22.589	14.003	10.984

From the results presented in Table 1, it has been concluded that taking into account the Winkler elastic base, there is the increase in the lowest frequencies of elastic walls, and there is no dangerous convergence of the oscillations frequencies of elastic walls and liquid sloshing. Therefore, in the vibrations studying of thin shells partially filled with liquid, it is advisable to use methods that allow taking into account the soil influence.

**Keywords:** technogenic influence, hazardous liquid, seismic loads, storage tanks, petroleum products, sloshing.

## SIMULATION OF HEAT TRANSFER AND AIR CIRCULATION IN HEATED AGRICULTURAL GREENHOUSES

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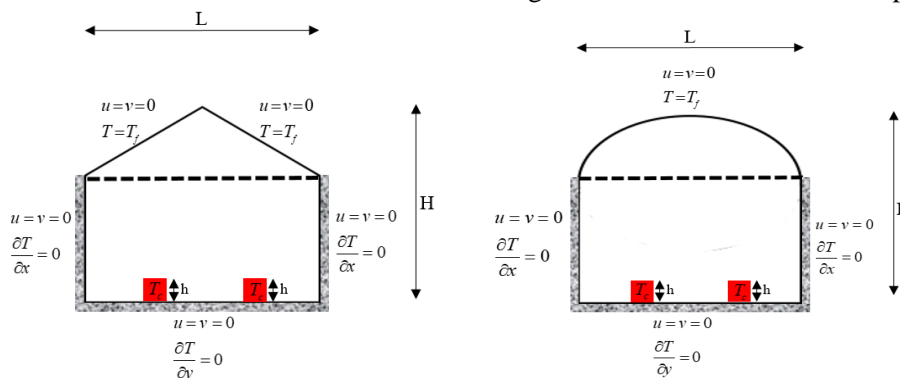
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### ABSTRACT

A greenhouse is a simple shelter or enclosure designed for the cultivation and protection of plants by providing the immediate environment of the plant to improve its productivity and quality throughout the year. Among these conditions are the influence of the external environment, carbon dioxide levels, incident light, humidity and air temperature. In addition, the climatic conditions inside a greenhouse are highly dependent on heating systems and air circulation. For these considerations, several numerical and experimental works have been performed to study the greenhouse-heating problem.

The heating of agricultural greenhouses in winter climatic conditions is essential to control the temperature inside the greenhouses. In this sense, this study consists in analyzing the thermal exchanges and the distribution of the temperature inside the agricultural greenhouses heated by heating blocks at constant temperature. Two types of greenhouses are studied, single-hood and multi-hood greenhouses with two roof shapes, triangular and spherical (Figure 1). Simulations are performed by solving the governing differential equations using the finite volume method. The algebraic systems are solved using a change-of-variable method to account for the variable shape of the greenhouse roof. The results are presented in terms of isotherms, flow lines, and local and average Nusselt number for Rayleigh number ranging from  $10^3$  to  $10^5$ . The results showed that the dominant heat transfer regime for Rayleigh numbers less than  $10^4$  is pseudo-conduction, and natural convection is for Rayleigh numbers greater than  $10^4$  and for both cases treated. Also, we found that the total Nusselt number increases with the increase of Rayleigh number, this increase has a very small effect for a mono-chapel greenhouse with triangular roof, so that the difference between the two greenhouses does not exceed a percentage of 1%.



**Figure 1:** Physical model and boundary conditions

## **BLOCKCHAIN AND HASHING ALGORITHMS**

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### **ABSTRACT**

Today the WEB is growing and expanding with the unexpected high speed and recently it gained extensive attention. The world is focusing and working on the web so that it could make more ease in our life. The web start from static pages and goes towards the smart industries and factories. All the industrial machines are augmented and directly connected to the web which leads to connect with different systems. This type of systems visualizes the whole production process and these systems are autonomous to take decisions on its own. Blockchain is a new technology, based on hashing, which is at the foundation of the platforms for trading cryptocurrencies and executing smart contracts. Forth industrial revolution is the second name of industry 4.0 which includes the Internet of Things (IoT), Cognitive Computing (CC), Big Data, AI and it is fostering Industrial Internet of Things (IIoT). Advanced web is covering the maximum aspects to encourage the businessman community to make trading using technology. The blockchain version 4.0 is helping the industry to ensure the transparency of supply, immutability of records and it ensures the trust of end-to-end trading organizations. Supply chain is now using the blockchain technology. Furthermore, Blockchain has the characteristics of decentralization, stability, security, and non-modifiability. It has the potential to change the network architecture. The consensus algorithm plays a crucial role in maintaining the safety and efficiency of blockchain. Using a right algorithm may bring a significant increase to the performance of blockchain application. In this work, we reviewed the basic principles and characteristics of the consensus algorithms and analyzed the performance and application scenarios of different consensus mechanisms. We also gave a technical guidance of selecting a suitable consensus algorithm and summarized the limitations and future development of blockchain technology.

**Keywords:** Blockchain, algorithms, smart contracts

## **SOL- GEL SYNTHESIS OF A NEW COMPOSITION OF BIOACTIVE GLASS**

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### **ABSTRACT**

Bioactive glasses were developed for use in surgery because of their ability to form a layer of hydroxycarbonate apatite (HCA) on their surface that facilitates bonding with natural bone. However, the enormous energy cost associated with the manufacture of bioglass by the melting process in which the raw materials are melted and then tempered to obtain the final glass. In order to reduce this huge energy cost is to change the glass manufacturing process. The sol-gel process is an alternative to the conventional melting method, with the advantage of obtaining glass at lower temperatures. But this method requires very expensive raw materials. This is why the sol-gel process is only used for very specific materials such as bioactive glasses used in the medical field. Sol-gel processing offers a number of advantages, including low temperature processing and precise microstructural and chemical control. Sol-gel bioactive glass not only offers a good degree of biocompatibility, but also a high specific surface area which may be a key factor in the bioactivity of the glass. The objective of our work is to synthesize a SiO<sub>2</sub>-based bioactive glass with a controlled Na<sub>2</sub>O content using the sol-gel route.

**Keywords:** Bioactive glass, hydroxycarbonate apatite Sol–gel processing, Melting

**LIFE OF A DAILY WAGE CONSTRUCTION WORKER IN CHENNAI: A SOCIO-ECONOMIC PERSPECTIVE****Bhakkeyalakshme D***VIT University, Business school, Chennai, India***Dr. L.R.K Krishnan***Professor ( OB/HR, ER&LL)**VIT University, Business school, Chennai, India***ABSTRACT**

Workers in the construction industry have physical labour every day, in places where safety is not ensured. Their income level is very low and they struggle to make ends meet, even to take care of the basic necessities of themselves and their dependents. The dependents of these workers, especially their children are greatly affected and their future is at stake. There is no job security and these people are the most affected during uncertainties like the pandemic of Covid-19. There are no proper working conditions, sanitation in particular. These workers stay at the construction site along with their dependents. The quality of life of construction workers is no close to the high growth and revenue in the construction industry. The aim of this study is to understand the issues faced by these construction workers and to come up with ways to create an improvement in their lives. This study measured the quality of life and issues faced by 1000 construction workers in Chennai, one of the metropolitan cities in India. This study also collaborates with other scholarly conversations on the subject.

**Keywords:** Working Conditions, Construction Industry, Quality of life, Job security, Improving Status-quo

**IMPACT OF PEOPLE PRACTICES IN A RETAIL OUTLET DRIVING CUSTOMER PREFERENCES WITH REFERENCE TO RELIANCE TRENDS**

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**ABSTRACT**

Retail industry is one of the highest growing industries in India. Apparel is the second largest segment of the Indian retail industry. With growing competition and changing customer requirements, survival in this industry has become highly challenging. This study aims at analyzing the effect of such people practices in driving the customer preferences with special reference to Reliance Trends. One of the most effective ways to drive customers towards a retail outlet is through efficient customer service. This is possible through impressive people practices such as inclusiveness, equity, improved engagement, diversified workforce, collaborative work culture etc. The ways in which employee practices can have an impact on customer preferences on clothing and accessories were studied across various Trends outlets based out of Chennai , India. This study also suggests few people practices that can be followed in the Trends outlet that can help enhance customers footfall. Employee satisfaction and customer satisfaction are positively correlated and hence it is concluded that effective people practices has a direct impact on driving better sales especially at a retail outlet selling readymade garments. This study collaborates with other scholarly conversations.

**Keywords:** Work culture, Customer loyalty, Customer service, Customer Value proposition, Customer engagement.

**ANALYSIS OF RELATIONSHIP BETWEEN EMPLOYEE SATISFACTION  
AND CUSTOMER OUTCOMES IN THE IT INDUSTRY****Padmapriya S***VIT University, Business school, Chennai, India***Dr. L.R.K Krishnan***Professor (OB/HR, ER&LL)**VIT University, Business school, Chennai, India***ABSTRACT**

To have sustainable business in the competitive world, positive outcomes of customers is necessary. When the organization values the customers outcomes, it aims on how to improve the customer satisfaction. In order to attain it, organization must improve the employee satisfaction. Once the satisfaction of employees increased, they assist customers by improving customer service that ultimately increases retention of customers and customer loyalty. And satisfied employees stay in the organization as they are highly motivated and appreciated for their contribution in improving the customer satisfaction. Employee satisfaction improvement can be attained by providing efficient performance evaluation, offering learning culture and growth opportunities, Employee Value proposition, open communication, transparency, rewards and treating employee as partners than subordinates. To find out what makes the employee satisfied, organization must receive continuous feedback to make sure reward and recognition system align with employee needs. The purpose of study is to relate the employee satisfaction and customer outcomes in the IT Industry. This study also collaborates with other scholarly conversations on the subject.

**Keywords:** Employee retention, Customers retention, Customer service, Employee Value Proposition, Employee satisfaction



**EFFECT OF THERMAL RADIATION AND CHEMICAL REACTION ON  
MAGNETO HYDRODYNAMICS FLOW OF BLOOD IN STRETCHING  
PERMEABLE VESSEL****Dr. Binyam Zigta**

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**ABSTRACT**

In this paper theoretical analysis of blood flow in the presence of thermal radiation and chemical reaction under the influence of time dependent magnetic field intensity has been studied. The unsteady non linear partial differential equations of blood flow considers time dependent stretching velocity, the energy equation also accounts time dependent temperature of vessel wall and concentration equation includes time dependent blood concentration. The governing non linear partial differential equations of motion, energy and concentration are converted into ordinary differential equations using similarity transformations solved numerically by applying ode45. MATLAB code is used to analyze theoretical facts. The effect of physical parameters viz., permeability parameter, unsteadiness parameter, Prandtl number, Hartmann number, thermal radiation parameter, chemical reaction parameter and Schmidt number on flow variables viz., velocity of blood flow in vessel, temperature and concentration of blood has been analyzed and discussed graphically. From the simulation study the following important results are obtained: velocity of blood flow increases with both increment of permeability and unsteadiness parameter. Temperature of the blood increases in vessel wall as Prandtl number and Hartmann number increases. Concentration of the blood decreases as time dependent chemical reaction parameter and Schmidt number increases.

**Keywords:** Stretching velocity, similarity transformations, time dependent magnetic field intensity, thermal radiation, chemical reaction.

## **CHALLENGES IN QUALITY OF EDUCATION IN HIGHER EDUCATION INSTITUTIONS (HEIS) OF PAKISTAN**

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### **ABSTRACT**

The purpose of this study is based on exploratory research to identify “Challenges in Quality of Education in HEIs of Pakistan”. The exploratory research approach is used to achieve the objectives of the study in less time and with inexpensive means. In the last few years, Pakistan is facing a lot of challenges in the education sector such as curriculum, less training institutions, corruption in education, teachers’ behavior, and less research work. Emerging issues in the education sector are fewer training institutions and the trend towards research work which is essential to follow for the growth and strength of any economy. The purpose of this research is to identify the major challenges in the educational sector in Pakistan which the educational sector is suffering for the last few years. The researcher used triangulation in order to carry out the reliability and validity of the data for results. So, to conduct this triangulation the researcher used a polling survey for the students, a questionnaire for the teachers, and interviews with the management. . In this regard primary data was collected from the focused group of students and teachers using a sample of 100 questionnaires for each university were filled by the students of the selected five universities. This attempt of conducting the research will play an important role in the development of Pakistan. The findings highlight the positive relationship of quality education with curriculum, few training institutions, corruption in education, teachers’ behavior, and less research work. These challenges caused restrictions in accomplishing competent teaching and learning with respect to quality education. According to the current situation in Pakistan, the same challenges are being faced.

**Keywords:** Curriculum, Corruption, Teacher’s Behavior, Research Work.

**SMART FORMAT ADAPTER FOR NOSQL POLYGLOT PERSISTENCE IN BIG-DATA WORLD**

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**ABSTRACT**

A hybrid strategy called polyglot persistence enables the use of various databases in a single software or application. Polyglot-persistent software is defined as software that can use multiple types of data storage. The growth of the NoSQL movement has sparked the creation of non-relational data models with a variety of Big Data management strategies. Since each strategy has benefits and drawbacks, it is necessary to incorporate some relational data model elements. Monolithic systems based on a single data model started to evolve into the first multi-model systems as a result of the mixing of relational and non-relational data models. The majority of database management systems in use today can be thought of as multi-model systems (e.g. Oracle, MySQL, Microsoft SQL Server, etc.). In this proposal, we introduce a Smart Format Adapter for NoSQL Polyglot Persistence where adaptive format of NoSql is followed for each compatible storage during raw data process for various reasons, hence we can reduce data persistence fast and efficient which will same data processing and

**Keywords:** Polyglot persistence, BigData, Smart Format

**SILICON-MEDIATED GROWTH, PHYSIOLOGICAL, BIOCHEMICAL AND ROOT ALTERATIONS TO CONFER DROUGHT AND NICKEL STRESS TOLERANCE IN MAIZE (*ZEA MAYS L.*)****Ejaz Ahmad Waraich***Department of Agronomy, University of Agriculture, Faisalabad, 38040, Pakistan***Humaira Ishaq***Department of Agronomy, University of Agriculture, Faisalabad, 38040, Pakistan***Nasir Mahmood***Department of Fibre and textile technology, University of Agriculture, Faisalabad, 38040, Pakistan.***ABSTRACT**

Abiotic stresses are the leading environmental factors which adversely affect plant growth and development particularly drought and nickel stress. Maize is susceptible to drought and nickel stress from germination to final kernel development stage. The present study was conducted to evaluate the role of silicon to improve drought and nickel stress tolerance in maize variety **FH-1036**. Treatments of the study were, Stress, i) drought (60% field capacity at BBSC scale code 14), ii) nickel (100 mg/kg at BBSC scale code 14); and drought and nickel stress at BBSC scale code 14 and silicon applications, i) control and ii) 50mg kg<sup>-1</sup>). CRD factorial and three replications. The experiment was lay out in a completely randomized design and each treatment was replicated thrice. The result showed that silicon had significant effects on plant growth attributes, including plant height, leaf area and leaf dry weight, stem fresh weight and stem dry weight. Plant height reduced up to 24% under drought stress, and 13% under nickel stress. While, silicon mitigated these stresses and increased up to 35% shoot length in maize. Water relation parameters also had significant effects of silicon. Leaf water potential decreased under drought 25%, nickel 11% and combined stress showed 53% reduction as compared with control. Furthermore, silicon applications increased up to 12%. Gas exchange parameters photosynthetic rate, stomatal conductance, Transpiration rate and Respiration rate were significantly affected by silicon application. photosynthetic rate showed more reduction in combined stress as compared with control-no stress. At 50 mg/L silicon application protein, chlorophyll a and b (mg/g) maximum values were found in non- water stress. Because stresses showed more reduction in chlorophyll contents and soil applications of silicon increased the contents of chlorophyll a and b up to 21% and 32% in maize as compared with control. H<sub>2</sub>O<sub>2</sub> values increased under the drought and nickel stress conditions and decreased in control-no stress. Water deficit increased the catalase (CAT), peroxide dismutase (POD) and superoxide dismutase (SOD) levels in leaves of maize which aimed at counteracting the spread of H<sub>2</sub>O<sub>2</sub>. Water deficit and heavy metal stress increased the levels of (SOD), (POD) and (CAT) in maize and increased levels of these enzymes stimulate tolerance against drought stress and nickel stress are vital to reduce its adverse effects. Soil application of silicon 50mg<sup>-kg</sup> improved the values of SOD, POD and CAT. In crux, the present investigation suggested that silicon application mitigated the harmful effects of drought and nickel alone and in combination by improving antioxidant defense in maize

**Key words:** Gas exchange; water relations; antioxidants; root attributes; silicon; drought and nickel stress

**HELICOPTER PARENTING AND IT'S PSYCHOLOGICAL EFFECTS ON  
CHILDREN AND ADOLESCENTS.**

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**ABSTRACT**

Gaining independence from various restriction and boundaries set by parents is overjoying for adolescent. However, things do not always go as planned. Helicopter parenting is the extreme involvement of parents such as hovering over their children to save them from danger and prevent them from failing. The goal of this study is to look at the impact of helicopter parenting on adolescent's mental health and coping skills, self-efficacy for learning. The age group of this research is 10 to 20. Using a quantitative research design with survey as method, the researcher collected the data from adolescents from school and college. As the sample of this study is 200 youth of school and college were selected. Data was collected from Lahore and Islamabad city. The sample is selected through a convenient sampling technique according to the criteria of research for data collection. A self-structured questionnaire was developed. The whole questionnaire comprised 23 items. The data was entered into SPSS. The questionnaire was designed by the researcher to consist of 23 items which are based on the effect of helicopter parenting on adolescents. Helicopter parenting had a detrimental impact on adolescent's mental health and related to low self-efficacy for learning. As a result, this study found that adolescents had their own distinct characteristics and that overprotecting them without allowing them to experience the world autonomously will impair their development, resulting in behavioral and psychological maladjustment.

**Keywords:** Helicopter Parenting, Psychological Health, Children, Adolescent.



## **HERITAGE, HERITAGIZATION AND HERITAGE INDUSTRY: A STUDY ON CLOTHING HERITAGE OF KERALA**

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### **ABSTRACT**

'Heritage' is a cultural process or performance that is concerned with the production and negotiation of cultural identity, individual and collective memory, social and cultural values. 'Heritage' is a property, something that is inherited, passed down from previous generations. In the case of "cultural heritage," the heritage doesn't consist of money or property, but of culture, values and traditions. Cultural heritage implies a shared bond, our belonging to a community. It represents our history and our identity; our bond to the past, to our present, and the future. And it is not just a set of cultural objects or traditions from the past. It is also the result of a selection process: a process of memory and oblivion that characterizes every human society constantly engaged in choosing-for both cultural and political reasons. The term "cultural heritage" typically conjures up the idea of a single society and the communication between its members. In shorts heritage is a cultural and ideological construct of the society according to the needs of the age. Clothes are one of the most creative ways of expressing individuality and lifestyle. Every community, region and culture has its own distinct way of dressing and clothing. India has a rich heritage of art and crafts which is reflected in its textiles and fabrics. Kerala is a state on the Malabar coast of the India having a common linguistic heritage manifested with textual version. And in the matter of clothing, Kerala presents through the ages a picture of astonishing variety. The clothing which has been interpreted as cultural heritage by our society. In this study tries to explore the role of 'Kerala brand' in the discourse of fashion in textile market. And demonstrate that the heritagization (heritage interpretation) process of costume is based on the memory/ nostalgia of being a Malayalee or Keralite, which is sanitized under the glorious craftsmanship of Kerala weavers. It also attempts to explain the social dynamic of costume heritage of Kerala.

**Keywords:** Heritage, Heritagization, Heritage Industry, Culture, Textile, Clothing, Memory, Sanitization, cultural Construction, Communication, Kerala, Malayalee, Nostalgia.

**THE KNOWLEDGE AND PRACTICE OF PERSONAL HYGIENE AMONG  
PRIMARY SCHOOL PUPILS IN PAKI COMMUNITY IKARA LOCAL  
GOVERNMENT AREA OF KADUNA STATES**

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**Dr ABDULLAHI DAHIRU**

**ABSTRACT**

**Background:** For a healthy life personal hygiene must be maintain especially the personal hygiene of children, it is important to know for us to have a healthy adult we must first have a healthy child, and that will help to have a development of positive values about health and the use of health services. The increased spread of communicable diseases among schools children is due to poor personal hygiene practice and lack of sanitary conditions which remain concerns on the public health agenda in developing countries. Therefore school pupils need to be taught regarding importance of personal hygiene practice. The present research study was designed to assess the knowledge and practice of personal hygiene among primary school pupils in Paki community, Ikara local government area of Kaduna state. **Methods:** simple random sampling technique study was conducted with a sample size of 300 primary school pupils from four (4) selected primary schools in paki community, age group 7 to 14 years. Closed ended questionnaire was used. **Results:** The result shows knowledge of personal hygiene in Paki community is not significant at 0.57 significant value. **Conclusion:** Timely screening of health problems along with health education shall be given to the pupils in the primary school to improve their personal hygiene knowledge and thereby leading to a healthy life.

**Keywords:** Knowledge, Practices, Personal hygiene, Primary school pupils



**PROXIMATE AND MINERAL ANALYSIS OF WATERMELON SOLD AT NORTH BANK MARKET, MAKURDI, NIGERIA****Gav, Benedict. L***Department of Chemistry, Federal University of Agriculture, Makurdi, Nigeria***Anyanwu, Solomon Nonso***Department of Chemistry, Federal University of Agriculture, Makurdi, Nigeria***Oloruntoba, S. O***Department of Chemistry, Federal University of Agriculture, Makurdi, Nigeria***Tor. P***Department of Chemistry, Federal University of Agriculture, Makurdi, Nigeria***ABSTRACT**

The study was carried out on proximate and mineral analysis of watermelon sold at North bank market Makurdi. Water melon samples were purchased at North bank in January, 2018. The samples were sliced using a knife to separate the seeds, pulp and rind. These samples were dried and milled into powder and were analyzed for proximate and mineral content using standard methods and atomic absorption spectrophotometer (AAS). The results for the proximate analysis revealed the presence of moisture content ranging from 3.50 % to 10.90 %, ash content (2.80 % to 6.50 %), fibre content (5.80% to 15.30%), crude fat (0.40 % to 13.10 %), crude protein (3.20 % to 19.20 %), and carbohydrate (46.10 % to 75.50 %). The result obtained from the mineral analysis revealed the presence of selected element, with Calcium having the highest mean value (25.69 mg/100g), followed by Magnesium (3.60 mg/100g), Iron (0.22 mg/100g) and Chromium (0.11 mg/100g), there were no traces of Lead and Cadmium. The data (result) of the study showed that the proximate and mineral parameter with the exception Pb and Cd were present in the bark, pulp and seeds although their concentration in the rind, seed and pulp vary significantly and also fall below the WHO recommended standard for minerals element.

**Keywords:** watermelon, proximate, minerals, AAS. GJSFR-B Classification: FOR Code: 030699

**ENCAPSULATION OF *ORIGANUM COMPACTUM* ESSENTIAL OIL IN BETA-CYCLODEXTRIN METAL ORGANIC FRAMEWORKS: CHARACTERIZATION, OPTIMIZATION AND ANTIOXIDANT ACTIVITY**

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**ABSTRACT**

The excellent biological activity makes *Origanum compactum* essential oil a promising candidate for the food industry. Nevertheless, the encapsulation process is needed to enhance its physicochemical and/or preserve biological properties. In this context, a Clevenger apparatus was performed in the hydrodistillation process for the extraction of *O. compactum* essential oil. The major components thymol, carvacrol,  $\gamma$ -terpinene and p-cymene were identified and quantified using GC/MS and GC/FID analysis. The construction of metal organic frameworks (K- $\beta$ CD-MOFs) was based on potassium ions ( $K^+$ ) and  $\beta$ -cyclodextrin ( $\beta$ CD) according to the vapor diffusion method. The encapsulation procedure of the essential oil through  $\beta$ CD and K- $\beta$ CD-MOFs changed the particle shape, molecular structure and enhanced the thermal stability, according to the results of SEM, FTIR and TGA. In addition, the OCEO/K- $\beta$ CD-MOFs (w/w) and water/ethanol ratios (v/v) were investigated to improve the encapsulation efficiency (EE) by employing a response surface design, and the highest EE ( $35.34 \pm 1.23\%$ ) was achieved at 1/12 and 4/5, respectively. 1,1-diphenyl-2-picrylhydrazyl was performed to assess the antioxidant activity of the essential oil before and after the encapsulation process. As a result, *O. compactum* essential oil encapsulated by K- $\beta$ CD-MOFs sequentially exhibited higher antioxidant activity.

**Keywords** *Origanum compactum*; Essential oil; Metal organic frameworks; Beta-cyclodextrin; Response surface design; Antioxidant activity.



**CHALLENGES FACED TO ONLINE EDUCATION & LEARNING IN PAKISTAN  
DURING COVID-19 PANDEMIC****Zohaib Hassan Sain***Superior University, Faculty of Business & Management Sciences, Lahore, Pakistan.**ORCID ID: <https://orcid.org/0000-0001-6567-5963>***ABSTRACT**

This study was required to analyze the challenges/issues teachers and students encountered in the online education & learning process as it was being carried out in Pakistan during the Covid-19 pandemic. The social, economic, and political systems around the world have all experienced COVID-19 as a nightmarish. In Pakistan, one of the most damaged sectors is thought to be education. The developed nations have already switched from traditional classroom settings to online learning environments, while Third World nations like Pakistan were most negatively impacted because they lacked the necessary technology for online learning at any point during the COVID-19 pandemic. There have been several difficulties in getting teachers and students to adopt new technology. In this study, closed-ended questionnaires were used in a mixed-method research design. To improve data collection and analysis, the researcher issued questionnaires to students, teachers, and the management in addition to conducting management interviews. This study offers advice to online teachers in Pakistan on how to overcome their difficulties. The results show a negative attitude toward faculty members using online learning environments for teaching and learning. The difficulties faced by faculty members prevented them from providing effective teaching and learning. Faculty members also needed extensive expertise in teaching online and were not provided the right training to deal with the technical difficulties. This study will assist educators in improving the quality of online teaching in Pakistan by identifying suitable solutions and suggestions by exploring the experiences and difficulties faculty members have with online education and learning.

**Keywords:** Online Education & Learning, Pakistan, Covid-19 Pandemic, Online Teaching & Learning Challenges.

**ANALYSIS OF MICROBIAL GROWTH MODELS FOR MICROORGANISMS IN CHICKEN MANURE DIGESTER**

**Abdulhalim Musa Abubakar**

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**ABSTRACT**

Several microorganisms are there in chicken manure (CM) but *Salmonella*, *Cryptosporidium* and *Escheridia coli* are the most identified. Objective of this research includes, carrying out microbial count in the CM substrate for 40 days retention time in a digester, deriving kinetic equation satisfying the process and fitting results obtained with existing microbial growth kinetic models. Results shows that microbes inside the chicken manure slurry, survived for a full period of 37 days divided into 7 days of acclimatization, 23 days of growth and another 7 days of equal rate of death and multiplication. Findings shows that the maximum specific growth rate,  $\mu_{max}$ ,

estimated from the basic Monod equation, of the organisms is  $0.0076\text{hr}^{-1}$  and the half-saturation constant,  $K_S$ , is  $3.838 \times 10^8$  mg/l which indicates how sufficient the substrate concentration is for the bacteria to feed on. Not all 26 growth kinetic models found in the literature fit the measured experimental data. However, Monod with decay rate, Wayman and Tseng, Han and Levenspiel, Luong and Moser models fit the Monod values after regressing with POLYMATH 6.10 Educational Release.

**ELECTROCHEMICAL SYNTHESIS AND CHARACTERIZATION OF  
POLY(RHODAMINE B) COATING ON FTO****Khadija Bahend****Mina El fazdoune****Sana Ben jadi****Mohammed Bazzaoui****ABSTRACT**

The electrochemical modification of electrodes is a powerful technique to enhance and improve the surface qualities of electrode material. It might provide the foundation for new future electrochemistry applications and new devices. In this work we describe the conditions of electrochemical synthesis of a homogeneous and highly adherent pink film of poly(Rhodamine B) (PRhB). The originality of our study consists in the depositing of this polymer on a conducting glass substrate, which facilitates and enables its optical characterization, together with overcoming anti-fouling problems of glassy carbon electrode. The electrosynthesis was performed by cyclic voltammetry, galvanostatic and potentiostatic techniques in 0.1 M KCl as supporting electrolytes and 1 mM Rhodamine B (RhB) as monomer on fluorine doped tin oxide (FTO) samples. The anodic peak associated with the RhB oxidation appears at 0.977 V during the first scan and shifts to 1.059 V in the following cycles, indicating the increase in the electrical resistance of the polymer coating until it reaches the overpotential to overcome the resistance. Chronopotentiometry and chronoamperometry show that the PRhB is obtained at applied current densities and potentials higher than  $10\mu\text{A cm}^{-2}$  and 0.8V, respectively and the polymer coating become thicker and darken with increasing the applied current and potential. Electrochemical methods show that the polymer growth is controlled by the maximum oxidation potential applied. The physico-chemical properties of generated PRhB film has been characterized by different microscopic and spectroscopic techniques such as scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS) and UV-visible spectrophotometry (UV-vis). The produced modified electrode would offer a promising candidate for future applications such as sensors and dye synthesized solar cell.

**Keywords:** Poly(Rhodamine B); electrochemical polymerization; Conductive polymers; modified electrode; Fluorine-doped tin oxide (FTO), Chronopotentiometry, chronoamperometry, cyclic voltammetry, XPS, UV-visible.

**WASTEWATER TREATMENT USING ACTIVATED CARBON DERIVED FROM  
DETARIUM MICROCARPUM SEED AND THEIR ADSORPTION ISOTHERM.**

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**ABSTRACT**

This study was carried out to evaluate the efficiency of metals (Pb and Co) removal from solution using *detarium microcarpum* seeds as adsorbent. The effect of initial concentration and adsorbent dosage on the adsorption process of these metals were studied, the percentage removal of these metals increased with increased in weight (0.5 -2.5g) in 50ml of the solution and the adsorption efficiency increased with increasing initial metal ion concentration (0.01-0.05 moldm<sup>-3</sup>). The percentage removal obtained for Lead and Cobalt were compared. The result of adsorption were fitted to the Langmuir models and coefficients indicated favourable adsorption of Pb<sup>2+</sup> and Co<sup>2+</sup> ions on the adsorbents. The adsorption of Pb<sup>2+</sup> and Co<sup>2+</sup> in aqueous solution was in the following order (1400µm>420µm>150µm). more than 55.4% of studied Lead cations were removed by 1400µm, 47.2% by 420µm and 29.8% by 150µm. while for Cobalt cations only 53.2% by 1400µm, 38.6% by 420µm and 24% by 150µm respectively, from aqueous solution it was concluded that, Lead with highest percentage removal can be adsorbed better than Cobalt using activated Carbon derived from *detarium microcarpum* seed..

## **ANALYSIS OF EDUCATIONAL PATTERNS IN SUBURBAN SCHOOLS**

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### **ABSTRACT**

Human understanding of the environment has led his life in a condition called "unsustainable for development". A situation where human life is unbalanced due to human activities that tend more to exploit the environment than preserve the natural resources that exist. In other words, human beings tend to be more use and forget to keep the environment itself, so that it causes environmental crisis. The perspective errors can reduce the human ecological values, which in fact they have a relationship of space and time with nature, therefore humans play a role as subjects in life that have the will to interact with nature. They can use nature according to their will, or they will manage nature according to their conscience for the sake of sustainability, harmony, harmony of life. This research aims to find facts about the pattern of ecopedagogic education in the suburban School. This research uses a qualitative approach with a case study method. Data collection techniques in the form of interviews and observations, secondary data includes data collection techniques in the form of literature studies and documentation studies. Based on the results of research, education pattern that is applied in the suburban School, humanist pattern, a pattern of religious and democratic pattern. The education pattern oriented to the development potential of learners through the integration of subjects and learning support activities.

**Keyword:** Ecopedagogic, Educational Patterns



**A NUMERICAL COMPUTATION ON BOUNDARY LAYER ANALYSIS OF  
PERSISTENT MOVING HORIZONTAL NEEDLE IN MHD FERROFLUID****G.P. Ashwinkumar***Department of Mathematics, Vijayanagara Sri Krishnadevaraya University, Bellary-583105 India.***C. Sulochana***Department of Mathematics, Gulbarga University, Kalaburagi-585106, India.***N.Sandeep<sup>3</sup>***Department of Mathematics, Central University of Karnataka, Kalaburagi, India.***ABSTRACT**

The boundary layer analysis of a 2D forced convection flow along a persistent moving horizontal needle in electrically conducting magnetohydrodynamic dissipative ferrofluid is investigated. The energy equation is constructed with the joule heating, variable heat source/sink and dissipation effects. To check the variation in the boundary layer behaviour, we considered the two ferrofluids namely, Fe<sub>3</sub>O<sub>4</sub>-methanol and Fe<sub>3</sub>O<sub>4</sub>-water. The reduced system of governing PDEs are solved by employing the R-K process. Computational results of the flow and energy transport are interpreted with the assistance of tabular and graphical illustrations. Increasing the needle size significantly reduces the flow and thermal fields of both nanofluids. In particular, thermal and velocity fields of Fe<sub>3</sub>O<sub>4</sub>-methanol nanofluid is highly depreciated when equated with the Fe<sub>3</sub>O<sub>4</sub>-water nanofluid.

**Keywords:** Thin needle, Non-uniform heat source/sink, Ferrofluid, MHD, Nanoparticles, viscous dissipation.

**ESTIMATION OF MANN ITERATIVE FIXED-POINT SCHEME OF  
CONTRACTIVE-TYPE CONDITIONS IN BANACH SPACES****D. John***Department of Mathematics, Faculty of Physical Sciences, University of Abuja, Nigeria***A. M. AYINDE***Department of Mathematics, Faculty of Physical Sciences, University of Abuja, Nigeria***T. O. WAHAB***<sup>2</sup>Department of Mathematics, and Statistics, Faculty of Pure and Applied Sciences, Kwara State University, Malete, Nigeria.***H. B. ALIYU***Department of Mathematics, Faculty of Physical Sciences, University of Abuja, Nigeria***ABSTRACT**

The study of estimation of the Mann iterative fixed-point scheme of contractive-type conditions in Banach space is the focus of this paper. Every nonlinear problem with a solution has at least one fixed point in estimates. This estimation investigates contraction conditions that examine strong convergence in Banach space using the Mann iterative scheme. It reveals that with the imposed conditions, Mann iteration converges strongly to a unique fixed point in Banach space. The error estimate terms  $\rho_1$ ,  $\rho_2$ ,  $\rho_3$  and  $\rho_4$  of Mann iteration with the imposed contractive conditions and data profile are obtained, demonstrating that the approximate fixed point holds. The error estimate  $\rho_2$  performs better in terms of convergence than the other error estimate terms, whereas error estimate  $\rho_4$  performs poorly better in terms of convergent rate. This means that the Mann iteration compares more favorably to a fixed point of the  $\rho_2$  conditions. Some numerical examples are considered to compare the accuracy of each condition.

**Keywords:** Banach space, Mann iterations, Strong convergence, Contractive conditions, Fixed point

**THE EFFECT OF LEARNING USING MULTIMEDIA SOFTWARE ON THE  
MOTIVATION OF NINTH GRADE STUDENTS TOWARDS LEARNING A  
COMPUTER SUBJECT****Thahaba bani-khaled****Dr.Atallah shatnawi****ABSTRACT**

This study aimed to know the effect of using multimedia software on the motivation of ninth-grade students to learn computer science, divided into groups of male and female schools. The pre-test motivation scale was distributed before starting the teaching process to both the experimental and control groups, and then the students in the experimental groups were taught using the software prepared by the researcher. The students in the control groups were taught using the usual method. Then a post-test motivation scale was distributed to both groups to verify the effect of using software on their motivation. In order to answer the study questions, the researcher prepared an educational software using the Articulate storyline 360 program. The motivation scale was adapted by looking at the theoretical literature, and with help of some studies and the opinions of the arbitrators, where the final form was reached, and the study tools were applied to the sample. The data were collected and analyzed using the (SPSS) statistical package. To verify the equivalence of the groups a binary variance analysis was used, also to the effect of the group and gender variables and the interaction between them on the grades of ninth grade students on the pre-test motivation scale. as well as the arithmetic averages and standard deviations of the grades of ninth grade students on the motivation scale in the pre-test and post-test scale according to the variables of teaching strategy and gender. The study reached a number of results, the most important of which are: There are statistically significant differences in the average motivation of students due to the teaching method, in favor of the experimental group, which used the educational software in the teaching process. The result also detected no statistical significant differences to gender (male, female) or the interaction between teaching method and gender. The study recommended several recommendations, the most important of which is working on the computerization of the curriculum and using educational software in the teaching process for its clear impact on students' desire and motivation towards learning school subjects in general, and the computer in particular. In order to take advantage of modern technologies and means to serve the educational process.

**Keywords:** multimedia software, motivation.

**RECENT ADVANCES OF MAGNETIC GOLD HYBRIDS AND  
NANOCOMPOSITES, AND THEIR POTENTIAL BIOLOGICAL APPLICATIONS**

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**ABSTRACT**

Magnetic gold nanoparticles (mGNP) have become a great interest of research for nanomaterial scientists because of their significant magnetic and plasmonic properties applicable in biomedical applications. Various synthetic approaches and surface modification techniques have been used for mGNP including the most common being the coprecipitation, thermal decomposition, and microemulsion methods in addition to the Brust Schiffrin technique, which involves the reduction of metal precursors in a two-phase system (water and toluene) in the presence of alkanethiol. The hybrid magnetic-plasmonic nanoparticles based on iron core and gold shell are being considered as potential theranostic agents. In this critical review, in addition to future works, we have summarized recent developments for synthesis and surface modification of mGNP with their applications in modern biomedical science such as drug and gene delivery, bioimaging, biosensing, and neuro-regeneration, neuro-degenerative and arthritic disorders. I shall discuss the techniques and biological applications of mGNP majorly based on my own research.

**Keywords:** nanohybrids; magnetic gold nanoparticles; nanocomposites; surface functionalization; core-shell nanocomposites; magnetic-plasmonic nanoparticles; biological applications

**THE STRUCTURAL, ELECTRONIC, MAGNETIC AND ELASTIC PROPERTIES  
OF FULL-HEUSLER CO<sub>2</sub>CRAl AND CR<sub>2</sub>MNSB: AB INITIO STUDY**

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**ABSTRACT**

In this paper, the full-potential, linearized augmented plane wave (FP-LAPW) method was employed in investigating full-Heusler Co<sub>2</sub>CrAl's structural, elastic, magnetic and electronic properties. The FP-LAPW method was employed in computing the structural parameters (bulk modulus, lattice parameters,  $c/a$  and first pressure derivatives). The optimized structural parameters were determined by generalized gradient approximation (GGA) for the exchange-correlation potential,  $V_{xc}$ . Estimating the energy gaps for these compounds was accomplished through modified Becke–Johnson potential (mBJ). It was found that the conventional Heusler compound Co<sub>2</sub>CrAl with mBJ and GGA approaches had a half-metallic character, and its spin-down configuration had an energy gap. It was also found that the conventional and inverse Heusler Cr<sub>2</sub>MnSb and tetragonal (139) (Co<sub>2</sub>CrAl, Cr<sub>2</sub>MnSb) compounds with a half-metallic character had direct energy gaps in the spin-down configuration. To a certain degree, the total magnetic moments for the two compounds were compatible with the theoretical and experimental results already attained. Mechanically, we found that the conventional and inverse full-Heusler compound Co<sub>2</sub>CrAl was stable, but the inverse Cr<sub>2</sub>MnSb was unstable in the ferromagnetic state. The conventional Heusler compound Cr<sub>2</sub>MnSb was mechanically stable in the ferromagnetic state.

**THE IMPACT OF RENEWABLE ENERGY ON CARBON-DIOXIDE: THE NIGERIA EXPERIENCE****Isiaka, Najeem Ayodeji***Department of Banking and Finance, Federal Polytechnic, Ilaro***ABSTRACT**

The relationship between economic growth and carbon dioxide has long been established in literature. Meanwhile, efforts had been proposed on how to achieve economic growth without resulting to increase in carbon dioxide yet there is little or no success. Therefore, the study investigated the effect of renewable energy on carbon dioxide in Nigeria. Data on carbon dioxide, renewable energy consumption and renewable energy output were gathered from world development indicator. The data were analyzed using multiple regression analysis through OLS. It was revealed that renewable energy consumption reduces carbon dioxide significantly within the period under review. Therefore, the study concluded that renewable energy have a significant role and influence on carbon dioxide in Nigeria. It is therefore, recommended that more efforts should be channeled towards creating renewable energy such as solar and many others to reduce amount of carbon dioxide generating from fossil fuel.

**Keywords:** Renewable Energy, Carbon dioxide, Ordinary Least Square

**STATUS OF GASTROINTESTINAL TREMATODES INFECTIONS AMONG RUMINANTS SLAUGHTERED IN YAURI EMIRATE, KEBBI STATE, NIGERIA****Abdurrahman, U. D***Faculty of life Sciences, Department of Animal and Environmental Biology,***Hafsat, A, L***Faculty of life Sciences, Department of Animal and Environmental Biology,***Kamaluddeen, A***Faculty of Agriculture, Department of Fisheries and Forestry, Kebbi University of Science and Technology, Aliero, Nigeria.***Garba, U. A***Department of Biology, Adamu Augie College of Education, Argungu, Kebbi State, Nigeria.***Libata, A. H***Department of Biology, College of Basic and Advanced Studies, Yelwa, Yauri, Kebbi State, Nigeria***U. M. Doma***Department of Mathematics and Computer Science, College of Basic and Advanced Studies, Yelwa Yauri, Kebbi State, Nigeria***ABSTRACT**

A cross-sectional study was carried out from October 2019 to April 2020 to investigate the prevalence of gastrointestinal trematode parasites of cattle, goat and sheep in Yauri emirate. 350 fresh fecal samples were examined by using simple test tube sedimentation techniques to determine the Trematode eggs in the fecal samples. In addition culture technique was used to detect any available trematode larvae and was harvested using Baerman technique. Out of 350 examined, 79 (22.6%) were found positive for at least an egg or more of some of trematode parasites belonging to *Dicrocoelium spp*, *Echinostoma spp* and *Fasciolopsis buski*. The most prevalent helminth parasite was *Echinostoma spp* 36 (10.3%), followed by *Fasciolopsis buski* 29(8.3%) and the least was *Dicrocoelium spp* 14 (4.0%). The overall prevalence of trematode parasites among the animals examined was 22.6%. Moreover there was no significant variation ( $P>0.05$ ) between the contamination of the parasites and the animals diagnosed. This study therefore observed that prevalence of trematodes is prevalent in the study area. Therefore, there is the need to control and prevent the ruminants from grazing on feces or sewage polluted grass, It is therefore important that sufficient emphasis should also be given to this problem so as to improve health, quality and quantity of meat that may satisfy the domestic requirements..

**Keywords:** Cestodes, cattle, goat, sheep, Yauri emirate

**ADDITIONAL NAMENODE'S EXTENDED CACHING FOR IMPROVING  
AVAILABILITY FOR READ-ONLY TRANSACTIONS IN CAP THEAORAM**

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**ABSTRACT**

According to the CAP(consistency, availability and partition tolerance.) theorem, only two of these characteristics—consistency, availability, and network partition tolerance—can be ensured at once in a distributed service. Atomic consistency is situated at the strongest end of the range, although there are other consistency models as well. Cloud platforms should support a large number of distributed services that are highly available and scalable. In certain implementations, network partitions may occur; they should be accepted. Relaxing consistency is one strategy for addressing CAP restrictions. Consequently, it is intriguing to investigate the range of consistency models that a readily available and partition-tolerant service does not provide (CAP-constrained models). When scalable services are implemented, other, weaker consistency models might still be preserved. In this proposal, we propose an introduction of additional Name-Node for extended Cache Mechanism for Fast Read Operations in HDFS which will store frequent requested records for ease access instead of performing Lookup across DataNodes. This will drastically reduce the latency in accessing records in HDFS.

**Keywords:** HDFS, NameNode, DataNode, CAP



**THE GROWING RATIO OF REDEMPTION (KHULA) IN THE CURRENT  
SITUATION: (FROM ISLAMIC PERSPECTIVE)**

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**ABSTRACT**

Khula's concept of redemption refers to leaving her husband. In order to avoid issues and troubles, the couple should decide to separate if living together gets difficult. Islam permits redemption (Khula), but only if it becomes difficult for the couple to coexist. Otherwise, redemption (Khula) is not a suitable practice. If we look at the lives of women who underwent redemption (Khula) in modern society, the majority of the ladies go through a lot of hardships since women who have undergone redemption (Khula) are not viewed positively. The goal of this study project is to identify the causes of the growing trend toward redemption (Khula) in society and to examine how Islam teaches about it. Due to this, 120 female students from Shaheed Benazir Bhutto Women University in Peshawar were removed. Eleven questions total were posed. The conclusion reached by the perspectives was presented in various tables. As a result, media and smartphones are playing a crucial role in the society's daily expansion of the drift of redemption (Khula). The majority of women who participate in redemption (Khula) are employed women from a variety of sectors who dislike restrictions and seek freedom. The primary cause of this is the lack of adherence to Islamic beliefs. Children are not the only ones who are negatively impacted by a curse like redemption (Khula). Society is in a state of decay as a result of the growing trend of redemption (Khula). It is imperative that we live our lives in accordance with Islamic teachings. Then, the state of society might improve. For its particular field, this study work can be instructive and helpful to readers and researchers.

**Keywords:** Islamic teachings, Redemption, Khula, Women, SBBWUP

**YIELD AND SECONDARY METABOLITE CONTENT OF MOROCCAN  
JUNIPERUS THURIFERA'S EXTRACTS: CASE OF THREE PROVENANCES**

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**ABSTRACT**

*Juniperus thurifera* is a dioecious tree belonging to the Cupressaceae family. It has important ecological, socio-economic, floristic and cultural interests. It is endemic to the western Mediterranean basin to which belongs Morocco. It is among the Moroccan species less valued and less preserved. Its stands do not cease that has degraded vigorously. It is distributed in areas with semi-arid and sub-humid bioclimates with cold to very cold variants in the Middle Atlas, the Eastern Anti-Atlas and the Eastern and Central High Atlas and on altitudes ranging from 1800 m to 3300 m and on all types of substrates.

In traditional medicine, the essential oils of juniper have been used as abortifacient and regulator of menstruation, while the wood tar is used as veterinary remedy.

The objective of the present work is to explore the effect of provenance on the yield, phenolic compounds, flavonoids and tannins contents and antioxidant activity of the extracts of the leaves of this species. The results obtained show a significant variability between the samples coming from three different biogeographic zones: the Eastern, Central and Western High Atlas. This allowed us to highlight the effect of the origin on the production of secondary metabolites. In fact, we found that the population of Eastern High Atlas has a good yield in methanolic extracts ( $9.41\% \pm 0.59$ ) and that the population of El Haouz is the richest in polyphenols ( $191.30 \pm 4.27$ ), as well as it has endowed an important reducing power ( $IC_{50} = 0.98 \pm 0.05$  mg/ml). These results can be exploited as bioindicators in any program of valorization and conservation of Moroccan juniper thurifer.

**Key words:** *Juniperus thurifera*, provenance, extract, yield, compound, Morocco.

**STUDY ON PICTURE FUZZY COMPETITION GRAPHS AND  
ITS APPLICATIONS****Sankar Das***Department of Applied Mathematics with Oceanology and Computer Programming, Vidyasagar  
University, Midnapore - 721 102, India.**ORCID ID: <https://orcid.org/0000-0002-7273-9926>***ABSTRACT**

In ecological problem, species may be of several types like lerten, non-lerten etc. Similarly, victims may be tasteful, digestive, injurious, etc. These terms have no proper meaning. They are fuzzy in nature. So the species and victims may be assumed as PFSs and inter-relation between them may be designed with a PFG. Due to uncertainty in description of species and victims, and their relationships, it is necessity to design a PFCG model. In 1968, Cohen first introduced the concept of competition graph (CG) while studying inflictions of graph theory in relation with an ecological problem. Let  $\vec{G} = (V, \vec{B})$  be the digraph corresponding to a food cycle . A vertex  $r \in V(\vec{G})$  indicates that a species in the food cycle and an edge  $(r, x) \in \vec{B}(\vec{G})$  indicate that  $r$  victims on the species  $x$ . The species  $r$  and  $s$  compete for a victim  $x$  if they have a common victim  $x$ . Due to this harmony, Cohen defined graphs representing the relationship of competition within the species of food cycle. An undirected graph  $C(\vec{G})$  of  $\vec{G}$  is the CG with  $V$  as vertex set and having an edge  $(r, s)$  in  $C(\vec{G})$  if there is a vertex  $x \in V$  such that  $(r, x), (s, x) \in \vec{B}$  in  $\vec{G}$  . In this study, the concept of picture fuzzy competition graph along with its two subclasses such as picture fuzzy  $k$ -competition graphs and  $p$ -competition picture fuzzy graphs are introduced. Picture fuzzy competition graph is one of the generalization of competition graph. Several properties of picture fuzzy competition graphs have been investigated. Some new types of picture fuzzy graphs have been introduced like picture fuzzy open neighborhood graph and picture fuzzy closed neighborhood graph. Also, the relationship between picture fuzzy  $k$ -competition graph and picture fuzzy  $k$ -neighborhood graph are established. An application of picture fuzzy competition graph in medical science is presented.

**Keywords :** Picture fuzzy digraphs, picture fuzzy competition graphs, picture fuzzy  $k$ -competition graphs,  $p$ -competition picture fuzzy graphs, picture fuzzy neighborhood graphs.

**RELATIONSHIP BETWEEN COLOR AND STRENGTH OF JUTE FIBRE****Nayab Khan***Department of Fibre and Textile Technology, University of Agriculture, Faisalabad.***Michal Vik***Department of Material Engineering, Technical University of Liberec, Liberec, Czech Republic.***Assad Farooq***Department of Fibre and Textile Technology, University of Agriculture, Faisalabad.***Farida Irshad***Department of Fibre and Textile Technology, University of Agriculture, Faisalabad.***ABSTRACT**

Jute is a natural fibre and is also known as golden fibre due to its shiny brown color. It has different grades on the basis of its length, strength, color, luster and softness. Jute fibre can be used as food packing material as it is a biodegradable fibre. Jute fibre processing mills grade the fibres according to its color values to predict their strength visually. Visual classification of jute fibres is an ancient art to grade the jute fibre. Jute fibres are not used for the fine clothing in the international market therefore; the other physical parameters (length, Strength, softness) are of less importance as compared to color. Precise and accurate color measurement through instrument is need of the hour for better grading of fibres. In this research the color measurement of jute fibre through instrument and its comparison with the visual assessment is performed. And the strength of jute fibre is studied with respect to its color values. The research shows that the color values of jute fibre predict strength of the jute fibres and its capacity to withstand load while used as packing material. Visual color assessment of jute fibre can be replaced with instrumental color measurement to obtain the precise color measurement.

**Key words:** / Arial italic bold, 12 point:*Jute Fibre, Color, Visual assessment, Packing Material.*

**OPTIMIZATION OF PORTFOLIO REBALANCING MODEL ON AN EXTENDED  
INTERVAL VECTOR SPACE**

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**ABSTRACT**

In this paper, a generalized interval vector space is considered and an order relation is defined. This order relation is used to formulate an interval optimization problem. A portfolio rebalancing problem with interval parameters is designed. A methodology has been developed to find the efficient portfolio. Further, a numerical example is illustrated for our proposed model.

**Keywords** Interval vector space, Interval Analysis theory, Interval optimization problem, Portfolio selection, Rebalancing, Efficient solution.

## **HOW GOVERNMENT POLICIES CAN SUPPORT INNOVATION DEVELOPMENT IN SOUTH AFRICA**

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### **ABSTRACT**

This paper undertakes an examination of innovation policy and governance in South Africa. The article therefore contributes to the importance of intra-African region innovation policy dialogue by using policy developments in South Africa. The article identifies a weak and fragmented innovation system as a major challenge facing many of the African countries, exacerbated by the lack of an explicit innovation strategy. The literature indicates that Science, Technology and Innovation (STI) policies should not simply adopt a science-push way to innovation, but rather look building an entire system of innovation. The emergence of a knowledge-based economy and globalisation such as the BRICs - Brazil, Russia, India, China and South Africa are restructuring the dynamics of innovation in developing countries. The literature has also shown that several international organizations have played significant roles in the development of Science and Technology (S&T) policies among African countries. However, the international company's initiatives have mostly focused on the development of S&T with minimal emphasis on the role of policies and administration, which would increase learning and innovation performance in South Africa. The central premise of the article is that innovation policy and governance is an essential component of the National System of Innovation in South Africa.

**ANTIMYCOTIC PROPERTIES OF DIODIA SARMENTOSA, AND OCIMUM GRATISSIMUM ON NINE FUNGAL STRAINS OBTAINED FROM CHILDREN AND ADULTS IN SELECTED COMMUNITIES OF AKWA IBOM STATE, NIGERIA****Ofonmbuk Victor Joseph***University of Port Harcourt, Faculty of Science, Department of Microbiology, Port Harcourt, Nigeria***Obakpororo Ejiro Agbagwa***University of Port Harcourt, Faculty of Science, Department of Microbiology, Port Harcourt, Nigeria***Nnenna Frank-Peterside***University of Port Harcourt, Faculty of Science, Department of Microbiology, Port Harcourt, Nigeria***Iheanyi Omezuruike Okonko***University of Port Harcourt, Faculty of Science, Department of Microbiology, Port Harcourt, Nigeria*  
<https://orcid.org/0000-0002-3053-253X>**ABSTRACT**

Medicinal plants are plants in which at least one of its parts possess therapeutic properties. *Diodia Sarmentosa* and *Ocimum gratissimum* were collected from University of Uyo botanical garden. Random samples of 2991 from children of ages (5-16) and 2243 from adults (20-80above) were collected at various suspected infected body sites from six communities namely: Essien udim, Abak, Ikot ekpene, Uyo, Eket and Oron. The samples were cultured on Sabouraud dextrose agar. Nine fungal strains which includes *Rhizopus oryzae*, *Aspergillus tamaril*, *Tricholoma matsutake*, *Kodamaea ohmeri* strain, *Aspergillus awamori*, *Aspergillus fumigatus*, *Aspergillus nomius*, *Aspergillus awamori* and *Aspergillus nomius* were identified by genotypic method. The qualitative phytochemical screening of the leaf extracts showed that tannins, flavonoids, salwoski, keller-killian, liberman were present in these two plant extracts. The antifungal assay of the aqueous and ethanolic leaf extract of *Diodia Sarmentosa* and *Ocimum gratissimum* at different concentrations showed that *Ocimum gratissimum* had higher inhibition zone than *Diodia sarmentosa*. The quantitative percentage composition of phytochemical constituents such as Tannins, Alkaloids, Saponins and Flavonoids were determined and result obtained showed that Saponins had the highest average composition (5.6%) across all plant extracts followed by Tannins (5.3%), Flavonoids (4.8%) and Alkaloids (1.6%) which was the least. MIC obtained ranged between 31.25-125mg/ml. The outcome of the work justifies the use of these plants in ethno-medicine.

**Keywords:** *Diodia Sarmentosa*, *Ocimum gratissimum*, Antimycotic properties, Nigeria



**SPACE-TIME RADIAL BASIS FUNCTION COLLOCATION METHOD AND  
VARIABLE SHAPE PARAMETER STRATEGY FOR TELEGRAPH EQUATION**

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**ABSTRACT**

A numerical solution for the inhomogeneous hyperbolic telegraph equation based on Radial Basis Function (RBF) collocation method has been improved and presented. The telegraph equation is considered important because it appears in many areas such as propagation of electrical signals along a telegraph line, digital image processing, and telecommunication. The RBF method and collocation points with both space and time coordinates are meshless ways we used to solve this equation. Several RBFs contain a free shape parameter, and choosing an optimal one plays an important role in the accuracy of the method. The symmetric variable shape parameter (VSP) method based on Generalized Multiquadratic (GMQ) space-time RBFs is used to solve a class of the second-order hyperbolic telegraph equation. Comparison between symmetric and Trigonometric variable shape parameters proves the efficiency. The accuracy of the proposed generalized multiquadratic method is demonstrated through several test problems

**Keywords:** Radial Basis Functions, Telegraph Equations, Variable Shape Parameter.

**STRUCTURAL ANALYSIS OF WUDIL CATTLE MARKET (KARA) WUDIL LOCAL  
GOVERNMENT OF KANO STATE-NIGERIA**

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**ABSTRACT**

The study examined the structure of Wudil cattle market Wudil local government of Kano state-Nigeria. A multi stage sampling technique was employed for the study in which purposive sampling technique was used in the selection of the market, based on the concentration and intensity of the cattle marketing activities. The second stage involved random selection a total of one hundred thirty five (135) Buyers were selected using systematic sampling by truncation on weekly basis for period of 5 weeks. Descriptive statistics and ginni co-efficient was employed to analyze the collected data. The result shows that cattle buyers fall within the age range of 22-76 years and the majority 32.60% of the cattle buyers are within age group of 33-43 years, it was discovered 99% of the respondent were male. Ginni co-efficient model shown that the markets structure were competitive with low Ginni co-efficient of 0.413 which indicated homogeneous Market, freedom to enter or exit the market. The major constraints identified were price determination because value of an animal is determined by visual and tactile examination.

**Keywords:** Breed, structure, Price, Cattle, Market and Analysis

**EVALUATION OF THE PERFORMANCE OF TRIMMER ROBOTS: REVIEW  
STUDY**

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**ABSTRACT**

In this paper, we will review the types of trimming robots such as trimmer robots along the highway, autonomous trimming robots in gardens, greenhouses, potted plants and open spaces. These robots have different types of blades depending on their application, they can move on different terrains and can approach plants like boxwood and trime them as desired. Manual trimming machines have several disadvantages, including; Low operational efficiency, inappropriate performance and high error rate, life risks for human users, risks of climbing trees for trimming, high vibration of manual trimming machine that causes injuries to human users in the long run. Its low performance speed. However, trimmer robots in agriculture have several advantages, including; Labor costs, speed change, daily working hours and also economically, they are equal to human labor. The shift to autonomous robots in agriculture will reduce the investment in implementation by about 15% and reduce the total annual labor and machinery costs by about 90%. Autonomous trimmer robots in agriculture will eliminate the time limit of work and will have the ability to increase working hours day and night, improving performance and increasing accuracy and quality in doing work. It seems that using artificial intelligence in trimmer robots will increase efficiency, speed of operation and higher accuracy in performing trimming processes.

**Keywords:** Autonomous, Agricultural Robotic, Trimmer

**VEXILLOLOGY AND TERMINOLOGIES**

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**Vexillology** is the scientific study of the history, symbolism and usage of flags or, by extension, any interest in flags in general. The word is a synthesis of the Latin word vexillum ("flag") and the Greek suffix -logia ("study.") The constitution of the International Federation of Vexillological Associations formally defines vexillology as "the creation and development of a body of knowledge about flags of all types, their forms and functions, and of scientific theories and principles based on that knowledge. The study of flags, or vexillology, was formalized by the U.S. scholar and student of flags Whitney Smith in 1957. Vexillology is the scholarly study of flags. It is not nearly as well known as numismatics, Philately or the many other 'ologies, such as Biology (the study of life), Zoology (the study of animals) or Palaeontology (the study of fossil animals). However, Vexillology is exiting, motivating but demanding. There exist many types of flags in UK and around the world. Their categorisation, their typology and their studies are worth mentioning for a better understanding of vexillophiles.

**Keywords :** Numismatics ; Philately ; FIAV, Vexillophiles.

**RETENTION OF DYE BY WASTE-DERIVED MATERIAL (POLYSTYRENE SULFONATE)**

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**ABSTRACT**

Polystyrene (PS), one of the most used polymers in everyday life, has a low recycling rate due to its inexpensive virgin resin. In order to make polystyrene waste (WPS) recycling advantageous, it is possible to change it chemically, introducing heteroatoms in the polymer chain thus transforming the waste into a material with more added value. A strong polyanion, polystyrene sulfonate (PSS) a material has been investigated for the removal of various dyes from water. PSS was characterized by Fourier-transform infrared spectroscopy (FT-IR) and thermogravimetry. The adsorbent showed good adsorption performance due to its functional groups and strong adsorption strengths. Selective removal of methylene blue (MB) from the MB/wastewater mixture can be achieved using this adsorbent. The removal efficiency was over 90% even after five cycles of adsorption-desorption.

**Keywords:** polystyrene, polystyrene sulfonate, Fourier-transform infrared spectroscopy, methylene blue.

**PSYCHOLOGICAL DISTRESS AND SUICIDAL IDEATION AMONG  
ADOLESCENTS: THE MODERATING ROLE OF SOCIAL SUPPORT****Priya Chaudhary***Research scholar, Lovely Professional University, Punjab, India***Richa Gupta***PhD, Assistant Professor, Maulana Azad Memorial College, J&K, India***Neelam Kumari***Assistant Professor, Maulana Azad Memorial College, J&K, India***Shabila Wani***PhD, Assistant Professor, Maulana Azad Memorial College, J&K, India***ABSTRACT**

Concern is mounting over the rising suicide rate among Adolescents. Development of effective preventative treatments to lower suicidal behaviour and the suicide rate has been spurred by the worrisome rise in the number of suicide and attempted suicides among Adolescents. This study was conducted to assess the impact of psychological distress on suicidal ideation among adolescents. Mental health disorders among adolescents have emerged as a major public health issue in many low and middle-income countries, including India. There is a paucity of research on the determinants of psychological distress, particularly among the adolescents. The role of social support in mitigating the effect of psychological distress on suicidal ideation, if any, was analyzed. Standardized questionnaires for assessment of study variables were used. The data was collected from 182 adolescent boys and girls. The data was analyzed using SPSS 20. The results of the study revealed that psychological distress has positive relationship with suicidal ideation and leads to suicidal tendencies among adolescents. However, this relationship was moderated by social support available to the participants. This implies that adolescents with social support are less likely to have suicidal ideation when they experience psychological distress while those with low social support are less vulnerable to suicidal tendencies under psychological distress. The findings of the study project the importance of social groups and support available in this transitional phase of adolescence.

**Keywords:** Psychological distress, suicidal ideation, adolescents, support

**TECHNOSOCIAL WORLD: A CHALLENGE TO GENDER DISPARITY****Sadaf Mushtaq Nasti***Research Scholar DAVV Indore, MP***Dr. Priti Bhatt***Prof. Govt. Nirbhay Singh Patel Science College Indore, MP***Devi Ahilya Vishwavidyalaya Indore**

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**ABSTRACT**

The onset of technological advancements in both developed and developing countries have been promising in challenging the existing power imbalances created by gender disparities. Although many critics believe that technology studies long remained gender-blind, yet the fact remains that technology fundamentally addresses the practical problems and in the modern as well as post modern era ‘gender’ has been one of the most discussed problems. The radical and eco- feminists of 1970’s have been highly critical of technology for its patriarchal nature. They believed that it further enhances and consolidates the existing power hierarchies. However, towards the end of 1980’s there was a paradigm shift in technology studies and the concepts like ‘sociotechnical systems’ came into vogue which put forth the slogan that the social and technological are inseparable – “a seamless web”. (Hughes 1986). With the result, in the very recent times, it was witnesses how “Me Too” movement in 2017 in many parts of the world especially America, used different technological platforms like Facebook, WhatsApp, Instagram etc were used by women to expose the abuses, inequalities and injustice faced by them. The technology not only became their voice to challenge the gender inequalities but also empowered them to get rid off one of their most vulnerable aspects- “biological motherhood within the established institution of marriage”. The women can now be solo mothers without getting physical with their male partners through technological motherhood-Parthenogenesis. The aim of this paper is to explore how technology in the present scenario is used to challenge long debatable issue of gender disparity. It would also designate sex as a biological phenomenon and gender as culturally constructed.

**Keywords:** Biological, Cultural, Female, Gender, Sex.

**THE MANIFESTATION OF THE LAMPUNG COMMUNITY PHILOSOPHY OF LIFE IN THE TRADITIONAL ARCHITECTURE OF LAMBAN GEDUNG PAKSI BUAY PERNONG**

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**ABSTRACT**

The traditional architecture of Lamban Gedung Paksi buay Pernong, Kepaksian Sekala Brak is one form of Indonesian culture that has socio-cultural meaning and is a characteristic of the people of Lampung. Today, the existence of traditional architecture is decreasing because many are abandoned and made changes that also affect people's understanding of the sociocultural meaning it contains. The contributing factor is the influence of globalization and the lack of availability of raw materials. This study aims to examine the Slow Architecture of the Paksi buay Pernong Building, Kepaksian Sekala Brak in the context of sociocultural meaning. The method used in this research is descriptive qualitative with data collection techniques of observation, in-depth interviews, and documentation involving traditional leaders and relatives of Paksi buay Pernong, Kepaksian Sekala Brak. Data analysis techniques were carried out through data reduction, data presentation, and data verification. The results show that the socio-cultural meaning of the architecture of Sansando Paksi buay Pernong, Kepaksian Sekala Brak is a manifestation of the Lampung people's philosophy of life as contained in "*Piil Pesengiri*" which comes from divine values (*Hablum Minallah*), human values (*Hablum Minannas*), and values of life (*Hablum Minal'Alam*). *Piil Pesengiri* includes Leadership (*Bejuluk Beadok*), Hospitality (*Nemui Nyimah*), social and environmental (*Nengah Nyappur*), and Gotong Royong (*Sakai Sambayan*).

**Keywords:** *Philosophy of Life, Traditional Architecture, Social Culture.*



**GRAY-BROWN SOILS OF THE SAMUKH DISTRICT AND THEIR ENVIRONS:  
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<https://orcid.org/0000-0001-8933-8152>**ABSTRACT**

In the essay, the grayish-brown soils of the Samukh area and its surrounds are described morphologically. In the Republic of Azerbaijan's northwest is the administrative district of Samukh. The Samukh district is a component of the Middle-Kura Economic District and the Ganja-Kazakh region. It has a dry, continental climate. It has a 1,455 sq. km. area. 802 km<sup>2</sup> of the 1,082 km<sup>2</sup> total area are state-owned stock lands. 133 km<sup>2</sup> of the municipality's total area is privately owned. 708 km<sup>2</sup> of the area are used for agriculture. The district shares boundaries with the Georgian Republic, the city of Ganja, Goygol, Shamkir, Tovuz, Gakh, Yevlakh, and Geranboy districts. The Samukh district's land is primarily flat. The Alazani Valley, which flows into the Kursk Basin and the physical and geographic region of Jeyranchol, the gray Mountains massif, surrounds a portion of the land from the north. The district's land is traversed by the rivers Kura, Gabyrchay (Iori), Alazani (Ganykh), Ganjachay, and Goshgarchay. Relict Eldar pine woods are abundant on an area of 392 hectares, located exclusively in this region, on the territory of the Samukh district, on the left bank of the Gabyrchay River, at an altitude of 400–600 meters above sea level, in a mountain massif known as "Eliyoyu." For the first time in Caucasian nature, such a special location—the Eldar—was designated as a protected area in 1910 as the forestry of Eldar Pine. The Samukh district's soils are of the light gray-brown soil variety. In the inclined plumes of the surrounding strip of the Kura-Araz lowland, light gray-brown soils cover a significant region. These soils' distribution areas are characterized by non-flushing water regimes, which favor the development of the soil formation process. In this context, gypsum, readily soluble salts, and carbonates are gradually building up in the soil layers. The profile of light gray-brown soils is typically well-differentiated morphologically. The following are the primary morphological characteristics of the soil: the soil profile's structure, the depth of the soil and each individual horizon, its color, granulometric composition, structure, looseness, fresh sod-podzolic soils, and sod-podzolic soils. It is suggested that soil color is an easier-to-understand and-notice morphological characteristic. The presence of high carbonate content (CaCO<sub>3</sub>) has been established for the mentioned soils, and the external signals of the soil in the field and indoors are used to determine the granulometric composition. These soils were discovered to be saturated with absorbed bases, with an alkaline reaction in the soil medium and a clayey and severely clayey granulometric composition.

**Keywords** carbonation, humus, genetic layer, soil profile, light gray-brown, and granulometric composition

## **SURVIVAL AND CONTINUITY OF "RICE AND FISH MAKES A BENGALI" CULTURE AMONGST BRITISH BANGLADESHIS**

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### **ABSTRACT**

In terms of land area, Bangladesh is ranked 98<sup>th</sup> globally and yet it has the largest number of rivers in the world. These rivers provide ideal environment for a rich diversity of fish to flourish. Despite its small size Bangladesh is ranked third in the world for inland fish production. Furthermore, river water is also used for growing rice and Bangladesh is ranked third globally for rice production. Bangladeshis are very fond of their fish and rice diet and often call themselves "Mache Bhate Bengali" which can be translated as "Rice and Fish Makes a Bengali". Since the 1960s many Bangladeshis migrated to the United Kingdom (UK) and pioneered the establishment of restaurants and takeaways selling curry and rice. They are considered as the founders of "British Curry" and a large catering industry emanated from it. At the same time, the UK Bangladeshi community worked extremely hard to maintain their culture, identify and food habits. We have been conducting research on the culture, diet, lifestyle, and health of UK Bangladeshis. Our research revealed that the Bangladeshis consume the highest quantities of rice and eat fish imported from Bangladesh. Of all the different ethnic minority groups in the UK, the Bangladeshis have the highest number of shops that specialise in selling different varieties of fish, including dried fish. Furthermore, during the last decade there has been a growth of restaurants that serve traditional fish dishes for local Bangladeshis. Many different Bangladeshi owned companies import fish into the UK from Bangladesh. Local Bangladeshi media, including newspapers and television channels carry adverts promoting sale of such fish. There is clear evidence that "Rice and Fish Makes a Bengali" culture is still strong and thriving amongst the UK Bangladeshis. The third and fourth generation UK Bangladeshis are beginning to adopt a more westernised diet. However, there is a revival in traditional Bangladeshi culture and diet in the UK due to the recent migration of a large number of Bangladeshis from Europe, especially from Italy. Many of these migrants were born in Bangladesh and still maintain a traditional diet. They have re-ignited interest in Bengali culture through organisation of activities and events including food festivals promoting traditional Bangladeshi foods. In this context, one can argue that the integration of these new arrivals within the existing UK Bangladeshi community and tapping into businesses, facilities, and platforms it has established, will ensure the survival and continuity of "Rice and Fish Makes a Bengali" culture in the UK.

**CONDUCT OF STUDENTS IN FINANCIAL INCREASE TOWARDS INTEREST OF  
SOCIAL ENTREPRENEURSHIP IMPROVEMENT IN BANGLADESH****Md. Ibrahim Khalil***MBA Student, FBFAH, MAHSA University, Malaysia***Saif Ahmed***MBA Student, FBFAH, MAHSA University, Malaysia***Binoy Chowdhury***MBA Student, FBFAH, MAHSA University, Malaysia***Dr. Rasheedul Haque***Supervisor, Associated Professor, MAHSA University, Malaysia***ABSTRACT**

Certain traits, such as bravery, foresight, a clear idea of direction, creativity, intellect, and curiosity, are natural for success in the business world. This study is about the challenges which have significant influence over intention building process among the graduates in Bangladesh. As a country increases and Huse population level, unemployment is increasing day by day. There are a lot of businesses with a social aiming that are trying to improve the world (2016, Tally Press). When a country's people take up social ventures, it helps the country's economy grow and thrive in the long run. Social entrepreneurs make a well value in our society and also, they increase the of personal value. Educated people are looking for work rather than starting an entrepreneurship business where there is a trend of joining as an official employee is more respectful. Social entrepreneurship can be a good solution to reduce unemployment rate and change the trend of people. And it will assist to raise the socio-economic level, people's lifestyle and living advantage. Due to many obstacles, now social supporters well as government support are coming in front of us. This study has found social support as an indicator with other challenges such as Attitude, Education, Social Entrepreneurial Outcome Expectation and Self-efficacy in order to measure the effect on social entrepreneurship intention. Data has been collected through an online survey questionnaire and analyzed by Smart PLS3. Attitude and Education have more affect towards social entrepreneurship intention. It has been learned that some entrepreneurs are facing problems with high charge of business approval certificate. Besides, at present E-commerce is becoming a part of entrepreneurial business which is flexible, time saving and cost effective. Moreover, leadership and outcome wishing experience is also earned priority in the intention making tacking of social entrepreneur.

**Keywords:** Social entrepreneur, Own-efficacy, Output Expectations, Socio-economic, Leadership.

**RETROSPECTIVE DOSIMETRIC COMPARATIVE STUDY OF HYBRID IMRT, 3DCRT, IMRT, TREATMENT PLANNING FOR LEFT-SIDED CHEST WALL IRRADIATION.**

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**Introduction:** Irradiating the chest wall (CW) and lymphatic nodes is more difficult due to the small target volume and irregular body surface. Target coverage, conformity, and homogeneity in 3D-CRT are frequently insufficient at the CW and supraclavicular. Intensity-modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT) are two treatment delivery methods that help produce better dose coverage and homogeneity and lower doses to the heart and ipsilateral lung. The most serious worry with IMRT is an increase in the quantity of radiation administered to healthy soft tissue and a higher Monitor Unit (MU), which may raise the chance of late secondary cancer. **Methods & Materials:** The three different planning strategies (FiF [Field-in-field], IMRT, and Hybrid IMRT) were examined for ten patients with left-sided chest wall irradiation. For the planned target volume, a prescription dose of 40 Gy in 15 parts was used (PTV). To measure PTV dose conformance, homogeneity, and the quantities of normal tissues treated, dose-volume histograms were used to compare plans (DVHs). **Result:** In FiF, the D95 per cent of PTV was  $37.10 \pm 0.48$  Gy, but in IMRT ( $p=0.01$ ) and Hybrid IMRT ( $p=0.01$ ), it was  $39.32 \pm 0.34$  Gy and  $38.39 \pm 0.29$  Gy, respectively. FiF plans have the lowest CI value of  $0.931 \pm 0.026$  compared to IMRT ( $0.981 \pm 0.014$ ) and Hybrid IMRT ( $0.970 \pm 0.013$ ). The homogeneity of IMRT plans ( $0.087 \pm 0.021$ ) was found to be higher than that of the other two planning techniques ( $0.111 \pm 0.013$  [FiF,  $p=0.016$ ],  $0.107 \pm 0.021$  [hybrid IMRT,  $p=0.056$ ]). **Conclusion:** Hybrid IMRT treatment plans for the ca-breast are recommended because they provide superior and comparable PTV dose coverage and OAR sparing than IMRT and FiF plans. Hybrid IMRT plans have lower MU, BOT, and a smaller dosage area.

**POLICY MODEL FOR UTILIZING GREEN OPEN SPACE IN BANDAR LAMPUNG  
CITY DEVELOPMENT****Pitojo Budiono****Nadia K Nisa Alfathan****Harjuno Saputro****Adella Putri Aprialiani****ABSTRACT**

Green Open Space is a serious problem in every city in Indonesia, due to the rapid population growth and currently reaches 275,361,267 people. Meanwhile, the total population in Lampung Province as of August 2022 is 6,560,300 people. The consequence of population growth is that the area of green open space is the spearhead for land conversion for development. The development of a city should and should be followed by the construction of public and supporting facilities for economic, social and cultural growth. The dilemmatic government policy related to sustainable development needs to be pursued a development model that is adaptive to the needs and developments. An urban area that becomes an urban area that promises a better life and welfare. The phenomenon of environmental damage in Lampung continues to increase, green open space which is only 11.8% is a challenge for all citizens to get a good microclimate. Problems and challenges of physical and environmental facilities and infrastructure become serious problems, such as slum settlements, hills being barren or land conversion, garbage, flooding are complex problems. Development that meets the needs of its citizens which is the responsibility of the government cannot be transferred. Therefore, the implementation of policies that tend to defeat green space and the environment, and this seems to be a constant model in every leadership period that cannot be avoided. The quality of the green city of Bandar Lampung is a question that will be sought through the application of the Square Equation Model SMART PLS, which will find direct and indirect models of the influence of economic development, social development and environmental development.

**Keywords:** Green Open Space, Greencity, Policy Model.

**LOCAL WISDOM "PI'IL PESENGGIRI" FROM LAMPUNG AS A FILTER FOR  
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Science, Bandar Lampung, Indonesia***Adella Putri Aprialiani***University of Lampung, Master of Environmental Science, Bandar Lampung, Indonesia***ABSTRACT**

Local wisdom is a very specific and unique value system in today's modern life. Local wisdom, which is based on the agreement of noble values, must be maintained as a cultural feature and identity. Lampung's typical value system in life uses "Pi'il Pesenggiri" which is a guideline to behave not only towards fellow humans but also to the natural surroundings. Radicalism has become a discourse of new values that is very hard and has firm boundaries with exclusive group forms and is very similar to local culture, because the nature of radicalism seeks to change the value order of truth beliefs trying to create an extreme new value order where the point is to destroy the old value system and build a paradigm. new oriented idea of a new value order. Radicalism is a global agenda in every country and has the potential to become a destroyer of the integrity of the nation, because with the local wisdom Pi'il Pesenggiri becomes the basis of regional culture that is able to filter radical values to change cultural values in maintaining the integrity of the nation.

**Keywords:** Local wisdom, Radicalism, Piil Pesenggiri

**THE ROLE OF WOMEN IN SOCIAL LIFE IN THE COUNTRY OF ANDALUSIA****Dr. Bahaa Mousa Habeeb***University of Kufa / College of Education for Girls***ABSTRACT**

Women represent a social, political and cultural position in Andalusian society in general and her life in particular through her participation in poetry clubs and the participation of men on the political stage of Andalusia directly or indirectly, so her political activity was through her influence on princes, rulers and caliphs, The Arab woman in Andalusia was also characterized by her courage and her courage in confronting princes and rulers and presenting her complaints freely and steadfastly. In addition, the Andalusian woman was interested in her external appearance and adornment. It was known that the women of Andalusia were greatly interested in adornment and demonstrated with gold and brocades, and the clothes differed according to the classes of Andalusian society, in addition to that they used decorations, ornaments, jewelry and the most expensive types of perfumes made of musk, amber, etc. And Andalusian women were famous for their beauty. The softness of her voice and sweetness, as she was preferred by many rulers, princes and polite people to sing more than men in forums and in education houses, and she was educated and given great attention by educators and teachers, so Andalusian women represented half of Andalusian society. The nature of the research necessitated dividing it into four sections and a focused conclusion that dealt with the first section dividing Andalusian women into different classes, each layer having its place and its role in life in Andalusia and its effects. Andalusian society and how the customs of engagement and marriage were carried out in the Andalusian society and the smallest details that take place between the father of the bride and the groom, in addition to that we shed light on the most important family problems in the Andalusian society (divorce) and everything related to it from child custody and divorce expense and what are the reasons that lead to divorce, The third topic was related to her clothes, her adornment, her interest in her external appearance and the adornment with gold, and he mentioned the most famous Andalusian clothes, the most prominent of which were the lace, the buttons, the shirts, and others. While the fourth topic focused on the role of women in political, cultural and intellectual life, she had a prominent role in influencing rulers and princes, as she was characterized by her courage and feet in the face of princes. As for the intellectual and cultural, women were famous poets in Andalusia and excelled in various sciences. The research relied on a group of important publications and references that enriched it with many important opinions and ideas, perhaps the most prominent of which are: Ibn Hazm Al-Andalusi in his book The Letters of Ibn Hazm, Shawish and Totah in their treatise entitled The Woman in Andalusia, and Al-Maqri in his book Nafh Al-Tayyib from the moist branch of Andalusia. that I have succeeded in accomplishing this research, and it is sufficient for me to have worked , God hard .

**JUVENILE CRIME IN INDIA: A SOCIO-PSYCHIC STUDY****Libina M H***Research Scholar, University Of Kerala, Kariavattom, India***ABSTRACT**

Tracing out the standard of living and social conditions of women and children in contemplation with historical antecedents the respective categories are treated a vulnerable in nature. They have not been given equitable status in comparison with their counterparts, to a considerable extent. Constitution of India, 1950 envisages social justice in this context the dilapidated condition of women and children. Law is an apparatus to social changes. The metamorphosis of crime across time is different. As time passes the multitude of crimes changes in the way. While analysing the time period it shows drastic differences in the status of crimes. Crimes defines no age .It doesn't have any spatial or temporal difference. Children are adult in making. The category, child itself is a social construction. They do commit crime and termed as offenders. As per rule of law everybody is equal in the eyes of law. So children are no exemption if they commit crime. Children who commit crime traditionally labelled as "deviants". Delinquent is a term used by the British and Australian criminologists tend towards juvenile of "youth offender". Children are defined by their physiological status, relatively limited experience, growing Youth offenders were created in their childhood. While coming to gender boys were more likely to commit crimes. Passing of time the trend tends to choose both. The gender gap narrowed because of the "greater gender equality". Each children needs to be treated differently to understand their specific circumstances. The paper analyses the circumstances, the law and conditions of a child offender to conduct a crime in a psychological and social perspective. It also gave emphasis on the Juvenile System in India.

**Keywords:** Juvenile Justice , Law, Gender, Crime , Psychology



**ESKİŞEHİR BASTNASİT CEVHERİNDE BULUNAN FLUORİTİN  
ZENGİNLEŞTİRİLMESİ**

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**ÖZET**

Fluorit kalsiyum florür bileşiminde ( $\text{CaF}_2$ ) olup saf olduğunda % 51.1 kalsiyum, % 48.9 flor ihtiva eder. Uluslar arası ticari ismi ‘fuorspar’ olan fluoritin esas elementi flordur. Doğal fluorit kuvars, barit, kalsit, galenit, sfalerit, siderit, sölestit, kalkopirit ve diğer sülfür mineralleri ile birlikte bulunur. Fluorit başlıca demir-çelik sanayiinde, alüminyum sanayiinde, kimya sanayiinde (HF ve türevlerinin yapımında) ve seramik sanayiinde olmak üzere cam, mobilya ve çimento sanayi dahil 30’dan fazla sanayii dalında yaygınca kullanılmaktadır. Bu çalışma Eskişehir ili Sivrihisar ilçesi sınırları içinde bulunan ve ülkemiz ekonomisi açısından oldukça büyük bir öneme sahip olan nadir toprak element içerikli bastnazit cevherinde bulunan fluoritin ( $\text{CaF}_2$ ) flotasyon işlemi ile seçici olarak cevherden ayırdıktan sonra çözelti ortamında zenginleştirilmesi amacıyla yapılmıştır. Bu çalışmanın en önemli tarafı ise flotasyondan önce cevherin kristal yapısını değiştirerek belli bir tanecik boyutunda serbestleşme derecesini sağlamak ve daha sonra elde edilen örneğin flotasyonla fluorit ( $\text{CaF}_2$ ) içeriğini ana mineralden yüksek verimle ayırmak olmuştur. Cevherin kristal yapısını değiştirerek belli bir boyutta serbestleşme derecesini arttırmak amacıyla yaptığımız işlem sülfürleme işlemidir. Bu amaçla yapılan deneylerde sülfürleme işlemine sıcaklık, süre ve  $\text{H}_2\text{S}$  miktarının etkisi, flotasyon verimine ise pH, toplayıcı miktarı, pülp yoğunluğu ve bazı canlandırıcı ve bastırıcı reaktiflerin etkisi incelenmiş olup, tespit edilen optimum koşullarda cevher içerisinde bulunan fluoritin ( $\text{CaF}_2$ ) flotasyon verimi % 94,6 olarak tespit edilmiştir. Bu şekilde elde edilen konsantrede Barit tenörü % 31,79’dan % 98,85’e kadar çıktığı tespit edilmiştir.

**Anahtar Kelimeler:** Bastnazit; Fluorit, Flotasyon; Zenginleştirme

**ENRICHMENT OF FLUORITE FROM ESKİŞEHİR BASTNAESITE ORE****ABSTRACT**

Fluorite is in calcium fluoride composition ( $\text{CaF}_2$ ) and when pure it contains 51.1 % calcium and 48.9 % fluorine. The main element of fluorite, whose international trade name is 'fuorspar', is fluorine. Natural fluorite occurs with quartz, barite, calcite, galenite, sphalerite, siderite, celestite, chalcopryrite, and other sulfide minerals. Fluorite is widely used in more than 30 industries including glass, furniture and cement industry, mainly in the iron and steel industry, aluminum industry, chemical industry (making HF and its derivatives) and ceramic industry. This study was carried out in order to enrich the fluorite ( $\text{CaF}_2$ ) found in bastnasite ore containing rare earth element, which is located within the borders of Sivrihisar district of Eskişehir province, which is of great importance for the economy of our country, in solution medium after selectively separating it from the ore by flotation process. The most important aspect of this study was to change the crystal structure of the ore before flotation, to provide a certain degree of liberation at a certain particle size, and then to separate the fluorite ( $\text{CaF}_2$ ) content of the obtained sample from the main mineral with high efficiency by flotation. The process we do in order to increase the degree of liberation in a certain size by changing the crystal structure of the ore is the sulphidation process. In the experiments carried out for this purpose, the effect of temperature, time and  $\text{H}_2\text{S}$  amount on the sulphuring process, the effect of pH, collector amount, pulp density and some invigorating and suppressive reagents on the flotation efficiency were investigated, the flotation efficiency of fluorite ( $\text{CaF}_2$ ) in the ore in the determined optimum conditions was determined as 94.6%. In the concentrate obtained in this way, it was determined that the barite grade increased from 31.79% to 98.85%.

**Keywords:** Bastnaesite; Fluorite; Flotation; Enrichment

## ALEVİLİKLE İLGİLİ TOPLUMSAL ALANDA GÖRÜNEN ÇATIŞMA BOYUTLARI: YOUTUBE YORUMLARI ÖRNEĞİ

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### ÖZET

Sosyolojide toplumu birbiri ile uyumlu olarak gören düşüncelere karşın çatışmanın da doğal olarak bulunduğunu öne süren yaklaşımlar bulunmaktadır. Bu bağlamda toplumsal alanı açıklama yollarından biri de çatışmadır. Bireyler tarihsel süreç içinde toplumsal ilişkiler kurarak birbirinden farklı toplumsal kimlikler benimserler. Söz konusu kimlikler medeniyet, etnik, milli ya da dini temelli olabilmektedir. Ayrıca bu kimliklerin bireyler arası ilişkilerde çeşitli çatışma unsurlarına dönüşme potansiyeli bulunmaktadır. Dini kimlikler diğer toplumsal kimliklerden oldukça farklı motivasyon kaynaklarına sahiptir. Diğer yandan bireylerin güvenlik, saygınlık veya iç huzur gibi ihtiyaçlarını karşılaması yanında vahye dayanması nedeni ile çatışmanın meşrutiyetini güçlendirici işlev görür. Alevi-Sünni çatışması dini kimliğe dayalı bir çatışmadır. Osmanlı-Safevi arasında süregelen egemenlik mücadelesi ile siyasal olarak başlatılabilecek Alevi-Sünni çatışması, Alevilerin yeni kurulan Cumhuriyet'in laik devlet yapısı ile uyumlu bir görünüm sergilemeleri nedeni ile yumuşamış gibi görünse de 1950'li yıllarda devleti yönetenlerin dinsel temeldeki tutumları ve laiklikten ödün vermeleri nedeni ile yeniden görünür olmuştur. Devletin giderek daha fazla Sünni din anlayışını benimsemesi nedeni ile 1980 ve sonrasında Alevilerin korku ve kaygıları giderek artmış ve söz konusu çatışmayı pekiştirici bir rol üstlenmiştir. 2002 yılında iktidara gelen Ak Parti, farklı yerel kültürel ve dini unsurları kapsayıcı bir politika izlemişse de bugün toplumsal boyutta Alevi-Sünni karşıtlığının sonlandığını söylemek iyimser bir yaklaşım olur. Bu çalışmanın amacı Alevi-Sünni çatışmasının bugünkü görünürlüğüne dair toplumsal boyutların ortaya konmasıdır. Daha açık bir ifade ile Aleviler ile Sünnilerin toplumsal zeminde mutabakat noktalarını zayıflatan keskin uçların tespit edilmesi amaçlanmıştır. Bu amaç doğrultusunda "Soramazsın: Alevi" isimli Youtube programı altında yapılan 20.566 izleyici yorumu nitel araştırma tekniklerinden içerik analizi ile yorumlanmıştır. Programın seçilme nedeni hem izlenme oranının yüksek olması hem de yorumlarda Aleviliğe dair toplumsal boyutta pek çok çatışma ögesinin ortaya çıkmasıdır. Çalışma sonucunda Sünniler ile Aleviler arasında halen yoğun bir çatışma, hatta hakaret dilinin hâkim olduğu tespit edilmiştir. Ortaya çıkan bu çatışma unsurları "Dört Halife'ye Karşı Tutum, Muaviye'ye "Hazreti" Hitabının Kullanılması, Osmanlı İmparatorluğu'na Olumsuz Yaklaşım, Yavuz Sultan Selim, Cem Evlerinde Resim Bulunması, Temel İbadet Ritüellerinde Ortaya Çıkan İhtilaflar, Kadının Toplumsal Alanda ve İbadethanelerde Görünürlüğü, İslam Kültüründe Cami Olup Olmadığı ve Kız Alıp Verme olarak tespit edilmiştir.

**Anahtar Kelimeler:** Kimlik, Alevi, Sünni, Çatışma

**DIMENSIONS OF CONFLICT IN THE SOCIAL AREA RELATED TO ALAEVITY:  
EXAMPLE OF YOUTUBE COMMENTS****ABSTRACT**

In sociology, there are approaches that suggest that conflict naturally exists, despite the ideas that see society as compatible with each other. In this context, one of the ways of explaining the social sphere is conflict. Individuals adopt different social identities by establishing social relations in the historical process. These identities can be based on civilization, ethnicity, nationality or religion. In addition, these identities have the potential to turn into various elements of conflict in interpersonal relations. Religious identities have quite different sources of motivation from other social identities. On the other hand, besides meeting the needs of individuals such as security, dignity or inner peace, it strengthens the legitimacy of the conflict because it is based on revelation. The Alawite-Sunni conflict is a conflict based on religious identity. The Alevi-Sunni conflict is started politically with the ongoing struggle for sovereignty between the Ottomans and the Safavids. This conflict was softened by the fact that the Alevis were in harmony with the secular state structure of the newly established Republic. However, in the 1950s, it became visible again due to the religious-based attitudes of the rulers and their compromising from secularism. Due to the state's adoption of more and more Sunni religious understanding, the fear and anxiety of Alevis increased gradually in 1980 and after, and it played a role in reinforcing the conflict in question. The AK Party, which came to power in 2002, followed a policy that included different local cultural and religious elements. However, it would be an optimistic approach to say that the Alawite-Sunni opposition in the social dimension has come to an end today. The aim of this study is to reveal the social dimensions of the current visibility of the Alevi-Sunni conflict. To put it more clearly, it is aimed to identify the sharp ends that weaken the consensus points of Alawites and Sunnis on the social ground. For this purpose, 20,566 viewer comments made under the Youtube program called "You Can't Ask: Alevi" were interpreted with content analysis, one of the qualitative research techniques. The reason for choosing the program is both the high rate of viewing and the emergence of many elements of conflict in the social dimension regarding Alevism in the comments. As a result of the study, it has been determined that there is still an intense conflict between Sunnis and Alawites, and even the language of insult is dominant. These emerging conflict elements are "Attitude towards the Four Caliphs, Use of the Address "His Excellency" to Muaviye, Negative Approach to the Ottoman Empire, Yavuz Sultan Selim, Finding Paintings in Cem Houses, Basic Worship Rituals, The Visibility of Women in the Social Area and Places of Worship, Whether there is a Mosque in Islamic Culture and Daughter Exchange have been determined.

**Keywords:** Identity, Alawite, Sunni, Conflict

## **BİR KÖPEKTE BENİGN MİKST MEME TÜMÖRÜ OLGUSU**

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### **ÖZET**

İyi huylu mikst tümör, genellikle kıkırdak ve/veya kemik oluşumları, değişken miktarlarda fibröz stroma üreten mezenkimal hücre odaklarıyla hem epitelyal (duktal) hem de miyoepitelyal proliferasyona sahiptir. Miyoepitelyal/bazal hücrelerin kıkırdak, kemik ve/veya yağ dokusu üretebilen mezenkimal hücrelere farklılaştığı bilinmektedir. Bu olgu sunumunda, 4 yaşlı, dişi melez bir köpeğin torak 1 ve 2. inci meme lobunundan iki adet kitle cerrahi operasyonla alındı ve Patoloji Anabilim Dalına getirildi. Makroskopik olarak, ilk kitle 17x28 çapında, kesit yüzünde boz beyaz renkli alanlar ve kistik oluşumlar ile sarımsı kırmızı renkli, pis kokulu bir içerik vardı. İkinci kitle, 7x8 cm ebatlarında, sert kıvamlı ve kitlenin kesit yüzü sarımsı beyaz renkteydi. Histopatolojik incelemeler için, %10'luk formaldehit solusyonunda tespit edildi ve ardından rutin doku takibi prosedürü uygulandı ve parafine bloklandı. Parafin dokulardan kesitler mikrotom cihazında 5 µm kalınlığında alındı ve Hematoksilen-eosin boyama yöntemine göre boyandı. Mikroskopik incelemede, ductus epitellerinde ve miyoepitel hücrelerinde proliferasyon ile kıkırdak ve/veya kemik odakları vardı. Epitel, küboidal ila kolumnar olan ve orta miktarda eozinofilik sitoplazmaya sahip hücrelerle döşeliydi. Miyoepitelyal hücreler, iğsi, yıldızsı ve yuvarlak hücrelerden oluşuyordu ve bol miktarda hücre dışı matris (miksoid matris) sahipti. Ayrıca miyoepitelyal hücreler tarafından oluşturulan kıkırdağın endokondral ossifikasyonu görüldü ve bu alanın bağ dokusuyla çevrili olduğu belirlendi. Sonuç olarak yapılan incelemede, benign mix tümör olduğu belirlenmiştir.

**Anahtar kelimeler:** Bening mikst tümör, meme, köpek



**A CASE OF BENIGN MIXED MAMMARY TUMOR IN A DOG****ABSTRACT**

The benign mixed tumor has both epithelial (ductal) and myoepithelial proliferation with mesenchymal cell foci producing variable amounts of fibrous stroma, usually with cartilage and/or bone formations. Myoepithelial/basal cells are known to differentiate into mesenchymal cells capable of producing cartilage, bone, and/or adipose tissue. In this case report, two masses were surgically removed from the 1st and 2nd mammary lobes of a 4-year-old female crossbred dog and brought to the Pathology Department. Macroscopically, the first mass was 17x28 in diameter, gray white areas and cystic formations were found on the cross-sectional surface, and there was also a yellowish red colored, foul-smelling content. The second mass was 7x8 cm in size, with a hard consistency, and the cross-sectional surface was yellowish white. For histopathological examinations, it was fixed in 10% formaldehyde solution, followed by routine tissue follow-up procedure and paraffin blocking. Sections from paraffin tissues were taken at a thickness of 5µm in a microtome device and stained according to the hematoxylin-eosin staining method. In microscopic examination, proliferation of ductal epithelium and myoepithelial cells and cartilage and/or bone foci were present. The epithelium was lined with cells that were cuboidal to columnar and had a moderate amount of eosinophilic cytoplasm. Myoepithelial cells consisted of spindle, stellate and round cells and had abundant extracellular matrix (myxoid matrix). In addition, endochondral ossification of the cartilage formed by myoepithelial cells was observed and it was determined that this area was surrounded by connective tissue. As a result, it was determined that it was a benign mixed tumor.

**Keywords:** Bening mixed tumor, breast, canine

**BUĞDAY BİTKİSİNDE STRES TABANLI VE DNA METİLASYONU ÜZERİNE  
YAPILAN ÇALIŞMALARIN BİBLİYOMETRİK ANALİZİ**

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**ÖZET**

Buğday bitkisi, besin-enerji profili ve dünya genelindeki kullanımı, onu dünyanın en önemli tahıl ürünlerinden biri yapmaktadır. Dünya çapında değişen iklim şartlarıyla birlikte bitkilerde stres kaynaklı düşük verimler elde edilmektedir. Stres faktörleri, dünya genelinde bitki büyüme ve gelişimini etkileyen, ürün verimliliğini kısıtlayan sorunların başında gelmektedir. Bu nedenle bitki büyümesini teşvik edecek, bitki verim ve kalitesini arttıracak çeşitli çalışmalar yürütülmektedir. Bu çalışmada Web of Science (WoS) veri tabanı kullanılarak stres tabanlı yapılan çalışmaların bibliyometrik analizi Vosviwer programı aracılığıyla görselleştirilmesi amaçlanmıştır. WoS veri tabanından “Wheat and Stress” anahtar kelimeleriyle yapılan araştırma sonucunda 2002-2022 yılları arasında toplamda 21,974 adet döküman elde edilmiştir. “Wheat, Stress” anahtar kelimelerine “DNA methylation and CRED” anahtar kelimeleri eklendiğinde toplamda 6 adet çalışmanın yapıldığı belirlenmiştir. “Wheat” dışında sadece “DNA methylation ve CRED” kelimeleri ile yapılan aramada ise sadece 32 adet çalışma olduğu belirlenmiştir. 2002 yılından beri buğday bitkisinde yapılan DNA metilasyonu ve CRED çalışmaları toplamın yaklaşık %20’sini oluşturmaktadır. Ancak DNA metilasyon çalışmaları 2002 yılından beri buğday bitkisinde yapılan stres tabanlı çalışmaların yaklaşık %0.02’sini oluşturmaktadır. Sonuç olarak dünyada en çok üretilen tahıl ürünü olan buğday bitkisinde bu çalışmaların artırılması düşünülmektedir.

**Anahtar kelimeler:** Buğday, DNA metilasyon, CRED, Vosviwer,





**BIBLIOMETRIC ANALYSIS OF STRESS-BASED AND DNA METHYLATION STUDIES IN WHEAT PLANT****ABSTRACT**

The wheat plant, nutrient-energy profile, and worldwide use make it one of the world's most important cereal crops. With the changing climatic conditions around the world, low yields due to stress are obtained in plants. Stress factors are among the leading problems affecting plant growth and development and limiting crop productivity worldwide. For this reason, various studies are carried out to promote plant growth and increase plant yield and quality. This study aims to visualize the bibliometric analysis of stress-based studies using the Web of Science (WoS) database through the Vosviewer program. As a result of the research conducted with the keywords "Wheat and Stress" from the WoS database, 21,974 documents were obtained between 2002 and 2022. When the keywords "DNA methylation and CRED" were added to the keywords "Wheat, Stress," it was determined that a total of 6 studies were conducted. The search made with only the words "DNA methylation and CRED" other than "Wheat" determined that there were only 32 studies. DNA methylation and CRED studies carried out in wheat plants since 2002 constitute approximately 20% of the total. However, DNA methylation studies have comprised about 0.02% of the stress-based studies conducted on wheat plants since 2002. As a result, it is thought to increase these studies on the wheat plant, the most produced cereal product in the world.

**Keywords:** Wheat, DNA methylation, CRED, Vosviewer,

## **SÜRDÜRÜLEBİLİR TARIM VE ÇEVRE KİRLİLİĞİ**

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### **ÖZET**

Sürdürülebilir tarım kavramı doğal kaynakların korunması, çevreye zarar vermeyen tarımsal teknolojilerin kullanıldığı uzun dönem sürmesi planlanan bir tarımsal alt yapının oluşturulması ve geliştirilmesidir. Sürdürülebilir tarımın amaçları, bir yandan tarımda verimliliği korurken diğer yandan da çevreye verilen zararı azaltarak, kısa ve uzun dönemde ekonomiyi canlı tutmak, tarımla uğraşanların yaşam kalitesini yükseltmek, sürdürülebilir bir yaşam için geleceğe yönelik planlamalar yapmak ve bu planların özellikle insanların yaşam standartlarını iyileştirecek nitelikte olmasına katkı sağlamaktır. Sürdürülebilir bir tarım için doğal kaynakların korunması zorunludur. Aksi halde bilinçsizce yapılan uygulamalar sonucunda insanların gelecekte doğal kaynaklardan mahrum kalması kaçınılmaz olacaktır. Dünyada bilinçsizce yapılan bu uygulamalar sonucunda doğal kaynaklar hızla tükenirken, üretim ve tüketimden kaynaklı atıkların yeterli önlem alınmadan doğaya atılması çevre kirliliğinin oluşmasına da ortam sağlamaktadır. Doğal kaynakların bilinçsiz kullanılması çevre kirliliğinin en önemli nedenlerindedir. Bu nedenle öncelikle bu konudaki hedefler iyi belirlenmeli ve açıkça ortaya konulmalıdır. Çevrenin ve doğal kaynakların tahrip edilmeden kullanılması amacıyla özellikle tarımsal faaliyetlerde toprak işlemeden başlayarak, üretimin her aşamasının kontrol edildiği sürdürülebilir tarım uygulamaları yaygınlaştırılmalıdır. Bu derleme çalışmasında dünyada giderek artan çevre kirliliğinin sürdürülebilir tarım kapsamında incelenmesi amaçlanmıştır.

**Anahtar kelimeler:** Sürdürülebilir tarım, çevre kirliliği, doğal kaynaklar

**SUSTAINABLE AGRICULTURE AND ENVIRONMENTAL POLLUTION****ABSTRACT**

The concept of sustainable agriculture is the protection of natural resources, the creation and development of an agricultural infrastructure that is planned to last for a long time, in which agricultural technologies that do not harm the environment are used. The aims of sustainable agriculture are to keep the economy alive in the short and long term, to increase the quality of life of those engaged in agriculture, to make future plans for a sustainable life, and to contribute to the quality of these plans to improve the living standards of people, while maintaining productivity in agriculture on the one hand, and reducing the damage to the environment on the other. is to provide. Conservation of natural resources is essential for a sustainable agriculture. Otherwise, it will be inevitable for people to be deprived of natural resources in the future as a result of unconscious practices. As a result of these unconscious practices in the world, natural resources are rapidly depleted, while the wastes from production and consumption are thrown into the nature without adequate precautions, which also creates an environment for environmental pollution. The unconscious use of natural resources is one of the most important causes of environmental pollution. For this reason, first of all, the objectives on this subject should be well defined and clearly stated. In order to use the environment and natural resources without destruction, sustainable agricultural practices in which every stage of production is controlled, especially starting from tillage in agricultural activities, should be expanded. In this review study, it is aimed to examine the increasing environmental pollution in the world within the scope of sustainable agriculture.

**Keywords:** Sustainable agriculture, environmental pollution, natural resources

## **KAFA TRAVMALI BİR ÇOBAN KÖPEĞİNDE KRANIYOTOMİ OPERASYONU VE DEĞERLENDİRİLMESİ**

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### **ÖZET**

Kafa travmaları hem insan hem de hayvanlarda yüksek mortalite gösterir. Acil müdahale gerektiren bir durumdur. Hayvanlarda kafa travmaları genellikle motorlu taşıt kazaları, yüksekten düşme, ezilme, ateşli silah yaralanmaları ve diğer hayvanlardan gelen saldırılar sonucu meydana gelir. Travma sonrası ölüm genellikle intrakraniyal basınçtaki artıştan meydana gelir. Hastalarda bilincin kapalı olması, nistagmus, anizokori ve schiff sherrington gibi belirtiler kafa travmasını doğrulayan klinik bulgulardır. Beşeri hekimlikte teknolojinin ilerlemesiyle birlikte travmatik beyin hasarı tedavisi için temel tedavi yolları geliştirilse, veteriner hekimlikte uygun tedavi halen tartışma konusudur. Ayrıca, retrospektif veya prospektif klinik veri eksikliği nedeniyle veteriner hekimler deneysel araştırmalara, insan kafa travması çalışma sonuçlarına odaklanmış ya da kişisel deneyimleri sonucunda netice almışlardır. Şiddetli kafa travması olan evcil hayvanlarda, veteriner hekimin asıl amacı hastayı hayatta tutmak için uygun ve hızlı bir tedavi sürecine başvurmak ve travma öncesindeki normal yaşam fonksiyonlarını yeniden kazandırmaktır. İntrakraniyal basınç oluşturacak durumlar için yapılan müdahalelerden olumlu sonuçlar alınmaktadır. Dolayısıyla yapılan tedavi uygulamasına dair verilerin paylaşılması ve klinik veteriner hekimlerine doğru uygulamanın yaygınlaştırılması ve ölümleri azaltmada katkı sağlamaktadır. Bu çalışmada taşıt çarpması sonucu bilinci kapalı halde Hatay Mustafa Kemal Üniversitesi Veteriner Sağlık Uygulama ve Araştırma Merkezi Hastanesi'ne getirilen 2 aylık erkek çoban melezi bir köpekte kraniyotomi operasyonu ve sonrasında 7 günlük iyileşme sürecinin aktarılması hedeflenmiştir. Bu kapsamda parçalı kafatası kırığı belirlenen çoban köpeği melezi çalışmanın materyalini oluşturmuştur. İlk yardım ve acil müdahalesi uygulanan köpeğin kraniyotomi operasyonu sonrası 7 günlük verileri kayıt altına alınmıştır.

Bu çalışma kafa travması bulunan hayvanlarda intrakraniyal basınçtan kaynaklanan ölümleri azaltmaya katkı sağlayabilecek bilgi ve tecrübeler sunulmuştur.

**Anahtar Kelimeler:** Kafa Travması, İntrakraniyal Basınç, Kraniyotomi, Köpek

**CRANIOTOMY OPERATION AND EVALUATION IN A HEAD-INJURED SHEPHERD DOG****ABSTRACT**

Head injuries show high mortality in both humans and animals. It is a situation that requires emergency action. Head injuries in animals often occur as a result of motor vehicle accidents, falls, crushes, gunshot and attacks from other animals. Post-traumatic death usually results from an increase in intracranial pressure. Symptoms such as unconsciousness, nystagmus, anisocoria and schiff sherrington are clinical findings confirming head trauma. Although basic treatment methods have been developed for the treatment of traumatic brain injury with the advancement of technology in human medicine, appropriate treatment in veterinary medicine is still a matter of debate. In addition, due to the lack of retrospective or prospective clinical data, veterinarians focused on experimental research, human head trauma study results, or drew conclusions from personal experience. In domestic animals with severe head trauma, the main goal of the veterinarian is to resort to an appropriate and prompt treatment to keep the patient alive and to restore normal life functions before the trauma. Positive results are obtained from the interventions made in cases of intracranial pressure. Therefore, sharing the data on the treatment practice and spreading the right practice to clinical veterinarians contribute to reducing deaths. In this study, it was aimed to convey the craniotomy operation and the 7-day recovery period after a 2-month-old male shepherd crossbreed dog, who was brought to Hatay Mustafa Kemal University Veterinary Health Application and Research Center Hospital as a result of a vehicle crash. In this context, the shepherd dog crossbred with a fragmented skull fracture formed the material of the study. After the craniotomy operation, the 7-day data of the dog, which was given first aid and emergency action, were recorded. In this study, information and experiences that can contribute to reducing deaths from intracranial pressure in animals with head trauma are presented.

**Keywords:** Head Trauma, Intracranial Pressure, Craniotomy, Dog

**THE EFFECT OF CLONOSTACHYS ROSEA (SCH.) SCHROERS AND SAMUELS  
AGAINST VERTICILLIUM WILT (VERTICILLIUM DAHLIAE KLEB.) AND  
EARLY BLIGHT [ALTERNARIA SOLANI (ELL. AND G. MARTIN) SOR.]  
DISEASES IN TOMATO PLANTS**

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**ABSTRACT**

The effectiveness of *Clonostachys rosea* against Verticillium wilt (*Verticillium dahliae*) and early blight (*Alternaria solani*) diseases, as the two most important problems in tomato cultivation with significant economic losses, was determined. It was determined that *C. rosea* was effective on *A. solani* and *V. dahliae* and suppressed mycelial growth. Also, the *C. rosea* on wheat grains inoculated to plants at 20 g, 30 g, and 40 g concentrations before and after pathogens inoculation. Then, fungal discs (2 mm in diameter) from *V. dahliae* growing colonies were inoculated on the host plant root zone. *A. solani* was also inoculated ( $1 \times 10^6$  conidia ml<sup>-1</sup>) by spraying the foliar parts of the plants. Results showed that *V. dahliae* caused 76.0% disease severity in control plants, while the disease severity indices were 58.3%, 55.3%, and 25.3% at 20 g, 30 g, and 40 g *C. rosea* application, respectively. In *A. solani* x *C. rosea* treatments, the disease severities were determined as 96.6%, 63.3%, 43.6% and 46.6% in control, 20 g, 30 g, and 40 g application of *C. rosea*, respectively. The pathogen suppression rates by *C. rosea* at 30g application dose was 54.8% against *A. solani* and at 40 g application dose was 66.6% against *V. dahliae*. The effects of *C. rosea* on plant growth parameters were also determined. Results showed that *C. rosea* had a positive effect on the morphological parameters in tomato plants.

**Keywords:** *Alternaria solani*, Biological control, *Clonostachys rosea*, Tomato, *Verticillium dahliae*

**KIZILIRMAK NEHRİNDEKİ (TÜRKİYE) BALIK DOKULARINDA BAZI AĞIR  
METAL KONSANTRASYONLARININ BALIK BOYUTU İLE İLİŞKİSİ**

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**ÖZET**

Bu çalışma Ocak 2022 tarihinde yapılmış ve Kızılırmak Nehri'nde yaşayan *Barbus anatolicus*'un karaciğer, solungaç ve kas dokularında As, Mn, Co, Ni, Cu ve Cd gibi ağır metal konsantrasyonlarının belirlenmesi amaçlanmıştır. Metal analizleri ICP-MS/MS ile yapılmıştır. Cihazın doğruluğunu saptamak amacıyla DORM-2 standart referans materyalinden metal analizi yapılarak, elde edilen değerler Kanada Ulusal Konseyi tarafından verilen değerlerle kıyaslanmıştır. Analizi yapılan tüm metaller her dokuda tespit edilmiştir. Yapılan çalışmaya göre ortalama ağır metal değerleri göz önüne alındığında *B. anatolicus*'un dokularındaki metal birikimi sırasıyla karaciğer dokusunda  $Cu > Mn > Ni > As > Cd > Co$ , solungaç dokusunda  $Mn > Cu > Ni > As > Co > Cd$  ve kas dokusunda  $Ni > Cu > As > Mn > Cd > Co$  olarak belirlenmiştir. As, Ni ve Cd konsantrasyonları kas dokusunda, Cu konsantrasyonu karaciğerde, Mn konsantrasyonu ise solungaçlarda önemli farklılık göstermiştir ( $p < 0.05$ ). Dokular arasında sadece Co birikiminin istatistiksel açıdan önemli bir farklılık göstermediği tespit edilmiştir ( $p > 0.05$ ). Çalışmamızda ayrıca balık boy ve ağırlığı ile metal miktarları arasındaki ilişkiyi belirlemek amacıyla Pearson korelasyon testi uygulanmıştır. Dokuya ve metale bağlı olarak değişmek suretiyle genel olarak metal seviyesi ile balık boy ve ağırlığı arasındaki korelasyonların net ve tutarlı olmadığı saptanmıştır. Sonuçların bazıları Dünya Sağlık Örgütü, Gıda Tarım Örgütü ve Türk Gıda Kodeksi tarafından verilen limit değerlerin üstünde bulunmuştur. Bu çalışma, gelecekte tarımın gelişmesine bağlı olarak bu bölgede bir tehlikenin oluşabileceğini göstermektedir.

**Anahtar Kelimeler:** Ağır Metaller, Kızılırmak Nehri, *Barbus anatolicus*, Balık dokuları, Balık boyutu.



**RELATIONSHIP OF CONCENTRATIONS OF SOME HEAVY METALS WITH FISH SIZE IN TISSUES OF FISH FROM THE KIZILIRMAK RIVER (TURKEY)****ABSTRACT**

This study was carried out in January 2022 and it was aimed to determine the heavy metal concentrations such as As, Mn, Co, Ni, Cu and Cd in the liver, gill, and muscle tissues of *Barbus anatolicus* living in the Kızılırmak River. Metal analyzes were performed with ICP-MS/MS. In order to determine the accuracy of the device, metal analysis was performed by the DORM-2 standard reference material and the values were compared with the values given by the Canadian National Council. All analyzed metals were detected in each tissue. According to the study, when the average heavy metal values are taken into account, the metal accumulation in the tissues of *B. anatolicus* is Cu > Mn > Ni > As > Cd > Co in the liver tissue, Mn > Cu > Ni > As > Co > Cd in the gill tissue and Ni in the muscle tissue. > Cu > As > Mn > Cd > Co. As, Ni and Cd concentrations differed significantly in muscle tissue, Cu concentrations in liver and Mn concentrations in gills ( $p < 0.05$ ). It was determined that only Co accumulation in tissues did not show a statistically significant difference ( $p > 0.05$ ). In our study, Pearson correlation test was also applied to determine the relationship between fish height and weight and metal amounts. It was determined that the correlations between metal level and fish height and weight were not clear and consistent in general, depending on the texture and metal. Some of the results were above the limit values given by the World Health Organization, Food Agriculture Organization and Turkish Food Codex. This study shows that a danger may occur in this region depending on the development of agriculture in the future.

**Keywords:** Heavy metals, Kızılırmak River, *Barbus anatolicus*, Fish tissues, Fish size.

*B. anatolicus* is Cu > Mn > Ni > As > Cd > Co in the liver tissue, Mn > Cu > Ni > As > Co > Cd in the gill tissue and Ni > Cu > As > Mn > Cd > Co in the muscle tissue.

**FARKLI LOKASYONDA EKİM ORANLARINDA KARIŞIK OLARAK EKİLEN ADI FİĞ (*Vicia sativa* L.) VE İTALYAN ÇİMİNİN (*Lolium multiflorum* L.) OT VERİMİ ÜZERİNE ETKİSİ**

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**ÖZET**

İtalyan çimi, tek yıllık buğdaygildir ve yem bitkileri içerisinde verim oranı yüksektir ve aynı zamanda biçim sayısı da diğer buğdaygil yem bitkilerine oranla daha fazladır. Aynı mevsimde yetişen kışlık baklagil yem bitkileriyle karışım olarak ekildiğinde hayvan rasyonu için kaliteli ve verimli kuru ot alınabilmektedir. Bu araştırma, farklı lokasyonlarda Adi Fiğ (*Vicia sativa*) ve İtalyan çiminin (*Lolium multiflorum* Lam.) farklı karışım oranlarının yeşil ot verimi üzerindeki etkileri belirlemek amacıyla yürütülmüştür. Araştırma Ankara/Yenikent ve Manisa/Beydere lokasyonlarında, 2021-2022 yıllarında tesadüf blokları deneme desenine göre 3 tekrarlamalı olarak yürütülmüştür. Araştırmada, Aneto adi fiğ ve Trinova italyan çimi çeşitleri kullanılmıştır. Araştırmada; yalın Adi fiğ (AF), yalın İtalyan çimi (İÇ), %90 AF+%10 İÇ, %80 AF+%20 İÇ, %70 AF+%30 İÇ, %60 AF+%40 İÇ, %50 AF+%50 İÇ, %40 AF+%60 İÇ, %30 AF+%70 İÇ, %20 AF+%80 İÇ, %10 AF+%90 İÇ olacak şekilde 11 uygulama kullanılmıştır. Araştırma sonunda, en yüksek yeşil ot verimi 3324.4 kg/da verim değeri ile %90 AF %10 İÇ uygulaması ile Manisa/Beydere lokasyonundan elde edilmiştir. En düşük yeşil ot verimi ise 1290.0 kg/da verim değeri ile %90 AF %10 İÇ uygulaması ile Ankara/Yenikent lokasyonundan elde edilmiştir. En yüksek kuru ot verimi 650.47 kg/da değeri ile %90 AF %10 İÇ uygulaması ile Manisa/Beydere lokasyonundan elde edilmiştir. En düşük kuru ot verimi ise 265.90 kg/da verim değeri ile %80 AF %20 İÇ uygulaması ile Ankara/Yenikent lokasyonundan elde edilmiştir. Bu çalışmanın sonucunda karışım olarak ekilen baklagil ve buğdaygil yem bitkilerinin, karasal ve sahil bölgelerinde karışım olarak ekilmelerinin, verim bakımından yalın olarak ekilen hallerinden daha iyi oldukları. Hatta karışım olarak ekilen yem bitkilerinin yalın olarak ekilen baklagillerden yatmaya daha dayanıklı olduklarından verim ve kalite olarak daha avantajlı oldukları tespit edilmiştir.

**Anahtar kelimeler:** Adi fiğ, İtalyan çimi, Karışım, Verim

**THE EFFECT OF MIXED SOWING RATIOS IN DIFFERENT LOCATIONS OF  
COMMON VETCH (*Vicia sativa* L.) AND ITALIAN GRASS (*Lolium multiflorum* L.)  
PLANTED AS MIXED ON FORAGE YIELD**

**ABSTRACT**

Italian grass is an annual grassy and has a high yield among forage crops, and at the same time, the number of forms is higher than other grassy forage crops. When planted as a mixture with winter legume forage crops grown in the same season, high quality and productive hay can be obtained for animal ration. This research was carried out to determine the effects of different mixing ratios of Common Vetch (*Vicia sativa*) and Italian grass (*Lolium multiflorum* Lam.) on green forage yield in different locations. The research was carried out in Ankara/Yenikent and Manisa/Beydere locations, in the years 2021-2022, in a randomized block design with 3 replications. In the research, Aneto common vetch and Trinova Italian grass varieties were used. In the research; plain Common vetch (AF), lean Italian grass (IN), 90% AF+10% IC, 80% AF+20% IC, 70% AF+30% IC, 60% AF+40% IC, 50% AF+50% IC, % 11 treatments were used as 40 AF+60% IR, 30% AF+70% IR, 20% AF+80% IR, 10% AF+90% INT. At the end of the research, the highest green forage yield was obtained from Manisa/Beydere location with a yield value of 3324.4 kg/da with 90% AF 10% İÇ application. The lowest green forage yield was obtained from Ankara/Yenikent location with a yield value of 1290.0 kg/da and 90% AF 10% İÇ application. The highest hay yield was obtained from Manisa/Beydere location, with a value of 650.47 kg/da, with 90% AF 10% internal application. The lowest hay yield was obtained from Ankara/Yenikent location with a yield value of 265.90 kg/da with 80% AF 20% İÇ application. As a result of this study, it was found that the legume and wheat forage crops planted as a mixture were better sown in terms of yield than when planted as a mixture in terrestrial and coastal regions. In fact, it has been determined that forage plants planted as a mixture are more advantageous in terms of yield and quality since they are more resistant to lodging than legumes planted as plain.

**Keywords:** Common vetch, Italian grass, Mixture, Yield

**KATYON- ANYON FARKLILIĞININ RUMEN FERMANTASYONU VE  
YEMLERİN SİNDİRİMİNE ETKİLERİNİN İN VİTRO YÖNTEMLE (DAİSYII)  
TESPİTİ**

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**ÖZET**

Ruminant rasyonlarındaki inorganik elementlerin miktar ve oranlarının yanında rasyona kazandırdıkları iyonik yük de yani kation-anyon farklılığı durumu (KAD) da hayvan metabolizmasına etki etmektedir. Bu çalışma kation-anyon değişimlerinin yemlerin sindirimi ve rumen sıvısına etkilerini belirlemek amacıyla in vitro olarak DaisyII inkübatörü kullanılarak gerçekleştirilmiştir. Bu amaçla buğdaygil olarak arpa, baklagil olarak fiğ yoğun yemleri ve buğdaygil olarak arpa samanı, baklagil olarak fiğ samanı kaba yemleri kullanılmıştır. Rumen sıvısı ve yemlerin KAD değerlerini azaltmak için  $CaCl_2$  arttırmak için kaya tuzu kullanılmıştır. İki deneme halinde yürütülen çalışmada 1. denemede rumen sıvılarının, 2. denemede yem maddelerinin KAD değerleri değiştirilerek muamele grupları oluşturulmuştur. Her grup için rumen sıvısı ve yemlerin sindirim özelliklerine etkileri belirlenmiştir. Çalışma sonucunda  $CaCl_2$  gruplarında iki deneme içinde IVGS ve IVKMS değerleri en yüksek olmuştur ( $P<0.05$ ). Birinci denemede bütün sindirim değerleri için kontrol grubu değerleri en düşük olmuştur ( $P<0.05$ ). Sonuç olarak özellikle rumen sıvısındaki KAD değişimleri yemlerin sindirimini dolayısıyla rumende oluşan son ürünleri etkilediği anlaşılmıştır.

**Anahtar kelimeler:** DaisyII, İn vitro, Kation-anyon dengesi, Rumen

*Bu çalışma Yüzüncü Yıl Üniversitesi Bilimsel Araştırma Projeleri Başkanlığı tarafından FYL-2019-7639 nolu proje olarak desteklenmiştir.*

**DETERMINATION OF THE EFFECTS OF CATION-ANION DIFFERENCE ON  
RUMEN FERMENTATION AND FEED DIGESTION BY IN VITRO METHOD  
(DAISYII)****ABSTRACT**

In addition to the amount and ratio of inorganic elements in ruminant rations, the ionic load they add to the ration, that is, the cation-anion difference status (KAD), also affects animal metabolism. This study was carried out, as in vitro, using DaisyII incubator to determine the effects of cation-anion exchange on feed digestion and rumen fluid. For this purpose, barley, vetch and barley straw, vetch hay were used. CaCl<sub>2</sub> was used to decrease the CAD values of the rumen fluid and feed, and rock salt was used to increase the CAD values. In the study conducted in two trials, treatment groups were formed by changing the CAD values of rumen fluids in the first trial and feedstuffs in the second trial. The effects of rumen fluid and feeds on digestive properties were determined for each group. At the end of the study, IVTD and IVDMD values were highest in CaCl<sub>2</sub> groups (P<0.05). In the first experiment, the control group values were the lowest for all digestion values (P<0.05). As a result, it was found that especially the changes in CAD in rumen fluid affect the digestion of feeds and the final products formed in rumen.

**Keywords:** Cation-anion, DaisyII, In vitro, Rumen

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**SİNİR OTU (*PLANTAGO LANCEOLATA*) EKSTRAKTININ ARPA, FIĞ VE ASPİR DANE YEMLERİNİN İN VİTRO GERÇEK KURU MADDE, ORGANİK MADDE SİNDİRİLEBİLİRLİĞİ VE RUMEN SIVISINA ETKİLERİ**

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**ÖZET**

Sinir otu (*Plantago lanceolata*) meralarımızda da yaygın olarak bulunan, içerdiği biyoaktif maddelerden dolayı alternatif tıbbi tedavide de kullanılan, içerdiği sekonder metabolitlerle ilgili bilimsel çalışmaların yürütüldüğü bir bitkidir. Bu nedenle sinir otu ekstraktının yapay rumen ortamında rumen sıvısı fermentasyonu ve yemlerin sindirimine etkisini belirlemek bu tezin amacını oluşturmuştur. DaisyII inkübatöründe in vitro olarak gerçekleştirilen bu çalışmada mezbanede kesilen 3 adet erkek sığırın rumen sıvıları kullanılmıştır. İnkübatörde 4 kavanozda bulunan rumen sıvılarına, 0mg/l, 50mg/l, 100mg/l, 150 dozlarında sinir otu ekstraktı eklenmiştir. Her doz için ayrılan bir kavanoza arpa, fiğ ve aspir dane yemlerinden 7'şer kese olmak üzere 21 ve 3 kese de şahit olarak 24 kese inkübe edilmiştir. 24 saatlik inkübasyon öncesi ve sonrası rumen sıvılarında pH, amonyak, asetik asit, propiyonik asit, ve bütirik asit ölçümleri, yemlerin besin madde analizi yapılarak in vitro gerçek, kuru madde, organik madde ve nötral deterjan fiber sindirimleri belirlenmiştir. Rumen sıvısına eklenen sinir otu ekstraktı dozları arttıkça ölçülen amonyak, asetik asit, propiyonik asit ve bütirik asit miktarları da kontrol grubuna göre önemli derecede artırmıştır ( $P<0.05$ ). İnkübe edilen yemlerin nötral deterjan fiber sindirimleri haricindeki sindirim değerleri sinir otu ekstraktı dozu arttıkça yükselmiştir ( $P<0.05$ ). Elde edilen bulgular ve kaynak bilgileri değerlendirildiğinde sinir otu ekstraktının rumen mikroorganizmalarının aktivitelerini, dolayısıyla yemlerin sindirimi üzerine artırıcı etkisi olduğu kanaatine varılmıştır. Sinir otunun yapısında bulunan sekonder komponentlerin, biyolojik olarak aktif maddelerin belirlenmesi, bunların hangilerinin ekstraktlara geçtiği ve rumende etkin olduğunun belirlenmesine yönelik çalışmaların yapılması gerekmektedir.

**Anahtar kelimeler:** DaisyII, In vitro, Rumen fermentasyonu, Sinir otu (*Plantago L.*).

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**THE EFFECTS OF PLANTAIN (*PLANTAGO LANCEOLATA*) EXTRACT ON THE TRUE DRY MATTER AND ORGANIC MATTER DIGESTIBILITY OF BARLEY, VETCH, SAFFLOWER SEEDS, AND RUMEN FLUID IN VIVO**

**ABSTRACT**

Plantain (*Plantago lanceolata*) is a plant commonly found in our pastures and used in alternative medicine due to the bioactive compounds it contains, and scientific studies are being carried out on its secondary metabolites. Therefore, the aim of this study was to determine the effect of Plantain extract on rumen fluid fermentation and digestion of feeds in an artificial rumen environment. A DaisyII incubator containing bovine rumen fluid was used for this study. Plantain extracts were added to 4 jars of rumen fluid at concentrations of 0, 50, 100, and 150 mg/l. A total of 24 bags were incubated in each incubation jar; 7 bags each for barley, vetch, and safflower; and 3 bags each for the validator. In order to determine the in vitro true, dry matter, organic matter and neutral detergent fiber digestibility of the feeds, nutrient analyses of the feeds before and after incubation, pH, ammonia and volatile fatty acids analyses in rumen fluids were performed. The amount of ammonia and volatile fatty acids measured with the plantain extract added to the rumen fluid increased significantly compared to the control group. Digestion values of barley, vetch, and safflower also increased, except for neutral detergent fiber values. The findings revealed that plantain extract improved the activities of rumen microorganisms and thus the digestion of feed. It was concluded that in vitro and in vivo studies should be conducted to determine the bioactive components in the structure of plantain and their activities in rumen.

**Keywords:** *Plantago lanceolata*, Rumen fermentation, Digestion, DaisyII

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**AKUT BÖBREK YETMEZLİĞİ TEŞHİSİ KONULAN KEDİLERDE BAZI  
HEMATOLOJİK VE BİYOKİMYASAL DEĞİŞİKLİKLERİN ARAŞTIRILMASI**

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**ÖZET**

Kedilerde akut böbrek hasarı (AKI)'nin belirlenmesi, mevcut teşhis yaklaşımlarının sınırlamaları ve subklinik hasarla sonuçlanan birçok böbrek hasarı nedeniyle karmaşıktır. Bu çalışma kedilerde AKI teşhisinde hematolojik ve biyokimyasal verileri sunmayı amaçlamaktadır. Çalışmaya 2-5 yaşlı hasta ve sağlıklı farklı ırklardan (Scottish Fold, Sarman/Tekir, British Shorthair ve Melez) toplamda 14 erkek kediler dahil edildi (n=7/grup). Klinik olarak AKI teşhisi konulan hasta kedilerde letarji, kusma, ishal, ağızda amonyak benzeri koku, iştahsızlık, poliüri ve polidipsi görüldü. Kedilerden tekniğine uygun olarak kanül yardımı ile vena cephalica antebrahii'den kan alındı ve hematolojik ve biyokimyasal analizler gerçekleştirildi. Hematolojik analizlerde WBC, nötrofil sayısı, lenfosit sayısı, monosit sayısı, eozinofil sayısı, nötrofil/lenfosit oranı (NLR), monosit/lenfosit oranı (MLR), RBC, Hgb, Hct, MCV, MCHC, platelet (PLT) ve platelet/lenfosit oranı (PLR) parametreleri değerlendirilmeye alındı. Biyokimyasal analizlerde kan üre nitrojeni (BUN), kreatinin, BUN/kreatinin oranı, fosfor (P) ve kalsiyum (Ca) parametreleri ölçüldü. Hasta grubu kedilerde sağlıklara göre RBC, Hgb ve Hct değerleri istatistiksel olarak düşüktü (P<0.05). Hasta kedilerde WBC, nötrofil, monosit ve MLR değerleri sağlıklı kedilere göre yüksekti (P<0.05). Hasta kedilerde BUN, Kreatinin ve P sağlıklı kedilere göre yüksekti (P<0.05). Bu bulgular kedilerde AKI'nin teşhisine katkı sağlayan öncül hematolojik ve biyokimyasal bulgular olabilir. Daha geniş katılımlı ileriki çalışmalara ihtiyaç vardır.

**Anahtar kelimeler:** AKI, kedi, hematoloji, biyokimya, klinik



**INVESTIGATION OF SOME HEMATOLOGICAL AND BIOCHEMICAL  
CHANGES IN CATS DIAGNOSED WITH ACUTE RENAL FAILURE****ABSTRACT**

Identifying acute kidney injury (AKI) in cats is complex due to the limitations of current diagnostic approaches and the many kidney injuries that result in subclinical damage. The aim of this study is to present hematological and biochemical data for the diagnosis of acute kidney injury (AKI) in cats. A total of 14 male cats (n=7/group) of 2-5 years old sick and healthy different breeds (Scottish Fold, Sarman/Tabby, British Shorthair and mixed breeds) were included in the study. Lethargy, vomiting, diarrhea, ammonia-like odor in the mouth, anorexia, polyuria, and polydipsia were observed in cats with clinical diagnosis of AKI. Blood was collected from the cephalic vein antibrachii of the cats using a cannula, and hematological and biochemical analyzes were performed. The parameters of WBC, neutrophil count, lymphocyte count, monocyte count, eosinophil count, neutrophil/lymphocyte ratio (NLR), monocyte/lymphocyte ratio (MLR), RBC, Hgb, Hct, MCV, MCHC, platelets (PLT), and platelets/lymphocyte ratio (PLR) in hematological analyzes were evaluated. Biochemical analyzes measured blood urea nitrogen (BUN), creatinine, BUN /creatinine ratio, phosphate (P), and calcium (Ca). RBC, Hgb, and Hct levels were statistically lower in cats in the sick group compared with the healthy group ( $P<0.05$ ). WBC, neutrophil, monocyte, and MLR values were higher in sick cats than in healthy cats ( $P<0.05$ ). BUN, creatinine and P levels were higher in sick cats than in healthy cats ( $P<0.05$ ). These results may be hematologic and biochemical findings that contribute to the diagnosis of AKI in cats. Further studies with larger participation are needed.

**Keywords:** AKI, cat, hematology, biochemistry, clinic

**‘KUMA OLMA’NIN CAZİBESİNE KAPILMAK: DOĞRU BİLİNEREN YANLIŞLAR**

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**ÖZET**

Türkiye’de geleneksel yaşamın önemli ölçüde çözülmesi ve modern yaşamın hızla yaygınlaşmasının bir sonucu olarak bireyci/bireysel temelde öne çıkan özgürlükçü anlayış, günlük hayatın tutum, davranış, ilişki ve etkileşimlerini yeniden gözden geçirmeyi gerektiren anlamlar barındırmaktadır. Geleneksel yaşamın anlam kodlarını modern dünyanın öngördüğü yaşam pratikleriyle ilişkilendirerek yeni ve farklı anlam arayışlarını denemek ve bunları yaşam tarzı haline getirmek esasen gereklidir, ancak önemli riskler de içermektedir. Örneğin erkeğin birden fazla kadınla aynı anda evli olmasını meşru gören geleneksel yaşam tarzına karşılık, cinsiyetler arası eşitliği ve dolayısıyla tekeşli olmayı zorunlu gören modern hayat arasında kalan, ne sadece birinde karar kılabilen, ne de diğerinden vazgeçebilen toplumlarda önemli ölçüde sorunlar ortaya çıkabilmektedir. Modern hayatın rahatlık öngören konforuna ulaşmayı düşünen ve aynı zamanda geleneksel yaşam tarzının ilişkilerinden uzak kalmak isteyen genç kızlar, kimi zaman tercihlerini geleneksel yaşamın bir formu olan kuma evliliklerinden yana vermektedirler. Genellikle evli erkeklerin verdikleri söz ve vaatlerden başka tutunacak bir dal bulamayan kızlar, kuma olarak evlendiklerinde ilk eşlerden daha avantajlı oldukları bazı yönleri öne çıkararak erkeğin çokeşli evliliğini olumlu bir şekilde yansıtmaktadırlar. İlk eşlerin kocaları tarafından bir kenara atılmasıyla, erkeklerin tüm ilgilerini ve ekonomik kaynaklarını yeni eşe (kumaya) harcamaya yönelmeleri, kuma evliliği yapan kadınların dışa dönük mutlu bir tablo çizmelerine etki etmektedir. Daha çok kısa süreli olan ve önemli sorunları hasıraltı eden kuma evliliğine dair bu cazibeli görünüm, sosyal çevrenin de baskısıyla evlilik planları yapan genç kızlarda soru işaretlerine neden oluşturmaktadır ve kuma evliliği, öngördükleri bir evlilik alternatifini haline gelebilmektedir. Öyle ki toplumda ‘evli erkeğin birinci karısı olarak gitmekten ve üzerine kuma gelip bir tarafa atılmaktansa, kuma olarak gidip kocanın gözdesi olmak daha iyidir’ şeklinde değerlendirmeler dahi yapılmaktadır. Bu çalışma, kuma evliliklerinin avantajlı olduğuna dair dışa dönük yüzünün, evlenme döneminde ve çabasında olan genç kızlarda oluşturduğu etkilerin yanında kuma evliliklerinin, olumsuzluklarını da içeren, genel bir değerlendirilmesi yapılmaktadır. Eğitim seviyesinin düşüklüğü ve ekonomik kaynakların azlığıyla doğrudan, toplumsal ve kültürel yapı dolaylı yünden ilişkili olan kuma’lık uygulaması, alan araştırmasıyla elde edilen veriler ve literatürden edinilen bulgular ışığında tartışılmaktadır.

**Anahtar Kelimeler:** Kuma, Çokeşlilik, Polijini, Evlilik.

**BE ATTRACTED OF 'BEING A SECOND WIFE': RIGHT KNOWN MISTAKES****ABSTRACT**

As a result of the disintegration of traditional life and the rapid spread of modern life in Turkey, the libertarian understanding that stands out on an individualist/individual basis has meanings that require reconsidering the attitudes, behaviors, relationships and interactions of daily life. It is essential to try new and different meaning quests by associating the meaning codes of traditional life with the life practices envisaged by the modern world and to turn them into a lifestyle, but it also includes significant risks. For example, in societies that are between the traditional lifestyle that sees it as legitimate for a man to be married to more than one woman at the same time, and the modern life that sees equality between the sexes and therefore monogamy, and that can neither decide on only one nor give up the other, significant problems may arise. Young girls who want to reach the comfort of modern life and at the same time want to stay away from the relations of the traditional lifestyle, sometimes prefer marriage to the second wife, which is a form of traditional life. Generally, the girls, who cannot find a branch to hold on to other than the promises and promises made by married men, reflect the polygamous marriage of the man in a positive way by highlighting some aspects that they are more advantageous than the first spouses when they get married as a second wife. The fact that the first wives are cast aside by their husbands, and that men tend to spend all their attention and economic resources on the new wife (kuma), affects the outwardly happy picture of the women who are married to second wife. These attractive appearances of marriage in second wife, which are mostly short-term and hide important problems, cause question marks in young girls who make marriage plans under the pressure of the social environment, and marriage to second wife can become a marriage alternative they envision. So much so that there are even evaluations in the society that 'it is better to go to the second wife and be the husband's favorite, rather than going as the first wife of a married man and being thrown aside. In this study, a general evaluation is made, including the negative effects of the outward-looking face of the advantage of co-marriages on young girls who are trying to get married, as well as the negative effects of co-marriages. The practice of second wife, which is directly related to the low level of education and the scarcity of economic resources, and indirectly to the social and cultural structure, is discussed in the light of the data obtained from the field research and the findings obtained from the literature.

**Keywords:** Second Wife, Polygamy, Polygyny, Marriage.

**DENEYSSEL EPİLEPSİ ARAŞTIRMALARINA YÖNELİK STATUS EPİLEPTİKUS  
HAYVAN MODELLERİNİN KARŞILAŞTIRILMASI**

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**ÖZET**

Epilepsi popülasyonun yaklaşık %1'ini etkileyen nörolojik bir hastalıktır. Günümüzde yaklaşık 20'den fazla antiepileptik ilaç olmasına rağmen epileptik nöbetlerin yaklaşık %30'luk bölümü mevcut ilaçlar ile kontrol altına alınamamaktadır. Epileptik nöbetler ile ilgili en ağır tablolardan bir tanesi status epileptikustur. Bu durum araştırmacıları status epileptikusun tedavisine yönelik deneysel çalışmalar yapmaya yönlendirmektedir. Araştırmalarda kullanılan status epileptikus hayvan modelleri, tek bir status epileptikus atağının kronik epilepsiye geçişini incelemek için kullanılmaktadır. Ayrıca nöronal hasar ve duyarlılık mekanizmaları, sinaptik reorganizasyon, hipokampal skleroz, nöbet, gen ekspresyonunda ve nörojenezde değişiklikler ve yeni antikonvülsan ilaçların geliştirilmesi çalışmalarında da status epileptikus modellerinden faydalanılmaktadır. İdeal hayvan modeli, insandaki status epileptikusa benzer bir patofizyolojiyi yansıtmalıdır. İnsanda görülen status epileptikus birçok etiolojik neden ve nöbet fenotipini kapsayan karmaşık bir nörolojik bozukluk olduğundan herhangi bir hayvan modelinin, status epileptikusa ilişkin özelliklerin tüm spektrumunu sergilemesi pek olası değildir. Bu nedenle, test bileşiklerinin bir dizi hayvan modelinde ve ayrıca refrakter status epileptikus paradigmasında taranması gereklidir. Kemirgenlerde epilepsinin birçok formu, kimyasal, elektriksel veya genetik olarak indüklenen nöbetlerle modellenilebilir. İdeal bir status epileptikus modeli için istenen bazı özellikler vardır: Uygun nöbet fenotipini sergilemelidir. İnsandaki status epileptikusun nöropatolojik özellikleriyle uyumlu olmalıdır. İlk ataktan sonra uygun latent süreye sahip olmalıdır. Status epileptikus sonrası kronik aşırı uyarılabilirlik ve nöronal plastisite göstermelidir. Latent dönemden sonra spontan nöbetler olmalıdır. İlaç tedavisine yanıt vermeli ve belirli antikonvülzanlara direnç göstermelidir. Yeni bileşiklerin hızlı taranmasına izin vermelidir. Status epileptikusun çok sayıda hayvan modeli arasında, status epileptikusun elektriksel stimülasyon modelleri (Perforan yol stimülasyonunu, Kendi kendini sürdüren stimülasyon modeli), farmakolojik modeller (Kainik asit, Pilokarpin, Lityum-pilokarpin, Organofosfatlar, Flurotil, Kobalt-homosistein tiyolaktan tarafından indüklenen modeller), termal modeller (Hipertermi veya Ateşli nöbetler) ve refrakter modeller (Diizopropil florofosfat) bulunmaktadır. Bu kadar farklı hayvan modeli arasından model mekanizmalarını, olumlu ve kısıtlı yönlerini değerlendirerek tercihte bulunmak yapılacak araştırmanın sonuçlarını doğrudan etkileyecektir. Bildiride araştırmalara yönelik en doğru hayvan modelinin seçimi için bu modellerin özellikleri karşılaştırmalı olarak değerlendirilecek ve önerilerde bulunulacaktır.

**Anahtar kelimeler:** Epilepsi, deneysel status epileptikus, status epileptikus hayvan modeli

## **COMPARISON OF STATUS EPILEPTICUS ANIMAL MODELS FOR EXPERIMENTAL EPILEPSY STUDIES**

### **ABSTRACT**

Epilepsy is a neurological disease that affects approximately 1% of the population. Although there are more than 20 antiepileptic drugs available today, approximately 30% of epileptic seizures cannot be controlled with current drugs. Status epilepticus is one of the most severe manifestations of epileptic seizures. This situation leads researchers to conduct experimental studies on the treatment of status epilepticus. Animal models of status epilepticus used in research are used to examine the transition of a single episode of status epilepticus to chronic epilepsy. In addition, status epilepticus models are also used in studies of neuronal damage and sensitivity mechanisms, synaptic reorganization, hippocampal sclerosis, seizures, changes in gene expression and neurogenesis, and the development of new anticonvulsant drugs. The ideal animal model should reflect a pathophysiology similar to human status epilepticus. Because human status epilepticus is a complex neurological disorder encompassing many etiologic causes and seizure phenotypes, it is unlikely that any animal model will exhibit the full spectrum of status epilepticus features. Therefore, it is necessary to screen test compounds in a number of animal models as well as refractory status epilepticus paradigms. Many forms of epilepsy in rodents can be modeled by chemically, electrically, or genetically induced seizures. There are some desirable features for an ideal status epilepticus model: It should exhibit the appropriate seizure phenotype. It should be compatible with the neuropathological features of human status epilepticus. It should have an appropriate latent period after the first attack. It should show chronic hyperexcitability and neuronal plasticity after status epilepticus. Spontaneous seizures should occur after the latent period. It must respond to drug therapy and resist certain anticonvulsants. It should allow rapid screening of new compounds. Numerous animal models of status epilepticus include electrical stimulation models of status epilepticus (Perforating pathway stimulation, Self-sustaining stimulation model), pharmacological models (Kainic acid, Pilocarpine, Lithium-pilocarpine, Organophosphates, Flurotyl, Cobalt-homocysteine thiolactone-induced models), thermal models (Hyperthermia or Febrile seizures) and refractory models (Diisopropyl fluorophosphate). Choosing among so many different animal models by evaluating the model mechanisms' positive and limited aspects will directly affect the results of the research to be conducted. In this paper, the characteristics of these models will be evaluated comparatively and recommendations will be made for the selection of the most accurate animal model for studies.

**Keywords:** Epilepsy, experimental status epilepticus, animal model of status epilepticus

## SON DÖNEM ARAP BELÂGATİ KİTAPLARINDA KİNAYE TANIMLARI VE TASNİFLERİ

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### ÖZET

Arap belâgatinde mecaz teşbih ve istiareyle birlikte beyan ilminin dört ana konusundan biri olan ve sözlükte *bir şeyden söz edip başka bir şeyi kastetmek* anlamına gelen kinaye, terim olarak; *bir sözü hakiki manasına gelecek şekilde anlamı dışında kullanmak* demektir. Klasik dönemden beri çeşitli tanımları yapıp farklı açılardan değerlendirmeye tabi tutulan kinayenin günümüz Arap belâgati kitaplarında benzer şekilde tanımları ve tasnifleri yapılmıştır. Örneğin 20. yüzyıl belâgat müelliflerinden Ahmed Mustafa el-Merâğî *‘Ulûmü’l-belâğa* kitabında kinayeyi; *“Lafzın kendisi için vazedildiği manada kullanılıp o mananın bizatihi kastedilmemesi ve örfî bir gereklilikten dolayı farklı bir anlamı kendi içinde barındırması”* şeklinde tanımlamıştır. Merâğî, kinayeyi meknâ bih yönüyle sıfat, mevsuf ve nispet olarak üç kısımda; vasıtalar yönüyle ta’rîz, telvîh, remz ve îmâ olarak dört kısımda, hüsün ve kubuh olarak iki kısımda değerlendirmiştir. Muhammed Ahmed Kâsim - Muhyiddîn Dîb ise *‘Ulûmü’l-belâğa: el-Bedî’ ve’l-beyân ve’l-me’ânî’* adlı eserlerinde klasik dönem müelliflerin tanımlarından örnekler vermiş ve kinayeyi; sıfat, mevsuf ve nisbet olarak üç kısma ayırmıştır. Ayrıca Kâsim - Dîb, sıfattan kinayeyi kendi içinde karîbe ve ba’îde olarak iki alt başlıkta ele almış, vasıtalar yönüyle kinayeyi Merâğî gibi dört kısma ayırmalarına rağmen diğer taksime değinmemiştir. Bu dönemin Arap belâgati müelliflerinden Ahmed el-Hâşimî (ö. 1943), Muhammed b. Sâlih el-‘Useymîn (ö. 2001) ve Ali Bulut ise belâgat kitaplarında Kâsim - Dîb gibi tasnif yapmışlardır. Diğer belâgat müellifleri Alî el-Cârim (ö. 1949) - Mustafa Emîn, Abdülaziz Atîk (ö. 1976), Hasen Habenneke el-Meydânî (ö. 2004) ve Fadl Hasan Abbâs (ö. 2011) eserlerinde kinâyeyi sadece sıfat, mevsuf ve nisbet yönüyle üç kısma ayırmalarına karşın Mustafâ es-Sâvî el-Cüveynî (ö. 1988) sadece kinayeyi anlatmakla yetinmiştir. Bu çalışmadaki amaç, modern dönem Arap belâgati kitaplarında kinaye ile ilgili çeşitli tanımları ve tasnifleri birbiriyle karşılaştırmak ve farklı metodolojik yaklaşımları tespit etmektir.

**Anahtar Kelimeler:** Arap Belâgati, Belâgat, Belâgat Kitapları, Kinaye, Kısım.



**THE DEFINITIONS AND CLASSIFICATIONS OF KINĀYA IN THE RECENT  
ARABIC RHETORIC BOOKS****ABSTRACT**

In Arabic rhetoric, kināya, which is one of the four main subjects of the science of *al-bayān* together with majāz, tasbīh and isti'āra, and which means to *mention one thing and mean another* in the dictionary, as a term; It means to *use a word out of its meaning in a way that means its true meaning*. The kināya, which has been variously defined and evaluated from different perspectives since the classical period, has been similarly defined and classified in today's Arabic rhetoric books. For example, Aḥmad Muṣṭafā al-Marāghī, one of the 20th century rhetoric writers, used the allusion in his book '*Ulūm al-balāgha*'; He defined it as "*the word is used in the meaning that exists for it, but that meaning is not meant, and it contains a different meaning in itself due to a customary necessity*". Marāghī is divided kināya into three parts as al-ṣifa, al-mawsūf and al-nisba in terms of *maknā bih*; In terms of *wasāit*, he evaluated it in four parts as ta'rīḍ, telwīḥ, ramz, īmā', and in two parts as ḥusn and qubḥ. Muḥammad Aḥmad Qāsim and Muḥyiddīn Dīb, on the other hand, gave examples from the definitions of the authors of the classical period in their book called '*Ulūm al-balāgha: al-badī' al-bayān, al-ma'ānī*' and divided the kināya into three parts as al-ṣifa, al-mawsūf and al-nisba. In addition, Qāsim and Dīb divided the kināya from the al-ṣifa into two as qarība and ba'īda, and although they divided the kināya into four parts like Marāghī in terms of means, they did not mention the other division. Aḥmad al-Hāshimī (d. 1943), one of the Arab rhetoric writers of this period, Muḥammad b. Ṣāliḥ al-'Uthaymīn (d. 2001) and Ali Bulut made classifications like Qāsim and Dīb in their rhetoric books. Other rhetoric writers, Alī al-Jārim (d. 1949) and Muṣṭafā Emīn, Abdul'azīz Atīq (d. 1976), Ḥasan Ḥabannaka al-Maydānī (d. 2004) and Faḍl Ḥasan 'Abbās (d. 2011) divided kināya only as al-ṣifa, al-mawsūf and al-nisba. Although they divided it into three parts, Muṣṭafā al-Ṣāwī al-Juwaynī (d. 1988) was content with only telling the kināya. The aim of this study is to compare various definitions and classifications of kināya in modern Arabic rhetoric books and to identify different methodological approaches.

**Keywords:** Arabic Rhetoric, Rhetoric Theory, Rhetoric Books, Kināya, Classification.



**GÜNEYDOĞU ANADOLU BÖLGESİNDE ATOPIK DERMATİT TANISI ALAN  
ÇOCUKLARIN KLİNİK VE EPİDEMİYOLOJİK ÖZELLİKLERİ**

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**ÖZET**

Bu çalışmanın amacı Güneydoğu Anadolu bölgesinde atopik dermatit tanısı alan çocukların değerlendirilmesidir. Çalışma Adıyaman'ın Kahta ilçesinde farklı okullarda, en düşük yaşı 13 en yüksek yaşı 14 olan 162 çocuğa yüz yüze anket yapılarak düzenlenmiştir. Çalışmada son 1 yılda döküntüsü olan hastalar, döküntü sıklıkları, ilk atopik tanı aldıkları yaş ve döküntünün şiddeti incelenmiştir. İstatistiksel analiz: Veriler SPSS 20 paket programında değerlendirilmiştir. Nitel özellikte olan veriler sayı ve yüzde (%) olarak sunulmuştur. Kategorik verilerin analizinde Chi-Square ve Fisher's exact testleri yapılmıştır. İstatistiksel önemlilik için p değerinin <math>0.05</math> olması anlamlı kabul edilmiştir. Bu çalışmada Babasında egzema bulunan çocuklarda egzema görülme oranı, babasında egzema olmayanlara göre anlamlı düzeyde yüksektir ( $p=0,005$ ). Çalışmamızda atopik dermatiti olan hastaların genellikle ailelerinde de benzer şikayetler olduğu, diğer alerjik hastalıklarla birlikteliğinin sık olduğu görülmüştür. Sonuç olarak eğer ailede alerjik hastalık öyküsü varsa aileler atopik dermatit açısından yakından takip edilmeli ve çocuklara gerekli destekler verilmelidir.

**Anahtar kelimeler:** Atopik dermatit, egzama, alerjik hastalıklar.

**CLINICAL AND EPIDEMIOLOGICAL FEATURES OF CHILDREN DIAGNOSED WITH ATOPIC DERMATITIS IN SOUTHEASTERN ANATOLIA REGION****ABSTRACT**

The aim of this study is to evaluate the children diagnosed with atopic dermatitis in the Southeastern Anatolia region. The study was conducted by conducting face-to-face questionnaires on 162 children, whose minimum age is 13 and the highest age is 14, in different schools in the Kahta district of Adiyaman. In the study, patients who had a rash in the last 1 year, the frequency of the rash, the age at which they were first diagnosed as atopic, and the severity of the rash were examined. Statistical analysis: Data were evaluated in SPSS 20 package program. Qualitative data are presented as numbers and percentages (%). Chi-Square and Fisher's exact tests were used in the analysis of categorical data. For statistical significance, a p value of <0.05 was considered significant. In this study, the incidence of eczema in children whose fathers had eczema was significantly higher than those whose fathers did not have eczema (p=0.005). In our study, it was observed that patients with atopic dermatitis generally had similar complaints in their families, and its association with other allergic diseases was common. In conclusion, if there is a family history of allergic disease, families should be followed closely in terms of atopic dermatitis and necessary support should be given to children.

**Keywords:** Atopic dermatitis, eczema, allergic diseases.

## **HPV(HUMAN PAPİLLOMA VİRÜSÜ) AŞILARI**

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## **ÖZET**

**Amaç:** HPV virüsü ve HPV aşılı hakkında literatüre dayalı güncel bilgileri sunmaktır. **Giriş:** Human papilloma virüs (HPV) Papillomaviridae ailesinde yer alan, sadece insanları enfekte eden ve cinsel yolla bulaşan bir DNA virüsüdür.Serviks, vajina, vulva, penis, testis, anogenital bölge ve baş boyun bölgelerinde kansere ve siğillere neden olabilir. HPV enfeksiyonu servikal kanser gelişimi için en önemli neden olup,dünyada her iki dakikada bir kadının ölümüne neden olan kadınlarda meme kanserinden sonra en sık görülen ikinci kanser türüdür. HPV ye karşı geliştirilmiş etkin aşılı mevcuttur. Bunlar şu an için kullanımda olan ikili (bivalent), dörtlü (quadrivalent) ve dokuzlu (nonavalent) HPV aşılı mevcuttur. **Yöntem:** Araştırma literatüre dayalı bir derleme çalışmasıdır. **Sonuç:** HPV ile ilişkili hastalıklar önemli bir halk sağlığı problemi olarak görülmektedir ve serviks kanseri HPV ilişkili kanserlerin çoğunluğunu oluşturmaktadır. Hastalıkla mücadelede HPV aşılı çok önemlidir. Etkenin tiplerine karşı geliştirilmiş etkin ve güvenli aşılı mevcuttur. DSÖ tarafından önerilmesine ve birçok ülkede ulusal aşılılama programına dâhil edilmesine rağmen Türkiye’de HPV aşılı ücretsiz olarak sunulmamaktadır. Bu durum kişilerin sağlık hakkından etkin bir şekilde yararlanamamalarına sebep olmaktadır. Ayrıca Türkiye’de yüksek meblağlar ödenmek kaydıyla temin edilebilen HPV aşılı sosyal hizmetin özünde yer alan sosyal adalet ilkesini sekteye uğratmaktadır. Aşının tercih edilmesinin önündeki engeller ise temel halk sağlığı stratejileri ile ortadan kaldırılmalıdır. HPV aşılı aşı programına alınmalı ya da aşılılanmak isteyen bireylerin desteklenmesinin önemli olduğu düşünülmektedir.

**Anahtar kelimeler:** HPV, HPV Aşılı,Serviks Kanseri,Halk Sağlığı

**HPV (HUMAN PAPILLOMA VIRUS) VACCINES****ABSTRACT**

**Objective:** In this study, HPV (human papilloma virus) vaccines were evaluated through literature review.intended to examine. **Introduction:** Human papillomavirus (HPV) is a DNA virus in the Papillomaviridae family that infects only humans and is sexually transmitted. It can cause cancer and warts in the cervix, vagina, vulva, penis, testis, anogenital region and head and neck regions. HPV infection is the most important reason for the development of cervical cancer and it is the second most common cancer type after breast cancer in women, which causes the death of a woman every two minutes in the world. Most of the cervical cancers (99.7%) are related to HPV and in 70% of the patients HPV infection It develops due to -16 and HPV-18. There are effective vaccines developed against HPV. WHO has been recommending the HPV vaccine since 2009. The HPV vaccine has been developed against some types of HPV. These vaccines have been reported to play an important role in the reduction of HPV-related diseases as well as being effective. Currently, there are dual (bivalent), quadrivalent and nine (nonavalent) HPV vaccines in use. HPV types endemic in Turkey; Considering 16, 51, 31, 52, 56, 39, 58 45, 33 and 18, it has been reported that the need for Nonavalent HPV vaccine for our country will be understood more clearly. **Method:** In this study, national and international original studies, field-specific books and guides were used in obtaining the evidence and creating the theoretical infrastructure of the compilation. Google Academy, PubMed, National Thesis Center, Dergipark, Medline were scanned. No time limit was applied during the literature review. **Conclusion:** HPV-related diseases are seen as an important public health problem and since cervical cancer constitutes the majority of HPV-related cancers, HPV vaccine immunization should be the main point. There are effective and safe vaccines developed against the types of the agent. Although recommended by WHO and included in the national vaccination program in many countries, HPV vaccine is not offered free of charge in Turkey. This situation causes people to not be able to benefit from the right to health effectively. In addition, the HPV vaccine, which can be obtained by paying high amounts in Turkey, disrupts the principle of social justice, which is at the core of social work. Barriers to vaccine preference should be eliminated with basic public health strategies. HPV vaccines should be included in the vaccination program or individuals who want to be vaccinated should be supported.

**Keywords:** HPV,HPV Vaccine,Cervical Cancer,Public Health

**LİSE ÖĞRENCİLERİNİN İNTERNET BAĞIMLILIĞI VE PROSOSYAL  
BECERİLERİ ARASINDAKİ İLİŞKİNİN İNCELENMESİ**

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**ÖZET**

Bu çalışma; lise öğrencilerinin internet bağımlılığı ve prososyal becerileri arasındaki ilişkinin incelenmesi amacıyla yapılmıştır. Çalışma grubunu; Ankara ilinde eğitimine devam eden 300 lise öğrencisi oluşturmuştur. Araştırmada veri toplama aracı olarak araştırmacılar tarafından hazırlanan ‘Genel Bilgi Formu’ Taş (2019) tarafından geliştirilmiş ‘Ergenler İçin İnternet Bağımlılığı Ölçeği’ ve Ata ve Artan (2021) tarafından geliştirilmiş ‘Ergen Prososyallik Ölçeği’ kullanılmıştır. İstatistik aşamasında öncelikle verilerin normal dağılım gösterip göstermediği incelenmiş ve normal dağılım elde edilememesinden dolayı, ikili gruplar arasındaki karşılaştırmalarda Mann-Whitney U testi, üç veya daha fazla gruplar arasındaki karşılaştırmalarda Kruskal Wallis H Testi, değişkenler arası ilişkilerde ise Spearman korelasyon testi analizi kullanılmıştır. Araştırma sonucunda; Ergenler İçin İnternet Bağımlılığı Ölçeği’nden alınan puanlarda cinsiyet değişkeni açısından anlamlı bir farklılık bulunmazken; ‘Ergen Prososyallik Ölçeği’ dışsal prososyal alt boyutunda farkın kız öğrenciler lehine anlamlı olduğu bulgusuna ulaşılmıştır. Anne eğitim durumu değişkeni açısından her iki ölçekten alınan puanlarda anlamlı bir farklılığa rastlanmazken; baba eğitim durumu değişkeni açısından Ergenler İçin İnternet Bağımlılığı Ölçeği’nden alınan puanlarda anlamlı farklılıklar saptanmıştır. Ergenler İçin İnternet Bağımlılığı Ölçeği’ ve ‘Ergen Prososyallik Ölçeği’ toplam puanları arasındaki ilişkinin negatif yönde ve anlamlı olduğu sonucu elde edilmiştir. Araştırmadan elde edilen bulgular doğrultusunda; ergenlik döneminde internet bağımlılığın önlenmesi ve olumlu davranış içeren prososyal becerilerin artırılması için birtakım derslerin müfredata eklenmesi, seminer, konferans, panel gibi çalışmaların lise bünyesinde artırılması önerilebilir.

**Anahtar Kelimeler:** İnternet bağımlılığı, prososyallik, ergenlik.

**EXAMINATION OF THE RELATIONSHIP BETWEEN HIGH SCHOOL STUDENTS' INTERNET ADDICTION AND PROSOCIAL SKILLS****ABSTRACT**

This study was carried out in order to analyze the relationship between high school students' internet addiction and prosocial skills. The study group consisted of 300 high school students whose attend in Ankara. General Information Form” prepared by the researchers, Internet Addiction Scale for Adolescents developed by Taş (2019), Adolescent Prosociality Scale developed by Ata and Artan (2021) were used as data collection tools in the study. At the statistical stage, it was first examined whether the data showed normal distribution or not. Due to the inability to obtain a normal distribution, the Mann-Whitney U test was used for comparisons between paired groups and the Kruskal Wallis H Test for comparisons between three or more groups. Spearman correlation test analysis was used for the relations between variables. As a result of the research; while there was no significant difference in the scores obtained from the Internet Addiction Scale for Adolescents in terms of gender; it was found that the difference in the external prosocial sub-dimension of the “Adolescent Prosociality Scale” was significant in favor of female students. While no significant difference was found in the scores obtained from both scales in terms of the mother's educational status variable; significant differences were found in the scores obtained from the Internet Addiction Scale for Adolescents in terms of the father's educational status variable. It was concluded that the relationship between the total scores of the "Internet Addiction Scale for Adolescents" and the "Adolescent Prosociality Scale" was negative and significant. In line with the findings obtained from the research; in order to prevent internet addiction in adolescence and to increase prosocial skills including positive behavior, it can be suggested that some courses be added to the curriculum, and studies such as seminars, conferences and panels should be increased within the high school.

**Key Words:** Internet addiction, prosociality, adolescence.

**IN SILICO EVALUATION OF THE ANTIMALARIAL POTENTIAL OF THE  
PHYTOCONSTITUENTS OF THE AZADIRACHTA INDICA PLANT****Ekundayo T. AREH***Department of Chemistry, Confluence University of Science and Technology, P.M.B. 1040, Osara,  
Kogi State, Nigeria***Olubunmi ATOLANI***Department of Chemistry, University of Ilorin, P.M.B. 1515, Ilorin, Nigeria***Learnmore KAMBIZI***Department of Horticulture, Cape Peninsula University of Technology, South Africa***ABSTRACT**

**Background and objectives:** Malaria, a parasitic protozoan disease caused primarily by Plasmodium falciparum, has killed millions of people in Africa, particularly those with meager or no access to orthodox medical facilities and therapies. Extracts from the Azadirachta indica (neem) plant is believed to possess antimalarial properties among the locals that rely on herbs. Numerous in - vivo studies have suggested the antimalarial properties of neem extract and phytochemicals. This study employs an in - silico method through molecular docking techniques to provide insight while adding credence to the antimalarial potential of phytochemicals of neem plants as claimed in folkloric medicine. **Methods:** The crystal structure of P. falciparum, a causative parasite of malaria, was retrieved from the Protein Data Bank, and Azadirachta indica phytochemicals were obtained from the PubChem database. Molecular docking through virtual screening was carried out on the characterized phytochemicals. The bioactive compounds from the Azadirachta indica plant were investigated by docking with the crystal structure of the P. falciparum receptor and compared with standard antimalarial drugs (lumefantrine and artemisinin). **Results:** Three Azadirachta indica phytochemicals (gedunnin, nimbinene and salanin) shows a competing binding energy and affinity when compared to the approved antimalarial drugs (lumefantrine and artemisinin). While the binding affinities for azadirachtin, nimbandiol and quercetin is lower than the affinity in artemisinin but comparable with lumefantrine. **Conclusion:** This virtual screening verified and identified a potential phytochemical component of antimalarial properties against a protein target: 1m7o, P. falciparum triosephosphate isomerase (PfTIM).

**Keywords:** In silico, Azadirachta indica, Plasmodium falciparum, Phytochemical, 3-Phosphoglycerate (3 PG).

**ASSESSING THE TOXICITY OF SERTRALINE HYDROCHLORIDE, AN  
ANTIPSYCHOTIC DRUG, ON *CHLORELLA VULGARIS***

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**ABSTRACT**

Sertraline hydrochloride (Ser-HCl), a commonly used antidepressant, enters the environment through metabolic waste and incorrect disposal; nevertheless, it is undetermined how Ser-HCl impacts freshwater microbiota. The current research looks into the impact of Ser on the microstructure of green algae. Ser-HCl treatment significantly reduced the proliferation of the green alga *C. vulgaris*, lowering chlorophyll content and nutrient uptake. Because of its widespread use and manufacture, Ser-HCl is likely to remain an environmental pollutant. The current study illustrates how Ser-HCl may provide an ecological concern to biota. These results indicate that the harmful consequences of these biologically active contaminants on freshwater environments should indeed be given more emphasis.

**Keywords:** Sertraline hydrochloride; Ecotoxicity; antidepressant; *C. vulgaris*



**CLIMATE CHANGE: A MAJOR DRIVER IN ZONOTIC DISEASE EXPANSION**

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**ABSTRACT**

The past few decades has evidenced the flooding out of the emergence of infectious diseases with a cornucopia of impacts globally. It should be noted that lion part of the emerging human pathogens are zoonotic in nature. The predisposing factors leading to the emergence and spread of zoonotic diseases are geared by pathogen, host and vector or ecological determinants and in many cases a combination of all. The reservoir and vector dynamics are very much influenced by climate change which opens new avenues of ecological niches for vectors thereby altering temporal and spatial distribution of diseases. The nexus between climate change, anthropogenic and natural factors in the emergence of zoonotic diseases like West Nile fever, Chikungunya fever and Lyme disease are well established. In the case of vector-borne diseases, such as Dengue or Malaria, climate change is contributing in expanding its geographical range. As a result of global warming, infectious diseases which are confined to warmer latitudes are slowly and steadily expanding their range with scattered outbreaks to even epidemics. Moreover, climate change has accelerated the stepwise process of pathogen spillover from wild/domestic animals to humans. Outbreaks of human diseases like leptospirosis are often associated with increases in rodent population after heavy rainfall or floods. The emergence of Hantavirus is another example where climatic change is influencing population dynamics of the rodent reservoir. To conclude, climate change is an ecological exigence, but its repercussions for human disease caused by zoonotic infectious agents remains understudied. Thus the paper divulges into the impact of climate change on zoonotic diseases emergence with crippling public health and economic impacts.

**Keywords:** Climate Change, Zoonotic Diseases, Global Warming, Disease Emergence

**YETİŞTİRME SİSTEMLERİ VE YETİŞTİRME ORTAMININ KURAK MEVSİM VE  
BREZİLYA İSPANAK BÜYÜMESİ SIRASINDA MİKRO İKLİM ÜZERİNDEKİ  
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**ÖZET**

Brezilya ıspanağı (*Alternanthera sissoo*), yüksek vitaminler, diyet lifi ve antioksidanlar içeren çok yapraklı bir sebzedir. Sınırlı araziye ve dalgalı iklime sahip tropik kentlerde yetiştirilecek Brezilya ıspanak potansiyeli. Bu çalışma, kurak mevsim ve Brezilya ıspanak büyümesi sırasında mikro iklim üzerinde en iyi yetiştirme sistemini ve yetiştirme ortamının etkisini belirlemeyi amaçlamaktadır. Çalışma, ana arsa olarak yetiştirme sistemleri ve alt arsa olarak yetiştirme ortamı ile bölünmüş bir arsa deneysel tasarımı kullandı. Sonuçlar, yüzen kültür (FC) sisteminin SPAD değerlerini, gölgelik alanını (CA), yaprağın kuru ağırlığını (DWL), kuru dal ağırlığını (DWB) ve gövdenin kuru ağırlığını (DWS) teşvik ederek Brezilya ıspanak büyümesini arttırdığını göstermiştir. ). Yüzen kültür (FC) sistemi, diğer yetiştirme işlemlerinden daha yüksek pazarlanabilir verimin kanıtlandığı gibi daha iyi verim sağlayabilir. Yüzen kültür (FC) sistemi ayrıca toprak nemi (SM) ve gölgelik sıcaklığı (CT) yoluyla daha iyi büyüme için daha iyi mikro çevresel koşullar yaratır. Öte yandan, yetiştirme ortamına dayalı olarak ince kum + pirinç kabuğu biyokömürü (%12.5 + %12.5 v) vejetatif büyüme ve yetiştirme ortamı durumu için, önemli ölçüde farklı olmasa bile, diğer işlemlerden daha iyi bir eğilim göstermiştir. Muamele yetiştirme ortamı ince kum + pirinç kabuğu biyokömürü (% 12.5 + %12.5 v) toprakta suyu tutabildi, ancak gölgelik sıcaklığı görsel olarak ne yetiştirme sistemine ne de yetiştirme ortamı muamelelerine göre tanınmadı. Bu arada, hava ve toprak sıcaklığının katkısı, gölgelik sıcaklığında doğrusal olarak etkili olmuştur ( $R^2 = 0.9042$ ). Yaprak Brezilya ıspanağının morfolojik tanımlaması yaprak genişliği (LW) belirleyicisi, doğrusal sıfır kesişim regresyonu ( $R^2 = 0.9502$ ) yoluyla yaprak alanının belirlenmesinde etkili olmuştur. Yaprak genişliği tahmincisi, ortalama spesifik yaprak alanının belirlenmesinde de doğrusal olarak etkiliydi ( $R^2 = 0.9935$ ). Bu nedenle, yüzen kültür sistemi ve ince kum + pirinç kabuğu biyokömürü (%12.5 + %12.5 v) en iyi uygulamalardı ve yaprak genişliği, Brezilya ıspanağının yaprak alanı tahmincisi olabilir.

**Anahtar Kelimeler:** besleyici yapraklı sebzeler, tahribatsız tahmin, kentsel çevre uygunluğu, büyüme analizi, uyarlanabilir yetiştirme.

**CULTIVATION SYSTEMS AND GROWING MEDIA EFFECT ON  
MICROCLIMATE DURING DRY SEASON AND BRAZILIAN SPINACH GROWTH****ABSTRACT**

Brazilian spinach (*Alternanthera sissoo*) is a leafy vegetable perennial with high vitamins, dietary fiber, and antioxidants. Brazilian spinach potential to be cultivated in tropical urban that have limited land and fluctuating climate. This study aims to determine the best cultivation system and growing media effect on microclimate during dry season and Brazilian spinach growth. The study used a split-plot experimental design with cultivation systems as the main plot and growing media as the subplot. The results showed that the floating culture (FC) system increased Brazilian spinach growth by promoting the SPAD values, canopy area (CA), dry weight of leaf (DWL), dry weight of branch (DWB), and dry weight of stem (DWS). The floating culture (FC) system could maintain better yields as evidenced by the marketable yield was higher than other cultivation treatments. Floating culture (FC) system also creates better microenvironmental conditions for growing better through soil moisture (SM) and canopy temperature (CT). On other hand, based on growing media fine sand + rice-husk biochar (12.5% + 12.5% v) showed a better trend for vegetative growth and growing media condition than other treatments, even not significantly different. Treatment growing media fine sand + rice-husk biochar (12.5% + 12.5% v) was able to retain water in the soil, although visually the canopy temperature could not be recognized either based cultivation system or growing media treatments. Meanwhile, the contribution of air and soil temperature was linearly influential in canopy temperature ( $R^2 = 0.9042$ ). The morphological of leaf Brazilian spinach describe leaf width (LW) predictor was influential to determining leaf area through linear zero intercept regression ( $R^2 = 0.9502$ ). The leaf width predictor was also linearly influential to determining the average specific leaf area ( $R^2 = 0.9935$ ). Therefore, floating culture system and fine sand + rice-husk biochar (12.5% + 12.5% v) were best treatments and leaf width could be a leaf area predictor of Brazilian spinach.

**Keywords:** nutritional leafy vegetable, non-destructive estimation, urban environmental suitability, growth analysis, adaptable cultivation.

**A REVIEW OF THE MOST IMPORTANT THEORIES RELATED TO EMBRYONIC  
IMPLANTATION AND PLACENTAL IMMUNITY IN FARM ANIMALS****Omar MARDENLI**

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**ABSTRACT**

Many opinions and theories have been put forward about how the dam's body accepts the fetus that is different in the genetic structure, an antigenic foreign body and a stimulant for the dam's immune system. The first theory was based on the fact that the fetus is considered immature from an immunological point of view. Therefore, the maternal immune system remains dormant. The second theory explains the decline in the activity of the dam's immune system due to the embryonic secretory activity of gonadotropins, estrogen and corticosteroids, which the dam's body deals with as foreign bodies that interact with maternal antibodies during pregnancy. As a result, the dam's immune system becomes stressed and ineffective. Supporters of the third theory assume that the placenta acts as an immunological barrier that protects the fetus from antibodies. Thus, the placenta is the primary target for immune reactions (the interaction between antigens and antibodies). The aforementioned theories remain insufficient to explain these phenomena. The reason is that the occurrence of the complete contact between the fetal membranes and the endometrium is not necessary, as a large part of the fetal membranes are naked and exposed to the *in vivo* environment. It was also found that maternal cells or embryonic cells are interchangeable and have the ability to survive in the host, whether the dam or the fetus, without secreting antibodies. The fourth theory was widely welcomed and became an alternative theory to the previous ones. According to the theory, the cells of the trophoblast act as an immune barrier that protects the fetus by secreting hormones (HCG, PMSG) and proteins that pass into the dam's blood stream and inhibiting T-Type cells responsible for tracking foreign bodies. Moreover, the cells of the trophoblast carry on their surfaces antigens that receive the antibodies, where an equilibration takes place and the fetus remains healthy and safe.

**Keywords:** embryonic implantation, placental immunity, farm animal.

**FARMERS' INFORMATION NEEDS ON HERBICIDE USAGE IN ENUGU STATE, NIGERIA****Okoro, John C***Department of Agricultural Extension, University of Nigeria, Nsukka***Unuchi Maryann***Department of Agricultural Extension, University of Nigeria, Nsukka***Agaba Juliet***Department of Agricultural Extension, University of Nigeria, Nsukka***Ezema Chizoba***Department of Agricultural Extension, University of Nigeria, Nsukka***Enemuo Judith***Department of Agricultural Extension, University of Nigeria, Nsukka***Onah, S.O<sup>2</sup>.***Department of Psychology, University of Nigeria, Nsukka***ABSTRACT**

The study assessed herbicide information needs of rural farmers in Enugu State, Nigeria. Structured interview schedule was used to obtain information from 200 rural farmers. Data collected were analyzed using frequency counts, percentage, mean score and factor analysis. The major crops grown by the farmers were maize (89.0%), cocoa yam (77.0%) and yam (73.0%). The farmers' herbicide practices were not of international best standard as only 53.5% read users' manual, 66.0% wear nose mask during spraying, and 76.5% checked expiry date of herbicide before use. On the farmers' knowledge level on herbicide usage, the majority (91.5%) had moderate knowledge while only 8.5% has high knowledge on herbicide usage. The farmers' major source of information on herbicide usage were from friends (71.0%), neighbours (69.0%) and input suppliers (65.5%). Farmers perceived constraints to assessing information on herbicide usage were categorized into financial constraints, communication constraints and ignorance constraints. Their perceived areas of information needs were on herbicide hygiene, personal protective measures, herbicide specification and herbicide poisoning respectively. The study concluded that farmer herbicide knowledge and practices were poor basically because their major sources of information on herbicide usage were not scientific based as they were mostly from non institutional sources. Therefore farmers should seek scientific based information for informed decision making on herbicide usage.

**Key words:** Herbicide usage, information needs, rural farmers

**CHEMICAL CHARACTERIZATION, AND ANTIOXIDANT ACTIVITY OF  
BIOACTIVE MEDICINAL PLANT EXTRACTS**

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**ABSTRACT**

Natural extracts have been proposed as preservatives to increase the safety of various food products. In this work, the phytochemical and antioxidant profiles of *Mentha* extracts were studied. The antioxidant activity of the different extracts of this plant was evaluated by three spectrophotometric methods; DPPH, FRAP and TAC. The contents of polyphenols, flavonoids, flavones and flavonols were determined. The evaluation of the antioxidant activity of these same extracts by different tests shows that they have an important antioxidant power.

**Mots clés :** *Mentha, antioxidant activity, polyphenols, flavonoids, flavones and flavonols*

**PREVALENCE OF FASCIOSIS IN COWS IN THE CENTER OF RUSSIA****Igor Gennadievich Glamazdin***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***Ilya Nikolaevich Medvedev***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***Ilnura Ibragimovna Fayzullina***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***Natalya Yuryevna Sysoeva***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***Marina Mikhailovna Goryacheva***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***Galina Mikhailovna Kryukovskaya***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***Tatyana Olegovna Maryushina***Department of Veterinary Medicine, Moscow State University of Food Production, 125080, Moscow, Russia***ABSTRACT**

A major task of modern animal husbandry is to increase the productivity of the dairy herd. It is possible to solve it, including under the condition of a decrease in the prevalence of the level of parasites among cows of the dairy herd. Currently, fascioliasis is very common in cows. The difficulty of identifying this parasite is due to the fact that fascioliasis in cattle is very often asymptomatic. However, at the same time, it contributes to a significant decrease in the level of productivity of infected cows. For this reason, the widespread detection of this parasite in the bulk of cows is very relevant. Previous studies have shown that the frequency of occurrence of this parasite is very high, and with its prevalence up to 25%, the milk productivity of a dairy herd changes little. The completed study was conducted in October 2021. The level of antibodies to fasciolas *Fasciola hepatica* (ODRf) and *Ostertagia ostertagi* (ODRo) in milk collected from cows in the Moscow region of Russia was assessed. The relationship between the content of these antibodies and the level of productivity of dairy cows of these herds was revealed. The determination of the level of antibodies was carried out by multivariate linear regression models. Their connection with the level of protein in milk, % of milk fat and the time between calving in cows was traced. The increase in ODRf from the 25% quantile (0.412) to the 75% quantile (0.976) was associated with a decrease in the average milk yield per year by 0.8 kg ( $p=0.002$ ), with a decrease in milk fat content by 0.07% ( $p<0.001$ ), with an increase in the value of time intervals between departments by 4.6 days ( $p=0.04$ ). It was noted that there was no relationship between the level of antibodies and the amount of protein in milk. The relationship between ODRf and ODRo levels turned out to be complementary rather than synergistic in the case of simultaneous infection with helminths.

**Key words:** cows, milk productivity, parasites, *Fasciola hepatica*, *Ostertagia ostertagi*, antibodies, milk

## **İSLAM MEŞŞAİ DÜŞÜNCE GELENEĞİNDE İNSANIN YETKİNLİĞİNİ GERÇEKLEŞTİRMESİNDE ADALET ERDEMİNİN ROLÜ**

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### **ÖZET**

İslam'ın Altın Çağı olarak bilinen 8. ve 13. yüzyıllar arası dönemde Müslüman düşünürler sosyal ve beşeri ilimler alanında sayısız eserler vererek özgün fikirler ortaya koymuşlardır. İslam dini ve kültürü çerçevesinde bilhassa insanın yaşamdaki amacının ne olduğunu sormuşlar, onun akıl sahibi bir varlık olmasından yola çıkarak insanı amacı bakımından diğer varlıklardan ayıran ve kendisine özgü olan bir yaşayış biçimi ortaya atmışlardır. Farabi, İbn Sina ve İbn Miskeveyh gibi Meşşai filozoflar insanın dünyaya gelişinin nihai amacını mutluluğa ulaşmak olarak tayin etmiş, bunun yolunun da onun kendini gerçekleştirmesinden geçtiğini bildirmişlerdir. İnsanın kendini gerçekleştirme ve yetkinliğine ulaşabilmesi için kendisine bahşedilen ve onu diğer yaratılmışlardan ayıran düşünme ve eyleme gücünü amacına uygun olarak kullanabilmesi elzemdir. Tüm bunları göz önünde bulundurmak suretiyle ilk olarak İslam filozoflarının ekseriyetinin nefsin güçleri olarak tasvir ettiği düşünme, arzu ve öfke gücünü kontrol altına almak gerekmektedir. Nitekim bu üç güce karşılık gelen hikmet, iffet ve şecaat erdemleri nefste bir ahenk meydana getirdiğinde adalet erdemi ortaya çıkmaktadır. Dolayısıyla adalet erdemi, insanın kendi yetkinliğini gerçekleştirmesinde kilit rol oynamaktadır. Zira aklını kullanarak yaşamının yegane amacına, bir diğer ifade ile mutluluğa ulaşmak için kendi yetkinliğini gerçekleştirmek isteyen insan, tüm bu erdemleri kendinde toplamalı ve davranışlarıyla dışarıya yansıtmalıdır. Bu da nefsin üç erdeminin uyumlu bir bütünlük oluşturmasıyla ortaya çıkan adalet erdeminin zaruri olduğunu gözler önüne sermektedir. Yetkin insan, düşünme ve eyleme gücünü kullanmanın yanı sıra nefsin üç gücüne tekabül eden erdemleri kendinde uyumlu bir bütün oluşturmasını sağlayarak adalet erdemine ulaşır. Adalet erdemi başlı başlıca bir yetkinlik olmakla birlikte insanın gücü ölçüsünde sahip olabileceği en yüksek iyi, en değerli mertebedir. Bu çalışmamızda adalet erdeminin Meşşai düşünürler tarafından insanın yetkinliğine ulaşması çerçevesinde nasıl ele alındığını araştıracağız. Yetkin insanın mutluluğa ulaşma yolunda düşünme ve eyleme gücünü ortaya koyarken kendini keşfedip potansiyelini açığa çıkarmasında adalet erdeminin üstlendiği rolü ortaya koyacağız.

**Anahtar Kelimeler:** Yetkinlik, Adalet, Erdem, Mutluluk



## **THE ROLE OF THE VIRTUE OF JUSTICE IN REALIZING HUMAN'S COMPETENCIES IN THE TRADITION OF ISLAMIC MESHAI THOUGHT**

### **ABSTRACT**

In the period between the 8th and 13th centuries, known as the Golden Age of Islam, Muslim thinkers put forward original ideas by giving countless works in the field of social and human sciences. Within the framework of Islamic religion and culture, they especially asked what the purpose of man is in life, and they put forward a way of life that distinguishes man from other beings in terms of its purpose and is unique to man, based on his being a rational being. Peripatetic philosophers such as Farabi, Ibn Sina and Ibn Miskeveyh have determined the ultimate goal of man's coming into the world as reaching happiness, and they have stated that the way to achieve this is through self-realization of man. Man's self-realization and attainment of his competence depend on the ability to properly use the power of thought and action, which is bestowed upon him and distinguishes him from other creatures. Considering all these, first of all, it is necessary to control the power of thinking, desire and anger, which most of the Islamic philosophers describe as the powers of the nafs. As a matter of fact, the virtue of justice emerges when the virtues of wisdom, chastity and courage, which correspond to these three powers, create a harmony in the soul. Therefore, the virtue of justice plays a key role in the realization of one's own competence. Because a person who wants to realize his own competence in order to realize his purpose in life, in other words, to reach happiness by using his mind, should collect all these virtues in himself and reflect them to the outside with his behaviors. This reveals that the virtue of justice, which emerges when the three virtues of the soul form a harmonious whole, is essential. In addition to using the power of thinking and acting, a competent person achieves the virtue of justice by ensuring that the virtues corresponding to the three powers of the soul form a harmonious whole. Although the virtue of justice is a major competence, it is the highest good and the most valuable rank that a person can have in proportion to his power. In this study, we will discuss how the virtue of justice is revealed by Peripatetic thinkers within the framework of reaching human competence. We will reveal the role of the virtue of justice in self-discovery and revealing the potential of a competent person while realizing the power of thinking and acting on the way to happiness.

**Keywords:** Competence, Justice, Virtue, Happiness

**ATATÜRK BARAJ GÖLÜ SET- TÜNEL BÖLGESİ COPEPODA ÇEŞİTLİLİĞİ,  
YENİ TÜRLER VE AYLIK İLE MEVSİMSEL DÖNGÜ**

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**ÖZET**

Zooplankton çeşitlerinden Copepoda faunasının varlık kompozisyonu yıl içerisinde değişim göstermektedir. Copepoda faunasının kompozisyonu, mevsimsel değişimi aylık periyotlarla ve üç aylık periyotlar halinde 12 ay boyunca incelenmiştir. Çalışmanın örnekleme aşaması için konum olarak Şanlıurfa – Adıyaman il sınırları içinde yer alan Atatürk baraj gölünün Set- Tünel girişi bölgesinden 4 istasyon belirlenmiştir. Bu çalışmada Copepoda filumlarından 2 taksona ait 3 türün varlığı ortaya konmuştur. Bu türler; Calanoid copepod Cyclopoid copepod ve Nauplius olarak belirlenmiştir. Teşhis edilen bu türler Atatürk Baraj Gölü için ilk kayıttır.

**ATATÜRK DAM LAKE SET- TUNNEL REGION COPEPODA DIVERSITY, NEW SPECIESSES, SEASONAL AND MONTHLY CYCLE****ABSTRACT**

The asset composition of Copepoda fauna, one of the zooplankton varieties, changes throughout the year. The composition and seasonal variation of the Copepoda fauna were studied in monthly and quarterly periods for 12 months. For the sampling phase of the study, 4 stations were determined from the Set-Tunnel entrance area of the Atatürk dam lake located within the provincial borders of Şanlıurfa - Adıyaman. In this study, the existence of 3 species belonging to 2 taxon from Copepoda phylum was revealed. These species are; Calanoid copepod has been designated as Cyclopoid copepod and Nauplius. These identified species are the first record for Atatürk Dam Lake.

**DİVAN SAHİBİ ŞEYHÜLİSLAM ŞAİRLERDE GELENEK VE TASAVVUF  
ÇERÇEVESİNDE ŞARAP VE SEVGİLİ**

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**ÖZET**

Divan şiirinde aşk ve şarap kavramları kadın olsun, padişah olsun, çoban olsun Osmanlı toplumunda her kesimden şairler için her zaman en önemli malzemeler olmuştur. Şarap ve sevgili kavramları en yüksek dinî ve ilmî otoriteyi temsil eden şeyhülislam şairler tarafından da kendilerine özgü bir anlayışla ve divan şiir geleneği de göz önünde bulundurularak çeşitli imgelerle aktarılmıştır. Osmanlının ciddi kurumlarından biri olan şeyhüislamlık makamında oturan bazı şeyhülislamların usta divan şairleri gibi şiir yazmaları dikkate değer bir konudur. En zarif söyleyişlerle sevgili ve şarap kavramlarına şiirlerinde yer veren şeyhülislam şairler, derin tasavvufî manaları da içerek şekilde imgeler oluşturarak gelenek çerçevesinde kendilerini ifade etmeyi amaçlamışlardır. Bu çalışmayla; şairlik yetenekleri pek bilinmeyen, beşeri olarak algılanabilecek bir aşkı ve sevgiliyi öven; meyden, meyhaneden söz eden, duygularını açık veya örtük bir şekilde şiirle ifade etmekten, yanlış anlaşılmaktan korkmayan divan sahibi şeyhülislam şairlerin divanlarından seçilen kimi beyitlerinin divan şiir geleneği bağlamında irdelenip divan şiir geleneği ile tasavvufî anlayışın şeyhülislamlar üzerindeki etkisini ortaya koyma amaçlanmaktadır.

**Anahtar Kelimeler:** Divan şiiri, tasavvuf, şeyhülislam, şarap, sevgili,

**WINE AND BELOVED IN THE FRAMEWORK OF TRADITION AND SUFFIC AT  
THE DIVAN OWNER SEYHULISLAMIC POETS****ABSTRACT**

In Divan poetry, the concepts of love and wine have always been the most important materials for poets from all walks of life in Ottoman society, whether they are women, sultans or shepherds. The concepts of wine and lover were conveyed by the shaykh al-Islam poets, who represent the highest religious and scientific authority, with a unique understanding and with various images taking into account the divan poetry tradition. It is noteworthy that some of the sheikhulislams who sat in the office of şeyhülislam, one of the serious institutions of the Ottoman Empire, wrote poems like master divan poets. The shaykh al-Islam poets, who included the concepts of lover and wine in their poems with the most elegant expressions, aimed to express themselves within the framework of tradition by creating images in a way that included deep Sufi meanings. With this study; who praises a love and lover whose poetic talents are not well known, which can be perceived as human; It is aimed to examine some of the couplets selected from the divans of the divan owner şeyhülislam poets who talk about meyden and meyhane, who are not afraid of expressing their feelings openly or implicitly with poetry and being misunderstood, in the context of divan poetry tradition and to reveal the effect of divan poetry tradition and Sufi understanding on shaykh al-Islams.

**Keywords:** Divan poetry, mysticism, sheikh al-Islam, wine, beloved.

## TÜRKİYE'DE ERKEN EMEKLİLİK SORUNU ÜZERİNE BAZI DÜŞÜNCELER

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### ÖZET

Bu çalışmanın amacı yeni bir erken emeklilik tartışması başlatmak değildir. Bu ne mümkündür, ne de doğrudur. Fakat günümüz sorunları üzerine önceki yüzyıllardan kalma kavramlar ile düşünmek de tartışmaların esasının iskanmasına yol açmaktadır. Zaman zaman şiddetini artırıp azaltarak uzun zamandan beri gündemimiz işgal eden, emeklilik, erken emeklilik gibi sorunlar da önceki yüzyıllardan kalma kavramlarla düşünüldüğünde çözümsüz kalmakta, ya da geliştirilen çözümler beklenen karşılığını bulamamaktadır. Bugün bilinen anlamı ile çalışma, modern zamanların bir icadıdır. Çalışma hayatı, endüstrileşmenin getirdiği fabrika sistemi ile doğanın ritmi dışına çıkılarak, günlük çalışma süresi yirmi dört saat esasına göre düzenlenirken, yaşamın bu tempoya en uygun evresi ile sınırlandırılarak da hayatın ritmi dışına çıkarılmıştır. Bir başka ifade ile sadece çalışma bir modern zaman icadı değil aynı zamanda çalışma sonrası yaşam, yani emeklilik de, bir modern zaman icadıdır. Kısaca çalışma, endüstrileşme ile birlikte, doğanın ve hayatın ritmi dışında, yeniden tanımlanarak toplumsal ve bireysel yaşamın merkezine yerleştirilmiştir. Bu gelişme üretimde ve maddi zenginlikte muazzam artışlara yol açarken bir çok temel sorunu da beraberinde getirmiş, sosyal bilimlerde bu sorunlar ve çözüm yolları üzerine yapılan çalışmalar konu hakkında zengin bir literatürü ortaya çıkarmıştır. Bu çalışma ile sosyoloji literatüründe kullanılan kurucu isimlerin geliştirdiği anomi, rasyonelleşme ve yabancılaşma kavramları üzerinden çalışma ve emeklilik tartışmalarına farklı bir bakış açısı getirmeye çalışılmaktadır. Bu çalışmanın hareket noktası, emekliliğin çalışma hayatından çekilmek anlamına gelmediğidir. Çoğu emekçi için çalışma, temel ihtiyaçlarını piyasa ilişkileri içinde karşılayabilmek için hayatlarından ayırdıkları zorunlu karşılık gibidir. Bu karşılık ne kadar kısa tutulursa, hayatın geri kalan o kadar uzun dönemini, piyasa ilişkilerinin dışında, bu ilişkilerin baskısından ve yabancılaştırıcı etkisinden bağımsız olarak, yeniden tanzim edebilme imkanına sahip olunacaktır. Bu yeniden tanzim çabası, çalışma hayatının sonu olarak değil, emeğin, “temel ihtiyaçlardan” bağımsızlaşarak “kendini gerçekleştirmeye” doğru, evrimi olarak görülmelidir. Bu evrime uygun politikalar, sosyal güvenlik sisteminde yaşanan sorunların daha kalıcı çözümlerini de beraberinde getirecektir.

**Anahtar kelimeler:** İş, emek, yabancılaşma, erken emeklilik, temel ihtiyaçlar, kendini gerçekleştirme

**SOME THOUGHTS ON THE PROBLEM OF EARLY RETIREMENT IN TURKEY****ABSTRACT**

The purpose of this study is not to start a new early retirement debate. This is neither possible nor right. However, thinking about today's problems with the concepts from previous centuries also causes the fundamentals of debate to be missed. Problems such as retirement and early retirement, which have been occupying our agenda for a long time by increasing and decreasing their severity from time to time, remain unsolved when considered with concepts from previous centuries. The solutions developed to solve the problems in this respect never matched the expected response. As known presently work is an invention of modern times. With the start of the factory system brought about industrialization, working life has been taken out of the rhythm of life and the rhythm of nature. Then the daily works has been arranged on the basis of twenty-four hours, and limited to the most suitable phase of life cycle. In other words, not only work is an invention of modern times, but life after work, namely retirement, is also an invention of modern times. In short, with industrialization, apart from the rhythm of nature and life, work has been redefined and placed at the center of social and individual life. Although this development created an enormous production and material wealth, it also caused too many fundamental problems such as exploitation, alienation and anomy. In this paper, it is tried to bring a different perspective to the discussions of work and retirement through the concepts of anomie, rationalization and alienation developed by the founding names used in the sociology literature. The starting point of this study is that retirement does not mean withdrawing from working life. For most workers, work is like a necessary compensation from their lives in order to meet their basic needs within market relations. The shorter this response is, the longer the rest of life will be able to reorganize outside of market relations, independent of the pressure and alienating effect of these relations. This reorganization effort should not be seen as the end of working life, but as the evolution of labor towards "self-realization" by becoming independent of "basic needs". Policies suitable for this evolution will bring along more permanent solutions to the problems experienced in the social security system.

**Keywords:** Work, labor, alienation, early retirement, basic needs, self-actualization

**DİN FAKTÖRÜNÜN TÜRK MİLLİ MÜCADELESİNİN KAZANILMASINDAKİ ETKİLERİ**

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**ÖZET**

Bu bildiri; din etkenin Türk milli mücadele dönemi boyunca nasıl bir işlev gördüğü ele alınmıştır. Bununla beraber, sürecin şekillenmesini resmetmek için, Osmanlı devletinin parçalanmasıyla başlayan bağımsızlık mücadelesinde, ülkeyi işgalden kurtarmak için çareler aranmıştır. Bu noktada birleştirici unsurları öne çıkarmak, milli güç unsurlarını etkin kullanmak açısından kritik öneme sahiptir. Tarih boyunca bütünleyici ve etkinlik sağlayıcı en önemli unsur din ögesi olmuştur. Milli mücadelenin yönetici kadrosu bunun önemini erken fark etti. Öyle ki bu güç onlar için maddi güçten daha etkili konuma sahip olmuştur. Böylelikle hareketin tüm faaliyetlerinde dini unsurlar belirgin olarak kendini göstermiştir. Dini motivasyonu arkasına alan milli mücadele hareketinin, imparatorluk topraklarının bakiyesinin bir kısmını kurtarıp düşmanı Anadolu'dan süpürerek bağımsız bir devlet kurmaya muvaffak olduğu görülmüştür.

**Anahtar Kelimeler:** Milli Mücadelede Din, Atatürk ve Din, İttihat Terakki ve Din, Kurtuluş Savaşı



**THE EFFECT OF RELIGIOUS CONCEPTS ON THE WINNING OF THE TURKISH  
NATIONAL STRUGGLE****ABSTRACT**

In this notification; The function of religion factor during the Turkish national struggle period is discussed. However, in order to illustrate the shaping of the process, in the struggle for independence that started with the disintegration of the Ottoman state, remedies were sought to save the country from occupation. At this point, it was critical to highlight the unifying elements and to use the elements of national power effectively. Throughout history, religion has been the most integral and effective factor. The administrative staff of the national struggle realized the importance of this early. So much so that this power has had a more effective position for them than physical force. Thus, religious elements were evident in all the activities of the movement. It has been seen that the national struggle movement, which was motivated by religion, was able to save some of the remnants of the imperial lands and to establish an independent state by sweeping the enemy from Anatolia.

**Keywords:** Religion in the National Struggle, Atatürk and Religion, Union and Progress and Religion, War of Independence

**YERLİ BİR SOSYOLOJİNİN İMKANI YA DA SOSYOLOJİNİN TEOLOJİ İLE  
İMTİHANI**

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**ÖZET**

Sosyolojinin kurucu isimlerinden Durkheim'e göre "din bir toplumun kendi üzerine düşünme biçimidir". Kişisel olarak dinin metafizik önermelerine mesafeli ve/ya kayıtsız olan birinin böyle bir söz söylemesi şaşırtıcı gelebilir. Kuşaklar boyu haham yetiştiren bir aileden gelen Durkheim'in, kendisinde ergenlik dönemine kadar haham mektebine devam etmiş olduğu, dinle yollarının ilk gençlik yıllarında ayrıldığı dikkate alındığında Durkheim sosyolojisinde dinin işgal ettiği yerin önemi daha iyi anlaşılacaktır. Durkheim kadar açık olmasa da benzer ilişkiyi Weber düşüncesinde de görebiliriz. Siyasi ikbal peşinde koşan liberal politikacı bir baba ile püriten Kalvinist bir annenin oğlu olarak yetişen Weber'in Protestan ahlakına, kapitalizmin gelişmesine, karşılaştırmalı dinler ve rasyonelleşmeye olan ilgisinde dinin köklerini de görmek şaşırtıcı olmayacaktır. Kurucu isimler arasında dine yaklaşımı ve mesafesi en şaşırtıcı olan ise Karl Marx'tır. Marx'ın diyalektik materializme dayalı düşünceleri ilk bakışta dine en karşıt olandır. Ancak düşünce sisteminin dayandığı temel kavramlara bakıldığında ise Marx'ın karşıt olan konumunun teolojik geleneğe en yakın düşünce sistemi olduğu görülecektir. insanın doğası, emek, emeğin doğası, yabancılaşma, komünist toplum gibi kavramlar Marx'ın içine doğduğu ve yetiştiği teolojik gelenekle diyalektik bir ilişkinin yansımalarıdır. Bu bildirinin amacı sosyolojik düşüncede uzun zamandan beri unutulmuş görünen bu teolojik bağlantıya dikkat çekmektir. Bildirinin temel iddiasına göre, yerli bir sosyolojinin imkanı ilgili toplumun teolojik geleneğine aşinalık, onu kavrama ve anlama kabiliyeti ile doğrudan ilişkilidir.

**Anahtar kelimeler:** Yerli sosyoloji, kültür, gelenek, teolojik gelenek, din, din sosyolojisi.

**THE POSSIBILITY OF A NATIVE SOCIOLOGY OR THE CHALLENGE OF  
SOCIOLOGY WITH THEOLOGY****ABSTRACT**

According to Durkheim, one of the founding names of sociology, “religion is a society's way of thinking about itself”. It may come as a surprise for someone who is personally distant and/or indifferent to the metaphysical propositions of religion to make such a statement. The importance of religion in Durkheim's sociology will be better understood when it is taken into account that Durkheim, who came from a family that trained rabbis for generations, attended the rabbinical school until his adolescence, and his religious paths diverged in his early youth. We can see a similar relationship in Weber's thought, although not as obvious as Durkheim. It would not be surprising to see the roots of religion in Weber's interest in the Protestant ethic, the development of capitalism, comparative religions and rationalization, who grew up as the son of a liberal politician father who sought political fortune and a puritanical Calvinist mother. Among the founding names, Karl Marx is the most surprising in his approach to religion and his distance. Based on dialectical materialism, Marx's ideas are at first glance the most anti-religious. However, when we look at the basic concepts on which his thought is based, it will be seen that Marx's opposing position is the system of thought closest to the theological tradition he was familiar. Concepts such as human nature, labor, nature of labor, alienation, communist society are of a dialectical reflections with the theological tradition in which Marx was born and raised. The purpose of this paper is to draw attention to this theological connection that seems long forgotten in sociological thought. It claims that the possibility of an indigenous sociology is directly related to the familiarity, comprehension and understanding of the theological tradition of the related society.

**Key words:** Native sociology, culture, tradition, theological tradition, religion, sociology of religion.

## **ÖĞRENCİLERDE ELEŞTİREL DÜŞÜNME BECERİSİNİN GELİŞTİRİLMESİNE İLİŞKİN ÖĞRETMEN GÖRÜŞLERİNİN İNCELENMESİ**

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### **ÖZET**

İnsan ilişkilerinin karmaşık ve küreselleşmenin hüküm sürdüğü günümüzde birey ve demokratik yurttaş profilinin ana boyutları içinde eleştirel düşünmenin vazgeçilmez yeri vardır (Gürkaynak, Üstel ve Gülgöz, 2003). Eleştirel düşünme, gözlem ve bilgiye dayanarak sonuçlara ulaşma (Paul, 1991) olarak tanımlanmaktadır. Bilgi çağında okullar, eleştirel düşünebilen, ihtiyaç hâlinde bilgiye ulaşabilen ve bilgiyi üreten bireylerin yetiştirildiği yerlerdir (Balay, 2004). Okulda bireylerin eleştirel, özgün ve yenilikçi düşünebilmeleri öğretim programlarının amaçları arasında yer almaktadır. Bu bağlamda çalışmada, öğrencilerde eleştirel düşünme becerisinin geliştirilmesine ilişkin öğretmen görüşlerinin incelenmesi hedeflenmiştir. Çalışmada nitel araştırma yöntemi kullanılmıştır. Çalışma deseni ise program yürütme durum çalışmaları desenidir. Nitel durum çalışmasının en belirgin özelliği bir ya da birkaç durumun derinliğine araştırılmasıdır (Yıldırım ve Şimşek, 2018). Durum çalışmasında amaç, birtakım karar ya da kararların neden alındıklarını, nasıl uygulandıklarını ve sonuçlandıklarını aydınlatmaya çalışmaktır (Yin, 2003). Bu kapsamda öğrencilerde eleştirel düşüncenin geliştirilebilmesi için okul müdürleri ve öğretmenlerin yapması gereken çalışmaların neler olabileceği konusunda öğretmenlerin görüşlerine başvurulmuştur. Araştırmada amaçlı örnekleme yöntemlerinden ölçüt örnekleme yöntemi kullanılmıştır. Ölçütler en az 3 yıllık mesleki kıdeme sahip olmak, farklı branş ve okul kademelerinde görev yapıyor olmak şeklinde belirlenmiştir. Buna göre araştırmanın çalışma grubunu okul öncesi, ilkokul, ortaokul ve liselerde görev yapan 17 öğretmen oluşturmaktadır. Araştırmada veri toplama aracı olarak yarı yapılandırılmış görüşme formu kullanılmıştır. Soruların geçerliği için eğitim bilimleri alanında bir doçent ve iki doktor öğretim üyesinin görüşüne başvurulmuştur. Araştırmanın soruları şu şekilde oluşturulmuştur:

- Öğrencilerde eleştirel düşünme becerisinin geliştirilmesi için okul yöneticilerinin yapması gereken çalışmalar nelerdir?
- Öğrencilerde eleştirel düşünme becerisinin geliştirilmesi için öğretmenlerin yapması gereken çalışmalar nelerdir?

Verilerin analizinde içerik analizi tekniği kullanılmıştır. Analizde güvenilirliği sağlamak için iki alan uzmanı görev almıştır.

Öğretmen görüşlerine göre öğrencilerde eleştirel düşünme becerisinin geliştirilmesi için okulun yapması gereken çalışmalar arasında öğrencilere değer vermek, demokratik bir okul ortamı oluşturma, karar alma süreçlerine öğrencileri dâhil etme, uygun bir okul iklimi oluşturma ve öğrencilere bu konuda model olmaktır. Öğretmenlerin yapması gereken çalışmalar arasında öğrencilerin fikirlerine değer verme, özgür ve demokratik bir öğrenme ortamı oluşturma, derste öğrenci merkezli yaklaşımlar kullanma ve eleştirel düşünme konusunda onları cesaretlendirme şeklindedir.

**Anahtar kelimeler:** Düşünme, eleştirel düşünme, öğretmen görüşleri

**EXAMINATION OF TEACHERS' OPINIONS ON DEVELOPMENT OF CRITICAL THINKING SKILLS IN STUDENTS****ABSTRACT**

Today, in which human relations are complex and globalization prevails, critical thinking has an indispensable place among the main dimensions of the individual and democratic citizen profile (Gürkaynak, Üstel, & Gülgöz, 2003). Critical thinking is defined as reaching conclusions based on observation and knowledge (Paul, 1991). . In the information age, schools are places where individuals who can think critically, access information when needed, and produce information are raised (Balay, 2004). One of the aims of the curriculum is to enable individuals to think critically, authentically and innovatively at school. In this context, the aim of the study is to examine the views of teachers on the development of critical thinking skills in students. Qualitative research method was used in the study. The study pattern is the program execution case studies pattern. The most distinctive feature of the qualitative case study is the in-depth investigation of one or more cases (Yıldırım & Şimşek, 2018). The purpose of the case study is to try to illuminate why some decision or decisions were made, how they were implemented and resulted (Yin, 2003). In this context, teachers' opinions were sought on what the school principals and teachers should do in order to develop critical thinking in students. The criterion sampling method, one of the purposive sampling methods, was used in the research. The criteria were determined as having at least 3 years of professional seniority, working in different branches and school levels. Accordingly, the study group of the research consists of 17 teachers working in pre-school, primary, secondary and high schools. A semi-structured interview form was used as a data collection tool in the research. For the validity of the questions, the opinions of an associate professor and two doctoral faculty members in the field of educational sciences were consulted. The research questions were formed as follows: 1. What are the studies that should be done by school administrators in order to develop critical thinking skills in students? 2. What are the studies that teachers should do in order to develop critical thinking skills in students? Content analysis technique was used in the analysis of the data. Two field experts took part in the analysis to ensure reliability. According to the teachers' opinions, among the activities that the school should do in order to develop critical thinking skills in students are to value students, to create a democratic school environment, to include students in decision-making processes, to create an appropriate school climate and to be a model for students in this regard. Valuing students' ideas, creating a free and democratic learning environment, using student-centered approaches in the lesson and encouraging them to think critically are among the activities that teachers should do.

**Keywords:** Thinking, critical thinking, teacher views

## **TÜRKİYE’DE KAPALI KONUT SİTELERİ: GAZİANTEP ÖRNEĞİ**

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### **ÖZET**

Türkiye’de kapalı konut siteleri ve etkilerine dair farklı bilim dallarına mensup araştırmacılar araştırma yapmaktadır. Araştırmalar, bu konut tipinin mekân ve toplum üzerinde önemli etkiler bıraktığını göstermektedir. Bu araştırmalardaki etkiler genellikle fiziksel ve toplumsal ayrışma, güvenlik açısından ele alınmaktadır. Böyle bir perspektifte çıktılar ağırlıklı olumsuz etkileri ile ön plana çıkmaktadır. Dışa kapalı, duvarla çevrili, 24 saat güvenlik önlemlerinin alındığı fiziki alanlar kamusal mekânların ortadan kalkmasına neden olmaktadır. Ayrıca kendini dışarıdan yalıtmış nüfus grupları çoğu durumda dışarısını suç unsuru olarak görme eğiliminde olabilmektedir. Türkiye’de kapalı konut sitelerine dair yapılan araştırmalar ilk olarak İstanbul, Ankara, İzmir gibi büyük kentlere odaklanırken, günümüzde küçük kentler özelinde yapılmış çalışmalar da bulunmaktadır. Bu çalışmada Gaziantep’in 2000’li yıllardan sonraki kentleşme sürecinde baskın hale gelmeye başlamış kapalı konut siteleri ele alınmıştır. Gaziantep Büyükşehir Belediyesi’nden edinilmiş planlar yardımıyla Gaziantep’te kapalı konut özelliği gösteren konutlar haritalandırılmıştır. Yapılan saha araştırmaları ile kapalı konut olma özelliği gösteren yerler ArcGIS 10.7 programı vasıtasıyla haritalandırılmıştır. Elde edilen bulgular kapalı konut sitelerinin Gaziantep’in planlı gelişmiş mahallelerinde yaygınlaştığını göstermektedir. Bu mahalleler arasında 15 Temmuz, İbrahimli, Beştepe, Osmangazi gibi mahalleler bulunmaktadır. Kentte en fazla bilinen kapalı konut siteleri ise Iconova ve Antepia Yaşam Sitesidir. Her iki konut tipi de dışarıdan yüksek duvarlarla ayrılan, 24 saat güvenliklerin bulunduğu yapıdadır. Ayrıca her iki konut da 24 saat kameralarla denetim yapılmaktadır. Bu yapılarıyla hem Iconova hem de Antepia literatürde tartışılan fiziksel ve sosyal ayrışma, güvenlik gibi parametrelere uygun çıktılar sunmaktadır.

**Anahtar kelimeler:** Kapalı Konut Siteleri, fiziksel ve mekânsal ayrışma, Gaziantep

**GATED COMMUNITIES IN TURKEY: THE CASE OF GAZIANTEP****ABSTRACT**

Researchers from different disciplines conduct research on gated communities and their effects in Turkey. Researches shows that this type of housing has significant effects on space and society. The effects in these studies are generally discussed in terms of physical and social segregation and security. Outcomes are characterized by negative effects in such a perspective. Physical spaces such as closed to the outside surrounded by walls and where 24-hours security measures are taken caused the disappearance of public spaces. In addition, population groups that are isolated from the outside may tend to consider the others as a criminal element. While researches first focused on big cities such as Istanbul, Ankara and Izmir about gated communities in Turkey, there is recent studies on small cities. In this study, gated communities, which started to become dominant in the urbanization process of Gaziantep after the 2000s, are discussed. With the help of the plans obtained from Gaziantep Metropolitan Municipality, the houses that show the characteristics of gated communities in Gaziantep were mapped. With the field research, the places that are gated communities were mapped by the ArcGIS 10.7 program. The findings show that gated communities have become widespread in the planned neighborhoods of Gaziantep. These neighborhoods include neighborhoods such as 15 Temmuz, İbrahimli, Beştepe, and Osmangazi. The most well-known gated communities in the city are Iconova and Antepia Life Site. Both housing types are in a structure that is separated from the outside by high walls and has 24-hour security. In addition, both residences are monitored 24 hours a day by cameras. With these structures, both Iconova and Antepia have a structure that is suitable for parameters such as physical and social separation and security discussed in the literature.

**Keywords:** Gated communities, physical and social segregation, Gaziantep

**SIIRT KURTALAN KOÇPINAR KİLİ İLE Cd (II) İYONUNUN  
ADSORPSİYONUNDA LANGMUIR İZOTERM MODELİNE AİT 6 TİP DOĞRUSAL  
DENKLEMİN KARŞILAŞTIRMALI ANALİZİ**

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**ÖZET**

Kadmiyum elementi doğaya ve özelinde insan sağlığına zarar veren bir ağır metaldir. Adsorpsiyon yöntemi ucuz ve basit olduğu için ağır metallerin gideriminde sıklıkla başvurulan bir ayırma yöntemidir. Adsorpsiyon izoterm analizi yapmak ancak izoterm modellerinin adsorpsiyon verilerine uygulanmasıyla mümkündür. Ağır metallerin adsorpsiyonu çoğunlukla kimyasaldır. Kimyasal adsorpsiyondan önce akla ilk gelen model olan Langmuir modeline ait izoterm doğrusal değildir. Bununla beraber Langmuir modelinden 6 tip doğrusal denklemler türetilmiştir. Bu denklemlerden hangisinin kullanılacağını bilmek önemlidir. Bu çalışma, bu denklemlerden hangisinin adsorpsiyona daha uygun olduğunu anlamak için yapılmıştır. Bu çalışmada 318 K sıcaklığında gerçekleştirilen adsorpsiyon işlemi Siirt Kurtalan Koçpınar bölgesinden elde edilen kile uygulandı. Sonrasında elde edilen veriler, Langmuir izoterm modelinden türetilmiş 6 doğrusal denkleme uygulandı. Denklemlerin karşılaştırılması için regresyon modeli olarak en küçük kareler yöntemi kullanıldı. Yapılan regresyon analizi sonucunda modellerin adsorpsiyona uygunluk derecelerinin; tip 3 = tip 6 < tip 1 = tip 4 < tip 2 = tip 5 olduğu görüldü.

**Anahtar Kelimeler:** Adsorpsiyon, izoterm, Langmuir, doğrusal regresyon, kadmiyum, kil



**COMPARATIVE ANALYSIS OF 6 TYPE LINEAR EQUATIONS OF THE  
LANGMUIR ISOTHERM MODEL ON THE ADSORPTION OF Cd (II) ION BY  
SIIRT KURTALAN KOÇPINAR CLAY**

**ABSTRACT**

Cadmium is a heavy metal that harms nature and human health in particular. Because of the adsorption method is cheap and simple, it is a frequently used separation method for the removal of heavy metals. Performing adsorption isotherm analysis is only possible by applying isotherm models to adsorption data. Adsorption of heavy metals is mostly chemical. The isotherm of the Langmuir model, which is the first model that comes to mind when chemical adsorption is mentioned, is not linear. However, 6 types of linear equations were derived from the Langmuir model. It is important to know which of these equations to use. This study was conducted to understand which of these equations is more suitable for adsorption. In this study, the adsorption process carried out at 318 K temperature was applied to the clay obtained from Siirt Kurtalan Koçpınar region. The obtained data were applied to 6 linear equations derived from the Langmuir isotherm model. The least squares method was used as the regression model to compare the equations. As a result of the regression analysis, the degrees of suitability of the models for adsorption; type 3 = type 6 < type 1 = type 4 < type 2 = type 5.

**Keywords:** Adsorption, isotherm, Langmuir, linear regression, cadmium, clay

## **SINIF ÖĞRETMENLERİNİN DİJİTAL YETERLİLİK DÜZEYLERİ HAKKINDAKİ GÖRÜŞLERİNİN İNCELENMESİ**

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### **ÖZET**

Bu araştırma ile sınıf öğretmenlerinin ilerleyen bilim ve teknolojik gelişmeler karşısında farklılaşan becerileri kazanmaları yolunda sergilemiş oldukları tutumları gözlemleyerek “Dijital Yeterlilik” hakkında kendilerine yönelik değerlendirmelerini belirlemek ve bu değerlendirmelerin bağımsız değişkenler açısından anlamlı bir farklılık oluşturup oluşturmadığının belirlenmesi amaçlanmıştır. Amacı gerçekleştirmek üzere nicel araştırma yöntemi kapsamında olan tarama yöntemi kullanılmıştır. Araştırmanın örneklemini 2020-2021 eğitim öğretim yılında Doğu Anadolu’da bulunan bir ilde görev yapan 92 sınıf öğretmeni katılmıştır. Veriler normal dağılım gösterdiği için parametrik testlerden t testi ve ANOVA uygulanmıştır. Araştırma sonucunda elde edilen bulgular şöyle özetlenebilir: Ölçeğin tüm boyutlarında cinsiyet ve yaş değişkenlerine göre anlamlı bir farklılık görülmezken, yalnızca “Öğretme ve Öğrenme” boyutunda mesleki hizmet yılı değişkenine göre anlamlı bir farklılık belirlenmiştir.

**Anahtar Kelimeler:** Dijital yeterlilik, teknoloji, öğretmen becerileri

**EXAMINATION OF CLASSROOM TEACHERS' OPINIONS ON DIGITAL  
QUALIFICATION LEVELS****ABSTRACT**

With this research, it was aimed to determine the self-assessments about "Digital Competence" by observing the attitudes of classroom teachers towards gaining different skills in the face of advancing science and technological developments, and to determine whether these evaluations create a significant difference in terms of independent variables. In order to achieve the aim, the survey method, which is within the scope of the quantitative research method, was used. 92 classroom teachers working in a province in Eastern Anatolia participated in the sample of the research in the 2020-2021 academic year. Since the data showed normal distribution, t-test and ANOVA were applied from parametric tests. The findings obtained as a result of the research can be summarized as follows: While no significant difference was observed in all dimensions of the scale according to gender and age variables, a significant difference was determined only in the "Teaching and Learning" dimension according to the variable of years of professional service.

**Keywords:** Digital competence, technology, teacher skills.

## **IŞIK KAYNAĞI ESASLI ENERJİ YAYILIM ANALİZLERİ**

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### **ÖZET**

Görünürlük ya da görünmezlik dalga boylarında ışınım yapan ışınım kaynakları, gerçekleştirdikleri aydınlatma, radyo dalgaları vb. görevlerin yanı sıra enerji salınımı da gerçekleştirirler. Güneş, en önemli yerde değerlendirilmesi gereken bir ışık kaynağı olup, aydınlatmamızın yanı sıra enerji ihtiyacımızı da karşılar. Güneşten elde ettiğimiz ışığın yapısal özellikleri, dünyanın konumuna göre gün içerisinde ve mevsimler içerisinde değişkenlik arz ettiği gibi, yararlanmış olduğumuz enerji miktarı da değişkenlik arz eder. Benzer biçimde suni ışık kaynağı olarak yararlandığımız lambalar da, aydınlatma işlevlerinin yanı sıra enerji yayılımları gerçekleştirirler. Işınımsal enerji yayılımı etkisi, frekans ve dalga boyuna bağlı olarak, planck sabiti esaslı hesaplanabilmekle beraber, ışınım türü ya da ışık kaynağı enerji miktarı için temel belirleyici etken olmaktadır. Bu kapsamda, burada yapılan çalışmalarda, farklı ışık türü ya da ışık kaynağı esaslı olarak, ışınım dalga boylarının enerji etkilerinin ölçümleri, aynı ışınım miktarları ölçütünde değerlendirilmiştir. Öncelikle, deneysel çalışmalarda elde edilen veriler kullanılarak aynı ışık kaynağı için enerji-dalga boyu ilişkisi, fonksiyonel olarak ortaya konulmaya çalışılmıştır. Ayrıca farklı ışık kaynakları için de enerji-dalga boyu ilişkisi ele alınarak, aynı dalga boyu için ışık kaynağı farklılığının enerji oranını etkileyebildiği görülmüştür.

**Anahtar Kelimeler:** Işık, Enerji, Işık türü, Lamba türü

**LIGHT SOURCE BASED ENERGY DIFFERENCE ANALYSIS****ABSTRACT**

Light sources emitting radiation in visibility or invisibility wavelengths, while they perform facilities of lighting, radio waves, etc., also release energy. The sun is the light source that should be evaluated in the most important context and provides our energy needs as well as our lighting. As the structural features of the light we obtain from the sun vary during the day and seasons according to the location of the earth, also the amount of energy we benefit from it is differed. Similarly, lamps that we use as artificial light sources, besides their lighting functions, they also perform energy emissions. Although the effect of radiative energy dissipation can be calculated on the basis of Planck's constant, depending on the frequency and wavelength, the type of radiation or the light source is the main determining factor for the amount of energy. Here, in the studies carried out in this context, the measurements of the energy effects in radiation wavelengths based on different types of light or light sources are evaluated in the same radiation amount criterion. First of all, the energy-wavelength relationship for the same light source is tried to be revealed functionally by using the data obtained in experimental studies.

**Keywords:** Light, Energy, Light type, Lamp type

## **BAKTERİYEL ÜREME VARLIĞINDA RENK DEĞİŞTİREN AKILLI GIDA TAŞIMA BANDI ÜRETİMİ**

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### **ÖZET**

Taşıma bantları, üretim tesisleri için aktarma organları olarak görev yaparlar. Hammaddeler, ara ürünler, nihai ürünler ve yardımcı maddeler taşıma bantları yardımıyla işletme içerisinde transfer edilirler. Farklı taşıma bandı konstrüksiyonları bulunmakla beraber, polimerik kaplı taşıma bantları sıklıkla karşımıza çıkmaktadır. Gıda sektörü, insan sağlığını direkt olarak etkileyen bir endüstri dalı olduğu için, kullanılacak taşıyıcı bantların da dikkatle seçilmesi gerekir. Taşıma bantları sonsuz sistemlerdir ve taşıma bandının herhangi bir noktasında oluşacak bakteriyel üreme o noktaya temas eden tüm gıdaların kontamine olmasına sebebiyet verecektir, bu durum, çapraz kirlenme olarak adlandırılmaktadır. Gıda patojenlerinin neden olduğu hastalıklar ölümle sonuçlanacak kadar ciddi sonuçlar doğurabilmektedir. Hatta bu mikroorganizmalar, salgınlara neden olarak birden çok insanın etkilenmesine sebep olabilirler. Bu çalışma kapsamında, bakteriyel üreme olduğunda renk değiştirerek görsel uyarı veren bir taşıma bandı geliştirilmiştir. Bu sayede, üretim esnasında anında müdahale imkanı oluşturulması hedeflenmiştir. Çalışmanın temelinde bakteriyel üreme olduğunda ortam pH'nın asidik olması fikri yatmaktadır. Bu amaçla, doğal kaynaklı halokromik antosiyanin boyarmadde kullanılmıştır. Hedefte gıda endüstrisine yönelik bir taşıyıcı bant üretimi olduğu için doğal boyarmadde seçilmiştir. Halokromik boyarmadde termoplastik nişastaya yüklenmiş ve daha sonra nişasta, su bazlı poliüretan polimer pastası içerisine doplanmıştır (doplanan nişasta konsantrasyonu %15'tir). Bıçaklı kaplama yöntemiyle, pamuklu kumaş üzerine yapılan kaplamalar sonunda kürleme işlemi gerçekleştirilmiştir. pH değişimi ile gerçekleşen renk değişimi, CIE  $L^*$   $a^*$   $b^*$  değerlerinin spektrofotometrede ölçülmesi ile değerlendirilmiştir. Kumaş üzerinde bakteri kültürü oluşturularak renk değerleri ayrıca ölçülmüştür. Asidik pH altında ve bakteri kültürü yapılan bölgede belirgin kırmızı lekelenme oluşumu tespit edilmiştir. Taşıyıcı bandın renk değiştirme özelliği tekrarlı yıkamalara karşı test edilmiştir. Ayrıca, nişasta katkısının mukavemete olan etkisi belirlenmiştir.

**Anahtar Kelimeler:** Akıllı taşıyıcı bant, bakteriyel üreme tespiti, halokromik boyarmadde, poliüretan, termoplastik nişasta

**SMART CONVEYOR BELT THAT CHANGES COLOR WITH BACTERIAL  
REPRODUCTION MANUFACTURING****ABSTRACT**

Conveyor belts act as transfer systems for facilities. Raw materials, intermediate products, final products and auxiliary materials are transferred within the company with the aid of conveyor belts. Although there are different conveyor belt constructions, polymeric coated conveyor belts are frequently encountered. Since the food industry directly affects human health, the conveyor belts to be used must be carefully selected. Conveyor belts are endless systems and bacterial growth at any point of the conveyor belt will cause contamination of all foods that come into contact with that point, this is called cross contamination. Diseases caused by food pathogens may have serious consequences, including death. Moreover, these microorganisms can cause epidemics and affect a large population. Within the scope of this study, a conveyor belt was developed that gives a visual warning by changing color when bacterial growth occurs. In this way, it is aimed to create an opportunity for immediate intervention during production. The basis of the study is that the pH of the environment is acidic when there is bacterial growth. For this purpose, natural originated halochromic anthocyanin dyestuff was used. Natural dyestuff was chosen as the target is the production of conveyor belts for the food industry. The halochromic dyestuff was loaded into thermoplastic starch and then the starch was doped into a water-based polyurethane polymer paste (doped starch concentration was 15%). The curing process was carried out at the end of the coatings made with the blade coating method on cotton fabric. Color change depending on the pH change was evaluated by measuring CIE  $L^* a^* b^*$  values in a spectrophotometer. Color values were also measured on a bacterial culture that was created on the fabric. Significant red staining formation was detected under acidic pH and on the bacterial culture area. The color change feature of the conveyor belt has been tested against repeated washings. In addition, the effect of starch additive on the tenacity was determined.

**Keywords:** Smart conveyor belt, detection of bacterial reproduction, halochromic dyestuff, polyurethane, thermoplastic starch

**ELEKTRONİK SAĞLIK KAYIT SİSTEMLERİNDE BLOK ZİNCİRİ  
TEKNOLOJİSİNİN KULLANIMI**

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**ÖZET**

Sağlık kuruluşuna başvuran hastaların kimlik bilgilerinin kayıt altına alınmasında ve tıbbi işlemlerde kullanılan onaylı defterlere Protokol Defteri denir. Tıbbi mevzuat gereği uygulamada tutulması zorunlu olan bu defterlerde muayene edilecek hastaların bilgilerine, istirahat raporlarına ve doktor görüşlerine yer verilmektedir. Bu kayıt defteri girdileri genellikle el ile sağlanır. Hasta kayıtlarının arşivlenmesinde en önemli konu saklama alanı ve birçok belgenin uzun arşiv süreleri içerisinde güvenli bir şekilde saklanmasıdır. Sicil girişlerinin manuel olarak sağlanması, verilerin elektronik ortamda korunması gibi durumlar sağlık sektöründe bazı değişikliklerin yapılması gerektiğini ortaya çıkarmıştır. Günümüzde farklı sektörlerdeki birçok işin tasarlanan modellerle çözülmesi, manuel olarak sunulan problemlerin otomatik olarak gerçekleştirilmesini zorunlu kılmıştır. Bu çalışmada, son yıllarda önemli bir araştırma konusu haline gelen Blockchain teknolojisinin kullanılması amaçlanmaktadır. Sağlık sektöründe girişler manuel olarak yapılıp daha sonra elektronik ortama aktarılsa dahi takibin zorlaşması ve geçmiş süreçte veri kaybı ihtimali olması büyük bir sorundur. Tasarlanacak model ile bu sorunun çözülmesi ve veri gizliliğinin ve korunmasının sağlanması planlanmaktadır.

**Anahtar kelimeler:** Blok Zinciri Teknolojisi, Dağıtık Ağ/ Sistem, Tıbbi Uygulamalar, Solidity



**USE OF BLOCKCHAIN TECHNOLOGY IN ELECTRONIC HEALTH  
REGISTRATION SYSTEMS****ABSTRACT**

The approved books used in the registration of the identity information of the patients who applied to the health institution and the medical procedures are called the Protocol Book. In these books, which are obligatory to be kept in practice in accordance with medical legislation, information about the patients who will be examined, rest reports and doctor's opinions are included. These registry entries are generally provided manually. The most important issue in archiving patient records is the storage area and the safe keeping of many documents within long archive periods. Situations such as providing the registry entries manually and protecting the data in the electronic environment have revealed that some changes should be made in the health sector. Today, solving many jobs in different sectors with designed models has necessitated the automatic realization of the problems that are offered manually. In this study, it is aimed to use Blockchain technology, which has become an important research topic in recent years. Even if the entries are made manually in the health sector and then transferred to the electronic environment, it is a big problem that the follow-up becomes difficult and there is a possibility of data loss in the past process. With the model to be designed, it is planned to solve this problem and to ensure data confidentiality and protection.

**Keywords:** Blockchain Technology, Distributed Network / System, Medical Applications, Solidity

**SIÇANLARDA METAL KARIŞIMI NEDENLİ HEMOTOKSİSİTE VE  
İMMÜNSUPRESYONA KARŞI CURCUMİN'İN KORUYUCU ETKİLERİ**

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**ÖZET**

Neredeyse bütün biyolojik sistemleri etkileyen birçok ağır metal çevrede farklı dozajlarda karışımlar halinde bir arada bulunmakta ve kontaminasyona sebep olmaktadır. Bu nedenle metal karışımları ve onların muhtemel zararlı etkileri ile ilgili yapılan çalışmalar gün geçtikçe artmaktadır. Bu karışımlardan birisi olan Cd-As karışımları ile ilgili çalışmalar oldukça azdır. Cd ve As karışımlarının tekli hallerine göre daha toksik olduğu ifade edilmiştir. Bu çalışmada literatürde daha az çalışılmış Cd-As karışımı tercih edilmiştir. Biyoaktif bileşiklerin kullanımı, çevresel kirleticilerin neden olduğu toksisiteyi azaltmak için potansiyel bir yaklaşım olarak ortaya çıkmıştır. Polifenolik biyoaktif bir bileşik olan Curcumin (CUR)'in antioksidan, antiinflamatuvar, antitümör ve antibakteriyel, antiviral ve sitoprotektif etkilere sahip olduğu ve fenolik grupları sayesinde süperoksit anyonu, peroksinitrit, nitrik oksit, peroksil radikalleri ve hidrosil radikallerini temizlediği gösterilmiştir. CUR'in, süperoksit dismutaz (SOD), katalaz (CAT), glutasyon peroksidaz (GPx) gibi antioksidan proteinlerin ekspresyonunu dolaylı olarak indüklediği düşünülmektedir. CUR'in toksik kimyasalların neden olduğu karaciğer hasarına karşı sitoprotektif etkili olduğunu gösteren araştırmalar varsa da metal karışımı nedeni hematolojik hasarı önleme ile ilgili herhangi bir çalışmaya rastlanmamıştır. Bu çalışmada CUR'in, Cd-As karışımı nedeni hemotoksosite ve myelosupresiyona karşı muhtemel koyucu etkilerini belirlemek için, sıçanların periferik kanında eritrosit, lökosit, trombosit hücreleri ve hemoglobin ve hematokrit değerleri, kemik iliği çekirdekli hücreleri (KİÇH) ve antioksidan aktivite indikatörleri olan glutation (GSH), katalaz (KAT) ve Glutasyon Peroksidaz (GPx) aktiviteleri belirlenmiştir. Sadece 0.44+5.55 mg/kg Cd-As karışımı verilen grupta lökosit sayıları ciddi bir inflamasyonu gösterecek şekilde artmış ( $p<0.001$ ), eritrosit, hemoglobin ve hematokrit seviyeleri kayda değer şekilde azalmış ( $p<0.001$ ), trombosit ve KİÇH'nin sayıları önemli oranda değişmemiş ( $p>0.001$ ), GSH, KAT, GPx aktiviteleri büyük oranda azalmıştır ( $p<0.001$ ). 0.44+5.55 mg/kg Cd-As karışımı ile birlikte 100 ve özellikle 200 mg/kg CUR verilen gruplarda periferik kan hücreleri, KİÇH ve antioksidan aktivite indikatörleri kontrol grubuna yakın seviyelere gelmiştir. Deneysel sonuçlarımız CUR'in, Cd-As karışımı tarafından indüklenen hemotoksosite ve myelosupresiyonu büyük ölçüde önlediğini göstermiştir. CUR'in fenolik grupları, reaktif türlerle reaksiyona girme yeteneğinden sorumludur ve dolayısıyla CUR uygulamasının etki mekanizmalarından birinin hücreleri oksidatif hasardan koruma şeklinde olması muhtemeldir. Bu araştırma Eskişehir Osmangazi Üniversitesi Bilimsel Araştırma Projeleri birimi tarafından (Proje no: FHD-2022-2251) desteklenmiştir.

**Anahtar Kelimeler:** Curcumin, Hemotoksosite, İmmunsupresyon

**PROTECTIVE EFFECTS OF CURCUMIN AGAINST METAL MIXTURE-INDUCED  
HEMOTOXICITY AND IMMUNOSUPPRESSION IN RATS**

**ABSTRACT**

Many heavy metals, which affect almost all biological systems, coexist in the environment as mixtures at different dosages and cause contamination. For this reason, studies on metal mixtures and their possible harmful effects are increasing day by day. Studies on Cd-As mixtures, which is one of these mixtures, are very few. It has been stated that mixtures of Cd and As are more toxic than their single forms. Cd-As mixture, which has been less studied in the literature, was preferred in this study. The use of bioactive compounds has emerged as a potential approach to reduce toxicity caused by environmental pollutants. It has been shown that Curcumin (CUR), a polyphenolic bioactive compound, has antioxidant, anti-inflammatory, antitumor and antibacterial, antiviral and cytoprotective effects, and scavenges superoxide anion, peroxynitrite, nitric oxide, peroxy radicals and hydroxyl radicals thanks to its phenolic groups. CUR is thought to indirectly induce the expression of antioxidant proteins such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx). Although there are studies showing that CUR has a cytoprotective effect against liver damage caused by toxic chemicals, no study has been found on preventing hematological damage caused by metal mixture. In this study, in order to determine the possible protective effects of CUR against hemotoxicity and myelosuppression caused by Cd-As mixture, erythrocyte, leukocyte, platelet cells and hemoglobin and hematocrit values, bone marrow nucleated cells (BNC) and glutathione (antioxidant activity indicators) in the peripheral blood of rats were investigated. GSH, catalase (KAT) and Glutathione Peroxidase (GPx) activities were determined. In the group given only 0.44+5.55 mg/kg Cd-As mixture, leukocyte counts increased ( $p<0.001$ ) indicating severe inflammation, erythrocyte, hemoglobin and hematocrit levels were significantly decreased ( $p<0.001$ ), platelet and BMD counts were significant. unchanged ( $p>0.001$ ), GSH, CAT, GPx activities were greatly decreased ( $p<0.001$ ). In the groups given 100 and especially 200 mg/kg CUR together with 0.44+5.55 mg/kg Cd-As mixture, peripheral blood cells, RBC and antioxidant activity indicators were close to the control group. Our experimental results showed that CUR greatly inhibited the hemotoxicity and myelosuppression induced by the Cd-As mixture. The phenolic groups of CUR are responsible for its ability to react with reactive species, and thus it is likely that one of the mechanisms of action of CUR administration is to protect cells from oxidative damage. This research was supported by Eskişehir Osmangazi University Scientific Research Projects Unit (Project no: FHD-2022-2251).

**Keywords:** Curcumin, Hemotoxicity, Immunosuppression

**G20 ÜLKELERİNİN FAALİYETLERİNDE EKOSİSTEMİ KORUMA  
PERFORMANSLARININ GRİ ANALİZ YÖNTEMİ İLE KARŞILAŞTIRILMASI**

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**ÖZET**

Özellikle sanayisi ve ekonomisi gelişmiş ülkeler ile yükselen ve gelişmekte olan ülkelerin pek çoğu ekolojik ayak izi yüksek olan ülkelerdir. Bazı gelişmiş ülkeler ise ekolojik ayak izinin biyokapasitelerini aşmayacak ölçüde diğer bir ifade ile ekosistemde yarattıkları zararın onarılabılır düzeyde ya da tahribatın yıkıma dönüşmeyecek şekilde olmasına dikkat ederek ekonomik faaliyetlerini sürdürmektedir. Ekolojik ayak izi ölçümünde sadece kara parçası olarak tarım arazisi, otlak ve tarım alanı ile yapılandırılmış alanlar değil, deniz ve atmosfere salınan karbon miktarı da dahil edilerek, insanoğlunun her faaliyetinde doğabilecek zarar göz önünde bulundurulmaktadır. Ülkelerden istenen temel şey ekolojik açık yaratmamalarıdır. Ülkelerin sırf tüketim güdümlü üretim yapmamaları, ekosistemi koruyup sürdürülebilirliğini sağlamaları ve biyokapasitelerin tüketilmesinde günümüz ihtiyaçları karşılırken gelecek nesillerin ihtiyaçlarını da karşılayacak kaynak bırakılması konusunda ısrarlı olunması arzu edilmektedir. Klasik yöntemler ile ekolojik ayak izinin iyi yada kötü olmasına göre ülkeleri değerlendirmek mümkün iken birbirine zıt olan kişi başına düşen ekolojik ayak izleri ve biyokapasite miktarları baz alınarak karşılaştırılması için ÇKKV tekniklerine ihtiyaç duyulmaktadır. Bu amaçla Gri ilişki analiz yöntemi, erişimi sağlanan en güncel veri olan 2018 yılına ait, her alandaki kişi başına düşen ayak izi ve biyokapasite miktarlarından oluşan veri seti üzerine uygulanarak, G20 ülkelerinin tüm faaliyetlerinde ekosistemi gözetme düzeyleri karşılaştırılmaktadır. Böylece karşılaştırmada ülkelerin korudukları biyokapasite miktarı için pozitif, bıraktıkları ayak izinin büyüklüğü ölçüsünde de negatif puanlama yapılarak ülkelerin ekosistem içindeki gerçek durumlarını yani performanslarını sergilemek mümkün olmaktadır. Yapılan analiz sonucuna göre Avusturya, Kanada ve Arjantin ekosistemi gözetten en iyi ülkeler arasında yer almaktadır. Hindistan ise faaliyetlerini gerçekleştirirken ekosistemi gözetme konusunda en başarısız ülkedir. Çalışmanın, diğer performans değerlendirme çalışmalarında olduğu gibi konu ile ilgili karar verici ve politika yapıcılara ülkelerin reel profilini sergilemesi açısından fayda sağlayacağı düşünülmektedir.

**Anahtar Kelimeler:** Gri ilişki analizi, Performans ölçme, Çok kriterli karar verme tekniği, Ekosistem, Ekolojik ayak izi

## **COMPARISON OF ECOSYSTEM PROTECTION PERFORMANCES OF G20 COUNTRIES WITH GRAY ANALYSIS METHOD**

### **ABSTRACT**

Especially industrial and economically developed countries and many emerging and developing countries are countries with high ecological footprints. Some developed countries, on the other hand, continue their economic activities by paying attention to the extent that the ecological footprint does not exceed the biocapacity, in other words, the damage they create in the ecosystem is at a repairable level or the destruction does not considerable. In the ecological footprint measurement, not only the cropland, grazing and built-upland land but also see area and the amount of carbon released to the atmosphere have been included. The ecological damage that may arise in every activity of human beings is taken into consideration. The main thing required for the countries is that they do not create ecological deficits. It is desired that countries do not produce purely for consumption, protect the ecosystem and ensure its sustainability, and it is desirable to insist on leaving resources to meet the needs of future generations while meeting the needs of the present in the consumption of biocapacities. While it is possible to evaluate countries according to whether the ecological footprint is at good or bad level using classical methods, MCDM techniques are needed to compare the countries in terms of the opposite criteria such as ecological footprints and the amount of biocapacity per capita. For this purpose, the Gray relationship analysis method is applied on the data set of 2018, which is the most up-to-date data available, consisting of the amount of footprint and biocapacity per capita in each area. Thus, in comparison of the G20 countries, it is possible to show the real stance of the countries in the ecosystem, namely their performance, by scoring positive for the amount of biocapacity they protect and negative for the size of the footprint they leave. According to the results of the analysis, Australia, Canada and Argentina are among the best countries in taking care of the ecosystem while carrying out their activities. India, on the other hand, is the most unsuccessful country in this sense. It is thought that the present study will be beneficial in terms of presenting the real profile of the countries to the decision makers and policy makers on the subject, as in other performance evaluation studies.

**Keywords:** Grey relation analysis, Performans measurement, Multi criteria decision making method, Ecosystem, Ecological footprint

## BİR SERAMİDAZ İNHİBİTÖRÜNÜN DİRENÇLİ VE DİRENÇSİZ MEME KANSERİ HÜCRELERİNDEKİ APOPTOTİK ETKİLERİ

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### ÖZET

Kanser vücudtaki anormal hücrelerin kontrolsüz bölünmesi ile başlayan çok faktörlü bir hastalık grubu olarak tanımlanmaktadır. Birçok farklı nedenle ortaya çıkabilen kanser, dünyada ve Türkiye’de yüksek ölüm oranlarına neden olan önemli sağlık problemleri arasında ilk sıralarda yer almaktadır. Günümüzde kanser tedavisinde kullanılan birçok farklı tipte kemoterapötik mevcuttur. Bu ajanların kombine veya tek başlarına kullanımı ile birçok kanser türü tedavi edilmeye çalışılmaktadır. Bu uygulamalar meme kanseri gibi yüksek mortaliteye sahip bazı kanser türlerinde yetersiz olup klinik vakalarda direnç gelişimi ile karşılaşılmasına neden olmaktadır. Meme kanserinde ve diğer kanser türlerinde ilaç direnci gelişimi intrinsik veya kazanılmış olabilmektedir. Kazanılmış direncin sebebi terapi sırasında uygun olmayan doz veya ilaç kullanımına bağlanmaktadır. Özellikle meme kanserinde kemoterapi sonrasında vakaların önemli bir kısmında yaklaşık 6 ay veya bir yıllık süreçte çoklu ilaç direnci gelişimi sebebiyle rekürrens meydana gelmektedir. Bu nedenle meme kanserinin tedavisi için farklı ilaçlar ve uygulamalara ihtiyaç vardır. Son yıllarda kanser araştırmalarında hücre içi hedeflere yönelik tedavi yaklaşımları ve yeni etkili ajanların araştırılması odak noktası haline gelmiştir. Bu hücre içi hedeflerin birçoğu sfingolipid metabolizması moleküllerden oluşmakta ve bunların modülasyonu ile kanser hücreleri efektif olarak ölüme yönlendirilebilmektedir. Sfingolipid metabolizmasının kilit enzimlerinden olan seramidazların inhibitörleri kanser araştırmalarında geliştirilen ve potansiyel etkinlikleri ortaya konulmuş ilaç adayları olarak literatürde yer almaktadır. Asit seramidaz enzimlerinin inhibitörü olan n-Oleoyethanolamine (NOE)’nin dirençli meme kanseri hücre hatlarındaki antikanser etkilerini gösteren çalışmaların sayısı literatürde oldukça azdır. Bu çalışmada dirençli insan meme kanseri hücrelerinde NOE’nin sitotoksik etkileri dirençli olmayan insan meme kanseri hücreleriyle karşılaştırmalı olarak araştırılmıştır. NOE’nin sitotoksik etkileri MTT kolorimetrik testi ile, morfolojik değişiklikleri ise konfokal mikroskopik yöntemle değerlendirilmiştir. NOE, hücre proliferasyonunu doza ve zamana bağlı olarak inhibe etmiş ve düşük dozlarda etkin sitotoksositeye neden olmuştur. Konfokal mikroskopik incelemelerde NOE’nin hücre çekirdeğinde parçalanma, membran tormurcuklanması, kromatin kondenzasyonu, hücre iskeletinde delinmelere neden olduğu gözlemlenmiş ve bu değişiklikler apoptotik gösterge olarak değerlendirilmiştir. Tüm sonuçlarımız meme kanseri tedavisinde direnç gelişiminin kırılması ve etkin tedavi ajanı ve stratejilerinin geliştirilmesi konusunda NOE’nin yüksek potansiyele sahip olduğunu vurgulamaktadır. Daha ileri farmasötik ve farmakokinetik araştırmalardan sonra antikanser ilaç geliştirilmesi konusunda hem *in vitro* hem de *in vivo* uygulamalar için NOE molekülünü önermekteyiz.

**Anahtar Kelimeler:** Seramidaz inhibitörü, Meme kanseri, Konfokal mikroskopi, Sitotoksosite.

**APOPTOTIC EFFECTS OF A CERAMIDASE INHIBITOR ON RESISTANT AND  
NON-RESISTANT BREAST CANCER CELLS****ABSTRACT**

Cancer is defined as a multifactorial disease group that begins with the uncontrolled division of abnormal cells in the body. Cancer, which can occur for many different reasons, is one of the most important health problems that cause high death rates in the world and in Turkey. There are many different types of chemotherapeutics used in cancer treatment today. Many types of cancer are being treated with the combined or singular use of these agents. These applications are insufficient in some cancer types with high mortality such as breast cancer and cause resistance development in clinical cases. The development of drug resistance in breast cancer and other cancer types may be intrinsic or acquired. The cause of acquired resistance is attributed to inappropriate dosage or drug use during therapy. Especially in breast cancer, after chemotherapy, recurrence occurs in a significant part of the cases due to the development of multi-drug resistance in a period of about 6 months or one year. Therefore, different drugs and applications are needed for the treatment of breast cancer. In recent years, treatment approaches for intracellular targets and the search for new effective agents have become the focus of cancer research. Many of these intracellular targets are composed of sphingolipid metabolism molecules, and by their modulation, cancer cells can be effectively driven to death. Inhibitors of ceramidases, one of the key enzymes of sphingolipid metabolism, take place in the literature as drug candidates that have been developed in cancer research and whose potential efficacy has been demonstrated. The number of studies showing the anticancer effects of n-Oleylethanolamine (NOE), which is an inhibitor of acid ceramidase enzymes, in resistant breast cancer cell lines is very few in the literature. In this study, the cytotoxic effects of NOE in resistant human breast cancer cells were investigated in comparison with non-resistant human breast cancer cells. Cytotoxic effects of NOE were evaluated by MTT colorimetric test, and morphological changes were evaluated by confocal microscopic method. NOE inhibited cell proliferation in a dose- and time-dependent manner and caused effective cytotoxicity at low doses. In confocal microscopic examinations, it was observed that NOE caused fragmentation in the cell nucleus, membrane blebbing, chromatin condensation, and hole formation in the cytoskeleton, and these changes were evaluated as apoptotic indicators. All of our results emphasize that NOE has a high potential in breaking the development of resistance and developing effective treatment agents and strategies in the treatment of breast cancer. After further pharmaceutical and pharmacokinetic studies, we propose the NOE molecule for both *in vitro* and *in vivo* applications in anticancer drug development.

**Keywords:** Ceramidase inhibitor, Breast cancer, Confocal microscopy, Cytotoxicity.



## TOPLUMSAL BİR KAVRAM OLARAK MİTLER VE MODERN DÜNYANIN YENİ MİTLERİ

**Büşra ÖZÜDOĞRU**

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### ÖZET

Mitsel anlatılar, insan ve evrenin var oluşuna dair bizlere bir izah sunar. Bu sayede bireyin yaşamını ve tüm tecrübelerini anlamlandırmasını sağlar. Öte yandan mitler inanç ve anlam dünyası oluşturma işlevi ile içinde buldukları toplumun kültür taşıyıcı ve değer koruyucu görevine sahiptir. Toplum içinde karmaşık bulunan deneyimler, bilgiler ve davranış modelleri mitler sayesinde bir düzen ve anlam kazanmaktadır. Toplumun kutsal olana ve doğaüstü olana yaklaşımını belirlemede etkisi olan mitlerin, Aydınlanma ile birlikte itibarının azaldığını ve geçersiz sayıldığını düşünebiliriz. Zira akılcılığın ön planda tutulduğu modernite ile birlikte, mitler metafizik bir alanın garip ve anlaşılmaz ürünü olarak kabul edilerek değersiz ve akılcılık dışı olarak kabul edilmiştir. Ancak kutsal ve doğaüstüne ait kabul edilen, bilgi ve mantık bakımından rasyonel dışı olarak görülen mitlerin yerini modern dönemde yeni bir forma büründüğünü görebiliriz. O halde mitleri ilkel ve modern olarak ayırmak mümkün müdür? Mitler ile bilimi birbirinin zıddı olarak kabul edebilir miyiz? Modern insanın bu dünyaya ait kendi kutsallarını yarattığı ve bunun üzerinden kendi mitlerini oluşturduğu yönündeki fikir bu çalışmanın temel tartışma alanlarından biridir. Süperman miti, Özgürlükler Ülkesi Amerika miti, modern kadının bedeni üzerinden kurulan mitler, uzay yolculuğu mitleri vb. modern insanın mitlere olan ihtiyacının devam ettiğini göstermektedir. Mitler, hala kuşaklar arası aktarılan ve önemli bir iletişim aracı olan toplumsal bağın korunmasında, değerleri ve inançları canlı tutmada, toplumların kendi varlıklarına anlam kazandırma çabasında işlevsel olmaya devam etmektedir.

**Anahtar Kelimeler:** Mitler, Toplumsal İşlev, Modernite

**MYTHS AS A SOCIAL CONCEPT AND NEW MYTHS OF THE MODERN WORLD****ABSTRACT**

Mythical narratives offer us an explanation for the existence of man and the universe. In this way, it enables the individual to make sense of his life and all his experiences. On the other hand, myths, with their function of creating a world of belief and meaning, have the duty of cultural carrier and value protector of the society they are in. Experiences, knowledge and behavior patterns that are complex in society gain an order and meaning thanks to myths. We can think that the myths, which have an impact on determining the approach of the society to the sacred and the supernatural, have been discredited and considered invalid with the Enlightenment. Because, together with modernity in which rationality was prioritized, myths were accepted as a strange and incomprehensible product of a metaphysical field and were accepted as worthless and irrational. However, we can see that the myths, which are considered sacred and supernatural, and seen as irrational in terms of knowledge and logic, take a new form in the modern period. Is it then possible to separate myths into primitive and modern? Can we accept myths and science as opposites? One of the main discussion areas of this study is the idea that modern people create their own sacred belonging to this world and create their own myths over it. The myth of Superman, the myth of America, the land of the free, myths based on the body of the modern woman, myths of space travel, etc. shows that modern man's need for myths continues. Myths continue to be functional in preserving the social bond, which is an important communication tool that is still transmitted between generations, keeping values and beliefs alive, and societies' efforts to give meaning to their own existence.

**Keywords:** Myths, Social Function, Modernity

**BELED SÛRESİ ÜZERİNE BİR TAHLİL VE DEĞERLENDİRME: İNSANİ  
ERDEMLERİ YENİDEN İHYA ETMEK**

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**ÖZET**

Kur'ân-ı Kerîm'deki hakikatleri insanlara en iyi öğretecek olan, Kur'ân'ın kendisine inzâl olunduğu ve onun ilk muhâtabı olan Hz. Peygamber'dir. Hz. Peygamber, Kur'ân âyetlerini tefsîr ederken ilk olarak âyetleri yine başka âyetlerle tefsîr etmektedir. Çünkü Kur'ân âyetlerinden pek çoğu birbirlerini îzâh eder mâhiyette indirilmiştir. Bu âyet öbeklerinden biri olan Beled sûresi yirmi âyetten oluşan kısa bir sûre olmasına rağmen konu açısından oldukça kapsamlıdır. Sûre, insanın bazı davranışlarına değinmektedir. Bu davranışlardan bir kısmı onun Allah'a, bir kısmı da topluma karşı sergilediği davranışlarıdır. Beled sûresi, aynı zamanda insanın bu dünyada olgunlaşmasını hedeflemektedir. Bu çalışmada Beled sûresinin tahlil ve değerlendirmesiyle birlikte insanın söz konusu durumu ve sorumluluğu açıklanmakta, bu bağlamda Allah'ın ona sunduğu seçenekler betimlenmektedir. Dolayısıyla Beled sûresi, insana bu konuda yol göstermekte ve seçtiği yolun sonuçlarını açıklamaktadır.

**Anahtar kelimeler:** Tefsir, Tahlil, Kur'ân, Sûre, Beled.

**AN ANALYSIS AND EVALUATION ON THE BELED SURAH: REVIEWING  
HUMAN VIRTUES****ABSTRACT**

The one who will best teach people the truths in the Quran is he is a prophet. While the Prophet was interpreting the verses of the Quran, he first interpreted the verses with other verses. Because many of the verses of the Quran have been sent down in a way that explains each other. One of these verses al-Balad is a short surah of twenty verses but topic of surah is quite comprehensive. Surah touches on some behaviors of human. Some of these behaviors are his behaviors towards Allah and some towards society. Surah al-Balad, at the same time, intends to mature of the human in this world. In this study, together with the analysis and evaluation of the Surah al-Balad, the situation and responsibility of the human being are explained, and in this context, the options God offers to him are described. Because of, Surah al-Balad guidances to the human at this subject and explains results of human's preferences.

**Keywords:** Tafsir, Analysis, Qurân, Surah, Al-Balad.

## ÇALIŞANLARIN AYIŞIĞI KARIYER SORUNU VE MOTİVASYON İLİŞKİSİ ÜZERİNE BİR DEĞERLENDİRME

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### ÖZET

Dünya genelinde özellikle son yıllarda yaşanmakta olan iklim değişikliği, kuraklıklar, salgınlar, savaşlar, beraberinde ekonomik belirsizlikler ve piyasa dalgalanmaları, yöneticileri yeni fırsatlar keşfetmeye, yeni yönetim modelleri geliştirmeye ve alternatif stratejiler geliştirmeye yönlendirmiştir. Yöneticilerin bunu başarabilmesi ise çalışanlarına bir itici güç unsuru, teşvik etme, başarıya özendirme iklimi yaratması gibi etkin bir motivasyon ile doğrudan ilişkilidir. Motivasyon eksikliğinin hâkim olduğu durumlarda çalışanların depresif tutumlar sergileyerek örgütün amaç ve hedeflerine giden yolda sorunlar oluşmasını tetikleyebilir. Çalışanlar da ancak etkin motivasyon sayesinde iş ve meslek hayatında ilerleyebilmek, başarı elde edebilmek, maddi anlamda hayatlarını kazanmalarını sağlamak, kendilerini gerçekleştirmek ve sosyal statülerini belirlemek durumu diye nitelendirebileceğimiz kariyerlerini gerçekleştirebilmektedirler. Bireylerin temel çalışma nedeni, yaptıkları iş karşılığında elde ettikleri gelir ile kendi çıkarlarını maksimize ederek kariyer yolunda ilerlemek suretiyle rahat bir şekilde yaşamak istemesi arzusu vardır. Bu açıdan bakıldığında çalışanların ekonomik açıdan yetersiz kalması, yaptığı işin karşılığını alamadığı düşüncesi ile hareket etmesi, çalışanı gelirini arttırmak için birden fazla işte çalışmasına yönlendirmektedir. Ayışığı sorunu olarak nitelendirdiğimiz bu durum, bireylerin asıl işinde göstermeleri gereken performansı, ikinci veya üçüncü işlerinde kullanmaları sonucunda düşük performans sergilemeleri, işe devamsızlık, iş sadakatinden taviz verme gibi birçok sorunu beraberinde getirmesi münasebetiyle yöneticiler tarafından kabul edilebilir değildir. Bu sebeple yöneticiler, çalışanlara yaptıkları işin karşılığını vermek, kar paylaşımı, ekonomik teşvik ve ödüller ve ek yararlar sağlamak suretiyle özendirici araçları etkin bir şekilde kullanarak çalışanların motivasyonlarını arttırmak suretiyle önemli bir kariyer sorunu olan ayışığı sorununu aşabilmeleri mümkündür. Bu çalışmanın amacı, önemli bir kariyer sorunu olan ayışığı sorununu motivasyon ile ilişkisi üzerinden değerlendirmektir. Ayrıca sorunların giderilmesi için yapılması gerekenleri de sunmak çalışmanın bir diğer amacıdır.

**Anahtar Kelimeler:** Ayışığı sorunu, Kariyer, Motivasyon.

**AN ASSESSMENT OF THE RELATIONSHIP BETWEEN EMPLOYEES'  
MOONLIGHT CAREER PROBLEM AND MOTIVATION****ABSTRACT**

Climate change, droughts, epidemics, wars, along with economic uncertainties and market fluctuations in the world, especially in recent years, have led managers to discover new opportunities, develop new management models and develop alternative strategies. The ability of managers to achieve this is directly related to an effective motivation such as creating a driving force element for their employees, encouraging them and encouraging them to succeed. In situations where lack of motivation prevails, employees may exhibit depressive attitudes and trigger problems on the way to the goals and objectives of the organization. Only through effective motivation, employees can progress in business and professional life, achieve success, enable them to earn a living financially, realize themselves and determine their social status. The main reason for working of individuals is the desire to live comfortably by maximizing their own interests with the income they earn in return for the work they do, and by advancing on the career path. From this point of view, the fact that employees are economically inadequate and act with the idea that they cannot get paid for their work directs the employee to work in more than one job to increase his income. This situation, which we define as the moonlight problem, is not acceptable to the managers due to the fact that it brings along many problems such as low performance as a result of using the performance that individuals should show in their main job, absenteeism and compromise on job loyalty. For this reason, it is possible for managers to overcome the problem of moonlight, which is an important career problem, by increasing the motivation of employees by using incentive tools effectively by providing employees with compensation for their work, profit sharing, economic incentives and rewards and additional benefits. The aim of this study is to evaluate the problem of sore, which is an important career problem, through its relationship with motivation. In addition, it is another purpose of the study to present what needs to be done to eliminate the problems.

**Keywords:** Moonlight problem, Career, Motivation.

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**ÖZET**

Asparagaceae dünyada geniş bir alanda yayılış göstermektedir. Hemen hemen kozmopolit bir familyadır. Familya üyelerine tropik, ılıman ve kurak alanlarda rastlanmaktadır. Dünyada 128 cins ve 2929 türle, Türkiye’de ise 19 cins ve bu cinslere ait 182 türle temsil edilmektedir. Ülkemizde bu familyanın tür bakımından en zengin cinsleri sırasıyla *Ornithogalum* L., *Muscari* Mill., *Bellevalia* Lapeyr., *Scilla* L., *Asparagus* Tourn. ex L. ve *Hyacinthella* Schur’dır. *Ornithogalum* cinsi dünyada doğal olarak Avrupa’dan Afganistan’a, Etiyopya’dan Güney Afrika’ya kadar yayılış göstermektedir. Ülkemizde son yayımlanan türler de dikkate alınarak toplamda cinsin tür sayısı 61’ e çıkmıştır. Bunların 31 tanesi endemiktir. Genel olarak “Ak Yıldız” adıyla bilinen *Ornithogalum* türlerine halk arasında ayrıca “Kurt Soğanı, Tükrük otu, Köpek soğanı, Kurtkirişi, Karga soğanı, Akbaldır” gibi isimler de verilmiştir. Bazı *Ornithogalum* türleri, halk arasında etnobotanik öneme sahip olup, hem gıda hem de tıbbi bitki olarak kullanılmaktadır. *Ornithogalum* cinsine ait bazı türler ekonomik olarak da ayrı bir öneme sahiptir. Bundan dolayı dünyada kültüre alınmış türleri bulunmaktadır. Bu çalışmada, Asparagaceae familyasının önemli cinslerinden biri olan *Ornithogalum* cinsine ait üç tür (*Ornithogalum pyrenaicum*, *Ornithogalum alpigenum* ve *Ornithogalum persicum*) karyolojik yönden incelenmiştir. Sitotaksonomik çalışmalar için toplanan örneklerin soğanlarından yararlanılmıştır. Bölünür somatik hücrelerde yapılan çalışmalar sonucunda, türlerin kromozom sayıları ve karyotip analizleri yapılarak ideogramları çizilmiştir. Kromozom sayısı *Ornithogalum pyrenaicum* türünde  $2n=18$  ve karyotip formülü  $M+5m+3sm$  olarak, *Ornithogalum alpigenum* türünde  $2n=18$  ve karyotip formülü  $4m+3sm+2st$  olarak, *Ornithogalum persicum* türünde ise  $2n=24$  ve karyotip formülü  $M+3m+5sm+3st$  olarak tespit edilmiştir.

**Anahtar kelimeler:** Geofit, *Ornithogalum*, Kromozom, Karyotip, Karyolojik Analiz

## KARYOLOGICAL INVESTIGATION OF SOME *ORNITHOGALUM L.* SPECIES

### ABSTRACT

Asparagaceae is widespread in the world. It is almost a cosmopolitan family. Family members are found in tropical, temperate and arid areas. It is represented by 128 genera and 2929 species in the world, and 19 genera and 182 species belonging to these genera in Turkey. In our country, the richest genera of this family in terms of species are respectively; *Ornithogalum L.*, *Muscari Mill.*, *Bellevalia Lapeyr.*, *Scilla L.*, *Asparagus Tourn. ex L.* and *Hyacinthella Shur.* *Ornithogalum* genus naturally spreads from Europe to Afghanistan, from Ethiopia to South Africa in the world. Considering the recently published species in our country, the total number of species in the genus has increased to 61. Also 31 of them are endemic. *Ornithogalum* species, generally known as "Ak Yıldız", are also given names such as "Kurt Soğanı, Tükrük otu, Köpek soğanı, Kurtkirişi, Karga soğanı, Akbaldır" among the people. Some *Ornithogalum* species have ethnobotanical importance among the people and are used both as food and medicinal plants. Some species belonging to the genus *Ornithogalum* are of economic importance. For this reason, there are species cultivated in the world. In this study, three species of *Ornithogalum* genus (*Ornithogalum pyrenaicum*, *Ornithogalum alpigenum*, and *Ornithogalum persicum*), one of the important genera of the Asparagaceae family, were examined in terms of karyological aspects. For cytotaxonomic studies, chromosomes of the collected samples were used. As a result of the studies carried out on dividing somatic cells, idiograms were drawn by counting the number of chromosomes and conducting karyotype analyses of the species. The chromosome number and karyotype formula as  $2n=18, M+5m+3sm$  in *Ornithogalum pyrenaicum* species; as  $2n=18, 4m+3sm+2st$  in *Ornithogalum alpigenum* species; as  $2n=24, M+3m+5sm+3st$  in *Ornithogalum persicum* species was determined.

**Keywords:** Geophyte, *Ornithogalum*, Chromosome, Karyotype, Karyological Analysis



**ORTAÖĞRETİM ÖĞRENCİLERİNİN OKUL REHBERLİK SERVİSİNDEN  
YARARLANMA DÜZEYLERİNİN İNCELENMESİ**

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**ÖZET**

Bu araştırmanın amacı, ortaöğretim kademesinde bulunan öğrencilerin okul rehberlik ve psikolojik danışmanlık servislerinden yararlanma düzeylerini incelemektir. Öğrencilerin okul rehberlik ve psikolojik danışmanlık servislerinden yararlanma düzeylerine ilişkin öğrenci görüşlerinin incelendiği bu çalışmada tarama modeli kullanılmıştır. Araştırmanın verileri Siirt ili Merkez ilçesinde ortaöğretim kademesinde öğrenim görmekte olan 818’i erkek (%57), 619’u kadın (%43) toplam 1437 öğrenciden toplanmıştır. Araştırmada veri toplama aracı olarak; “Kişisel Bilgi Formu” ve Oran (2013) tarafından geliştirilen “Öğrenci Anketi” kullanılmıştır. Araştırmada elde edilen nicel verilerin istatistiksel çözümlenmesinde frekans, yüzde, aritmetik ortalama, bağımsız gruplar için t- testi ve tek yönlü varyans analizi (ANOVA) kullanılmıştır. Araştırma bulgularına göre öğrencilerin PDR servisinde yararlanma alt boyutlarına göre en çok katılım gösterdikleri alt boyut “PDR servisini ihtiyaç olarak görme”; en az katılım gösterdikleri alt boyut “danışmana güven duyma” alt boyutudur. Ortaöğretim öğrencilerinin demografik değişkenlere göre okul rehberlik servisinde yararlanma düzeylerinin farklılıklarına ilişkin sonuçlar bakımından daha önceden rehberlik servisinde yararlanma durumuna göre tüm alt boyutlarda anlamlı farklılık tespit edilmiştir. Cinsiyet değişkenine göre “eğitsel ve mesleki rehberlik alanında PDR servisinde yararlanma”, “sosyal problemlerin çözümünde ve çevreyle ilişkilerini geliştirmede PDR servisinde yararlanma” ve “PDR servisini ihtiyaç olarak görme” alt boyutlarında anlamlı farklılık tespit edilmiştir. Ayrıca öğrencilerin öğrenim gördükleri lise türü, anne ve baba eğitim düzeyine göre de anlamlı farklılık bulunmuştur. Araştırmadan elde edilen sonuçlara göre öğrenciler rehberlik servisini bir ihtiyaç olarak görmekte ve her okulda bir rehberlik servisinin bulunması gerektiğini düşünmektedirler. Araştırmaya katılan öğrencilerin okul rehberlik servisinde en fazla eğitsel rehberlik konularında destek aldıkları sonucuna ulaşılmıştır. Öğrenciler rehberlik servisinin problemlerini çözmelerinde ve doğru kararlar almalarında yol gösterdiğini düşünmektedir. Kişisel bilgilerinin rehberlik servisinde gizli tutulduğuna inanan öğrenciler, rehberlik servisiyle sorunlarını paylaşmalarının kendilerini rahatlattığını düşünmektedirler. Ayrıca öğrenciler okula ve çevreye uyum sağlamada, PDR servisinin veli ve öğretmenlerle iletişimi konusunda da olumlu düşünceye sahip oldukları sonucuna ulaşılmıştır.

**Anahtar Kelimeler:** Rehberlik ve Psikolojik Danışmanlık Servisi, Rehberlik Hizmetleri, Ortaöğretim Öğrencileri.

**INVESTIGATION OF HIGH SCHOOL STUDENTS' LEVELS OF BENEFITING FROM SCHOOL COUNSELING SERVICE****ABSTRACT**

The aim of this research is to examine the level of students in secondary education benefiting from school guidance and psychological counseling services. The survey model was used in this study, in which students' views on the level of benefiting from school guidance and psychological counseling services were examined. The data of the study were collected from a total of 1437 students, 818 male (57%) and 619 female (43%) studying in the central district of Siirt province. As a data collection tool in the research; "Personal Information Form" and "Student Questionnaire" developed by Oran (2013) were used. Frequency, percentage, arithmetic mean, t-test for independent groups and one-way analysis of variance (ANOVA) were used in the statistical analysis of the quantitative data obtained in the study. According to the research findings, according to the sub-dimensions of benefiting from the school guidance service, the most common sub-dimension of the students is "seeing the guidance service as a need"; the sub-dimension that they least agree with is the sub-dimension of "trusting the school counselor". In terms of the results of the differences in the level of benefiting from the school guidance service according to the demographic variables of the secondary school students, there was a significant difference in all sub-dimensions according to the status of using the guidance service before. According to the gender variable, a significant difference was found in the sub-dimensions of "utilizing the guidance service in the field of educational and vocational guidance", "utilizing the guidance service in solving social problems and improving relations with the environment" and "seeing the guidance service as a need". In addition, a significant difference was found according to the type of high school students are studying and the education level of their parents. According to the results obtained from the research, the students see the guidance service as a need and they think that there should be a guidance service in every school. It was concluded that the students participating in the research received the most support from the school guidance service in educational guidance issues. Students think that the guidance service guides them in solving their problems and making the right decisions. Students who believe that their personal information is kept confidential in the guidance service think that sharing their problems with the guidance service relieves them. In addition, it was concluded that the students had positive thoughts about adapting to the school and the environment, and the communication of the guidance service with the parents and teachers.

**Keywords:** Guidance and Psychological Counseling Service, Guidance Services, High School Students

**NEOLİBERAL DEMOKRASİNİN KRİZİ ÜZERİNE ALTERNATİF ARAYIŞLAR:  
POSTDEMOKRATİK BİR MÜZAKERE SÖYLEMİ GELİŞTİRME ÇABASI**

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**ÖZET**

Tarihi süreçte çeşitli tanımların yapıldığı demokrasi kavramı, günümüzde de farklı disiplinlerde en çok tartışılan konu başlıklarından biridir. Demokrasi, günümüzde çokça karşımıza çıkan ve fazlaca anlam ile anlamlandırmalarla işlenen bir kavramdır. Tarihi süreçte çeşitli tanımların yapıldığı demokrasi kavramı üzerine çeşitli tartışma yapılmıştır ve halen bir sonuca varılmamıştır. Çünkü buradaki en önemli nokta demokrasi kavramının topluluklara göre anlamlandırılması ve bu çerçevede toplumların kendi hukuk sistemi, hakikat anlayışı, ekonomik ile siyasi yapılarına işaret edebiliriz. Geçtiğimiz yüzyılda demokrasi kavramı ideal bir yönetim tarzı olarak güçlenmesine rağmen kavramın hem içeriği hem de uygulamaları derin krizlerle karşı karşıya kalmıştır. Bu noktada demokrasinin yeniden tanımlanmasına, içeriğinin yeniden biçimlendirilmesine ihtiyaç duyulmaya başlanmıştır. Post demokrasi, müzakereci demokrasi gibi tartışmalar da bu ihtiyacın sonucunda ortaya çıkmıştır. Çalışmada Neoliberal dönemde demokrasinin yaşadığı sıkıntıların nedenleri ve sonuçları incelenecektir. Demokrasi krizi bağlamında geliştirilen *post demokrasi* ve *müzakereci demokrasi* kavramları etrafında nasıl bir demokrasinin kurgulanması gerektiği sorusuna cevap aranacaktır. Çalışma, demokrasinin yaşadığı krizde müzakereye dayalı bir demokrasini kavrayışının katılım kanallarını daha fazla etkinleştireceği varsayımı üzerine kurgulanmıştır.

**Anahtar kelimeler:** Neoliberalizm, Demokrasi, Post demokrasi, Müzakereci Demokrasi

**ALTERNATIVE QUESTS ON THE CRISIS OF NEOLIBERAL  
DEMOCRACY: AN EFFORT TO DEVELOP A POSTDEMOCRATIC  
NEGOTIATION DISCOURSE****ABSTRACT**

The concept of democracy, in which various definitions have been made in the historical process, is one of the most discussed topics in different disciplines today. Democracy is a concept that we encounter a lot today and is processed with many meanings and interpretations. Various discussions have been made on the concept of democracy, in which various definitions have been made in the historical process, and still no conclusion has been reached. Because the most important point here is the meaning of the concept of democracy according to the communities, and in this context, we can point to the communities' own legal system, understanding of truth, and economic and political structures. Although the concept of democracy has been strengthened as an ideal management style in the past century, both its content and applications have faced deep crises. At this point, there is a need to redefine democracy and reshape its content. Discussions such as post-democracy and deliberative democracy have emerged as a result of this need. In this study, the causes and consequences of the problems experienced by democracy in the neoliberal period will be examined. An answer will be sought to the question of what kind of democracy should be built around the concepts of post-democracy and deliberative democracy developed in the context of the democracy crisis. The study is based on the assumption that a deliberative understanding of democracy in the crisis of democracy will activate the channels of participation more.

**Keywords:** Neoliberalism, Democracy, Post democracy, Deliberative democracy

**METİNLERARASILIK AÇISINDAN NÂBÎ'NİN HAYRÂBÂD'I**

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**ÖZET**

Metinlerarasılık, iki veya daha fazla metin arasındaki alışveriş yahut bir metnin başka metinlerle arasındaki ilişki şeklinde ifade edilebilir. Metinlerarasılığın ortaya çıkışında; hiçbir metnin daha evvel var olmuş metinlerden ayrı düşünülmemeyeceği, her metnin aslında geçmiş yazınsal geleneği taklit ya da bu birikimden etkilenme ile meydana geldiği düşüncesi etkili olmuştur. Bu düşünce doğrultusunda bakıldığında her eser aslında bir metinlerarası ilişkiler ürünüdür denebilir. 1960'lı yılların sonlarında şekillenen ve esasen bir kuram niteliği taşıyan metinlerarasılığın daha ziyade modern edebiyat incelemelerinde, anlatım yöntemleri bahsinde ele alındığı görülmektedir. Metinlerarasılığın mantığı ve kapsamı dikkate alındığında Klasik Türk edebiyatının ürünlerini de aynı çerçevede incelemenin mümkün ve gerekli olduğu anlaşılır. Böylece söz konusu eserlerde kadim metinlerin izlerini araştırmak açısından elverişli bir yol elde edilebilir. Metinlerarasılık düşüncesinden hareketle bu çalışmada 17. yüzyıl şairlerinden Nabî'nin, İran edebiyatından izler taşıyan, *Hayrabad* adlı mesnevîsi metinlerarası ilişkiler bağlamında ele alınmakta ve eser; alıntı, gönderge, aşırma, anıştırma gibi yöntemler ışığında incelenmektedir. Nitekim *Hayrabad*; ünlü İran mutasavvıflarından Feridüddün-i Attar'ın *İlahînâme* mesnevisinde, Fahr-ı Cürcan ve Padişahın Kölesi arasında vuku bulan öyküsünün hem şahıs hem de olay yönünden eklemeler yapılarak yeniden kurgulanmış şeklidir. Öte yandan Attar'ın yazdığı öykü hazin bir sonla nihayet bulmasına rağmen Nabî, yaptığı eklemelerle öyküyü bambaşka bir sona taşımıştır. Hayrabad'da hikayenin kahramanlarının İbrahim Edhem, Hatem-i Tayy, Kerem ile Aslı hikayesinin kadın kahramanı gibi tarihsel-efsanevi veya hayali şahsiyetlerin çeşitli yönlerini hatırlatacak şekilde onların hikayelerine yapılmış anıştırmalar ve başta Kuran-ı Kerim kaynaklı olmak üzere birçok tarihsel anlatı, inanış ve olaya yapılan göndergelerle metinlerarası ilişkiler kurulmuştur.

**Anahtar kelimeler:** Metinlerarasılık, Hayrabad, anıştırma, gönderge.

**IN TERMS OF INTERTEXTS, NABI'S HAYRABAD****ABSTRACT**

Intertextuality can be expressed as the exchange between two or more texts or the relationship between a text and other texts. In the emergence of intertextuality; The idea that no text can be considered apart from previously existing texts and that every text actually comes into existence by imitating the past literary tradition or being influenced by this accumulation has been influential. When viewed in line with this thought, it can be said that every work is actually a product of intertextual relations. It is seen that intertextuality, which was shaped in the late 1960s and is essentially a theory, is mostly discussed in modern literary studies, in the subject of expression methods. Considering the logic and scope of intertextuality, it is understood that it is possible and necessary to examine the products of Classical Turkish literature within the same framework. Thus, a convenient way can be obtained in terms of investigating the traces of ancient texts in the works in question. Based on the idea of intertextuality, in this study, one of the 17th century poets, Nabi's masnavi named Hayrabad, which has traces of Iranian literature, is discussed in the context of intertextual relations and the work; It is examined in the light of methods such as quotation, reference, plagiarism, allusion. As a matter of fact, Hyrabad; It is a reconstructed version of the story that took place between Fahr-i Curcan and the Sultan's Slave in the Ilahinâme masnavi of Feridüddun-i Attar, one of the famous Iranian mystics, by making additions in terms of both personality and event. On the other hand, although the story written by Attar ended with a sad ending, Nabi brought the story to a completely different end with the additions he made. In Hayrabad, the heroes of the story, such as İbrahim Edhem, Hatem-i Tayy, Kerem and the heroine of the story of Ashi, remind various aspects of historical-legendary or imaginary personalities, and many historical narratives, beliefs and events, primarily from the Qur'an, intertextual relations were established with the references made.

**Keywords:** Intertextuality, Hyrabad, allusion, send.

## $C_\lambda(X, E)$ RIESZ UZAYININ SIRA-KURAMSAL ÖZELLİKLERİ ÜZERİNE

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### ÖZET

$X$  topolojik bir uzay olmak üzere  $X$  üzerinde tanımlı reel değerli sürekli fonksiyonların uzayı  $C(X)$  uzayı diğer yönler bir tarafa her Banach uzayın bazı  $X$  kompakt topolojik uzaylar için  $C(X)$  uzayının bir alt uzayına izomorfik olmasından dolayı önem arz eder. Yakınsama yapısı  $\lambda$ ,  $X$  kümesinden  $X$  kümesinde tanımlı filtrelerin kuvvet kümesine tanımlı ve (i.) esas filtre  $[x]$ ,  $\lambda(x)$  'in elemanıdır. (ii.)  $\lambda(x)$  'in keyfi iki elemanının birleşimi de  $\lambda(x)$  'tedir. (iii.)  $\lambda(x)$ 'teki keyfi bir elemanı kapsayan filtrede  $\lambda(x)$ 'in elemanıdır., aksiyomlarını sağlayan bir haritadır.  $(X, \lambda)$  ikilisi de topolojik uzayın bir genellemesi olarak yakınsama uzayı adını alır, çünkü  $\lambda(x) = \{F: F \text{ bir filtre ve } x \text{ 'e yakınsıyor}\}$  tanımlanmak üzere  $x \rightarrow \lambda(x)$  haritası bir yakınsama yapısı belirtir. Reel sayılar üzerindeki standart norm ve standart sıralama ile birlikte bir Banach kafesidir. Bu çalışmada topolojik uzay yerine yakınsama uzayı ve reel sayılar yerine de Banach kafesi alınarak  $C(X)$ 'in bir genellemesi çalışılmıştır, şöyle ki  $f, C_\lambda(X, E)$  uzayının bir elemanıdır, yani  $f$  süreklidir ancak ve ancak  $X$ 'in her bir elemanı  $x$  için  $F, \lambda(x)$  'in bir elemanı olduğunda  $\|x_\alpha\| \rightarrow f(x)$  sağlanır. Burada  $(x_\alpha)$ ,  $F$  filtresi tarafından üretilen nettir.  $C_\lambda(X, E)$  uzayının temel sıra-kuramsal yapısı çalışılmıştır.

**Anahtar kelimeler:** Riesz uzay, Yakınsama Yapısı, Yakınsama Uzayı, Banach kafesi

**ON THE ORDER-THEORETIC PROPERTIES of THE RIESZ SPACE  $C_\lambda(X, E)$** **ABSTRACT**

The importance of the structure of the set of all Real-valued continuous functions on a topological space  $X$  could be emphasized that every Banach space is isomorphic to a subspace of  $C(X)$  for some compact topological space  $X$  without other aspects. A convergence structure  $\lambda$  is a mapping from  $X$  into the power set of all filters on  $X$  with the axioms; (i.) principal filter  $[x]$  belongs to  $\lambda(x)$  (ii.) The union of two element of  $\lambda(x)$  belongs to  $\lambda(x)$  (iii.) The filter covering the element of  $\lambda(x)$  belongs to  $\lambda(x)$ . The ordered pair  $(X, \lambda)$  is called convergence spaces as a generalization of topological spaces since the map  $x \rightarrow \lambda(x)$  where  $\lambda(x) = \{F: F \text{ is a filter and converges to } x\}$  defines a convergence structure. Real numbers with the standard norm and the standard order is a Banach lattice. In the present study the generalization of  $C(X)$  studied as taking convergence structure instead of topological space and Banach lattices instead of Real numbers with the appropriate definition give as; Let  $f$  be a function in  $C_\lambda(X, E)$  if for each  $x$  in  $X$ ,  $F$  belongs to  $\lambda(x)$  implies  $\|x_\alpha\| \rightarrow f(x)$  where  $(x_\alpha)$  refers to net generated by the filter  $F$  then it is said that  $f$  is continuous on  $X$ . The order-theoretic structure of  $C_\lambda(X, E)$  has been studied.

**Keywords:** Riesz Spaces, Convergence Structure, Convergence Space, Banach Lattices



**TÜRKÇENİN YABANCI DİL OLARAK EĞİTİMİNDE AVRUPA DİL PASAPORTUNUN (PORTFOLYOSUNUN) ETKİSİ VE ÖNEMİ**

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**ÖZET**

Ülkemiz, Avrupa’da ortak eğitim uygulamalarını öngören Socrates Projesine 24 Ocak 2000 tarihinde 253/2000/EC sayılı Avrupa Konseyi kararıyla katılmıştır. Bu nedenle, Avrupa ülkelerindeki yabancı dil öğretim uygulamaları ülkemizde de benimsenmiştir. Avrupa ülkelerinde yabancı dil öğretimi, Avrupa Konseyi Modern Diller Bölümünce belirlenen eğitim politikalarına göre yapılmaktadır. Avrupa’da ortak bir yabancı dil öğretim programı ve yabancı dil öğretiminde ortak bir standart, ortak ölçütler ve buna dayalı bir araç geliştirmeyi amaçlayan Avrupa Konseyi Modern Diller Bölümü, Avrupa Dilleri Öğretimi Ortak Çerçeve Programı (The Common European Framework of Reference for Languages)’ni oluşturmuştur. Bugün tüm Avrupa ülkelerinde yabancı dil öğretimi bu çerçeve programa dayalı olarak gerçekleştirilmektedir. Avrupa Konseyi, kültürel ve dilsel çeşitlilik için hoşgörü ve saygı gibi ortak değerlere dayalı daha büyük bir Avrupa’yı inşa etmeyi amaçlamaktadır. Her yaştaki ve alt yapıdaki insana daha fazla dil öğrenmesi ve diğer kültürlerle tanışması için uygulamalı bir yardım aracı olarak Avrupa Dil Portfolyosu kullanımını geliştirmiştir. Bu araştırmanın amacı Türkçenin yabancı dil olarak eğitim ve öğretiminde, Avrupa Dil Portfolyosunda nasıl konumlandığını, literatür tarama yöntemi uygulanarak, bu yöntemde konu ile ilgili daha önceden yazılmış olan ulusal ve uluslararası yüksek lisans ve doktora tezleri, kitaplar, makaleler, bildiriler ve çeşitli çalışmalar incelenmiş ve toplu sentezler oluşturulmaya çalışılmıştır.

**Anahtar kelimeler:** Türkçe, Yabancı Dil Eğitimi, Avrupa Dil Pasaportu

**THE EFFECT AND IMPORTANCE OF THE EUROPEAN LANGUAGE PASSPORT  
(PORTFOLIO) IN EDUCATION OF TURKISH AS A FOREIGN LANGUAGE****ABSTRACT**

Our country participated in the Socrates Project, which envisages common education practices in Europe, on January 24, 2000, with the European Council decision numbered 253/2000/EC. For this reason, foreign language teaching practices in European countries have also been adopted in our country. Foreign language teaching in European countries is carried out according to the education policies determined by the Council of Europe's Modern Languages Department. Aiming to develop a common foreign language teaching program in Europe and a common standard, common criteria and a tool based on this in foreign language teaching, the Council of Europe's Department of Modern Languages has created the Common European Framework of Reference for Languages. Today, foreign language teaching in all European countries is based on this framework program. The Council of Europe aims to build a greater Europe based on common values such as tolerance and respect for cultural and linguistic diversity. He developed the use of the European Language Portfolio as a practical help tool for people of all ages and backgrounds to learn more languages and meet other cultures. The aim of this research is how Turkish is positioned in the European Language Portfolio in education and training as a foreign language, by applying the literature review method, previously written national and international master's and doctoral theses, books, articles, papers and various studies on the subject were examined and collective syntheses were tried to be formed.

**Keywords:** Turkish, Foreign Language Education, European Language Passport

## **PENDNÂME-İ İBN SİNAN**

**Ömür ERBAY**

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### **ÖZET**

Pendnâmeler, topluma ve fertlere yön vermek amacıyla yazılmış eserler olup yanlış giden bir durumu değiştirmek doğru olan bir tutumu ise pekiştirmek gayesi güder. Pendnâmeler/nasihatnâmeler, bu özellikleri yönüyle köklü bir geçmişe sahip olup Arap, Fars ve Türk edebiyatlarında sıklıkla kullanılmışlardır. Öğüt vermek maksadıyla yazılan bu kitapların manzum ve mensur şekilleri mevcuttur. Milli Kütüphane Yazma Eserler Kataloğu'nda bulunan 06 Mil Yz A 8294 numaralı bir mecmuada rastladığımız ve 06 Mil Yz A 8294/7 numarayla İbn Sinan adına kayıtlı olan pendnâme üzerine yapmış olduğumuz çalışmamızda pendnâmenin müellifine, eserin biçim ve muhteva özelliklerine ve transkripsiyonlu metnine yer verdik. Pendnâme/nasihatnâme; mesnevi nazım şekli ile Aruz vezninin Hezec Bahri'nin Mefâ'îlün Mefâ'îlün Fe'ûlün kalıbıyla kaleme alınmıştır. Eser, dinî-tasavvufî bir mesnevi olup nefsin aldatmaları ile dünya hayatına dalıp Allah'tan uzaklaşmanın insana ne kadar zarar verebileceği hususu üzerine bina ettirilmiştir. Eserde, ömrün kısalığı ve yapılması gerekenlerin çok olduğu özellikle vurgulanmış olup Allah'ın rızasına kavuşmanın ancak gaflet uykusu denilen sarhoşluktan uzak kalmakla mümkün olacağı gözler önüne serilmiştir. Ayrıca pendnâme/nasihatnâmede; dünyaya bağlı olmanın insanı felakete sürükleyeceği, Allah'ın rızasını kazanmanın oruç tutup, zekat verip, namazı kurallarına uygun olarak kılmakla mümkün olacağı, dilini kötü işler için kullanmayanların feraha ereceği ön plana çıkarılmıştır. İslamî bir yaşam tarzının nasıl olması gerektiğini ifade eden beyitlerle örülü pendnâme, bu yaşam tarzının daima Allah'la beraber olmayı hedeflediğini ve bunu sağlayabilmek için de çoğu zaman bir uzlet halinde olup halktan uzak kalmayı gerektirdiğini dikkatlere sunmaktadır. Eser, 4 varak olup 88 beyitten oluşmaktadır.

**Anahtar Kelimeler:** Pendnâme, İbn Sinan, Mesnevi

**İBN SİNAN'S PENDNÂME****ABSTRACT**

Pendnames are works written to give direction to society and individuals and they aim to change a wrong situation and reinforce a right attitude. Pendnames/nasihathnames have a deep-rooted history in terms of these features and have been frequently used in Arabic, Persian, and Turkish literature. These books were written to give advice, and have a verse and prose forms. In our study on the pendname which we found in a journal with the number 06 Mil Yz A 8294 in the National Library Manuscripts Catalogue and registered with the name of Ibn Sinan with the number 06 Mil Yz A 8294/7, we included the author of the pendname of the form on content features of the work and the transcribed text. Pendname Mefâ'îlün Mefâ'îlün Fe'ûlün was written by Hezec Bahri in the mesnevi verse form of the Aruz meter. The work is a religious-mystical masnavi and is built on the issue of how much harm can be done to a person by immersing himself in world lifeworldlythe deceptions of the soul and turning away from Allah. In the work, it is especially emphasized that life is short and there are many things to be done, and it is revealed that it is possible to attain Allah's approval only by staying away from the drunkenness called heedlessness sleep. In addition, in pendname; it is emphasized that being attached to the world will lead people to disaster, disasterning Allah's approval will be possible by fasting, paying zakat performing prayers by the rules, and that those who do not use their tongues for bad deeds will be relieved. The pendname, which is knitted with couplets expressing how an Islamic lifestyle should be draws attention to the fact that this lifestyle always aims to be with Allah and to achieve this, it is often necessary to stay away from the public by being in a state of isolation. The work consists of 4 leaves and 88 couplets.

**Keywords:** Pendname, İbn Sinan, Masnavi

## **ORTAOKUL ÖĞRENCİLERİNİN TARİHSEL BİLGİYE YÖNELİK GÖRÜŞLERİNİN BELİRLENMESİ**

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### **ÖZET**

Tarih öğretimi, özellikle ulus devletler için, akademik bilgi haricinde milli bilinç oluşturmak için de önem taşımaktadır. Bu nedenle özellikle örgün eğitimde tarihsel bilginin kavratılması konusu ayrı bir ehemmiyete sahiptir. Tarih konularının öğretiminde yaşanan sıkıntılardan birisi, konunun anlatıldığı sınıfın seviyesine uygun bilgilerin verilmesi olarak dikkat çekmektedir. Sorunun netleştirilmesi açısından öğrencilerin tarihsel bilgiye yönelik görüşlerinin belirlenmesi önem taşımaktadır. Bu araştırmanın amacı ortaokul öğrencilerinin tarihsel bilgiye yönelik görüşlerinin belirlenmesidir. Bu kapsamda sosyal bilgiler eğitimi dahilinde tarih eğitiminin incelenmesi ve ortaokul öğrencilerinin tarihsel bilgiye dair görüşlerin saptanması amaçlanmaktadır. Araştırmanın çalışma grubu 5, 6, 7. sınıfları içeren 614 ortaokul öğrencisinden oluşmaktadır. Araştırmanın amacına ulaşmak için nitel ve nicel araştırma yöntemlerinden yararlanılarak bir nedensel tarama araştırması yapılmıştır. Araştırmanın problemine "Orta Okul Öğrencilerinin Tarihsel Bilgiye Yönelik Görüşlerini Belirleme Ölçeği", "Kaynak Çalışmalarından" oluşan veri toplama araçları yoluyla veri çeşitlenmesine gidilerek cevap aranmıştır. Orta Okul Öğrencilerinin Tarihsel Bilgiye Yönelik Görüşlerini Belirleme Ölçeği, Kaynak Çalışmaları veri toplama aracı olarak birlikte kullanılmıştır. 5, 6, 7. sınıfları içeren öğrenciler arasından toplanan 614 veri, nicel verileri oluşturmaktadır. Nicel veriler SPSS programı kullanılarak çözümlenmiştir. Sonuç olarak öğrencilerin cinsiyet değişkenlerinin tarihsel bilgiye yönelik görüşlerinde herhangi bir anlamlı farklılığa sebep olmadığı görülürken; özel ders alma durumu, anne eğitim düzeyi, baba eğitim düzeyi ve aile gelir durumu ile tarihsel bilgiye yönelik görüşlerinde anlamlı bir farklılığın olduğu görülmektedir. Bu kapsamda özel ders almayan öğrencilerin alanlara göre, anne ve babalarının eğitim düzeyleri düşük öğrencilerin anne ve baba eğitim düzeyleri yüksek öğrencilere göre ve aile gelir durumları düşük seviyede olan öğrencilerin aile gelir durumları yüksek seviyede olan öğrencilere göre tarihsel bilgiye yönelik görüşlerinin daha yüksek olduğu sonucuna ulaşılmıştır.

**Anahtar Kelimeler:** Eğitim, Sosyal Bilgiler, Tarih, Tarihsel Bilgi

**DETERMINING SECONDARY STUDENTS' OPINIONS ON HISTORICAL KNOWLEDGE****ABSTRACT**

History teaching, especially for nation states, is also important for creating national consciousness besides academic knowledge. For this reason, the subject of comprehending historical knowledge, especially in formal education, has a special importance. One of the problems experienced in teaching history subjects draws attention as giving information appropriate to the level of the class in which the subject is taught. In order to clarify the problem, it is important to determine the students' views on historical knowledge. The aim of this research is to determine the views of secondary school students on historical knowledge. In this context, it is aimed to examine history education within the scope of social studies education and to determine the views of secondary school students on historical knowledge. The study group of the research consists of 614 secondary school students from 5th, 6th and 7th grades. In order to achieve the aim of the research, a causal survey research was conducted by using qualitative and quantitative research methods. The answer to the problem of the research was sought by using data collection tools consisting of "Scale for Determining Middle School Students' Views on Historical Knowledge" and "Source Studies". The Scale for Determining Secondary School Students' Views on Historical Knowledge and Resource Studies were used together as a data collection tool. 614 data collected from students in 5th, 6th and 7th grades constitute the quantitative data. Quantitative data were analyzed using the SPSS program. As a result, it is seen that the gender variables of the students do not cause any significant difference in their views on historical knowledge; It is seen that there is a significant difference in their views on taking private lessons, mother's education level, father's education level and family income status, and historical knowledge. In this context, it has been concluded that the students who do not take private lessons have higher views on historical knowledge than the students whose parents' education level is low compared to the students whose mother and father education level is high, and the students whose family income status is low compared to the students whose family income status is high.

**Keywords:** Education, Social Studies, History, Historical Knowledge

**THE POTENTIAL ADVERSE EFFECTS OF TRIFLURALIN ON THE OXIDATIVE STRESS RESPONSE OF *MYTILLUS GALLOPROVINCIALIS* DIGESTIVE GLAND**

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**ABSTRACT**

There is high demand for herbicides based on the necessity to increase crop production to satisfy world-wide demands. Trifluralin (TFL) is one of the most widely herbicides used in weed control. Increased application of these compounds may affect non-target organism's particularly aquatic organisms. The aim of this study is to assess the effects of TFN administered at different concentrations (C1=5µg/L; C2=100µg/L and C3=150µg/L) for 4 days to evaluate antioxidant status in the digestive gland of *Mytillus galloprovincialis*. Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), Malondialdehyde (MDA), Protein carbonyl (PCO) levels were increased in treated groups compared to controls. Moreover, an enhancement of the reduced glutathione levels (GSH) was observed when compared to the control. Our study provided the evidence that TFL may induce toxicity via oxidative stress installation in *Mytillus galloprovincialis* digestive gland.

**Keywords:** Trifluralin, *Mytillus galloprovincialis*, digestive gland, Antioxidant status.

**RESTORATIVE PROPERTIES of LICORICE****Mahira Firudin kizi Amirova**

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**ABSTRACT**

Licorice is a wild plant widely distributed over all surfaces of the globe. It has been used since ancient times in the treatment of various diseases, but it received real recognition after the COVID pandemic, when all other means were powerless in treating and saving millions of lives, while the valuable components contained in licorice helped control immunomodulation with immunosuppression in such a way as to include one mechanism and turn off the process that is not suitable for this segment of the disease. Various fractions of saponins and flavonoids are the main active ingredients of this plant. Possessing a multifaceted effect on receptor-mediated signaling, pro- and anti-inflammatory processes, licorice compounds have long been used in the East. Only medicinal plants created by the Almighty Creator have such unique properties, which makes them fundamentally excellent and indispensable tools in the treatment of diseases. The hepatoprotective properties of this plant are manifested in fatty degeneration of the liver, the plant is effective in bronchitis, anorexia, weakness, inflammation and infectious diseases, etc. This work presents a diverse spectrum and mechanism of action of licorice as a harmless effective herbal remedy indispensable in various therapeutic aspects

**Keywords:** inflammation, licorice, receptors, saponins, therapy, triterpenoids



**CONCENTRATION OF SPRAYING SOLUTION EFFECT ON THE STRUCTURAL,  
MORPHOLOGICAL AND OPTICAL PROPERTIES OF NIO THIN FILMS****Radhiyah M. Aljarrah***Iraq/University of Kufa/ Faculty of Science/ Department of Physics***ABSTRACT**

The aim of this work is the production of nickel oxide thin films with a suitable properties using simple and inexpensive homemade spray system of various component of nickel nitrate salt ( $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ ) dissolving on 100 ml of distilled water to prepare various solution concentration (0.01, 0.03, 0.05, 0.07 and 0.1 M) and deposit it on glass substrate with  $420 \pm 8$  °C substrate temperature. The thickness of the films varies between 250 to 350 nm with concentration. The effect of the solution concentration and the thickness on structural, and optical properties was investigated. The results obtained with several characterization techniques such as XRD, AFM and SEM, are well consistent and suggest that the prepared films were uniform and well adherent to the substrates. All the films are polycrystalline in nature with a cubic which is known as rock salt structure having a preferential orientation along the (111) plane., also showed that there was slightly shift in the direction of diffraction peaks with increasing the concentration . The crystalline size (D) of (NiO) films increased with increasing the molarities concentration. From the transmittance spectra, for all samples it was observed that the optical transmittance is direct allowed and the transparency values were moderate to relatively weak, it decrease by increasing the molar concentration of the spraying solution and the thickness of the films .Also this increases found to be decreasing in the band gap energy for the above mentioned reasons, and its values ranged from 3.85 to 3.15 eV.

**THE BATTLE OF AHZĀB (TRENCH) IS A GREAT MILITARY STRATEGY  
(IN THE MIRROR OF HISTORY)**

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**ABSTRACT**

With the Battle of Badr, Islam and nonbelief have been coexisting in a chain ever since. An essential link to this pressing circumstance was the battle of Ahzab. Islam was to be completely wiped from the land, according to the infidels. However, their attempts to accomplish their objectives kept failing. Nevertheless, the Muslims lost the battle of Uhud badly. After Badr, too, Abu Sufyan asked Muslims to compete once more. The unbelievers, however, fled in terror as the Muslims arrived at the tournament. The battle of Ahzab eventually resulted from their ongoing preparations in the interim. The purpose of this study was to shed insight on the battle of Ahzab's historical context. For new academics, this research effort can be extremely valuable and important.

**Keywords:** Islam, Infidels, Battle of Ahzab, Muslims

**FOOD SECURITY SYSTEM IN INDIA: A COMPARATIVE ANALYSIS****DR. DNOOP K***Assistant Professor, IMPSS, Kerala, India dinoopdas36@gmail.com***DR.SIM JOSEPH***Research Fellow, SIRP Kerala, India***ABSTRACT**

A food system is a composition of varieties of activities which begins from the process of planting a seedling nurturing it, preparing it manufacturing from it, finally an eatable form farm to the plate then again to the garbage can or compost pile. Food can be consider as a projectile which drives the growth of a nation. Particularly agriculture. Farming related business activities in a sustainable manner will help the individual or group of individuals and finally in turn the nation as whole. India's agriculture is directly depended on the climate of the geographical area it possess. Indian agriculture till the date depend directly or indirect on the help of monsoon. Hence the ultimate change will have a great impact on India as far as convinced there is a rise in temperature all over the world. This is reduced the rain fall and another impact of climate change is like cyclones hitting. The unexpected coast lines of India and thus causing Agricultural losses. The rising in temperature will change the perception trended and thus in turn Affect the water availability this is also out cited frequency of enhance weather conditions. But Indians case is unique one got self sufficient in its food production soon at her its independence. There are a lot of reason for it. The green revolution is the Germ that made Indian bright in the case of food production it actually tripled the Indian production of food grains soon after is implementation in 1960's it helped to reduce the food insecurity by a percentage of 50, similarly poverty too.

**E-LEARNING AND HOW TO BENEFIT FROM IT AS A STRATEGIC OPTION IN LIGHT OF THE CORONA PANDEMIC: AN ANALYTICAL STUDY FOR FACULTY AND STUDENTS IN IRAQ**

**Assistant Professor Dr. Samyiah Hani Ajeel**

**Prof. Dr. Azhar Nima Abdul Zahra**

**Assistant Professor Dr. Mariam Ibrahim Hammoud**

**ABSTRACT**

The current study aimed to identify the reality of e-learning in Iraqi universities in light of the Corona pandemic for faculty members and students, and the descriptive analytical approach was used to collect data. E-learning in light of the Corona pandemic is an important requirement and one of the basic requirements for the Ministry of Education in order to achieve its educational goals, as the World Health Organization has committed, according to the crisis, the spread of the Covid (19) epidemic since (2019) to most countries of the world, including the State of Iraq, to close universities and schools for a period of time Months. This prompted her to shift from the face-to-face study method to the electronic method, as many educational institutions followed one direction in order to complete their educational path, which is the direction of (e-learning) as a feature of education to keep pace with the general educational situation to reduce the spread of the epidemic and preserve public health, and therefore a problem was embodied The study searches for the reality of the e-learning pattern and its activation, and the extent to which it is used in the fields of education and its successes and acceptance in the Iraqi society. The selection of (110) from the total number of students and teaching staff in these Iraqi universities, and statistical methods were used for analysis based on the questionnaire forms that are valid for analysis and they number (150). Advanced Statistical SPSS v.23 SMART PLS The results of the current study showed us that the appreciation of students and faculty members in Iraqi universities for the reality of e-learning in light of the Corona pandemic is moderate, and the results of the study indicated that there is a statistically significant effect of the e-learning variable. Training and empowerment of teaching staff and students on how to use e-learning.

**Keywords:** organizational learning, organizational knowledge management.

**RESEARCH ON LOAD SPECTRUM COMPILATION METHOD OF EXCAVATOR  
CONNECTING ROD BASED ON MIXED DISTRIBUTION****MSc ZHOU YuJie***Key Laboratory of Road Construction Technology and Equipment of Ministry of Education, Chang'an University China***ABSTRACT**

The anti-fatigue design of connecting rod is the research focus in the mechanical field. If the load spectrum accuracy is not solved well, it will bring great errors to the fatigue analysis and subsequent research. The measured load data of excavator connecting rod were processed and analyzed, and the measured data were compressed and edited. In the process of load spectrum compilation, the load amplitude and frequency relationship of connecting rod were fitted together based on the mixed distribution, and the number of mixed distribution was optimized. Compared with the single peak distribution, the mixed distribution improved the energy utilization rate. It provides reference for the precision of fatigue life evaluation of key components of construction machinery equipment.

**Keywords:** excavator; Connecting rod; mixed distribution; Spectrum compilation;

**NEXUS BETWEEN DIGITAL FINANCE AND GOVERNMENT REVENUE IN  
NIGERIA****Gbenga Festus BABARINDE***PhD Student, Department of Banking and Finance, University of Nigeria, Enugu Campus, Nigeria;***Matthew Oladapo GIDIGBI***PhD Student, Department of Economics, University of Ibadan, Ibadan, Nigeria;***ABSTRACT**

Digital finance is any financial offering to the financial market that are enabled by digital technology and channels like automated teller machine, point of sales terminals, internet, personal computer, mobile phone and others. Digital finance is a burning issue among researchers, policy makers and practitioners. Although, this financial innovation has come to stay but what remains unsettled is its application to and effect on different sectors of the economy and most particularly, the public sector fiscal management. Thus, using Vector Autoregression (VAR) technique, and Pearson correlation test, this study empirically examines the nexus between digital finance and government revenue in Nigeria during period, 2009Q1 and 2019Q4. It is confirmed in this study that a weak, positive but non-significant correlation exists between digital finance and government revenue but the relationship is not statistically significant. The study also indicates an evidence of a positive and non-significant effect of digital finance on government revenue in Nigeria and simultaneously, government revenue has negative and non-significant effect on digital finance. These suggest that there is no causal relationship between the two variables. It can therefore be concluded that there is no causal relationship between digital finance and government revenue in Nigeria in the period of study. It is therefore recommended that Government should implement policies aimed at digitalization of its fiscal operations and strengthen frameworks and institutions that will encourage full digitalization of payment system and other financial services in Nigeria.

**Keywords:** Digital Finance, Government Revenue, Digitalization, Fiscal Operations, Payment System, Nigeria,

**IMPACT OF BREAKFAST HABITS ON THE GROWTH AND DEVELOPMENT OF  
ADOLESCENT GIRLS IN DISTRICT FAISALABAD**

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**ABSTRACT**

This study explored the impact of breakfast habits on the growth and development, academic achievements, class participation and school attendance. The study was a quantitative total of 120 adolescent girls purposively selected from three schools who participated in the study. Data were collected through interviews and Chi-square was applied to collect data to test the hypothesis. This study indicated that all the four alternate hypotheses were accepted ( $P < 0.05$ ) establishing a statistically significant relationship between breakfast habits with the growth and development ( $P < 0.05$ ), school attendance ( $P < 0.05$ ), class participation ( $P < 0.05$ ) and academic achievements ( $P < 0.05$ ). This implies that with the improvement and consistency in the breakfast habits, growth and development, class participation, class attendance and academic achievements of the students are likely to improve significantly which is directly related for decision making in future. Breakfast is important for the cognitive development of students and optimal school performance thus more attention should be given to the regular consumption of breakfast. Teachers, parents and concerned institutions should underlay their roles to let children be consistent in their breakfast habits.

**Keywords:** Breakfast habits, growth, development, school performance, adolescent girls.

**A STUDY ON THE FACTORS DETERMINING GREEN CONSUMPTION****Manita Matharu***Amity School of Business, Amity University, Noida, UP, India***ABSTRACT**

It is essential, for both environmental and economic reasons, to be familiar with ecologically sustainable purchasing habits. The purpose of this research is to investigate the factors that influence green curtailing behaviors and consumer adoption of green products including consumer adoption of technologies that are marketed as green (eco-innovations). This study develops a comprehensive conceptual framework of consumer behavioral intentions in green consumption. This study contributes to the current body of knowledge by incorporating the environmental concern perspective of consumers, about the adoption of green consumption. Our findings will enable managers and future academics to appreciate how environmentally conscious consumer attitudes may be fostered through sustainable consumption practices. In addition, they will assist firms in recognizing potential prospects, innovations, and other benefits derived from adhering to green or sustainable consumption habits.

**Keywords:** green, green consumption, values, sustainable consumption



**FUTURE IMPLICATIONS OF ARTIFICIAL INTELLIGENCE AND  
TECHNOLOGY: ANALYSIS OF THE CURRENT INTELLECTUAL PROPERTY  
LAWS AND ITS RELATIONSHIP WITH ARTIFICIAL INTELLIGENCE****Dr. Komal***Professor, Dean PG Program IILM Law School, IILM University Gurgaon***Ms. Tanya Sharma\****Research Scholar, IILM Law School, IILM University Gurgaon***ABSTRACT**

With the world continuously evolving, we are witnessing some major technological advancements. Technological tools have started to influence various facets of legal profession including those areas upon which they traditionally counted on proficient human opinion, Artificial Intelligence being the same. Intellectual property rights (IPR) are rights given to persons over the creations of original works of authors which are artistic, literary, technical, or scientific work in the fields of patent, copyrights, trademark and so on. Artificial Intelligence (AI) is the intelligence produced by machines. It is the concept which begins the moment, machines are able to accomplish the tasks in lieu of human intelligence. The researchers will theoretically analyse the Intellectual property rights (IPR) under the Indian patent and copyright law pertaining to provisions Section 6 of the Patents Act, 1970 and section 2(d) of the Indian Copyright Act. The concept to give AI status of a creator is still questionable and unfamiliar. There are no existing laws to specifically protect creations made from AI as original works. In particular Copyright law and Patent law do not recognise author other than a natural person for their inventions. Author in the Indian copyright act under section 2(d) is considered to be a human or legal person, thus making the idea of machine to be protected under this act restricted. Section 6 of the Patents Act, 1970 states inventor to be a person claiming to be the true and first inventor of the invention. The WIPO Conversation on Intellectual Property and Frontier Technologies will examine the economic potential of AI and understand the importance of issues faces by the inventors and IP offices to which can provide the best support to AI innovation.<sup>3</sup> The law does not clearly define if an original work is created by AI without human intervention then who will be considered the copyright owner? Also what will happen If a person plagiarizes or infringes another's original work of AI then who will be punished, either the coder/creator of Artificial Intelligence or the buyer of the creation. This paper is to review the existing provisions and seek answers to these questions through theoretical research. With this paper the researcher seeks to analyse technological advancements and growing usage of Artificial Intelligence and its interface with existing Intellectual Property laws.

**Keywords:** Artificial Intelligence, Intellectual Property Rights, Copyright, Patent, Innovations, Original Work.

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<sup>3</sup> IP And Frontier Technologies." *The WIPO Conversation on Intellectual Property and Frontier Technologies – April 2022*, [www.wipo.int/about-ip/en/frontier\\_technologies/frontier\\_conversation.html](http://www.wipo.int/about-ip/en/frontier_technologies/frontier_conversation.html). Accessed 22 Nov. 2022.

**ADOPTION OF AMERICAN AUDITING STANDARDS AS AN INTRODUCTION TO  
PROFESSIONAL BEHAVIOR IN IRAQI AUDITING FIRMS FROM THE VIEWPOINT OF  
THEIR AUDITORS AN EXPLORATORY STUDY OF THE OPINIONS OF A SAMPLE OF  
WORKERS IN ACCOUNTING AUDITING COMPANIES**

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**ABSTRACT**

aim of the study The current measurement of the level of professional behavior in the Iraqi auditing companies from the viewpoint of the auditors working in them in the light of the American auditing standards. The study population consists of 40 auditors, who were selected by random. The descriptive approach was used in the current study. To achieve the objectives of the study, the questionnaire was adopted, and its validity and reliability were confirmed. The results showed that the level of professional behavior in the Iraqi auditing companies from the point of view of the auditors working in them was average, and the results of the study showed a significant effect of the gender variable in favor of the male category, and the absence of a statistically significant effect for the educational qualification variable, and there is no statistically significant effect for the years of experience variable. In light of the results, the study recommended that the Iraqi auditing companies' administrations attach great importance to professional behavior, as they work to stimulate conducting studies and research from time to time, in order to study the work environment in which professional behavior will grow in all its circumstances and variables.

**Key words:** Professional Conduct, Audit Firms

**OPTIMAL SIZING OF MICROGRID SYSTEM FOR AN ISOLATED SITE WITH  
GPV/WIND/DG/BATTERIES USING HOMER****Mr. Mohamed Lamine Benaissa***Laboratory of Applied Automation and Industrial Diagnosis (LAADI)  
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Djelfa University, Algeria***ABSTRACT**

A hybrid Renewable energy system (HRES) is integrated into a Nano Grid system (NG), and it's a Suitable solution to provide power to off-grid and rural areas in developing countries. This research paper focuses on the optimization of an HRES connected to a stand-alone Nano Grid system consisting of photovoltaics (PV), wind turbines (WT), batteries (BT), diesel generators (DG), and inverters for Isolated country houses units which that's far away a 250 km to the south of Algeria capital city. For our hybrid system, the meteorological data of Solar Insolation is taken for Djelfa, Algeria (Longitude 3°6.6' E, Latitude 35°13.6'N), and the pattern of load consumption of the load is studied and suitably modeled for optimization of the hybrid energy system using HOMER software. HOMER (Hybrid Optimization Model for Electric Renewable) is a design model that determines the hybrid system's optimal architecture and control strategy. This result is validated through evolutionary computing such as GA (genetic algorithm). Our objective is selected as minimizing the total capital cost, subject to the constraint of the Loss of Power Supply Probability (LPSP). Studies have proved that the genetic algorithm converges very well and the methodology proposed is feasible for optimally sizing standalone hybrid power systems, On the other hand, the fuzzy logic is applied to the boost converter to develop characteristics of its performance like response time and steady-state error under different conditions like irradiation a temperature as well as to non-linearity of the I-V characteristic by tracking the maximum power point of the solar energy system. So, to demonstrate the effectiveness of this study we tried to make the simulation program with MATLAB/ Simulink which was used with several scenarios applied with different changes in parameters like the irradiation and temperature.

**Keywords:** Optimal sizing, NanoGrid, MicroGrid Hybrid Renewable Energy System, fHOMER, MATLAB, Djelfa, Algeria

**PREVALENCE AND ASSOCIATED RISK FACTORS OF STRONGYLOIDIASIS AMONG ORPHANAGES AND SOME ALMAJIRI SCHOOLS IN SOKOTO METROPOLIS, SOKOTO STATE, NORTH-WESTERN NIGERIA****Yusuf Muhammad Sanyinna***Department of Biology, Faculty of Natural and Applied Sciences, Nigerian Army University Biu, P.M.B. 1500, Biu, Borno State, Nigeria.**Department of Animal and Environmental Biology, Faculty of Life Sciences, Kebbi State University of Science and Technology, P.M.B. 1144, Aliero, Kebbi State, Nigeria.***Daniel Dan-Inna Attah***Department of Animal and Environmental Biology, Faculty of Life Sciences, Kebbi State University of Science and Technology, P.M.B. 1144, Aliero, Kebbi State, Nigeria.***Victoria Ebere Ukatu***Department of Animal and Environmental Biology, Faculty of Life Sciences, Kebbi State University of Science and Technology, P.M.B. 1144, Aliero, Kebbi State, Nigeria.***ABSTRACT**

Strongyloidiasis is a serious public health problem in under-developed and developing countries like Nigeria. Therefore, comprehensive local epidemiological data are very vital for successful control and prevention of this infection particularly among orphanage homes and *Almajiri* schools. This study was carried out to determine the prevalence and associated risk factors of strongyloidiasis among orphanages and some *Almajiri* schools in Sokoto Metropolis, Sokoto State, North-Western Nigeria. A descriptive cross-sectional survey was conducted among a total of 400 orphans and *Almajiris* in the study area. Stool samples were collected and examined using both direct wet-mount and formalin-ether concentration techniques by following standard operating procedure. Data were analyzed using the SPSS Version 26.0 and Chi-Square ( $X^2$ ) test, and  $P < 0.05$  was considered to be statistically significant. The prevalence of strongyloidiasis was calculated and expressed in percentages. The overall prevalence of strongyloidiasis was found to be 08 (2.00%). Based on institutions, the infection rate was greatly higher in the *Almajiri* schools 07 (1.75%) than in the orphanages 01 (0.25%). In relation to gender, the infection rate was higher in males 05 (1.25%) than in females 03 (0.75%). Also, based on age-group, the subjects aged 8 – 10 years were more infected 05 (1.25%) than the rest 03 (0.75%). However, there was no statistically significant difference ( $P > 0.05$ ) between the prevalence of strongyloidiasis among orphanages and *Almajiri* schools. Type of food normally eaten, fruit/vegetable washing before eating, going to fishing/swimming, and coming in contact with refuse/sewage were significant factors ( $P < 0.05$ ) for strongyloidiasis in this study. The study revealed the prevalence of *Strongyloides stercoralis* infection among the subjects in the study area. Therefore, provision of safe food and drinking water, regular deworming exercise, government interventions, health education and discouragement of open defecation are recommended.

**Keywords:** Prevalence; Epidemiology; Risk Factors; *S. stercoralis*; Orphanage Homes; *Almajiri* Schools; Sokoto Metropolis; North-Western Nigeria.

**SPEECH ACTS AND METACOMMUNICATIVE ATTITUDES AS A SOURCE OF GENRE FORMATION AND A FACTOR OF GENRE PERCEPTION. POETRY OF ASANA KAİGY**

*The article was written within the framework of the project «Scientific concept of Kazakh rhetoric: rhetorical ideal, identity, argumentation and speech practice»*

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**ABSTRACT**

The report is devoted to the study of Kazakh rhetoric in terms of the processes of genre formation and genre perception. The identification of the connection between speech acts and metacommunicative attitudes based on the material of the works of the poet of XV century zhyrau Asan Kaigy allows us to substantiate a new approach to the structure of the genre of a lyrical work. On the other hand, the systematization of the poet's methods of influencing the reader contributes to understanding the communication between the author and the recipient. The subject of the analysis are such types of speech acts as "imperative", "interrogative", "narrative sentence", etc. as the most frequent in the poet's style. Their influence on the structure of genres such as parable, appeal to the khan, tolgau, instruction, philosophical and landscape lyrics reveals in the utterance of the Asan such a communicative attitude as the speaker's conscious idea of communication and focus on the listener. On the other hand, this approach contributes to the study of the pre-linguistic and post-linguistic phases of communication, namely the intention and style of implementing the author's intention. Thus, the algorithm of communication as a sequence of components: the speaker's personality – the form / content of the message – the listener's personality reflects the correlation of three levels of linguistic personality (Y.N. Karaulov): verbal-semantic, cognitive and pragmatic allows through the reconstruction of the act of communication, to describe the picture of the world of zhyrau and the techniques of controlling the listener's consciousness with the help of linguistic means, as well as the activation of the unconscious through the use of symbols of the Kazakh folklore consciousness. The pragmatic nature of communication between zhyrau and his recipient raises the problem of fascination (Yu. Knorozov). The report examines the impact of the author on the addressee as the ability to generate lively interest or attract attention. Such a view becomes a source of analysis of the poet's psychological and artistic skill and indicates the connection between the method of influence considered in the system of tropes and the grammatical / syntactic organization of the text as a source of genre strategy. The popular concept of fascination and fascinativity in modern science, studied as a communicative phenomenon, contributes to such a promising direction as the description of the processes of genre formation and genre perception in the Kazakh lyrics of the Middle Ages. At the same time, reception as an individual perception of the text by the reader becomes the object of consideration in comparison with the supposed author's understanding of the text, known since the days of German receptive aesthetics as the idea of an 'implied reader'.

**Keywords:** genre, reception, fascination, speech act, utterance

**EVALUATION OF THE EFFECTS OF BROMELAIN AND PINEAPPLE STALK EXTRACT ON HISTOMORPHOMETRY OF THE UTERUS IN FEMALE ALBINO RATS**

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**ABSTRACT**

A total of thirty-six female albino rats (of the age 4-6 weeks) were randomly assigned to four groups of nine rats each. Group A served as the control group and received 0.3 ml of distilled water daily *per os*. Group B and C received 200 mg/kg and 400 mg/kg of pineapple stalk extract *per os* respectively, while Group D received 30 mg/kg of bromelain *per os*. All the rats were allowed to mate after 2 days of treatment. After 3 weeks of treatment, histopathology of the uterus was conducted on the rats. It was observed that bromelain and pineapple stalk extract did not produce any significant change in the histomorphometry of the uterus. Photomicrographs obtained showed normal uterine histological features of rats in all the groups consisting of the endometrium, myometrium and perimetrium. Normal histological architecture of the uterine horns was observed in all the groups. There was no significant difference ( $p \geq 0.05$ ) in the endometrial and myometrial thickness in groups A, B, C and D.

**Keywords:** Bromelain, pineapple, uterus, histology, rats.

**ANALYZE OF OIL AND GAS ACCIDENT ASSOCIATED WITH DRILLING  
OPERATION USING FISHBONE DIAGRAM**

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**ABSTRACT**

Oil and gas drilling is an important phase in petroleum industry life. it is the most important phase and the most expensive in terms of cost and time. this phase “drilling” associated with many constraints and incidents. The most common is lost-of circulation, fire explosion, blowout, explosion...etc. this paper analyze over than 26 incidents and accidents occurred around the world during the period between 2000 and 2018 based on reports and research articles, The results showed that the number of incidents doubled over the period 2012-2015 by 31%. also the results showed that explosion is the most common incident by 31%. finally in the period between 2016 and 2018 the number of fatalities has increased by 54%.

**Key words:** Drilling incident, Fishbone Diagram fire explosion, statistical analyses, industrial hazards.

**ALLEE EFFECT ON THE PREY-PREDATOR MODEL OF HOLLING TYPE-I  
FUNCTIONAL RESPONSE****Nisad Sardar**

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**ABSTRACT**

It is quite well-known that the study of dynamic behavior of the prey-predator models has emerged as one of highly researched topics in recent days. In our paper, we have tried to establish a prey-predator model of functional response of Holling type-I along with the allele effect. The dynamic behaviors of this model have also been discussed in detail. With the help of numerical simulation, the theoretical analysis has been illustrated elaborately. The equilibrium points of this model have been located by means of numerical analysis and the stability of these equilibrium points has also been analyzed. The position of these equilibrium points has been shown graphically by means of computational simulation. To analyze equilibrium points we use Hartman-Grobman theorem and for non-hyperbolic critical points we use numerical simulation.



**MARKSİST EDEBİYAT ELEŞTİRİSİ BAĞLAMINDA “BACAYI İNDİR BACAYI  
KALDIR” HİKÂYESİ**

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**ÖZET**

Bir felsefe olan Marksizm her alanda olduğu gibi sanatı dolaylı olarak edebiyatı da etkilemiştir. Marksist Edebiyat felsefesi Sovyet Yazarlar Birliği Kongresi'nde devletin resmi bir edebiyatı olmuş ve Toplumcu Gerçekçi olarak adını değiştirmiş toplumun istekleri doğrultusunda eserler vermeye başlamıştır. Bu felsefe ve akım her toplum gibi Türk toplumunu da 1930lu yıllardan itibaren politik, felsefe, ekonomi ve sanat alanlarında yeni çağrışımlar açmaya başlamıştır. Özellikle köy enstitü çıkışlı öğretmenler edebiyatla ilgilenmiş ve bu bağlamda öğretmenlik yaptıkları yerlerdeki köy halkının dertlerini Marksist felsefe açısından ele alarak eserlerini bu doğrultuda yazmaya başlamışlardır. Türk edebiyatının hikâye ve roman türlerinde önemli eserler veren Sadri Ertem Toplumcu Gerçekçi akımından etkilenmiştir. Sadri Ertem'in babasının asker olması ve görev yerinin değişmesinden dolayı farklı illerde ve köylerde bulunmuş ve köy halkını yakından tanıma fırsatı yakalamıştır. Sadri Ertem'in felsefe ile uğraşması ve felsefe öğretmenliği yapması da onun Marksist felsefeye yönelmesine ve bu bağlamda eserlerinde Marksist edebiyat eleştirisinin oluşmasına katkı sağlamıştır. Bu çalışmada Marksist edebiyat eleştirisi kurumsal açıdan bahsedilmiş bu kuram Türk edebiyatında toplumcu gerçekçi yazar olan Sadri Ertem'in Bacayı İndir Bacayı Kaldır adlı hikayesi üzerinde incelenmiştir.

**Anahtar kelimeler:** Marksizm, Marksist Edebiyat Eleştirisi, Toplumcu Gerçekçilik

**THE STORY OF "BACAYI İNDİR BACAYI KALDIR" IN THE CONTEXT OF  
MARXIST LITERARY CRITICISM**

**ABSTRACT**

As a philosophy, Marxism has indirectly affected literature as well as art. Marxist philosophy of literature became an official literature of the state at the Congress of the Union of Soviet Writers and changed its name as Socialist Realist and started to produce works in line with the demands of the society. This philosophy and movement, like every society, has started to open new connotations in the fields of politics, philosophy, economy and art in the Turkish society since the 1930s. Especially teachers from village institutes were interested in literature and in this context, they started to write their works in this direction by considering the problems of the village people in the places they teach in terms of Marxist philosophy. Sadri Ertem, who produced important works in the story and novel genres of Turkish literature, was influenced by the Socialist Realist movement. Due to the fact that Sadri Ertem's father was a soldier and his place of duty changed, he had been in different cities and villages and had the opportunity to get to know the people of the village closely. Sadri Ertem's dealing with philosophy and his teaching as a philosophy teacher also contributed to his orientation to Marxist philosophy and in this context, to the formation of Marxist literary criticism in his works. In this study, Marxist literary criticism is mentioned from an institutional point of view, and this theory is examined on the story of Sadri Ertem, a socialist realist writer in Turkish literature, named Bacayı İndir Bacayı Kaldır.

**Keywords:** Marksizm, Marxist Literary Criticism, Social Realizm, Sadri Ertem

**A SYSTEMATIC ANALYSIS OF THE IMPACT OF COVID-19 LOCKDOWN ON  
SLEEP HEALTH IN ATHLETES****Dr. Asif Ali**Associate Professor, Department of Physical Education & Sports Science, Government College  
University, Lahore. Email: asif.ali@gcu.edu.pk**Fariq Ahmed**BS student, Department of Physical Education & Sports Science, Government College University,  
Lahore.**Abstract**

**Background:** The role of sleep on the sports performance and psychophysical health of the athletes is considered to be vital. Covid-19 epidemic is reported to have negative impact on psychological health of the masses. Critical analysis regarding the impact of Covid-19 on athletes sleep remains unaddressed yet. **Objective:** The objective of this systematic review is to determine the effect of COVID-19 pandemic on the sleep in athletes. **Methods:** The major research data bases such as PubMed, Science Direct, Taylor & Francis, Google scholar etc., were used to conduct the systematic search for relevant articles. A total of 5128 article titles and their abstracts were retrieved by conducting preliminary search. Following further screening, 68 full text articles were identified. This resulted in obtaining 16 research studies found to be related to the objective of this study that were finally selected for quality assessment. Finally, only 13 eligible studies had sufficient quality and were included for the final analysis. Among those, ten studies (N=10) were cross-sectional, two were experimental, and one study used quasi-experimental approach, respectively. **Results:** Nine out of thirteen (9/13) studies demonstrated a significant negative impact of Covid-19 on sleep health, whereas, three studies (3/13) showed positive effect. However, only one study proclaimed no effect of pandemic on sleep in athletic population. **Conclusions:** The results of the systematic analysis showed mix results, as 69% of the included studies showed negative impact, 23% of the studies showed positive impact and only 7% studies showed no significant effect. Based on these findings, there is some tendency to suggest that Covid-19 might have impacted negatively to the sleep health of athletes, since, majority of the studies provided support to this view. Even though, the findings are conclusive in this regard. Most of the studies used self-reported measures to assess sleep health. Hence future research should be conducted using direct measures such as (triaxial accelerometer) to measure sleep health.

**Keywords:** - Covid-19, lockdown, Sleep, Athletes, Pandemic

**TIME SERIES ANALYSIS OF GST REVENUE, EXPENDITURE BUDGET AND BUDGET DEFICIT****Samreen Lodhi**

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**ABSTRACT**

Government introduces tax reforms to finance additional expenditure and budget deficit. However, efficient implementation is crucial to achieve economic goals. Government faces number of challenges while implementing tax reforms due to tax evasion, difficult tax filing procedures and public resentment. Moreover, government faces another challenge when to analyze whether certain tax reform was successful in achieving its goals or not and proposes measures that must be introduced to make it successful. The aim of broadening tax base reforms is either to lower budget deficit or to increase the expenditure budget in the economy. Therefore, this study utilizes a model to analyze the effectiveness of GST reform and its further Withholding scheme measures in attaining its objectives in the context of Pakistan. The paper helps policy makers understand the upshots of GST reform and to get a view of possible implications and glitches in its implementation if was ineffective. Otherwise, this study would also aid policy makers understand possible reasons and measures taken to make the reform successful. The paper analyses 28 years of GST, Budget Deficit and Expenditure Budget data from 1990 to 2018 of Pakistan by using Ordinary Least Square model. As evident by the results of the study, there is a significant impact of GST revenue on Budget Deficit (P-value<0.05) and Expenditure Budget (P-value<0.05). Moreover, GST predicts 91.56% and 98.88% variation in Budget Deficit and Expenditure Budget. The results also suggested that GST after the implementation of Withholding Sales tax still have significant impact on both of the independent variables i.e. Budget Deficit and Expenditure Budget, explaining 74.88% and 97.41% variation.

JEL Classification: H20, H26

**Keywords:** GST, Budget Deficit, Expenditure Budget, OLS

**IN THE WAY OF ORGANIZATIONAL DEVELOPMENT: INEVITABLE CHANGES IN  
KABABJEES, PAKISTAN****Sobia Jamil**

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Declarations: All authors declare that they do not have any conflict of interest. It is declared that animal or human testing is neither applicable nor relevant to this study.

Acknowledgment: This research is not supported by any funding agency

**ABSTRACT****Purpose**

The purpose of this case study is to analyze the organizational development and adaptation of innovative technological advancements of kababjees regarding customer services on utmost priority, policy maker's problems and what are the prospects of their business and how they can make their business more profitable and successful.

**Methodology**

This study is exploratory based on primary data collected from an interview, and we have not run any software because our data is not quantity wise it is quality-wise.

**Findings**

This study aims to examine how food restaurants like kababjees lead to success with the help of organizational development. With this important and effective information, strategy planners or marketers can formulate or develop an appropriate strategy on these factors that enable them to outdo the competitors.

**Practical Implications**

Findings of the case study for kababjees that clients have no more than five values, so the values are easy for employees to remember and understand what is important to the company that kababjees can improve through organizational development.

**Keywords:** Development, intervention, successful kababjees, organization structure.

**PATTERN OF PSYCHOTROPIC MEDICATION AMONG INPATIENT ADMITTED  
TO PSYCHIATRIC WARD IN ALHUSSAINY TEACHING HOSPITAL IN  
KERBALA CITY**

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**ABSTRACT**

**Aim:** To assess the psychotropic drug prescribing patterns among the inpatients psychiatric ward.

**Introduction:** The incidence of psychosis worldwide has been estimated at approximately 50 in 100,000 people, while the incidence of schizophrenia (the most frequent eventual diagnosis among cases of first episode psychosis) is approximately 15 in 100,000 per year. Antipsychotic medications have been used since the 1950s to treat psychosis; they can be used to treat acute psychosis from any cause and to manage chronic psychotic disorders such as schizophrenia. If an effective method of identifying patients with probable psychiatric disorder can be implemented, utilization data summarizing prescribing patterns of agents used in their treatment should be informative. Large pharmacy databases with nationwide scope can be useful sources of data for investigating utilization rates for specific treatments.

**Key words:** Psychotropic Medication, psychosis, First and second-generation antipsychotic medications

**ENTREPRENEURIAL SKILLS ARE NECESSARY FOR PROFESSIONAL SUCCESS  
IN TODAY'S DIGITAL ERA**

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**ABSTRACT**

For most professionals to succeed in today's business market, they need certain entrepreneurial skills. This paper aimed to describe and systematize these competencies, to highlight the impact of entrepreneurial education platforms in developing entrepreneurial and managerial competencies given the current phenomena of globalization and digital transformation. Documentary analysis and critical reflection on the data to be collected will allow us to identify the impact of education on entrepreneurs, and the socio-economic and sociocultural reasons behind the relevance of this issue. As a result, the development of a framework is designed to be relevant to the needs of professionals in the current global and digital era. This paper will present evidence that entrepreneurial skills are necessary for professional success in today's job market. Today's complexity and unpredictability require this type of capability to enable global and digital transformation, create valuable products, and develop innovative services as a team. In this sense, skills that support behaviors enable focus and openness to novelty, value creation, and effective communication. We will analyze the entrepreneurial competencies - openness to the new, self-education, creating solutions to emerging problems, and communicating effectively - that will integrate the following competencies: creativity and innovation, initiative, self-efficacy and resilience, strategic planning and evaluation, problem-solving and decision making, transformational leadership, clear and visual communication, teamwork and networking and digital communication. We will create and validate an entrepreneurial competency model, which will allow us to measure the degree of development of these competencies.

**Keywords:** entrepreneurial competencies; entrepreneurial education; entrepreneurial profile; reference framework.

**MINIMUM CAPITAL REQUIREMENTS, CORPORATE RESTRUCTURING AND BANKS  
PERFORMANCE–AN EMPIRICAL ANALYSIS OF MERGED BANKS IN PAKISTAN**

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**ABSTRACT**

This study has been done with the purpose to evaluate the impact of Mergers of banks for increasing paid up capital as required by SBP on the performance of the Banking companies. Bank of international Settlement suggest through its Basel recommendations regarding capital adequacy requirements. It's a regulation that banks should be merged with other banks so as to increase their paid up capital requirement as prescribed by State bank of Pakistan. Otherwise for smaller banks there exist risk of Liquidity, risk of market Failure, credit risk ,operational risk and other types of risk. Theoretically, the suppositions are that Mergers improves the performance of the company due to increased market power, and provide other internal and external boost. Banks performances are directly connected with the economic progression in the country as they channelized the funds from surplus unit to deficit unit. They are considered the lifeblood of an economy. This study after examining the financials and profitability ratios before and after consolidation shows that Banks solely were going into profit but after merger they couldn't do much to contribute positively in the performance improvement. The study therefore recommends that to increase the paid up capital requirements merger may not be a good option or it should be an efficient merger. Management of banks and Regulatory Authorities should go some other strategic plans to ensure that adequate measure is being put in place to determine increasing rate of all profitable returns. Consolidation of banks is hardly successful to improve the banking sector financials.

**Keywords:** Bank's profitability, merger, capital Adequacy, economic growth.



**THE BATTLE OF AHZĀB IS A GREAT MILITARY STRATEGY OF THE HOLY  
PROPHET (PBUH) (THE ACTUAL FACTS OF THE HISTORY)**

**Dr. Naseem Akhter (Associate Professor)**

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**Abstract**

With the Battle of Badr, Islam and nonbelief have been coexisting in a chain ever since. An essential link to this pressing circumstance was the battle of Ahzab. Islam was to be completely wiped from the land, according to the infidels. However, their attempts to accomplish their objectives kept failing. Nevertheless, the Muslims lost the battle of Uhud badly. After Badr, too, Abu Sufyan asked Muslims to compete once more. The unbelievers, however, fled in terror as the Muslims arrived at the tournament. The battle of Ahzab eventually resulted from their ongoing preparations in the interim. The purpose of this study was to shed insight on the battle of Ahzab's historical context. For new academics, this research effort can be extremely valuable and important.

**Keywords:** Islam, Infidels, Battle of Ahzab, Muslims

**PEACE IS A BASIC BRICK OF DEVELOPING SOCIETY (UNDER ISLAMIC DIRECTIVES)**

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**ABSTRACT**

The concept of peace is defined as the absence of violence in any society or a healthy, positive international or inter-human relationship. In this situation, all members of society enjoy social, economic, equality, political rights, and protection. Peace is considered an essential component of the well-being of society. Historically speaking, anarchy reigned worldwide before the advent of Islam. That illiterate culture lacked any understanding of law and order. The introduction of Islam brought about a period of social stability and protection for all of humanity. But regrettably, we have lost sight of Islam's teachings throughout time, and as a result, society today still suffers from many of the same issues that existed before the arrival of Islam. So that a peaceful society can be built, people must abide by Islamic precepts. In terms of its research, this research study may be exceptional and useful to others due to its specific field.

**Keywords:** Islam, Humanity, Peace, Society, Violence

**TERMINOLOGY AND TRANSLATION RELATIONSHIP**

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**Abstract**

Relationship between Terminology and translation in specialised translation A language has to adapt to all situations of communication with the necessary terminology in consonance with their technological and commercial developments or it is doomed to disappearance. Linguists have generally shown little interest in terminological studies and not all experts agree that terminology constitutes a separate discipline, or a theoretical subject. Understood as a process of creating, compiling, processing and choosing terms of specialized subject in one or more languages, terminology supports the standardization of a language and its implications by optimizing communication among specialists and professionals and providing help to translators. Maybe not independent, but terminology has gradually become rather an interdisciplinary and transdisciplinary discipline linked to a range of subdisciplines, from Linguistics, Lexicology, Semantics, Sociolinguistics, Communication to Philosophy, Logics, Sciences or even Computer Science.

**Keywords:** Terminology, process, terms, translation, science

**MONITORING PRE AND POST MONSOON DROUGHT PATTERN IN A SEMI-ARID REGION OF WESTERN INDIA**

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**ABSTRACT**

In the western semi-arid regions of India, severe drought occurs every 8-9 years and has become a common phenomenon. Therefore, two drought indices, namely Temperature Condition Index (TCI) and Vegetation Condition Index (VCI), were derived from Landsat datasets to assess and monitor the drought patterns during the pre-monsoon and post-monsoon seasons between 1996 and 2022 in Latur district of western India. In addition, the average frequency layers (AFL) of all drought and land use indices were constructed to study the relationship between them. The findings indicate that during the study period, there was a significant increase in the region classified as high, very high and severe drought. The largest increase was observed in the high drought class, which increased from 2532.45 to 4792.49 km<sup>2</sup> and from 1559.84 to 3342.32 km<sup>2</sup>, respectively, based on the TCI for the pre-monsoon and post-monsoon seasons, and from 1269.81 to 1787.77 km<sup>2</sup> based on the VCI for the post-monsoon season. The spatial correlation results show a significant although heterogeneous relationship between land use and drought indices. Both the VCI and TCI are cost-effective, less time-consuming methods and provide reliable results with good accuracy in drought monitoring analysis. The results of this study can help in drought management planning and mitigation in the study area. A similar tool can be used in other parts of the world, advancing the global literature.

**Keywords:** Semi-arid region; Drought pattern; Temperature condition index (TCI); Vegetation condition index (VCI); Average frequency layer (AFL); Land use indices.

**STUDIES ON ENGINEERING APPLICATION DOMAINS OF INDUSTRY 5.0 IN INDIA**

**Shivam Priyadarshi**

B.Tech. Mechanical Engineering students

**Mainak Pal**

B.Tech. Mechanical Engineering students

**Lalawmpuia**

B.Tech. Mechanical Engineering students

**Manapuram Muralidhar**

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Arunachal Pradesh, INDIA-791 109

**ABSTRACT**

Global population has reached 8 billion with a baby girl Vinis Mabansag born in Tondo, Manila on 15<sup>th</sup> November 2022, Tuesday as per the United Nations. As the population increases the material requirements will also be increased. Manufacturing has to cater the needs of the people on Earth with the available resources including technology. With the advent of technologies in the yester- centuries like Steam engine, Electricity, Computers, the Internet & Robotics various industrial revolutions have been evolved. These include Industrial Revolution 1.0 (1760-1840), Industrial Revolution 2.0 (1871-1914), Industrial Revolution 3.0 (1970-2012), Industrial Revolution 4.0 (2011 and beyond) and Industrial Revolution 5.0 (2020 and beyond). After the initialization of digital India, AI and Internet, the manufacturing industry has undergone significant changes on the technology front. Most of the industries are embedding emerging technologies into various manufacturing machines/ processes to improve productivity, quality, reducing cycle time and quantities down to 1 with flexibility. Industry 5.0 emphasis on the integration of human hands and brains back into the industrial framework which focuses on transforming factories into the Internet of Things (IoT), smart facilities that use cognitive computing, collaboration with robots (cobot) and link via cloud servers. Man and machine coming together to improve the means and effectiveness of production are known as the Fifth Industrial Revolution 5.0. In India there are large number of micro small medium enterprises which produces 40 percent of national Industrial production. It seems not much work has been done in industry 5.0 application domains and hence in the present work, an attempt has to be made to identify specific engineering application domains for Industry 5.0 considering its sub-systems for global society.

**Keywords:** Industry 5.0, Cobot, Digital Twins, Small to Medium Enterprise

**COLORING R-DISTANCE GRAPHS****Yegnanarayanan Venkataraman**

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**ABSTRACT**

A vertex  $k$ -coloring  $f$  of a simple graph  $G = (V, E)$  is a function from  $V(G)$  to the set  $\{1, 2, \dots, k\}$ . It is called proper, if any two adjacent vertices of  $G$  are colored differently. The least number of colors used in the above coloring is called the chromatic number  $\chi(G)$  of  $G$ .  $f$  is called a  $r$ -distance coloring if any pair of vertices separated by a distance of at most  $r$  is colored differently. The least number of colors used in such a  $2$ -distance coloring is denoted by  $\chi_r(G)$ . A probe on  $r=2$ -distance coloring was started by the authors in [1, 2]. It was continued especially for planar graphs by several others in [3-9]. The  $r$ -distance coloring possess vast scope in the study of frequency assignment challenge in communication networks. Coloring  $r$ -distance graphs handles this task nicely when a pair of transceivers separated by a distance  $r$  precludes due to interference the same channel use.[10]. We review in this article certain general results concerning both upper and lower bounds of  $\chi_r(G)$  subject to certain restrictions on the minimum degree of  $G$ , girth of  $G$ , connectivity of  $G$  and also on the spectral radius depending on the adjacency matrix of  $G$ .

**Keywords:** graphs, coloring,  $r$ -distance coloring, distance graphs

**PRODUCTION OF BAMBOO PRODUCTS TO ENCOURAGE SUSTAINABLE  
CONSUMPTION FOR ENVIRONMENTAL PROTECTION****Aamna Imran**

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**Yumna Ali**

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**ABSTRACT**

The world is moving towards the use of sustainable products for a better environment. There are many positive outcomes of using sustainable products including environmental protection, waste minimization, and most importantly cost-effectiveness. While, in Pakistan, around 3.9 million tons of plastic waste is recorded and increasing annually. Deforestation is another main environmental concern in our country, unfortunately in Pakistan, only 5.7 pc of the land area is covered with forests. Our project idea is to manufacture “Sustainable Bamboo Products to save our Planet” which addresses these main environmental concerns. The UN has already given some goals for the betterment of the world. One of its SDGs is SDG 12 “To ensure sustainable consumption and production patterns”. It aims for the world to ‘do more with less: reducing unsustainable resource use, which can result in deforestation and pollution. Bamboo products are renewable and have a low or even negative carbon footprint across their lifecycle. Bamboo plants have many uses and can replace materials with high carbon emissions, such as PVC, steel, and concrete. This reduces pressure on the use of forest timber resources. Increasingly, bamboo can create products that are very useful for sustainable public infrastructure. Our project consists of three main stages including the collection stage, the manufacturing stage, and the final product. In the first stage, the cleaned bamboo plants will be obtained from the suppliers at wholesale prices, then comes the manufacturing stage where the bamboo will be cut down into strips, and these strips will be passed through the lamination process to give them the shape of a board, then the final products will be made through these boards. All this work is done by small machines and through the labor force, making our project cost-effective. Our target market is retail stores, as well as these products, can also be used in normal households. So, in the last stage, our product will be supplied to these potential customers. This is our motive to promote the use of our local resources and by doing value addition, we can serve our own people by keeping the environment safe. We are motivated to work on creating more sustainable products through bamboo in the future.

**Keywords:** SCP, Bamboo Products, SDG 12, Environmental protection, Local resources

**TOPOLOGICALLY REGULAR OPEN SETS IN RELATOR SPACES****Muwafaq Mahdi Salih**Department of Mathematics, College of Basic Education, University of Duhok, Iraq.  
muwafaq.mahdi@uod.ac**Abstract**

A family  $\mathcal{R}$  of relations on a set  $X$  is called a relator on  $X$ , and the ordered pair  $X(\mathcal{R}) = (X, \mathcal{R})$  is called a relator space. Relator spaces of this simpler type are already substantial generalizations of not only ordered sets and uniform spaces, but also topological, closure and proximity spaces.

As it is usual, for any  $x \in X$  and  $A \subseteq X$ , we write

(1)  $x \in \text{int}_{\mathcal{R}}(A)$  if  $R(x) \subseteq A$  for some  $R \in \mathcal{R}$ ;

(2)  $x \in \text{cl}_{\mathcal{R}}(A)$  if  $R(x) \cap A \neq \emptyset$  for all  $R \in \mathcal{R}$ .

Regular open sets were first introduced by Kuratowski with reference to a paper of Henri Lebesgue. However, their importance became completely clear only after the consideration of Stone.

Following Kuratowski's definition, we introduce the regular open sets in relator spaces as follows.

A subset  $A$  of the relator space  $(X, \mathcal{R})$  will be called topologically regular open if

$$A = \text{int}_{\mathcal{R}}(\text{cl}_{\mathcal{R}}(A)).$$

Moreover, we investigate some important properties and characterizations of topologically regular open sets in relator spaces. For instance, we prove that if  $\mathcal{R}$  is a reflexive relator on a set  $X$  and  $A \subseteq X$  such that  $\text{int}_{\mathcal{R}}(\text{cl}_{\mathcal{R}}(A)) \subseteq A \subseteq \text{int}_{\mathcal{R}}(A)$ ,

then  $A$  is topologically regular open set.

Furthermore, if  $\mathcal{R}$  is a topological relator on a set  $X$ , then for any  $A \subseteq X$  we have  $\text{int}_{\mathcal{R}}(\text{cl}_{\mathcal{R}}(A))$  is topologically regular open. The above results published in a joint paper with Themistocles M. Rassias and Árpád Szász.

2010 Mathematics Subject Classification. 54E15, 54D05, 54G15, 54G20.

**Key words:** Generalized uniformities, Generalized open sets, Relator spaces



**FACTORS AFFECTING PEDESTRIANS' FREE-MOBILITY AND SOCIAL DISTANCING TO COMBAT COVID-19: EVALUATION OF PEDESTRIANS' MOBILITY AND URBAN SPACE IN DOWNTOWN OF NEKEMTE CITY, ETHIOPIA**

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**ABSTRACT**

Peoples' free mobility and social distancing in urban centers are among the methods to combat the pandemic of COVID-19. Proper implementation of social distancing needs adequate roads infrastructures to support basic human movement within the urban areas. However, socio-economics, transportation and urban space facilities of developing countries like Ethiopia are the challenging factors for free mobility and to implement social distancing. Thus, this study is used downtown of Nekemte city as case study to identify the factors affecting the pedestrians' free mobility and implementation of social distancing to fight against corona virus. A survey questionnaire containing 11 parameters explaining factors affecting pedestrians mobilities were distributed for pedestrians' and factor analysis was used to identify the most influencing parameter for the free mobility and social distance in the city. The result showed that *in adequate walkways* (i.e. narrow, deteriorated and overcrowded walkways and streets), *using pedestrians' ways for other function* and *in adequate urban public service spaces* such as at banks, shops, taxi and hospitals, are the major factors affecting the free mobility and implementation of social distancing against COVID-19. To achieve appropriate implementation of social distancing in down town areas, it needs a programs and policy to restrict on streets parking, streets vendors and using pedestrians' ways for others rather than for pedestrians' mobility hence enable to achieve healthy social and environment.

**Keywords:** Social distancing, COVID-19, Pedestrians' ways, Vendors, downtown of Nekemte, Factors analysis

**SPECIAL COMPOSITION OPERATOR'S INTERACTION BETWEEN DIRICHLET  
TYPE SPACES AND BLOCH-TYPE SPACES**

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This paper is a combined work between me and my supervisor Dr Sanjay Kumar, Associate Professor at Department of Mathematics, Central University of Jammu.

**ABSTRACT:**

In this paper, we use some examples to describe the boundedness and compactness of the Volterra composition operators  $J_g$ , and  $I_g$ , between Dirichlet-type spaces  $D_\alpha^p$  such that  $(\alpha > -1, 0 < p < \infty)$  and Bloch-type spaces  $\mathfrak{B}^\beta$  such that  $\beta > -1$  on the unit disc  $D$ .  
Keywords: Volterra operators, Dirichlet type spaces, Bloch type spaces, boundedness and compactness.

**ENERGY STORAGE CHARACTERISTICS OF 0.5 BaTiO<sub>3</sub>–Bi<sub>x</sub>Na<sub>x</sub>(Mg<sub>0.67</sub>Nb<sub>0.33</sub>)<sub>1-x</sub>Nb<sub>x</sub>****Mr. Asif Ali**

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**ABSTRACT**

The role of oxide perovskites is very fascinating and technologically very important in electronic circuits in the form of capacitors, ferro-electric random-access memories (FeRam), sensors, actuators and energy storage applications. Dielectric materials with perovskite structure are widely used for above discussed practical applications. Capacitors are most widely used component in electronic devices. However the Multilayer ceramic capacitors are dominated over a single layer due to their volumetric efficiency. Barium titanate (BaTiO<sub>3</sub>) based ceramics are of special interest for MLCCs applications. In the present research project, 0.5 BaTiO<sub>3</sub>–Bi<sub>x</sub>Na<sub>x</sub>(Mg<sub>0.67</sub>Nb<sub>0.33</sub>)<sub>1-x</sub>Nb<sub>x</sub> ( $x = 0.10, 0.20, \text{ and } 0.30$ ) ceramics solid solution were synthesized by conventional solid state sintering route. While the obtained properties of samples were characterized by using different characterization tools. X-ray diffraction, Scanning Electron Microscopy for microstructural analysis, LCR meter and Ferroelectric tester were used for the study of energy storage characteristics of the sample. Phase identification of the samples showed the formation of a single phase cubic perovskite-structure (space group Pm-3 m) which was further confirmed using Raman spectroscopy. The Raman spectroscopy result are in agreement with the XRD. Microstructural analysis of the samples revealed some voids in the samples while grain size was observed to decrease with increasing NaNbO<sub>3</sub> concentration. The addition of NaNbO<sub>3</sub> shifted maximum temperature  $T_m$ , to below room temperature and the stability range of 0.5BaTiO<sub>3</sub>–0.5Bi(Mg<sub>2/3</sub>Nb<sub>1/3</sub>)O<sub>3</sub> previously reported ceramics sample was enhanced. The sample with  $x=0.20$  exhibited  $\epsilon_r(\text{mid})$  with minimum variation of  $\pm 15\%$  stable over a wide temperature range from - 85 to 500 °C and most importantly a low dielectric loss of  $< 0.05$  stable across a wide temperature range - 100 to 426 °C was maintained. The thermally stable dielectric properties of sample  $x = 0.2$  suggests that it could be useful candidate material for capacitor applications in both low (X9R) as well as harsh environment applications.

**Keywords:** BaTiO<sub>3</sub>, Capacitors, Ceramics, High Temperature dielectrics, Harsh Environment, X9R

**BAYESIAN NETWORKS EFFECTIVENESS FOR ELECTRICAL SYSTEMS  
MAINTENANCE PLANNING**

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**Abstract**

Due to its financial benefits, the static synchronous compensator is now utilized more and more in electrical networks. This paper intends to propose a method for reactive energy compensation by optimizing a complex electrical system maintenance based on a reliability procedure. The intricacy of electrical system architecture is simply one facet of its complexity; the electrical network and interactions with reactive energy compensators (STATCOM) are equally important. In order to address this complexity constraint and evaluate the time-variant dependability of an electrical system, Bayesian networks are used. In order to optimize the electrical system's preventive control interval, a global cost that takes into account additional expenses associated with system operational uncertainty is included into the probabilistic technique. The found results can be applied to enhance the performance of the electrical system reliability.

**Key words:** Reliability, Maintenance, Electrical system, BNs

## **BIODEGRADATION OF AZO DYES BY HALOPHILIC BACTERIA**

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### **ABSTRACT**

The trend of urbanization and industrialization has granted the world with a lot of applicable and remarkable benefits. Along with the various advantages it also brings some issues and the revolution of industry comes with environmental problems. Like other industries, development in textile industry has brought the contamination of soil and water with effluent dyes, Therefore treatment of dye-contaminated wastewater discharged from the textile and other dye-stuff industries is necessary to prevent contamination of soil surface and ground water. The cost effective biological strategy is the need of the time to complete mineralization of organic pollutants. The current study is design to treat the toxic synthetic dyes that is present in textile waste effluent by using different microorganism in an environmental friendly manner. Total forty bacterial strains were isolated from effluent and dye contaminated soil samples using MSM (Minimal Salt) medium. After wards, the isolates were exploited for their dye degradation activity by employing agar well diffusion and calorimetric methods. Six out of forty bacterial cultures presented maximum dye degradation efficiency against five different azoic dyes. This suggests that these bacteria release extracellular enzymes which showed dye degradation ability. However, this research is beneficial to explore biodegradation potential of bacteria so that they can be used in the treatment of different waste effluents release from textile dyeing sector.

**Keywords:** Dye degradation, halophiles, azoic dyes

**CHITOSAN-DOPED STRONTIUM OXIDE NANOCOMPOSITE TO REMOVE  
METHYLENE BLUE AND CIPROFLOXACIN FROM WASTE WATER****Dr. Muhammad Ikram**Assistant Professor (Physics), Solar Applications Research Lab, Department of Physics,  
GC University Lahore, Pakistan**ABSTRACT**

Strontium oxide (SrO) and various concentrations of chitosan (CS)-doped SrO were synthesized via co-precipitation method. A variety of characterization techniques including XRD, EDS, FTIR, PL, UV-vis-spectroscopy and HRTEM were employed to synthesize the product. XRD affirmed cubic and tetragonal structure of SrO and CS-doped SrO with a decrease in crystallinity upon doping. FTIR spectrum endorsed existing functional groups on CS/SrO surfaces while d-spacing was estimated using high resolution TEM images. UV-Visible and PL spectra showed an increase in band gap energies with an increase in doping concentration. Elemental composition of SrO deposited with different doping concentrations was studied using EDS. Addition of CS resulted in the formation of quantum dots and rod-like structures that led to enhanced catalytic activity during Methylene Blue Ciprofloxacin (MBCF) degradation in the presence of reducing agent NaBH<sub>4</sub>. Improved antibacterial performance for doped samples was noted against both gram positive and negative bacteria. At high concentration, significant inhibition zones were measured against *S. aureus* ranging (0.95-9.20 mm) and (0-3.45 mm) at low concentration and (0.9-7.05 mm) at high concentration (0.5 and 1.0 mg/50uL) for *E. coli*. Prepared nanocatalysts are expected to be highly efficient for removal of pollutants from wastewater as well as exhibit enhanced antibacterial potential against *S. aureus* and *E. coli*.

# FULL TEXTS

**DEVELOPMENT OF A PROCESS SUITABLE FOR COW'S MILK KUMISS PRODUCTION**

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**ABSTRACT**

When the cow's milk kumiss technology is developed, the consumption of kumiss will become widespread. This study was carried out with the aim of improving the technology of cow's milk kumiss. Horse milk was not available in sufficient quantities to be used in the study. However, commercial horse kumiss was purchased and used as Controls in the analysis. Whole-fat cow's milk that was not modified was used as Controls. The ideal acidity and pH were improved in the Control samples. However, the panel members did not like them since they were more viscous and prosaic for a kumiss drink. The samples were not liked even after dilution them by water and homogenizing. The taste of the commercial mare's kumiss was not also liked by the panel members. However, a citizen of Turkmenistan liked and praised this mare's kumiss. The most admired samples determined to be modified cow's milk kumiss. Modification made as addition of 50% water to full-fat cow's milk, then fortification of this milk with 3.8% (w/v) lactose and 0.9% (w/v) whey protein. Inoculation with multi strains, incubation statically for 24 hours at 28 °C were determined to be suitable applications. Acidity and pH values in the samples were found to be in accordance with the values reported in the Turkish Food Codex. Even on the 14<sup>th</sup> d of cold storage, the alcohol rate remained below 0.5%, which is the suited value in the Turkish Food Codex Communiqué on Fermented Dairy Products (Communiqué No: 2009/25). The samples were kept fresh in storage at + 4 °C for 14 d. We believe that the "cow's kumiss" development should be extensively investigated to ensure appropriate taste and flavor for different cultural areas.

**Key words:** Kumiss, cow's milk, modified milk, kumiss culture, process



## **İNEK SÜTÜ KIMIZI ÜRETİMİNE UYGUN BİR PROSES GELİŞTİRİLMESİ**

### **ÖZET**

İnek sütü kımızı teknolojisi geliştirildiğinde kımız tüketimi yaygınlaşacaktır. Bu çalışma inek sütü kımız teknolojisini geliştirmek amacıyla yapılmıştır. Çalışmada kullanılacak yeterli miktarda at sütü mevcut olmadığı için ticari at kımız satın alınmış ve analizde Kontrol olarak kullanılmıştır. Kontrol olarak modifiye edilmemiş tam yağlı inek sütü kullanıldı. Kontrol numunelerinde ideal asitlik ve pH gelişti. Ancak, bir kımız içeceği için daha viskoz ve yavan oldukları için panel üyeleri tarafından beğenilmedi. Bu numuneler su ile seyreltikten ve homojenize edildikten sonra dahi beğenilmedi. Ticari kısrak kımızın tadı da panel üyeleri tarafından beğenilmedi. Ancak bir Türkmenistan vatandaşı bu kısrakın kımızını beğenmiş ve övmüştür. En beğenilen örneklerin ise modifiye inek sütü kımız olduğu belirlendi. Tam yağlı inek sütüne %50 su ilavesi ve ardından bu sütün %3,8 (a/h) laktoz ve %0,9 (a/h) peynir altı suyu proteini ile zenginleştirilmesi şeklinde yapılan modifikasyon yapıldı. Çoklu suşlarla inokülasyon, 28 °C'de 24 saat statik inkübasyon uygun uygulamalar olarak belirlendi. Örneklerdeki asitlik ve pH değerleri Türk Gıda Kodeksi'nde belirtilen değerlere uygun bulunmuştur. Soğuk muhafazanın 14. gününde bile alkol oranı Türk Gıda Kodeksi Fermente Süt Ürünleri Tebliği'nde (Tebliğ No: 2009/25) uygun değer olan %0,5'in altında kalmıştır. Numuneler +4 °C'de 14 gün depoda taze kalmıştır. Farklı kültürel alanlara uygun tat ve lezzeti sağlamak için “inek kımızı” geliştirme konusunun daha kapsamlı bir şekilde araştırılması gerektiği kanaatine varılmıştır.

**Anahtar Kelimeler:** Kımız, inek sütü, modifiye süt, kımız kültürü, proses

## 1. INTRODUCTION

Food safety and public health are at risk due to microbiological and chemical contaminants, especially in underdeveloped countries [1]. Tourists are particularly affected by this situation [2]. The majority of diarrheal diseases are related to food hygiene [3]. It is known that Kumis is an acidic and slightly alcohol-containing dairy product that has been traditionally produced by Central Asian communities using horse milk since ancient times [6]. It has been reported that horse milk contains properties similar to human milk in terms of nutritional value and health benefits, and no side effects have been observed, although it has been consumed for thousands of years [7]. Kumis has started to become widespread outside of these communities as well [8]. As the positive effects of functional dairy products such as cumys and kefir on health are revealed, their prevalence is accelerating [9, 10]. Another feature of kumis is that it offers the opportunity to meet the water needs in rural areas where access to potable water is difficult. Kumis is a product that also meets the vitamin C needs of people such as herdsmen who do not have the opportunity to consume vegetables and fruits in the Asian steppes for a long time [11,12]. Today, kumiss is used as a product that supports health tourism [13]. There are researchers who describe kumiss as a unique beverage [14]. It has been reported that kumiss has significant health gains as a result of studies performed on experimental animals [15,16]. Studies on both the nutritional and therapeutic properties of kumis have been compiled and presented in great detail [17].

Horse milk has its own characteristics [18]. Since the traditional form of kumis is made from horse milk, it has high lactose and low protein content [19,20]. However, where kumiss has the potential to become widespread, sufficient horse milk cannot be supplied in commercial kumiss production, Milk of the other farm animals, especially cow's milk, which is more economically produced in every month of the year, is recommended for kumiss production [21]. It is not easy to obtain the characteristics of traditional kumiss by using cow's milk. For this reason, when milk other than horse milk is used, it has been suggested that the milk should be modified as to horse milk. There are differences among researchers in terms of material, method and starter cultures used for cow's milk kumiss production [22-25].

Kumiss culture consists of a consortium of bacteria and yeasts. The dominant culture consists of lactobacilli, lactococci, leuconostocs and yeasts (*Saccharomyces* sp., *Candidia* sp. and *Torula* sp.) [26]. Along with these microorganisms, *Streptococcus* (*Sc.*) and *Enterococcus* (*Ec.*) *faecium* were also isolated in horse milk [27]. It has been reported that while *Enterobacter* and

*Rhodotorula* constitute the dominant flora in horse milk, *Lactobacillus* and *Dekkera* are the dominant flora during the formation of kumiss, and the flora and the metabolites that give its character to kumiss, differ [28]. *Lactobacillus*, *Lactococcus*, *Acetobacter*, *Streptococcus*, *Serratia* and *Leuconostoc* bacteria and the fungi *Kazachstania*, *Kluyveromyces*, *Trichosporonaceae*, *Pichia*, and *Candida* were predominantly isolated in traditionally produced horse milk kumiss [29]. It was reported that 112 volatile substances detected in the same study were mainly produced by 4 groups of bacteria (*Lactobacillus*, *Acetobacter*, *Lactococcus* and *Pseudomonas*) and 2 groups of fungi (*Kazachstania* and *Candida*). Yao et al. [30] have identified *Lc. otakiensis*, *Sc. macedonicus*, and *Ruminococcus torques*. The use of raw horse milk in production causes the diversity of the flora. So, the use of pasteurized milk in commercial production has been suggested [22]. Researches continue to achieve the technological development that will contribute to the spread of commercial kumiss production [31,32]. In this study, it was aimed to modify UHT cow's milk and to develop a kumiss production model suitable for consumers' palate by fermenting this milk with horse milk kumis.

## **2. MATERIAL AND METHODS**

### **2.1. Standard parameters used in the study**

UHT cow's milk purchased from a local market was transferred aseptically in autoclaved (121 °C for 15 min) erlenmeyer flasks before use. Horse milk kumiss (as 200 mL in glass bottle) purchased from the manufacturer was used as inoculant by adding at a rate of 5% to UHT milk at room temperature. The horse milk kumiss was also used as controls in the taste panels. Inoculated kumiss milk samples as 250 mL in 500 mL erlenmeyer flasks were incubated at 28 °C for 24 hours. By keeping these standard parameters constant, the effects of inoculant, water, sugar and whey proteins (WP) on the cow's milk kumiss acidity, pH and flavor. Effects of static and/or shaking incubation (100 rpm) were also investigated. Acidity and pH analyzes were performed on the 1<sup>st</sup> h, 7<sup>th</sup> and 14<sup>th</sup> d of cold storage (+ 4 °C) in kumiss samples. General liking tests were performed by six laboratory staff [30].

Analysis of UHT milk and modified milk samples were made by using autoanalyzer (Lactoscan S). The pH was measured using a digital pH meter (HI 9024; Hanna Instruments Ltd, Leighton Buzzard, UK). Titratable acidity (lactic acid, %) was made by using phenol phthalein indicator and a 0.25 N NaOH solution [24]. Alcohol analysis was determined by evaporation technique in kumiss samples [33].

For hygiene analysis, coliforms and *Staphylococcus aureus* were enumerated. VRB Agar (Violet Red Bile Agar, Fluka, Switzerland) was used for enumeration of coliforms. In order to provide an aerobic environment in the petri dishes, the surface was covered by pouring the same agar into the petri dishes again. Baird Parker Agar with egg yolk and potassium tellurite was used for *Staphylococcus aureus* count. Petri dishes were incubated at 37 °C for 48 hours. When 10 or more typical colony growths were observed in each petri dish, confirmatory tests were performed on the colonies from these petri dishes [19,20,22].

## 2.2. Process development

Unmodified UHT milk was used for making Control samples. Modified samples were prepared by adding autoclaved (121 °C for 15 min) drinking water to the UHT milk at a 1: 1 rate (v/v), then sugar (sold as food additives) and/or whey protein (WP, Maybi, Smart code: 058.320.50) were added in the diluted UHT milk. Each of the sugars (sorbitol, sucrose, glucose, maltodextrin, inulin and lactose) was added to the samples at a rate of 3.8% (v/w). The effect of adding 0.9% (v/w) WP to the samples with or without adding sugar was investigated. Static incubation or one from 5 different shaking procedures (continuous, 30 min shaking in every 3 h, 6 h static + 30 min shaking in every 3 h, 12 h static + 30 min shaking in every 3 h, 12 h static + 12 h continuous) were applied during incubation. The pH analysis result of the first step of the study were not given in detail.

## 2.3. Inoculant characterisation

Possible starter culture members were selected from Modified Cow's Milk Kumiss (MCMK). MCMK was obtained at the end of static incubation after adding 50% water, 3.8% lactose and 0.9% WP to cow's milk. Serial dilutions of the sample up to  $10^{-7}$  were prepared. A 100 µL from each of the last three serial dilution tubes were streaked on 10 parallel petri dishes [16]. de-Man Rogosa Sharpe Agar (MRS, Merck, Germany) was used for the isolation of lactobacilli and M17 Agar was used for the isolation of lactococci. Petri dishes were incubated at 37 °C for 3 d. [21 - 23]. For the isolation of yeasts, the petri dishes of Potato Dextrose Agar (PDA) pH adjusted to 3.5 with 10% lactic acid were inoculated and incubated for 4 d at 24 °C [18]. Colonies were randomly picked from the plates, and each colony was purified on its own agar plate (MRS, M17 or PDA). A total of 300 colonies, 100 colonies from each, were selected on MRS, M17 and PDA agar. Gram - positive, catalase negative, citrate negative bacteria that can utilise lactose, fructose, sucrose, glucose, maltodextrin and inulin were selected from these colonies. Among the yeasts, those that were catalase positive, citrate negative and able to use

lactose, fructose, sucrose, glucose, maltodextrin and inulin were selected. Carbohydrate fermentation tests were made according to Bansal et al. [34] using Phenol red Carbohydrate Broth. Ten colonies belonging to each petri dish were selected. So, each group of 10 isolates were made. Then, each group strains were multiplied by incubating them together in their own broth (MRS, M17 or PDA) for 24 hours at 30 °C. One mL from each of these broth cultures was inoculated to 100 mL of milk by making different combinations of MRS, M17 and PDA colonies. The most liked sample was used as inoculum for the next kumis production. The process was repeated three consecutive times. Colony selection and isolation procedures reported above were repeated from the most favored sample. Finally, selected 15 isolates, 5 from each of the MRS, M17 and PDA colonies, were propagated and used as kumiss milk inoculant as stated above. Identifications of the 15 colonies were made using a mass spectrometer “Matrix-assisted laser desorption/ionization-Time of Flight (MALDI-TOF)” system [35].

Data were analyzed using the general linear model procedure in SAS soft-ware [36]. Differences between the samples were determined using the least significant difference (LSD) test. A probability level of  $P < 0.05$  was considered statistically significant.

### 3. RESULTS

The results of the analyzes performed on the cow's milk and modified cow's milk (MIS) used in the study are given in Table.

**Table.** Analysis of UHT milk and modified UHT milk samples used in the experiments.

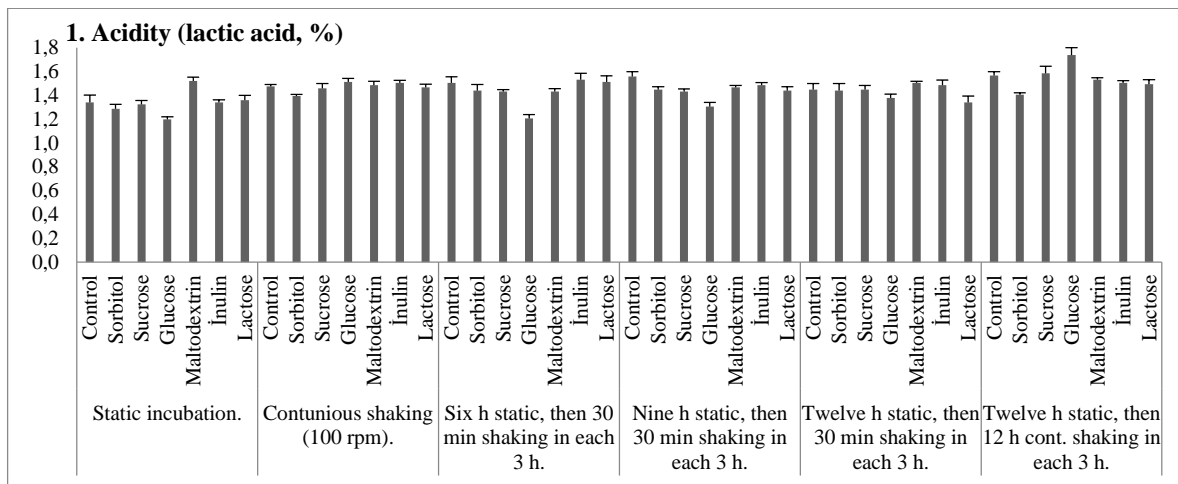
<b>Additives</b> Water: milk 1:1 (v / v) Lactose 3.8%, (w / v) Whey protein (WP) 0.9% (w / v)	Density	Conductivity (ms/cm)	Freezing point	Water, %	Nonfat dry mater, %	Fat, %	Protein, %	Lactose, %	Minerals, %	pH	Lactic acid, %
UHT cow's milk (as Controls)	26	5,6	0,5	82	7.6	3.2	2.8	4.2	0.6	5.7	0.31
Milk + water	15	3.9	0.3	49	4.4	1.7	1.6	2.4	0.4	5.4	0.23
Milk + water + lactose	21	3.7	0.4	31	5.9	1.9	2.2	3.2	0.5	5.2	0.23
Milk + water + whey proteins (WP)	15	3.6	0.3	49	4.5	1.8	1.6	2.4	0.4	6.0	0.24
Milk + water + lactose+ WP	20	3.1	0.3	33	5.8	1.5	2.1	3.2	0.5	6.1	0.23

Sugars and WP added to UHT milk made it difficult for the device to read. There was no information in the user manual of the device that such an analysis could be made. Therefore, only pH and acidity values were considered in this study. It was observed that the pH value decreased by 0.3 units when water and sugar were added to the milk, and increased by 0.3 units when WP was added together with water and sugar (Table).

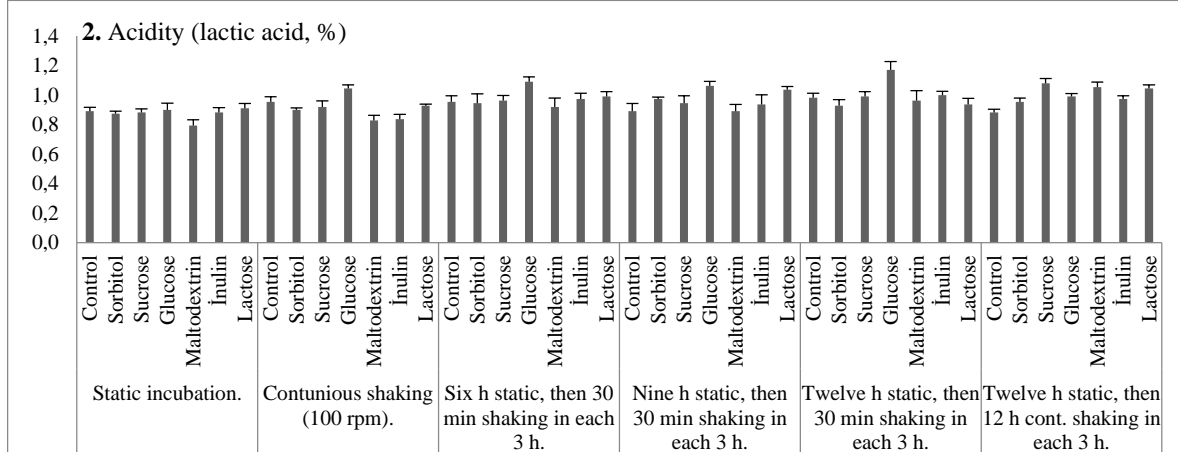
### 3.1. Results of process development

In the 1<sup>st</sup> stage of the process development, Control and modified milk samples (Table) were fermented by adding 5% of natural horse kumiss, and then stored at + 4 °C after 24 hours of incubation at 28 °C. Analyzes were made on the 7<sup>th</sup> d of storage. No coliforms or *Staphylococcus* was detected in the samples. The acidity values obtained are given in Figure 1-3. The average pH values of this step are given below.

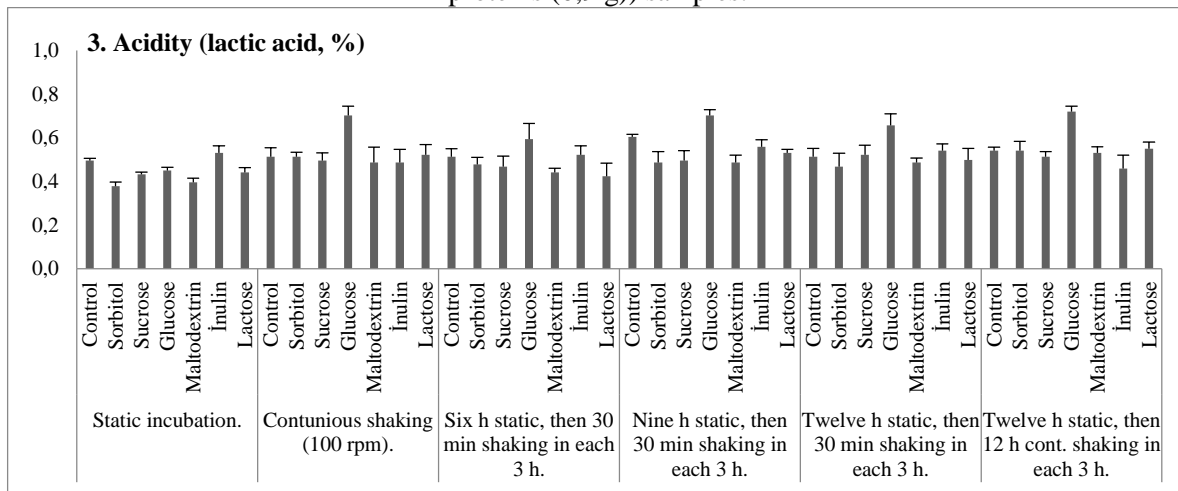
**Fig. 1:** Acidity (lactic acid, %) of Control (cow's milk) samples.



**Fig. 2:** Acidity (lactic acid, %) of CWS (cow's milk (50 mL), Water (50 mL), sugar (3,8 g)) samples.



**Fig. 3:** Acidity (lactic acid, %) of CWSP (cow's milk (50 mL), water (50 mL), sugar (3,8 g), whey proteins (0,9 g)) samples.

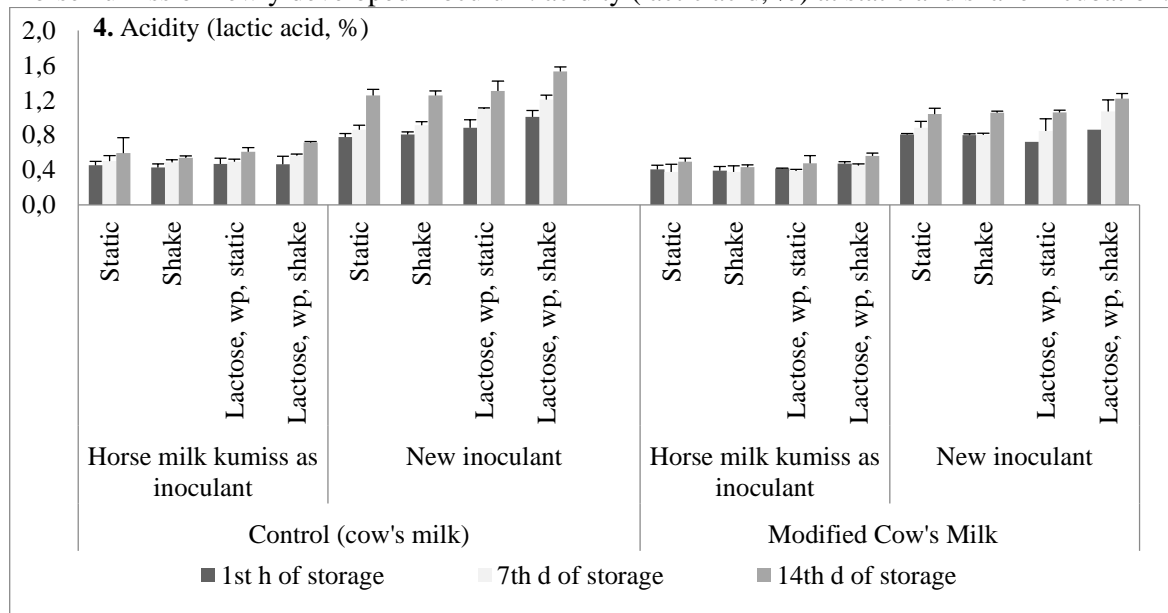


On the 7<sup>th</sup> d of cold storage, the mean % lactic acid value was  $0.52 \pm 0.07$  in the samples that did not add water to the milk (Figure 1), while it was  $0.95 \pm 0.08$  in the samples that added water and sugar (Figure 2), and  $1.45 \pm 0.1$  in the samples that water, sugar and WP were added (Figure 3). These average values of the each group are not given separately. There was no effect of shaking in terms of acidity development between the groups ( $p > 0.05$ ). No factor that significantly changed the acidity was observed among the added sugars or the shakes. Although not obvious, it was observed that the addition of glucose had a greater effect on the development of acidity (Figure 1-3). It was observed that the addition of water, sugar and PASP to the samples supported the fermentation. The taste panel members found these samples to be very thick, difficult to drink and tasteless (data not shown).

On the 7<sup>th</sup> d of cold storage, the mean pH value was  $5.68 \pm 0.13$  in the sample that did not add water to the milk. Also,  $4.79 \pm 0.04$  in the samples that added water and sugar, and  $4.68 \pm 0.03$  in the samples that added water, sugar and WP. There was no effect of shaking in terms of pH development between the groups ( $p > 0.05$ ). No significant pH changes were observed between added sugars or shakes. The addition of water, sugar and PASP to the samples supported pH reduction ( $p < 0.05$ ) (data not shown).

In the second stage of the process development, 16 different samples inoculated with 2 different inoculants and incubated with static or shaking process were compared with the Control samples. Acidity, pH and sensory analyzes were performed at the 1<sup>st</sup> h, 7<sup>th</sup> d and 14<sup>th</sup> d of cold storage (Figure 4 - 6).

**Fig. 4:** Effects of addition of water, lactose and whey proteins (WP) to cow's milk inoculated with horse kumiss or newly developed inoculum: acidity (lactic acid, %) at static and shake incubation.

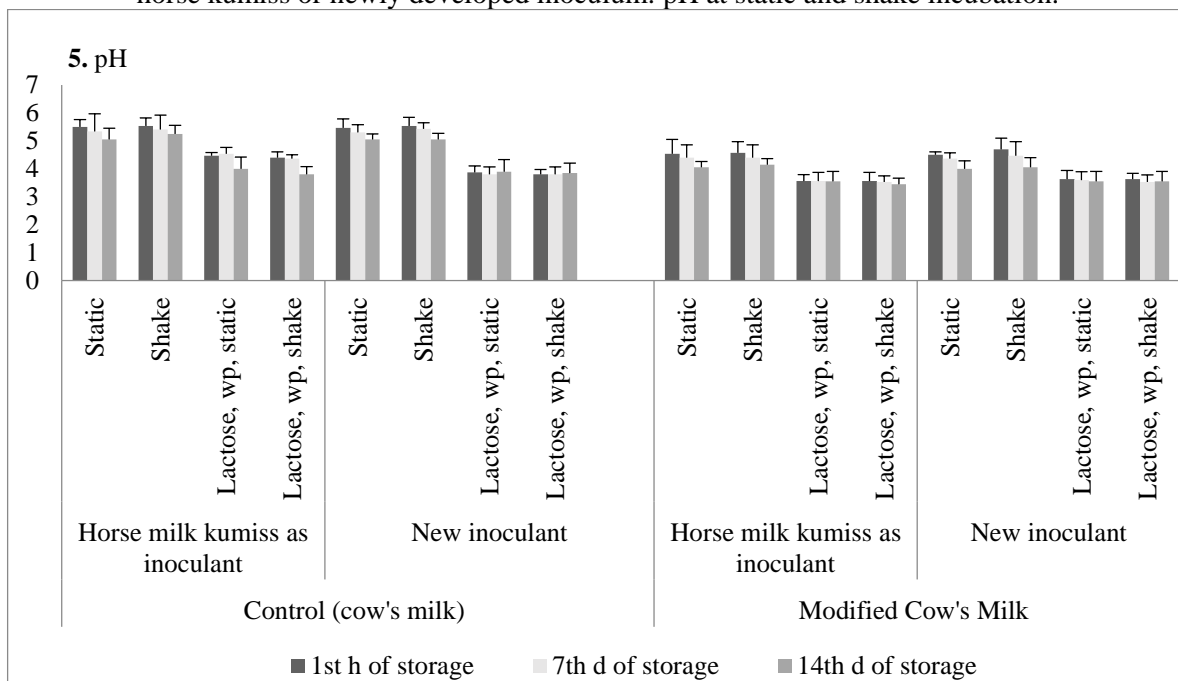


Acidity values in cold storage were higher in samples inoculated with fresh cow's kumiss (Figure 4). In addition, it was observed that the addition of lactose and PASP had a positive effect on acidity in both Control and modified samples (Figure 4). Acidity development continued during the 14 d of cold storage. However, the increase in acidity in the modified samples was less than in the Control samples. When the group averages (4 groups, analysis results of three different d) were taken into consideration, the acidity was  $0.52 \pm 0.08$  in control samples, while it was  $1.08 \pm 0.24$  in those fermented with new inoculant. These values were  $0.44 \pm 0.05$  in the experimental samples, in those fermented with horse milk kumiss, and  $0.93 \pm$



0.15 in those fermented with new inoculant. While the mean % lactic acid value was  $0.52 \pm 0.07$  in control samples, it was  $0.95 \pm 0.08$  in water and sugar added samples. In both control samples, the mean acidity value was  $1.45 \pm 0.1$  as the highest value in the samples to which water, lactose and PASP were added (data not shown). There was no effect of shaking in terms of acidity development between the groups. Sugar type or shaking regime were not effective on the acid development. The effect of lactose and WP on the acidity of 7<sup>th</sup> d and 14 d was clearly demonstrated (Figure 4) ( $p < 0.05$ ). It was observed that the addition of water, sugar and WP to the samples supported the fermentation. The horse kumiss culture adapted to cow's milk was used as inoculant in repeated incubations, making it more effective in acidity development. The Control samples were quite viscous, difficult to drink and tasteless even after shaken incubations (data not shown).

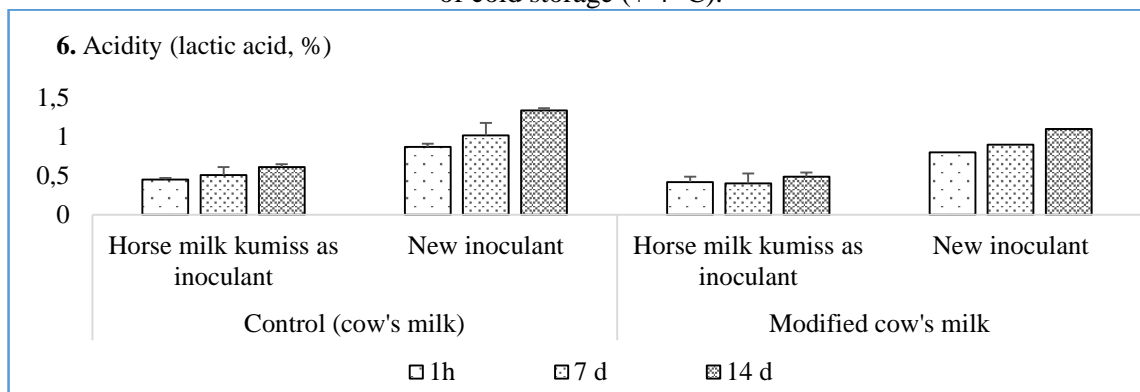
**Fig. 5:** Effects of addition of water, lactose and whey proteins (WP) to cow's milk inoculated with horse kumiss or newly developed inoculum: pH at static and shake incubation.



In the 1<sup>st</sup> h, 7<sup>th</sup> d and 14<sup>th</sup> d of cold storage, pH in both Control and MCMK samples were found to be lower in samples fermented with new inoculum than kumis inoculum (Figure 5). It was observed that adding lactose and PASP to the samples had a positive effect on pH ( $p < 0.05$ ). The pH became more stable with the addition of lactose and WP in all samples in 14<sup>th</sup> d of cold storage. The pH decrease in the experimental samples was less than in the Control samples.

While the mean pH was  $4.8 \pm 0.4$  in Control samples fermented with horse milk kumis, it was calculated as  $4.46 \pm 0.3$  in Control samples fermented with new inoculant. In the experimental samples, the pH was  $3.9 \pm 0.3$  in the samples fermented with horse milk kumiss, while the pH was  $4.0 \pm 0.3$  in the samples fermented with new inoculant (the values are not given separately). There was no effect of shaking in terms of pH decrease between groups. It was observed that the addition of water, lactose and WP to the samples supported the pH decrease ( $p < 0.05$ ).

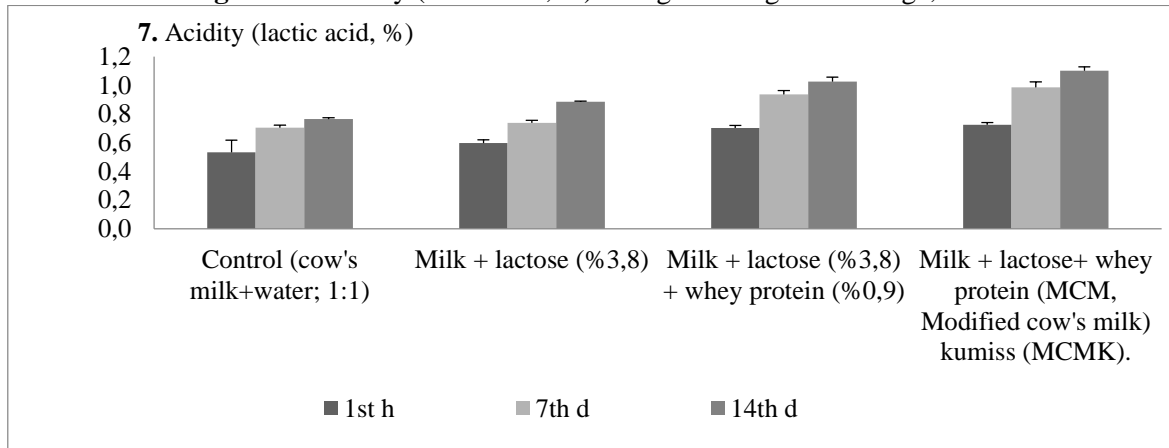
**Fig. 6:** Acidity, % lactic acids: Mean  $\pm$  SD of 4 different kumiss samples during 1<sup>th</sup> h, 7<sup>th</sup> d and 14<sup>th</sup> d of cold storage (+ 4 °C).



As can be seen in Figure 6, the acidity values of the samples made with modified cow's milk increased gradually in the 14<sup>th</sup> d cold storage. The highest acidity value ( $1.34 \pm 0.13$ ) was observed in samples of cow's milk fermented with new inoculant and kept in cold storage for 14 d. Acidity were found in modified cow's milk fermented with fresh yeast as  $1.1 \pm 0.8$  in cow's milk fermented with horse kumiss as  $0.61 \pm 0.07$  and in modified milk fermented with horse kumiss as  $0.49 \pm 0.05$ . Observation of  $1.1 \pm 0.12\%$  acidity on the 14<sup>th</sup> d of cold storage in the samples of modified cow's milk inoculated with new inoculum indicated that the product will have a longer shelf life. As a result of taste panel, it was seen that the samples made with cow's milk were thick and tasteless. By adding an equal amount of water as if making buttermilk, these samples became tmore tasteless to drink (data not shown).

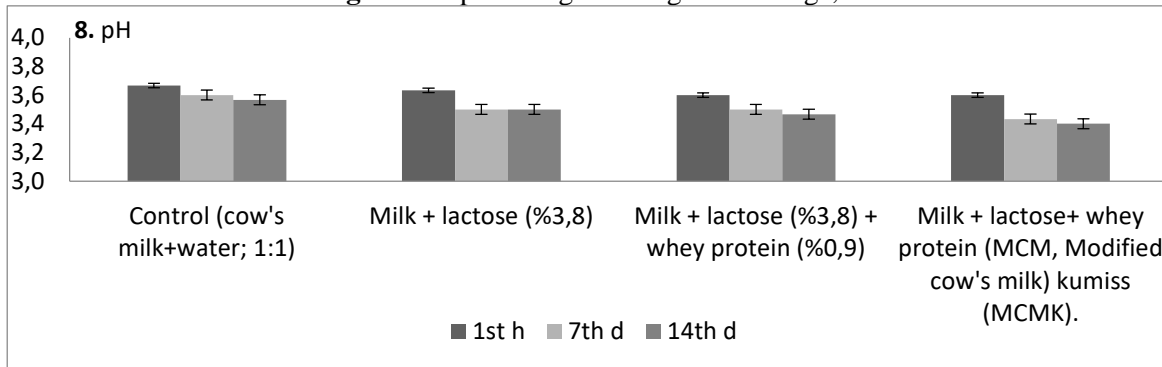
In the 3<sup>rd</sup> stage of the process development, the most admired sample (MCMK) was used as inoculant at a rate of 5%. Static incubation was applied to the samples and analyzes were made at the 1<sup>st</sup> h and 7<sup>th</sup> and 14<sup>th</sup> d of the cold storage (Figures 7 - 9).

**Fig. 7:** The acidity (lactic acid, %) changes during cold storage, 4 °C.



It was observed that adding lactose, WP or both lactose and WP to the ware added milk was important for the development of acidity during cold storage, which was not obvious at the end of the incubation. The best acidity development was observed on the 14<sup>th</sup> d of storage in the samples added water, lactose and WP ( $1.1 \pm 0.1$ ) (Figure 7).

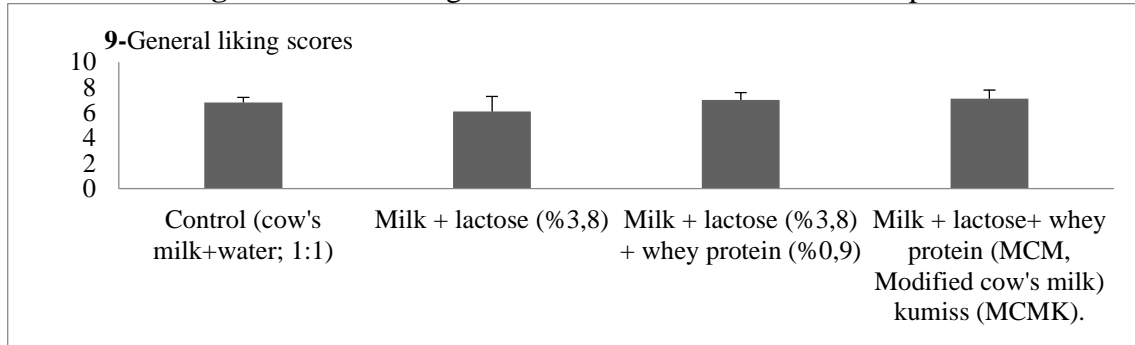
**Fig. 8:** The pH changes during cold storage, 4 °C.



No difference was observed in terms of pH change in the kumiss samples produced after adding lactose and/or PASP to the milk to which water was added. However, on the 7<sup>th</sup> d of cold storage, the highest pH decrease was observed in the samples added together with lactose and WP. This change did not persist and no significant difference was observed between the groups in the 7<sup>th</sup> and 14<sup>th</sup> cold storage d (Figure 8).

The average tasting scores of the samples are given in Figure 9.

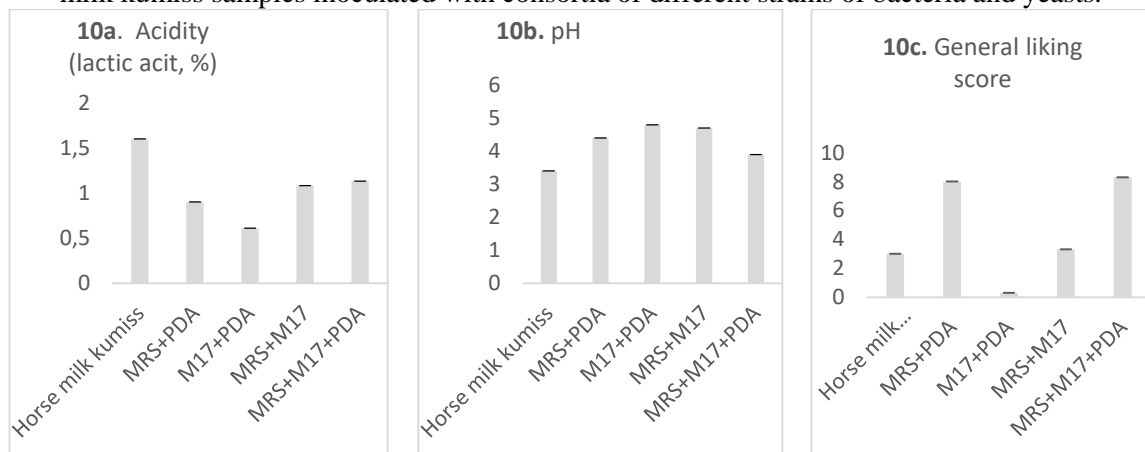
**Fig. 9:** General liking scores of the different kumiss samples.



### 3.2. Results of Inoculant characterisation

Control samples were liked the least and the MCMK samples the most (Figure 9). The panelists sought this taste because they were familiar with the taste of buttermilk. Control samples were reported to be thick, sticky, and tasteless. It was reported that some of the water added samples were bitter and tasteless. Adding lactose to milk together with water created a more sour taste, and adding WP created a more aromatic and tart taste. All of the panelists reported that there was no similarity between this new product (MCMK) and horse kumiss, but that they would prefer to consume this product over horse kumiss (data not shown). After this step, 4 different inoculants were prepared by selecting 5 each from MRS, M17 and PDA colonies. After the obtained MCMK samples were kept at + 4 °C for 1 h, acidity, pH and taste tests were performed (Fig. 10). The results of the analysis were compared with the results obtained from the commercial horse kumiss.

**Fig. 10:** Acidity (lactic acid, %), pH and general liking scores of horse kumiss and modified cow's milk kumiss samples inoculated with consortia of different strains of bacteria and yeasts.



**Horse milk kumiss;** a commercial product purchased for using as benchmark sample. Five colonies from each **MRS;** *de-Man Rogosa Sharpe* agar, **M17;** *M17* agar and **PDA;** *Potato dextrose* agar.

Horse kumiss had a taste score of  $3.4 \pm 2.1$  and panelists did not like the acrid and bitter taste in it. The M17 + PDA sample had the lowest appreciation score, with the highest acidity and lowest pH values. MRS + M17 + PDA samples containing 15 isolates were the best samples from other samples in terms of acidity development, pH decrease and taste score. As a result of Maldi-Toff analysis, 9 out of 15 isolates could not be identified. Two of the isolates were *Lb. bulgaricus*, 2 of them *Str. thermophilus*, one was *Saccharomyces* sp. and the other was *Torula* sp.

#### **4. DISCUSSION**

Kumis is a product developed by the Central Asian and Caucasian communities in the historical process and produced and traded in homes and industry until today [6]. It is known that horse milk is different from cow, sheep, goat and buffalo milk [18]. It is similar to albuminous milks such as human and goat milk in terms of serum proteins and high lactose content [18]. It is known that more than a century ago, products obtained as a result of fermentation of cow's milk with kumiss instead of horse milk are used in the treatment of sick and weak individuals [7,17,37]. It has been reported that kumiss has the potential to be consumed widely in other communities [8,14]. However, the biggest reason limiting this potential is the inability to produce sufficient horse milk [9,10]. Efforts are constantly being made to produce kumiss by using other milks, especially cow's milk, which is the most abundant milk in the world. In his research published in 1874, Legielski [38] mentioned that soft kumiss, hard kumiss and diabetic kumiss are made from cow's milk. In this study, although horse kumiss was not liked by the panelists, MCMK was liked.

In some studies, kumiss was produced without adding water to cow's milk [22,23]. Modification from the cow's milk has been made in different ways. The water ratio that add to milk is not similar in studies [39, 40]. In this study, after adding water to milk at a ratio of 1: 1, 3.8% lactose and 0.9% WP were added to increase lactose to 6% and WP to 1.2%, as in horse milk. We could not find any other study that modified cow's milk in this way. Therefore, comparing the findings of this study with the findings of other studies may not be confirmatory. Because, many different parameters may affect one or more qualities of kumis [23,40,41].

There is no production and consumption of horse milk in Turkey. On the other hand, horse kumiss is produced only by a Kyrgyz family business and sold directly to the consumer. Kumiss obtained from this family business was used as inoculant in the study and as reference sample

in taste tests. The acidity of the kumiss we supplied was  $1.57 \pm 0.1$  and the pH was  $3.9 \pm 0.1$ . The samples came in 24 of 250 mL glass bottles in a parcel. It was observed that there was no difference between the samples in the analyzes performed on 3 randomly selected samples. None of the panelists liked these kumiss and refused to drink it. However, one of our students, who is a citizen of Turkmenistan, stated that this kumis, which we do not like, is very tasty, very pleasant and has the same characteristics as the horse milk kumiss that he is accustomed to drinking in his country. This result showed us that food consumption habits should be taken into consideration more. Even if enough of our MCMK is produced in Turkey, it will not be easy for its consumption to become widespread. For this reason, it may not be appropriate for horse kumiss consumers. The MCMK developed in this study, which our panelists liked to drink and defines as a product that does not resemble yoghurt, kumiss or ayran, may not have pleasant taste for some other consumers.

In this study, UHT market milk from the same batch was used. In this way, we have avoided the mistakes that may arise from heating, cooling, homogenization and standardization. Coliform group bacteria and staphylococci were not found in milk, commercial kumiss and experimental samples. In this study, MCMK was obtained by adding 5% of kumiss to milk. Then MCMK itself was used as 5% inoculant. Later, the inoculating culture was developed. More than 5% inoculant has been used in traditional kumiss production [42-44]. Traditional horse milk is made in the form of increasing the amount by adding raw horse milk to the kumis made before [43]. Possibly, thanks to the constantly high acidity value in the product and the continued fermentation of the kumiss dominant culture, the reproduction of harmful bacteria in raw milk is suppressed and the hygienic quality of the product increases as the product is fermented. It is probably possible to use raw milk in this way. However, there are also researchers who report that the use of raw horse milk in kumiss may be harmful in terms of hygiene and public health [42, 45, 46]. Probably such a production method is not suitable for commercial kumiss production. It is clear that this production model will cause difficulties in hygienic and standard production. For this reason, it has been suggested that milk should be pasteurized, as in yoghurt, ayran and kefir, for the standard production [39,47,48].

While there is less protein and fat in the composition of horse milk than cow's milk, there is more serum protein and lactose [8]. In order to make these values of cow's milk similar to horse milk, full-fat cow's milk was modified. Values are given in Table. The MCMK is easy to produce, cheap and have the qualities to set an example for technological applications. Very

different incubation methods have been used in the production of horse kumis and other experimental kumiss studies. Shaking incubations were mostly made [41,49]. Studies using static incubation have also been made [21,48]. In this study, it was determined that a bitter and tasteless taste was formed in the shaken kumiss samples made after adding water to the cow's milk. These flavors did not occur in the shaken samples of cow's milk without modification. It was seen that excessive shaking would not be appropriate in the samples with added water. Static incubated samples yielded results similar to those produced with static for 12 hours and shaking every 3 hours for 12 hours (Figure 5). In the light of these results, it was concluded that it would be appropriate to use static incubation because it is more suitable for the industry and economy and probably has a longer shelf life of kumiss.

In the Turkish Food Codex Communiqué on Fermented Dairy Products (Communiqué No: 2009/25), kumiss is stated as “*Lactobacillus delbrueckii spp. bulgaricus* and *Kluyveromyces marxianus* cultures are used as fermented milk product”. In this communiqué, although it was not stated that horse milk should be used in production, no information was given about the milk to be used. The reason for this may be that kumiss is not yet traded in Turkey. The communiqué may not be fully detailed. The protein content of kumis is not reported in the Communiqué. The standard parameters are for ethanol content is at least 0.5%, the amount of lactic acid is at least 0.7, the number of specific microorganisms (cfu/g) is at least  $10^7$ , the number of added microorganisms (cfu/g) is at least  $10^6$  and the number of yeast is at least  $10^4$  (cfu/g). Salt content is not reported. The findings obtained from this study were found to be in compliance with the Communiqué. The acidity of MCMK was at least 0.7% lactic acid (Figures 1 - 4, 6, 7, 10). The amount of alcohol in the MCMK did not exceed 0.5%. It was observed that the bacteria and yeast contents were in compliance with the criteria reported in the Communiqué even on the 14<sup>th</sup> d of cold storage. In order for the kumis produced in this study to fully comply with the Communiqué, it is necessary to increase the amount of alcohol. Alcohol content naturally increases especially in the first week of cold storage [44,50,51]. However, on the 14<sup>th</sup> d of cold storage in this study, the alcohol rate remained below 0.5%, which was the desired value in the communiqué. Since the alcohol content is not higher than 0.5%, it is not possible to produce and trade this kumis in Turkey. Because the product does not provide the values required in the Communiqué. In this study, it was aimed to produce non-alcoholic kumiss and our findings are suitable for the purpose of our study. It has been reported that *Saccharomyces lactis* is the main yeast producing alcohol in kumiss, there are differences in the amount of

alcohol according to the fermentation time, and the amount of alcohol is 1% even in sweet kumis [52]. In this study, samples were taken from low alcohol beer production models [53]. Salt was not added to the samples for easier evaluation of the resulting flavors.

It has been mentioned that the trade of kumiss will be increased thanks to the development of production technology [54,55]. Küçükçetin [47] modified cow's milk using the membrane filtration technique and it was reported that the produced kumiss was more popular than horse milk kumiss. In another study, the shelf-life of the kumiss has been increased [56].

In previous studies, similar to our study, kumiss milk has been prepared by adding water, sugar, whey and other supplements to cow's milk [21,39,48]. However, there is no complete similarity and harmony between the studies. Our study is probably most similar to the study by Küçükçetin [47]. The researcher used horse kumiss as the main inoculant at a rate of 20% to modified cow's milk (90% water, 6.4% PAST and 3.6% milk powder). We obtained kumiss from the same farm as the researcher and used as inoculant at first step of the study. In our study, the process was simplified by adding water to cow's milk in equal proportions, adding lactose and PAST to make the content look like horse milk. The researcher reported that horse kumiss received the highest score in sensory tests. However, in this study, horse kumiss was not liked by the panelists and MCMK was the most liked (Figure 10c). Küçükçetin [47] made his inoculant at a different way from us. Inoculant production medium and the kumiss milk were incubated at 22 °C with shaking. We did it statically at 28 °C. Differences in alcohol levels may be due to different applications. It may not be accurate to make a one-to-one comparison with Küçükçetin's and our results.

Since different materials and methods were used in the researches, it is difficult to compare the results. Although the starter cultures of kumiss are traded, standard strains have not yet been found. In this study, horse kumiss was used to develop inoculant and sequential MCMK were made for inoculant adaptation. We tried to select culture strains from MCMK dominant flora. At this stage, more research should be done to develop best starter culture appropriate for material, method and cultural demands. Rakhmanova et al. [22] selected a strain from horse kumiss (colonies that grew by incubating the MRS agar plates used in strain selection at 37 °C and PDA agar plates at 28 °C) for cow's milk kumiss and fermented with a combination of the two strains. Researchers suggested incubation at 36 °C for 16 hours by adding 4% of culture obtained by the combination of a bacterium and yeast to milk. The researchers determined that yeasts were dominant in the horse milk and bacteria in cow's milk. It has also been reported



that acidity and pH development are higher in horse milk kumiss. Although our study and this study are designed differently from each other, the purpose of both is the same.

## **5. CONCLUSION**

Six of the 15 strains selected from MCMK were identified. The use of 5% inoculant in the standardization of process parameters, static incubation of fermented milk at 28 °C for 24 h, and 4.4 pH and 0.7% lactic acid levels in kumiss were found to be sufficient in terms of flavor development. A pH of 3.5 to 4, a maximum of 1.5% lactic acid formation was accepted in 14<sup>th</sup> d of cold storage. It was concluded that more detailed studies on the subject are needed to develop a cow's milk kumiss which is suitable for the taste, aroma and flavor criteria of the society in which it will be consumed.

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**TECHNICAL, PHYSICAL, CHEMICAL AND MICROBIOLOGICAL ANALYSES  
OF SIİRT HERBY CHEESE**

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**ABSTRACT**

A total of 19 production and sales points were inspected for their technical and hygiene status. Hygienic inadequacy and labeling deficiencies were determined in the relevant workplaces and products. A total of 20 herby cheese samples taken from the sales points were also analysed for their quality control. The mean±standard deviation (%) values of the samples were determined to be 1.9±0.7 for lactic acid, 49.6±4.8 for dry matter, 46.8±9.2 for fat in dry matter, 5.6±1.5 for ash, 2.9±0.7 for salt in dry matter and 65.7±6.1 moisture in cheese fat-free mass. The mean ( $\log_{10}$  cfu/g) values of the samples were determined as for total mesophilic aerobic bacteria; 8.7±0.99, *Enterobacteriaceae*; 6.8±2.7, coliform group bacteria; 4.6±2.8, coagulase positive staphylococci; 5.0±1.3 and yeasts - moulds; 8.1±1.3. The cheese has economic importance for the province of Siirt. But, production and sales have been remained at the traditional scale. The contribution of Siirt herby cheese to the economy of the city could be increased by applying standard and hygienic procedures for the cheesemaking.

**Key words:** Siirt herby cheese, Economy, Regulations, Hygiene, Quality



## **SIİRT OTLU PEYNİRİNİN TEKNİK, FİZİKSEL, KİMYASAL VE MİKROBİYOLOJİK ANALİZLERİ**

### **ÖZET**

Toplam 19 üretim ve satış noktası teknik ve hijyen açısından denetlendi. İlgili işyerlerinde ve ürünlerde hijyenik yetersizlikler ve etiketleme eksiklikleri gözlemlendi. Satış noktalarından alınan toplam 20 adet otlu peynir numunesi de kalite kontrolleri için analiz edildi. Örneklerin ortalama±standart sapma (%) değerleri laktik asit için  $1.9\pm 0.7$ , kuru madde için  $49.6\pm 4.8$ , kuru maddede yağ için  $46.8\pm 9.2$ , kül için  $5.6\pm 1.5$ , kuru maddede tuz için  $2.9\pm 0.7$  ve peynir yağsız kitlesinde nem için  $65.7\pm 6.1$  olarak belirlendi. Örneklerin ortalama ( $\log_{10}$  cfu/g) değerleri toplam mezofilik aerobik bakteriler için  $8.7\pm 0.99$ , Enterobacteriaceae için  $6.8\pm 2.7$ , koliform grubu bakteriler için  $4.6\pm 2.8$ , koagülaz pozitif stafilokoklar için  $5.0\pm 1.3$  ve mayalar -küfler için  $8.1\pm 1.3$ . Bu peynir Siirt ili için ekonomik öneme sahiptir. Ancak üretim ve satışlar geleneksel ölçekte kalmıştır. Siirt otlu peynirinin şehir ekonomisine katkısı, peynir yapımında standart ve hijyenik prosedürler uygulanarak arttırılabilir.

**Anahtar Kelimeler:** Siirt otlu peyniri, Ekonomi, Mevzuat, Hijyen, Kalite

## **1. INTRODUCTION**

Many varieties of cheese are produced in Turkey. White pickled cheese, kashar cheese and tulum cheese are the most produced ones among them. It has been reported that the consumption of herby cheese per capita is 14.74 kg/year and the Turkey average is 3.2 kg/year in the Eastern and Southeastern regions, where herby cheese consumption is intense (1). There are Siirt, Batman, Bitlis, Hakkari, Erzincan and Trabzon herby cheeses in Turkey. Among them, only Van herby cheese has geographical indication certificate (2). The herbs sirmo, mendo, heliz, wild mint, thyme and siabo and 13 other herbs are mostly used for herby cheese production. The cheese should be left in ripening for at least 4 m when raw milk is used in production and 30-60 d when pasteurized milk is used. Siirt herby cheese, which is an indispensable dairy product on the tables of the people of Siirt, is a type of cheese similar to Van herby cheese which is a semi-hard cheese. It is produced from raw sheep's milk or from a mixture of sheep, cow and goat milk. While the main herb added to cheese is sirmo (sirik, *Allium sp.*), heliz (*Ferula orientalis*) and çiriş (*Eremurus spectabilis*) are also used (2). Differences among Siirt herby cheese and other herby cheeses produced in Turkey has not been investigated yet. Also, chemical composition and hygienic quality of the Siirt herby cheeses have not been investigated extensively yet (3). The minimum technical and hygienic criteria for cheeses are set by official documents and official inspections are carried out accordingly (4-8).

Numerous studies have been conducted on Van herby cheese (9-14). However, very little research has been done on Siirt herby cheese. Due diligence on field samples is necessary in terms of providing basic data for scientific studies. In this study, Siirt herby cheese samples taken from sales points were analyzed to the economic and public health aspect of Siirt herby cheese was evaluated. In addition, observations were conducted at production and sales points. The Turkish Standards Institute (TSE) Herby Cheese Standard (TS 13205) (15), Turkish Patent Institute (TPE) Van Herby Cheese Geographical Indication (No: 405) (2) and Turkish Food Codex (TFC) Cheese Communique (No. 2015/6) was benefited for evaluations (4).

## **2. MATERIALS and METHODS**

### **2.1. Status of Production and Sales Points**

The findings obtained by observations and interviews with the officials of 14 small production and/or sales points and 5 chain market branches in Siirt city center were evaluated for their compliance with the Turkish Food Codex (4, 5, 7, 8) and related Turkish Standard (6).

## **2.2. Analysis of Siirt Herby Cheese Samples Taken from Sales Points**

At least 250 g sample from each of 20 randomly selected sales points in Siirt province, were brought and transferred to the lab within 2 hours. After each sample was mixed thoroughly in a sterile sample bag and turned into a homogeneous sample, it was used in analyzes. Each analyze was repeated 3 consecutive times.

The pH was measured by using a digital pH meter (Milwaukee AZ8686, USA). Titratable acidity (lactic acid, %) was determined by using 0.1 N NaOH and phenolphthalein indicator. The dry matter and ash were determined gravimetrically. The fat content was determined by using Van Gulik method. The salt was determined titrimetrically (15).

For microbiological analysis, reference methods were applied as mentioned in the book of Pouch and Iko (16). Briefly, 10 g of each sample was used for making ten-fold serial dilutions in diluted in 90 ml of steril physiological saline (PS). For mesophilic aerobic bacteria (MAB), Plate Count Agar (PCA, Oxoid CM 0463) was used and the petri dishes were incubated at  $30\pm 2^{\circ}\text{C}$  for 72 hours. For *Enterobacteriaceae*, Violet Red Bile Glucose Agar (VRBGA, Oxoid-CM0485) was used for the enumeration of the coliforms, and procedures were performed as instructed on the medium. For coliforms, Violet Red Bile Lactose Agar (VRBLA, Oxoid CM0107) was used. Petri dishes were incubated for 24 hours at  $30^{\circ}\text{C}$ , the growing pink-red colonies with a pink precipitation ring around were counted. For coagulase positive staphylococci, Baird Parker Agar plates including Baird Parker Agar Base (BPA, Oxoid CM1127) and Egg Yolk Tellurite Emulsion (Oxoid SR0054) were used. The plates were incubated at  $37^{\circ}\text{C}$  for 48 hours. Black shiny coagulase positive colonies with a diameter of 1.5 - 2.5 mm with a transparent zone around were counted. For yeast – moulds, Yeast Extract Glucose Chloramphenicol Agar (YGCA, Merck 1.16000) was used and the petri dishes were incubated at  $25^{\circ}\text{C}$  for 5 d. Colonies formed on the medium were counted.

## **2.3. Statistical analysis:**

The mean values of the samples and the standard deviation values between the samples were calculated by using the Microsoft Excel program.

### **3. RESULTS**

#### **3.1. Status of Production and Sales Points**

##### ***- Local herby cheese production and sales points (14 businesses):***

During the visits, we personally have inspected some inconveniences at the production and sales points. There were no adequate hygienic prequestions from production places. The cheese making staff had no adequate hygiene prequations during cheese making. Cheese curd and prepared cheese bags were mostly left at room temperature because of unavailability of adequate refrigerators. There were no labels on the prepared cheese bags. We could not demonstrate the sales points as hygienic as required.

***-Chain Market Branches (5 businesses):*** One branch of each of 5 different national chain markets operating in the city center of Siirt was visited and the sales department managers were interviewed. It has been observed that the cheeses are the products of local producers, they are kept in plastic bins of 1, 2, 5, 10 and 20 kg, on the cold shelf or in the refrigerator of the market, there are letters and/or numbers on the products with a felt-tip pen, but there is no label. Although there is Van herby cheese in these businesses, its sales are reported to be at most 5% of Siirt herby cheese. In these enterprises, it was observed that the market aisles were cleaner than the above-mentioned production areas and the products were kept under the cold chain. It was understood that these markets bought and sold these products from the herby cheese production points mentioned above, and they did not produce their own. Siirt herby cheese is sold in most of the grocery stores and markets in the city center.

#### **3.2. Analysis of Siirt Herby Cheese Samples Taken from Sales Points**

The pH, acidity, dry matter, fat, ash and salt levels in the samples are shown in Table 1. The mean values of the analyzes were  $5.3 \pm 0.5$  for pH,  $1.9 \pm 0.7$  % lactic acid,  $49.6 \pm 4.8$  for % dry matter,  $46.8 \pm 9.2$  for % fat in dry matter,  $5.6 \pm 1.5$  for ash and  $2.9 \pm 0.7$  for salt in dry matter.

**Table 1.** Physical and chemical analysis results of Siirt herby cheese samples taken from sales points in Siirt.

Sample No.	pH	St. deviation	Lactic acids. %		Dry matter. %		Fat in dry matter %		% Ash		Salt in dry matter %	
			St. deviation	St. deviation	St. deviation	St. deviation	St. deviation	St. deviation				
1	5.9	0.1	1.9	0.1	54.6	2.8	43.0	4.9	4.9	0.2	2.6	0.0
2	5.6	0.0	1.6	0.2	55.6	2.8	55.8	3.8	7.6	0.1	2.9	0.0
3	5.2	0.0	1.6	0.2	49.0	1.9	63.3	2.2	7.0	0.2	3.4	0.4
4	5.5	0.0	4.1	0.1	54.3	0.2	52.9	3.3	6.2	0.4	2.9	0.5
5	5.2	0.0	1.7	0.1	48.5	3.2	43.9	0.8	6.3	0.0	2.6	0.1
6	5.8	0.0	0.8	0.2	34.6	1.7	63.5	2.2	7.4	0.8	4.5	0.2
7	5.1	0.0	2.3	0.2	49.4	1.6	42.5	3.3	1.2	0.3	1.1	0.1
8	5.1	0.0	2.0	0.3	48.7	3.4	51.9	0.7	4.9	0.2	2.1	0.0
9	4.8	0.0	2.8	0.3	57.9	6.1	51.4	0.7	8.1	0.4	2.8	0.0
10	5.4	0.0	1.7	0.2	47.1	1.3	57.8	0.6	5.7	0.3	2.8	0.2
11	5.0	0.0	1.9	0.2	43.5	0.5	43.1	0.8	3.7	0.5	2.1	0.0
12	4.4	0.0	2.0	0.3	50.6	1.2	47.9	0.7	5.3	0.8	2.7	0.1
13	5.2	0.0	1.8	0.2	47.7	7.7	49.8	0.7	5.1	0.1	3.5	0.1
14	4.6	0.0	2.5	0.2	50.2	1.9	32.9	0.0	6.1	0.6	3.9	0.1
15	5.6	0.0	2.3	0.2	52.3	0.9	36.8	6.7	4.8	0.5	3.6	0.3
16	6.0	0.0	1.3	0.3	48.2	0.2	48.7	4.4	5.5	0.3	3.7	0.1
17	5.3	0.0	2.1	0.2	51.3	3.5	31.2	6.8	5.1	0.1	2.8	0.1
18	4.9	0.0	1.9	0.3	47.7	3.2	38.7	0.0	5.1	0.3	2.4	0.1
19	5.9	0.0	1.2	0.2	51.5	1.9	48.0	3.7	6.3	0.0	3.0	0.1
20	6.4	0.0	1.1	0.2	49.2	1.9	37.1	1.0	5.2	0.0	2.5	0.1
<b>Mean</b>	<b>5.3</b>	<b>0.5</b>	1.9	0.7	49.6	4.8	46.8	9.2	<b>5.6</b>	<b>1.5</b>	2.9	0.7
<b>Least</b>	<b>4.4</b>	0.0	<b>0.8</b>	0.2	<b>34.6</b>	1.7	31.2	6.8	1.2	0.3	1.1	0.1
<b>Most</b>	<b>6.3</b>	0.0	<b>4.1</b>	0.1	<b>57.9</b>	6.1	63.5	2.2	8.1	0.4	4.5	0.2

Microbiological analysis results of each sample are shown in Table 2. The mean numbers ( $\log_{10}$  cfu/g) of mesophilic aerobic bacteria, *Enterobacteriaceae*, coliform group bacteria, coagulase positive staphylococci and yeasts- moulds were determined to be  $8.7 \pm 0.99$ ,  $6.8 \pm 2.7$ ,  $4.6 \pm 2.8$ ,  $5.0 \pm 1.3$  and  $8.1 \pm 1.3$ , respectively.

**Table 2.** Microbiological analysis results of Siirt herby cheese samples taken from sales points in Siirt ( $\log_{10}$  cfu/g).

Sample No.	Mesophilic aerobes	St. deviation	Enterobacteriaceae	St. deviation	Coliforms	St. deviation	Coagulase positive staphylococci	St. deviation	Yasts - moulds	St. deviation
1	7.6	0.0	1.0	0.0	1.0	0.0	3.4	0.0	7.2	0.0
2	8.8	0.1	7.4	0.0	6.8	0.2	5.1	0.0	8.4	0.1
3	8.6	0.2	1.0	0.0	1.0	0.0	3.7	0.1	5.7	0.2
4	7.4	0.1	1.0	0.0	1.0	0.0	3.2	0.1	6.1	0.0
5	9.7	0.1	8.7	0.1	7.9	0.3	5.3	0.2	9.4	0.0
6	8.0	0.1	5.7	0.4	4.8	0.1	5.6	0.2	7.8	0.2
7	8.9	0.0	6.1	0.2	6.7	0.1	5.4	0.2	8.4	0.2
8	10.4	0.2	9.9	0.1	7.3	0.4	5.6	0.2	10.1	0.3
9	8.5	0.0	7.5	0.0	1.0	0.0	4.4	0.0	7.4	0.0
10	8.7	0.1	8.3	0.2	3.6	0.1	3.8	0.0	8.5	0.1
11	9.9	0.0	9.7	0.2	5.5	0.1	3.4	0.1	9.6	0.0
12	9.5	0.0	7.3	0.3	3.4	0.1	4.3	0.1	6.6	0.1
13	7.9	0.0	7.8	0.0	6.2	0.0	5.7	0.3	7.9	0.1
14	8.5	0.0	7.3	0.1	1.0	0.0	3.5	0.1	7.4	0.2
15	8.7	0.0	7.1	1.0	1.0	0.0	5.0	0.1	7.0	0.0
16	7.7	0.0	7.7	0.1	4.7	0.0	7.0	0.0	7.8	0.1
17	9.8	0.1	9.2	0.0	6.9	0.1	6.2	0.1	9.1	0.0
18	9.1	0.1	7.3	0.1	9.0	0.1	7.3	0.0	9.8	0.0
19	8.3	0.1	7.3	0.0	5.1	0.2	5.6	0.1	8.5	0.1
20	7.7	0.0	7.7	0.1	7.5	0.1	7.2	0.1	10.0	0.1
<b>Mean</b>	8.7	0.9	6.8	2.7	4.6	2.8	5.0	1.3	8.1	1.3
<b>Least</b>	7.4	0.1	1.0	0.0	1.0	0.0	3.2	0.1	5.7	0.2
<b>Most</b>	10.4	0.2	9.7	0.2	9.0	0.1	7.3	0.0	10.1	0.1

#### 4. DISCUSSION ANA CONCLUSION

It has been reported that raw milk and raw milk cheeses are responsible for 96% of food poisonings caused by consumption of dairy products in the USA (17). Çetin and Durlu Özkaya (18) have demonstrated that cheese is playing an important role in food poisoning cases, and health risks of some dairy products in Turkey between the years 2014 and 2018

Minimum requirements for production, packaging, labeling and sales points for cheese are stated in the Turkish Food Codex Cheese Communiqué (4). In the codex (4), packaging (Article 13/1), labelling (Article 14/1), product names (Article 4) or local/national names (Article 14/1a)

have been regulated as standards for retailed cheese. Cheeses produced from raw or thermized milk are ripened under cold storage for at least 4 months (Article 5/c). The ripening time period of the cheeses is stated as “has been ripened at least ...d or mo” on their labels. Our inspection results have demonstrated that the regulations mentioned above have not fully followed as minimum requirements for production and sales process by the relatives.

In many studies, it is concluded that herby cheeses sold in Turkey are unhealthy, poor quality, risky for public health (19-23). Kurt and Akyüz (24) reported in 1984 that primitive conditions should be abandoned and production should be carried out in modern factories. Likewise, the results of this study and formerly made studies demonstrate that the total amount of Siirt herb cheese produced under primitive conditions, and thus the hygienic quality and chemical parameters are variable as seen in Tables 3 and 4.

According to the Codex on the Supply of Raw Milk (8), only the supply of raw milk produced in a milk producing livestock enterprise with permission from the competent authority is allowed (Article 5/1). Farms must have a disease-free certificate (Article 5/2). Siirt herby cheese is made from raw sheep’s and/or goat’s milk. We don’t have information about the control and certification of herds and raw milk used for Siirt herby cheese production. Also, we could not find any production time or ripening time period for the cheese at the retail.

In the Herby Cheese Standard (6), it is stated that the amount of milk fat in dry matter should be at least 45%, humidity at most 60% and salt ~~amount~~ at most 7.5%. The minimum, (average) and maximum values (%) for the cheese are listed in the Geographical Indication Certificate as such: dry matter (%) 46.78 (43.81) 47.78, protein (%) 22.17 (20.60) 25.52, fat (%) 17.29 (16.75) 19.21, ash (%) 6.85 (5.07) 7.45, salt (%) 5.73 (4.60) 6.9. When it is classified in terms of % Moisture in Cheese Fat-Free Mass in cheese standards, herby cheese has been reported to be from the semi-hard cheese group, which falls between 57-64% values (6, 20). The % of Moisture in Cheese Fat-Free Mass of cheese samples analyzed was not less than 57%. The mean percentage was determined as  $65.7 \pm 6.1\%$  (data not given elsewhere).

According to the herby cheese standard (6), herby cheeses should contains at least 45% milk fat in dry matter, that is, it should be in the full-fat cheese category. It was observed that the average findings of the samples were compatible with the value specified in the Standard as shown in Table 1, and 15 samples were in the full-fat cheese category. However, 6 samples from the brined herby cheese samples and seven samples from the dry salted samples did not comply with the Standard as shown in Table 3. It has also been revealed in other studies that

herby cheeses sold in the market have not been standardized in terms of fat contents. The results of this and formerly made studies were comparatively given in Table 3. The non-standardization of the production process and the variables from milk used in the production during traditional production has been shown to cause this situation (25). We also demonstrated in this study non-standardized fat contents from the cheese samples.

The findings of previously made studies and this study were evaluated in the light of the Turkish Herby Cheese Standard (6). As shown in Table 3, the most of the samples analyzed was out of the Standard values. Only dry matter and results obtained from this study were in compliance with the Herby Cheese Standard (6). Nevertheless, dry matter rates of the two (10%) samples dry matter were minimum 45%), and did not comply with the Standard. Dry matter values found in these two samples are also below the value (at least 43.81%) reported in the Van herby cheese geographical indication certificate (2). Although the production methods of pressed herby cheese are different, their chemical compositions are similar to Erzincan tulum cheese. The humidity rate for Erzincan Tulum cheese has been reported to be 45% at most (50% in low-fat and fat-free tulum cheeses) in the Standard (20). However, this value was reported to be higher (at most 60%) in herby cheese. This value is similar to the value of white cheese. In addition, the minimum 45% dry matter and maximum 60% moisture values in the herb cheese standard do not complement each other. As shown in Table 3 and Table 4, many of the samples analyzed in previously made studies and in this study have not been in compliance with the standard regulations.

Salt values have been reported as maximum 7.5% in Herby Cheese standard (6), and maximum 6.9% in Van Herby Cheese Geographical Indication Certificate (2). However, we suggest that the maximum value allowed in other tulum cheeses, which is 6%, is also in non-brined herby cheeses, which we prefer to express as herby Tulum cheese in this study. In the Cheese Communiqué (4), a maximum of 7.5% salt rate in dry matter is allowed in brined cheeses. As shown in Table 3, the values given belong to herby tulum cheeses and there are samples containing 2-3 times more salt than allowed. In order to produce herby cheese with salt content in accordance with the standards, first of all, its technology must be developed and then its production must be carried out in licensed enterprises that have a technological competence certificate. Officially inspected licensed production facilities are needed

In the Turkish Food Codex Microbiological Criteria Regulation (9), it is stated that, as a hygiene criterion, the number of coagulase-positive staphylococci in cheese should not exceed the  $10^4$



cfu/g. The values of other microorganisms analyzed (total mesophilic aerobic bacteria, coliforms and yeast-mold) were used only in comparison with the findings of other researchers as shown in Table 4. Since these values were not included in the communiqué, they were not evaluated according to the Communiqué (4). Thirteen (60%) of the 20 samples examined in our study contained coagulase positive staphylococci more than  $4 \log_{10}$  cfu/g. As shown in Table 4, staphylococcal analysis was not performed in 5 of the 9 studies in which microbiological analysis was performed (19, 24, 26, 27). In the other 3 studies in which staphylococcal analysis was performed, it was reported that there was contamination above the values reported in the Communiqué (21, 22, 28). In a study, it was reported that the staphylococcal numbers were within standard values (29). When examined in terms of coagulase-positive staphylococci, which is the only value included as a hygiene criterion in the legal document, it was seen that the herby cheeses on sale did not comply with the standard as shown in Table 4.

Herby cheeses made after pasteurization of different milks were vacuum packed and their chemical changes have been investigated for 90 d (30). No significant changes have been observed in the average values of 50% for dry matter and 28% for fat. Although it is not possible to compare the findings of our study with the study, the findings of the study may be useful for industrial production models to be developed using pasteurized milk. High numbers of coliform bacteria and yeast-mold numbers were found to be high in our study and in some other studies as shown in Table 4. Herby cheese produced from raw milk poses a great risk in terms of pathogenic microorganisms, and although the antimicrobial activities of herbs are known, they carry the same risk, and pasteurization of milk and herbs is necessary for hygiene reasons (31-34). Although pathogenic bacteria analysis was not performed in our study, it can be predicted that the number of bacteria accepted as hygiene criteria is quite high, and pathogenic bacteria may also be present in the samples we examined.

When Tables 3 and 4, in which the findings of this study and previous studies are presented comparatively, are examined, it is understood that the sale of these cheeses should be controlled because they do not comply with the minimum chemical and microbiological criteria. It has been reported that pickled herbs are also unhygienic and carry health risks (32). Antibiotic residues have also been found in herby cheeses (21).

**Table 3.** Comparison of the results of physical and chemical analysis of Siirt herb cheese samples taken from sales points (as given in the Table 1) with the results of previous researches.

Reference No.	pH	Lactic acids. %	Dry matter. %	Fat in dry matter. %	Ash. %	Salt in dry matter. %
4	4.2-5.8	NA*	NA	NA	NA	NA
8	4.22-5.19	NA	45.24-57.38	35.33-59.37	NA	4.3-17.7
21	5.02-6.83	NA	NA	NA	NA	NA
22	5.09-5.93	NA	51.05-62.57	NA	NA	NA
23	4.33-4.90	0.87-1.36	50.10-56.69	18.93-21.09	5.21-5.77	6.08-7.28
24	4.32-5.8	0.24-1.45	37.32-58.24	NA	NA	3.62-7.3*
25	NA	0.18-1.75	29.1-61.57	22.74-56.28	NA	2.7-18.64
26	NA	NA	50.81-58.43	37.87-51.56	4.03-7.92	6.44-21.76
27	NA	0.31-1	42.52-52.31	28.12-51.06	3.28-15.21	2-13.81
29		0.11-0.72	36.26-46.8	26.8-48.76	NA	2.78-16.31
31	4.78-5.32	1.37-1.47	44-46	19.5-21.75	5.08-5.3	4.3-4.5
33	4.28-5.54	1.93-2.42	51.2-60.59	21.25-28.75*	5.32-12.51	4.24-14.4*
34	5.45	NA	44.37	NA	8.98	7.58
A	4.4-6.3	0.8-4.1	34.6-57.9	31.2-63.5	1.2-8.1	1.1-4.5
A*	<b>5.3</b>	1.9	49.6	46.8	<b>5.6</b>	2.9
B	NA	NA	En az 45	NA	NA	7.5
C	NA	NA	43.81-47.78	16.78-19.21	<b>5.07-7.45</b>	4.6-6.9
C*	NA	NA	46.78	17.29	<b>6.85</b>	5.73

NA: Not analyzed. A: The values are taken from Table 1. A\*: The mean values are taken from Table 1. B: The values are taken from the Turkish Standards - Herby Cheese Standard (15). C: The values are taken from Van Herby Cheese Geographical Indication Certificate (2). C\*: The mean values are taken from Van Herby Cheese Geographical Indication Certificate (2).

**Table 4.** Comparison of the results ( $\log_{10}$  cfu/g) of microbiological analysis of Siirt herb cheese samples taken from sales points (as given in the Table 2) with the results of previous researches.

Reference No.	Mesophilic aerobes	<i>Enterobacteriaceae</i>	Coliforms	<i>Coagulase positive staphylococci</i>	Yeasts - moulds
4	3.5-8.1	<1-6	NA*	NA	1.7-7.5
8	4-8.2	<2-4.49	NA	NA	NA
11	NA	NA	0-3	2-6	1-6
22	6.47	NA	NA	NA	4.85
23	7.04-10.49	3.03	<1-4.68	NA	3.03-5.71
24	5.6-9.31	NA	<1-5.89	1-8.71	2.6-8
25	4.3-9.6	1.3-6.86	1-6.2	1-1.64	2.04-6.68
27	8-10	NA	3-5	NA	5-7
28	6.14-8.55	NA	2.32-5.86	2.43-4.29	2.2-6.86
A	7.4-10.4	1-9.7	1-9	3.2-7.3	5.7-10.1
A*	8.7	6.8	4.6	5.0	8.1

NA: Not analyzed. A: The values are taken from Table 1. A\*: The mean values are taken from Table 1. B: The values are taken from the Turkish Standards - Herby Cheese Standard (15).

In conclusion, the production and trade of Siirt herby cheese should be produced and sold in more hygienic places by expert staff. When this progress is achieved, it is certain that the contribution of this cheese to the provincial economy will increase even more. Considering the goat presence and transhumance in Siirt province, the production process should be determined by scientific studies in order to produce Siirt herby cheese from a mixture of sheep and goat milk. Modern Siirt herby cheese production facilities should be established in the province. The brand value of the product should be created and this value should be established as a wide market network and used as a tourism-developing product. For this, the industry-appropriate technology of this cheese should be developed and the possibilities of using pasteurized milk and starter culture in production should be provided.

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#### Conflict of Interest

The authors declare no conflict of interest.

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**BACTERIA ISOLATION AND ANTIMICROBIAL SUSCEPTIBILITIES FROM  
SURGICAL SITE AFTER DIFFERENT OVARIOHYSTERECTOMY APPROACHES  
IN CATS AND DOGS**

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**ABSTRACT**

Ovariohysterectomy (OVH), which is one of the surgical sterilization methods, can be applied with two different operation approaches: median celiotomy (median-OVH) and lateral laparotomy (lateral-OVH). The aim of the study is to reveal the bacteria isolation and antibiotic susceptibility from the samples taken at the surgical site after median-OVH and lateral-OVH in cats and dogs. The study was carried out on 22 cats and 21 dogs, whose health checks were made before the operation. The animals included in the study were randomly divided into two groups as median-OVH (cat, n=11; dog, n=11) and lateral-OVH (cat, n=11; dog, n=10). Swap samples were taken from the surgical site for microbiological examination before the operation and on the 1st, 2nd, and 3rd days after the operation. Bacteria were identified in 50 (29.0%) of 172 swap samples, and a total of 70 bacteria were isolated. *Staphylococcus intermedius* (38.5%) was the most isolated bacteria from the surgical site, followed by *Enterococcus faecium* (10%) and *Staphylococcus lentus* (8.5%). The number of bacteria isolated from the median-OVH (59.5%; 50/84) was higher than in lateral-OVH (22.7%; 20/88) in cats and dogs. *Staphylococcus intermedius*, the most isolated bacteria (n=27); while 23 of them (85.1%) were beta-lactamase positive, 11 of them were also found to be methicillin resistant (40.7%), 2 of them were both beta-lactamase positive and clindamycin resistant (7.4%). Antimicrobial resistance is a growing problem in human and animal health, and the necessity of determining antimicrobial susceptibility in order to raise awareness about rational antibiotic use is a fact. In conclusion, this study revealed that the selection of the operation site in ovariohysterectomy may affect the bacterial population and it is necessary to determine the bacteria and antibiotic susceptibility in possible complications.

**Keywords:** Ovariohysterectomy, cat, dog, bacterial isolation, antimicrobial susceptibility

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**KEDİ VE KÖPEKLERDE FARKLI HATLARDAN YAPILAN  
OVARİOHİSTEREKTOMİ SONRASI OPERASYON BÖLGESİNDEN İZOLE  
EDİLEN BAKTERİLER VE ANTİMİKROBİYAL DUYARLILIKLARI**

**ÖZET**

Cerrahi sterilizasyon yöntemlerinden bir tanesi olan ovariohisterektomi (OVH) median celiotomi (median-OVH) ve lateral laparotomi (lateral-OVH) olmak üzere iki farklı operasyon bölgesi seçimi ile uygulanabilmektedir. Çalışmanın amacı, kedi ve köpeklerde median-OVH ve lateral-OVH sonrası operasyon bölgesinden alınan örneklerden izole edilen mikroorganizmaları ve antibiyotik duyarlılıklarının ortaya konulmasıdır. Çalışma, operasyon öncesi sağlık kontrolleri yapılan 22 adet dişi kedi ve 21 adet dişi köpek üzerinde gerçekleştirildi. Çalışmaya alınan hayvanlar rastgele median-OVH (kedi, n=11; köpek, n=11) ve lateral-OVH (kedi, n=11; köpek, n=10) olmak üzere iki gruba ayrıldı. Operasyon öncesi ve operasyon sonrası 1., 2. ve 3. günlerde ensizyon hattından mikrobiyolojik inceleme için swap örnekleri alındı. Alınan 172 swap örneğinin 50 (%29,0) tanesinde bakteri identifikasyonu yapılırken toplamda 70 bakteri izole edildi. Ensizyon hattı kültürlerinde en çok izole edilen bakteri *Staphylococcus intermedius* (%38,5) olurken, bunu *Enterococcus faecium* (%10) ve *Staphylococcus lentus* (%8,5) izledi. Kedi ve köpeklerde median-OVH hattından izole edilen bakteri sayısı (%59,5; 50/84) lateral-OVH'ye (%22,7; 20/88) göre daha fazla bulundu. En fazla izole edilen bakteri olan *Staphylococcus intermedius*'un (n=27); 23 adedi (%85,1) beta-laktamaz pozitifken bunlardan 11 adeti aynı zamanda metisiline dirençli bulunmuş (%40.7) olup, 2 adeti ise hem beta-laktamaz pozitif hem de klindamisine dirençli (%7.4) bulunmuştur. Antimikrobiyal direnç, insan ve hayvan sağlığında büyüyen bir problemdir ve akılcı antibiyotik kullanımı konusunda bilinçlenilmesini sağlamak için antimikrobiyal duyarlılıklarının belirlenmesi gerekliliği ortaya konulmuş bir gerçektir. Sonuç olarak, bu çalışma ovariohisterektomide operasyon bölgesi seçiminin bakteri popülasyonunu etkileyebileceğini ve olası komplikasyonlarda mikroorganizmaların ve antibiyotik duyarlılıklarının belirlenmesi gerekliliğini ortaya koymuştur.

**Anahtar kelimeler:** Ovariohisterektomi, kedi, köpek, bakteri izolasyonu, antimikrobiyal duyarlılık



## 1.GİRİŞ

Evcil hayvanlarda üremenin denetlenmesi amacıyla siklusun belirli dönemlerde baskılanması ya da cerrahi olarak kısırlaştırılma operasyonu gibi çözümler bulunmaktadır. Ovariohisterektomi (OVH) operasyonu, kedi ve köpeklere uygulanan en yaygın cerrahi sterilizasyon işlemlerinden birisi olarak kabul edilmektedir (Alaçam, 2008). Ovariohisterektomi operasyonu, uterus ile iki ovaryumun, uygun şekilde ligatüre edildikten sonra birlikte uzaklaştırılması işlemine denir (Alaçam, 2008). İstenmeyen östrus davranışlarının önlenmesinin yanı sıra pyometra, uterus torsiyonu, kistik endometriyal hiperplazi, uterus rupturu, ve uterus neoplazilerinde bir tedavi seçeneği olarak uygulanmaktadır (Fingland, 1998). Karnivorlarda ovariohisterektomi median celiotomi veya lateral laparotomi uygulaması şeklinde iki farklı bölgeden yapılabilmektedir. Ovariohisterektomi operasyonunda lateral laparotomi İngiltere’de sıklıkla kullanılırken, median laparotomi Amerika’da tercih edilmektedir (Coe ve ark., 2006). Karnivorlarda operasyon bölgesinin seçiminin karşılaştırıldığı çalışmalarda genellikle postoperatif ağrının değerlendirilmesi yapılmıştır (Holly ve ark., 2004; Coe ve ark., 2006). Lateral-OVH ilk bilateral ovarioektomi operasyonunun yapıldığı yöntemdir. Daha sonraki yıllarda ventral median yöntem geliştirilmiştir. Her iki yöntemde kendine göre avantaj ve dezavantajları yapılan çalışmalar ile gösterilmiştir. Özellikle meme hiperplazisi veya laktasyon döneminde ki kedilerde lateral-OVH uygulaması gelişmiş olan meme dokusunun olumsuz etkilerinden kaçınmak için tercih sebebidir. Sonuç olarak laktasyon döneminde OVH operasyonu yapılması gereken hayvanda lateral laparotomi uygulaması ile median celiotomi de karşılaşılabilecek olan yara iyileşmesinde gecikme veya enfeksiyon, memelerden süt sızması, deri ya da subkutan dokudan kaynaklı hemoraji gibi potansiyel komplikasyonlardan kaçınılmış olacaktır (Holly ve Hardie, 2004). Özellikle agresif ya da sokak hayvanlarında operasyon bölgesi olarak lateral hat yaklaşımı cerrahi yara bölgesinin uzaktan da rahatlıkla gözlenebilmesini sağlamaktadır, bu şekilde postoperatif dönemde oluşabilecek ensizyon bölgesinin açılması ve tespit edilmemesi riski azalmaktadır (Levy, 2004). Laktasyondaki hayvanlarda olduğu gibi, meme hiperplazisi olan hayvanlarda lateral hattın kullanılması, meme bezlerine yakın diseksiyondan kaçınılmış olunur ve meme bezi hasarına bağlı oluşabilecek perioperatif komplikasyonları en aza indirir (McGrath ve ark., 2004). Cerrahi yara enfeksiyonu en sık görülen postoperatif komplikasyonlardan birisidir ve bu tür enfeksiyonlarla karşılaşma olasılığı veteriner hastanelerinde giderek artan bir problem haline gelmiştir. Yapılan ensizyon ile birlikte derinin koruyucu bariyerinin kırılması nedeniyle,

tüm cerrahi alanlar kontaminasyon riski altındadır, ancak tüm cerrahi alanlarda postoperatif enfeksiyon şekillenmez. Bakterilerin bir alanı enfekte etme yeteneği, kontaminasyon düzeyine bağlıdır. Ayrıca, tüm bakteriler aynı patojenite ve virülansa sahip değildir (Mangram, 1999). Ameliyat sonrası profilaktik antibiyotik uygulaması cerrahi yara enfeksiyonu insidansını azaltsa da uygun antibiyotik seçimi gereksiz antibiyotik kullanımını ve antibiyotik direncini önlemek açısından önemlidir (Bratzler, 2004).

Bu çalışmanın amacı, farklı hatlardan yapılacak ovariohisterektomi operasyonu sonrası kedi ve köpeklerde operasyon bölgesinden izole edilecek bakteri türlerinin belirlenmesi ve bu bakterilerin antibiyotik dirençlerini değerlendirmektir.

## **2. ARAŞTIRMA ve BULGULAR**

Bu çalışma, klinik araştırmalara başlamadan önce Siirt Üniversitesi Hayvan Araştırmaları Yerel Etik Kurulu (No:2019/10) tarafından onaylanmıştır.

Bu çalışma Siirt Üniversitesi Veteriner Fakültesi Doğum ve Jinekoloji Anabilim Dalı'na rutin ovariohisterektomi operasyonu talebiyle getirilen sağlıklı hayvanlar üzerinde yapıldı. Yaşları 1 ile 3 arasında değişen, ortalama ağırlığı  $2,7 \pm 0,5$  kg olan 22 kedi ve yaşları yaklaşık 4 ay ile 3 yıl arasında, vücut ağırlığı 13 ile 36 kg arasında olan 21 köpek çalışmaya dahil edildi. Tüm hayvanların operasyona uygun olduğunu belirlemek için genel klinik muayeneleri (beden sıcaklığı, pulzasyon ve respirasyon sayısı, lenf nodülleri, trakheal palpasyon, akciğer oskültasyonu) yapıldı. Uygun görülen hayvanlara operasyondan bir gece önce yemek ve su kısıtlaması önerildi ve ertesi gün operasyona alındı. Ovariohisterektomi yapılacak hayvanlar median celiotomi yaklaşımına (11 kedi ve 11 köpek) veya lateral laparotomi yaklaşımına (11 kedi ve 10 köpek) göre rastgele dağıtıldılar. Ovaryohisterektomi operasyonunda kullanılan anestezi protokolünde 2 mg/kg dozda kas içi (im) ksilazin HCl (Xylazinbio%2, Bioveta PLC) enjeksiyonu ile hayvanların sedasyonu sağlandı. Ksilazin HCl uygulamasından 10 dk sonra ise 10 mg/kg im ketamin HCl (Ketasol ® %10, Richter Pharma) enjeksiyonu ile genel anesteziye geçişi sağlandı.

### **Ovariohisterektomi Operasyonunun Yapılması**

Ovariohisterektomi operasyonları, standart aseptik koşullar altında, tek bir operatör tarafından gerçekleştirildi. Median- OVH'de ensiyon göbek skatriksinin 2 parmak altından deriye düz bir şekilde yapıldı. Linea albadan abdominal boşluk içerisine girilerek ovaryumlar bulundu ve ovaryuma yakın gelmeyecek şekilde suspensiyör ligament üzerine ligatür uygulandı, daha sonra

standart prosedürlere uyularak corpus uteri ligatüre edildi ve vücut dışına alındı. Lateral-OVH'de ise operasyon bölgesi sol tarafta, kraniyalden son kosta, kraniokaudal yönde iliak kanat ve lumbal omurlar üçgeninin orta noktasına denk gelecek şekilde seçildi. Deri altı kaslar moskito pensi ile küt diseksiyon şeklinde tek seferde geçildi. Bir hemostatik pens ile operasyon bölgesi genişletildi. Uterusun bulunması, ovaryum ve kornuların çıkartılmasında aynı işlemler yapıldı. Devamında sırasıyla periton, kaslar ve deri 2/0 eriyebilir dikiş materyali ile dikilerek operasyonlar tamamlandı (Fingland, 1998). Araştırmaya alınan tüm hayvanlar aynı postoperatif bakım ve besleme koşulları altında tutuldu. Tüm hayvanlara ameliyattan önce analjeziyi sağlamak amacıyla subkutan meloksikam enjeksiyonu yapıldı (Demelox©, Denova, Türkiye, 0,2 mg/kg SC).

Operasyon süresi boyunca hiçbir hayvanda komplikasyon gözlenmedi. Aseptik hazırlıktan hemen önce ve operasyondan sonraki üç gün boyunca çalışmaya alınan hayvanlardan cerrahi operasyon bölgesinden mikrobiyolojik inceleme için swap örnekleri alındı. Örnekler Stuart-transport besiyeri (BD, Heildelberg, Almanya) ile soğuk zincir altında inceleme amacıyla Mikrobiyoloji laboratuvarına gönderildi. Postoperatif dönem sürecinde operasyon bölgesinde görülen komplikasyonlar kaydedildi.

#### **Bakteri Kültürü ve Antibiyogram**

Alınan örneklerden kanlı agar (Merck, Almanya) üzerine ekim yapıldı ve aerobik durumda 37 °C'de 24-96 saat inkübe edildi. Kolonilerin mikroskopik morfolojisi Gram boyama ile incelendikten sonra bakteri tanımlama sistemi (BD, Phoenix<sup>100</sup>) kullanılarak tür düzeyinde identifikasyonu üretici firma kılavuzuna göre yapıldı. Bakterilerin antimikrobiyal duyarlılığının belirlenmesi için PMIC/ID-87 Gram pozitif combo panel ve NMIC/ID-450 Gram negatif combo panel kullanıldı.

### **3. SONUÇ ve DEĞERLENDİRME**

Ovariohistektomi rutin olarak hayvan popülasyonlarını kontrol altında tutmak amacıyla uygulanan bir operasyon olmasının yanı sıra yavru alınması istenmeyen hayvanlarda görülebilecek komplikasyonların (pyometra, kistik endometriyal hiperplazi, meme tümörü) önlenmesi amacıyla da uygulanmaktadır (Levy, 2004). Ovariohistektomi operasyonu median celiotomi veya lateral laparotomi olarak iki farklı operasyon bölgesinden yapılabilmektedir. Genellikle operasyon bölgesinin seçimi uygulamayı yapan hekimin tecrübesine kalmıştır. Her iki yöntemin faydalarının karşılaştırıldığı çalışmalarda, median-OVH operasyon sırasında daha

iyi bir gözlem alanı sunar ve sonrasında daha az postoperatif ağrıya neden olurken, lateral-OVH'nin ise daha kısa operasyon süresine ve daha az hipotermi ve fitik riskine neden olduğu bildirilmiştir (Coe ve ark., 2006). Farklı yaşlarda 38 kedi üzerinde yapılan çalışmada median-OVH operasyonu sonrası yara bölgesinde şişme riski fazla görülürken lateral-OVH yapılmış kedilerde de palpasyonda fazla ağrı tespit edilmiştir (Swaffield ve ark., 2015). Başka bir çalışmada (yaş aralığı 6 ay-10 yaş kedi) lateral-OVH sonrası yara hassasiyeti ve yaradan akıntı görülme insidansı median-OVH'ye göre daha fazla tespit edilmiştir (Grint ve ark., 2006).

Cerrahi yara enfeksiyonlarından korunmak için postoperatif dönemde profilaktik olarak antibiyotik kullanımı insan ve hayvanlarda sıklıkla yapılan bir uygulamadır (Bratzler ve Houck, 2004). Köpek ve kedilerde cerrahi yara enfeksiyonu riski ortalama %5.7 olarak çeşitli çalışmalarda bildirilmiştir (Eugster ve ark, 2004; Nichols, 2004). Postoperatif dönemde cerrahi yara riskine neden olan bakteriler hastaneden hastaneye farklılık göstermektedir. Bu dönemde profilaktik amaçla kullanılan antibiyotikler enfeksiyon oranını azaltmasına rağmen, uygun olmayan antibiyotik seçimine bağlı olarak bakterilerin direnç kazanmasına ve süperenfeksiyona kadar gidebilen ciddi bir problem haline dönüşebilir (Turhanoglu ve ark., 2018). Bu nedenle profilaktik ya da tedavi amacıyla da olsa antibiyotikler seçilirken ortamın bakteri florasının bilinmesinin, mikroorganizma tipinin belirlenmesi için kültür testlerinin yapılmasının ve bakteriyel direnç şekilleri ile antibiyotik duyarlılık test sonuçlarının bilinmesi önemlidir (Dunning, 2003). Stafilokoklar, uygun ortam şekillendiği zaman çeşitli enfeksiyonlara neden olabilen normal deri florasının fırsatçı patojen üyelerindedir. Bu çalışmada izole edilen bakteri türlerinin çoğu, genellikle normal deri mikrobiyotasında bulunur ve fırsatçı patojenler olabilirler. Bu çalışmada alınan 172 swap örneğinin 50 (%29,0) tanesinde bakteri identifikasyonu yapılırken toplamda 70 bakteri izole edildi. Davarcı ve arkadaşları (S6) toplam 4492 yara örneği değerlendirmişler, %55'inden etken izole etmişlerdir. Kedi ve köpeklerde median-OVH hattından izole edilen bakteri sayısı (%59,5; 50/84) lateral-OVH'ye (%22,7; 20/88) göre daha fazla bulundu. Davarcı ve arkadaşları (2018) yara kültürlerinde en çok E. coli, Staphylococcus aureus ve Pseudomonas spp. izole etmişlerdir. Bu çalışmada ise enfeksiyon hattı kültürlerinde en çok izole edilen bakteri Staphylococcus intermedius (%38,5) olurken, bunu Enterococcus faecium (%10) ve Staphylococcus lentus (%8,5) izledi. Bu mikroorganizmaların ciddi enfeksiyonlara neden olabileceğini ve kayda değer dirençlilik geliştirebilecekleri çalışmalarda ortaya konulmuştur (Daniel ve ark., 2016; Davarcı ve ark., 2018). Çalışmamızda da izole edilen bakterilerin identifikasyon sonuçlarından çok bu bakterilerin antibiyotik

dirençlilikleri dikkat çekmektedir. En fazla izole edilen bakteri olan *Staphylococcus intermedius*'un; 24 adedi (%82.75) Beta-laktamaz pozitifken bu 24 Beta-laktamaz pozitifin 11 adedi aynı zamanda MRS bulunmuş, 2 adedi ise hem Beta-laktamaz pozitif hem de klindamisine dirençli bulunmuştur. Çalışmamızda 3 adet *Enterococcus faecium*; yüksek seviye streptomisin direnci (HLSR), 1 adet *Enterococcus faecium*; HLSR ve HLGR bulunmuştur.

Antimikrobiyal direnç, insan ve hayvan sağlığında büyüyen bir problemdir ve operasyona özgü profilaktik antibiyotik seçiminin özenle yapılması gerekliliği bildirilmiştir. Bu nedenle doğru antibiyotik kullanımının ancak bu çalışmaya benzer çalışmalarla sağlanabileceği görülmektedir. Sonuç olarak, bu çalışma ovariohisterektomide operasyon bölgesi seçiminin bakteri popülasyonunu etkileyebileceğini ve olası komplikasyonlarda mikroorganizmaların ve antibiyotik duyarlılıklarının belirlenilmesi gerekliliğini ortaya koymuştur.

#### **TEŞEKKÜR**

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## **KAYNAKLAR**

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**EVALUATION OF CK-MB, TROPONIN-1, D-DIMER, AND NT-proBNP LEVELS  
BEFORE AND AFTER TWO DIFFERENT ANESTHESIA PROTOCOLS IN  
CASRATED DOG**

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**ABSTRACT**

In this study, it was aimed to compare by measuring Troponin I, CK-MB, NT-proBNP and D-Dimer levels the cardiac effects of two different anesthesia protocols in castrated healthy and noncardiac dogs. The animal material of the study was formed by 30 healthy, noncardiac male dogs who reached sexual maturity between the ages of 1 and 3, who were brought to the animal hospital affiliated to the Animal Health Application and Research Center of Siirt University for castration. The animals were sedated with 1-2 mg/kg, intramuscular xylazine HCL and intramuscular 8-10 mg/kg Ketamine HCL were administered. The animals were intubated and connected to the closed-circuit anesthesia device. Following the injectable general anesthesia application, one group (G1) (n=15) was administered with 2-3% Isoflurane inhaler, the other group (G2) (n=15) was administered with 2-3% Sevoflurane inhaler to maintain anesthesia. Blood samples were collected before and 12. hours after anesthesia. Serum D-dimer and NT-proBNP concentration were measured using FIA meter commercial test kits with Fluorescent Immunassay quick tester. Serum Troponin I and CK-MB concentrations were measured with an automated biochemistry analyzer. In CK-MB values obtained after Sevoflurane and Isoflurane applications, it was observed that 0th hour measurements did not create a statistically



significant change on the measurements obtained 12 hours after anesthesia ( $p = 0.465$ ) however, a statistical difference was observed in CK-MB values due to the use of different anesthetic agents ( $p = 0.002$ ). In troponin values obtained after Sevoflurane and Isoflurane applications, it was observed that 0. hour measurements did not create a statistically significant change on the measurements obtained 12 hours after anesthesia ( $p = 0.811$ ). It was determined that there was no statistically significant difference in Troponin values due to the use of different anesthetic agents ( $p = 0.829$ ). Nt-ProBNP values were measured 12 hours after anesthesia, and a statistically significant difference was found between the 0th hour measurement ( $p < 0.001$ ) however, Sevoflurane and Isoflurane applications did not make a statistically significant difference on this change ( $p = 0.198$ ). Serum D-Dimer values could not be statistically evaluated because they were measured within normal limits. With this study presented, the effects on the heart of anesthetic agents used continuously in the field of veterinary medicine have been revealed, and the risk on patients in the selection of anesthetic agents will be determined in advance and anesthesia protocols will be made according to it..

**Keywords:** D-Dimer, Cardiac, Troponin- I, Nt-ProBNP

**KASTRASYON YAPILAN KÖPEKLERDE İKİ FARKLI ANESTEZİ PROTOKOLÜ ÖNCESİ VE SONRASI CK-MB, TROPONİN-1, D-DİMER VE NT-proBNP DÜZEYLERİNİN DEĞERLENDİRİLMESİ****ÖZET**

Sunulan bu çalışmada kastrasyon yapılan sağlıklı nonkardiyak köpeklerde iki farklı anestezi protokolünün kardiyak etkilerini Troponin I, CK-MB, NT-proBNP ve D-Dimer değerlerine bakılarak karşılaştırılması amaçlandı. Araştırmanın hayvan materyalini Siirt üniversitesi Hayvan Sağlığı Uygulama ve Araştırma Merkezine bağlı hayvan hastanesine kastrasyon amacı ile getirilen 1-3 yaş arasında, cinsel olgunluğa ulaşmış, sağlıklı, nonkardiyak 30 adet erkek köpek oluşturdu. Hastalara sedasyon için ksilazine Hcl 1-2 mg/kg i.m. indüksiyon için ketamine Hcl 8-10mg/kg i.m. uygulandı. Anestezinin devam ettirilebilmesi için hasta entübe edilerek kapalı devre anestezi cihazına bağlandı. Enjektale genel anestezi uygulamasının akabinde bir grup (G1) (n=15) % 2-3 oranında İzofluran ile, diğer grupta (G2) (n=15) % 2-3 oranında Sevofluran inhaler uygulanmak sureti ile anestezinin devamı sağlandı. Anestezi öncesi 0. saat ve sonrasında 12. Saatte kan örnekleri alındı. Serum D-Dimer ve NT-proBNP konsantrasyonu FIA meter ticari test kitleri kullanılarak Flöresan Immunassay hızlı test cihazıyla ölçüldü. Serum Troponin I ve CK-MB konsantrasyonları otomatik biyokimya analiz cihazı ile ölçüldü. Sevofluran ve İzofluran uygulamaları sonrasında elde edilen CK-MB değerlerinde, 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yaratmadığı görülmüştür ( $p = 0.465$ ) ancak farklı anestezi ajanlarının kullanılması sebebiyle CK-MB değerlerinde farklılık olduğu gözlemlenmiştir ( $p = 0.002$ ). Troponin değerlerinde ise, 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yaratmadığı ( $p = 0.811$ ) ve farklı anestezi ajanlarının kullanılması sebebiyle Troponin değerlerinde istatistiksel açıdan aynı şekilde anlamlı farklılığa neden olmadığı gözlemlenmiştir ( $p = 0.829$ ). Sevofluran ve İzofluran uygulamaları sonrasında elde edilen Nt-ProBNB değerlerinde, 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yarattığı tespit edilmiştir ( $p < 0.001$ ) ancak bu değişim üzerinde Sevofluran ve İzofluran uygulamalarının anlamlı bir farklılık yaratmadığını gözlemlenmiştir ( $p = 0.198$ ). Serum D-Dimer değerleri normal sınırlar içinde ölçüldüğünden istatistik değerlendirmeye alınamamıştır. Sunulan bu çalışma ile veteriner hekimlik alanında sürekli kullanılan anestezi ajanlarının kalp üzerine etkileri ortaya konulmuş olup anestezi madde seçiminde hastalar üzerindeki risk önceden belirlenerek anestezi protokollerinin ona göre yapılması sağlanmış olacaktır.

**Anahtar kelimeler:** D-Dimer, Kardiyak Troponin- I, Nt-ProBNP

## **GİRİŞ**

Genel anestezi uygulanan hastalarda seçilen anestezi türüne göre birçok hemodinamik parametre etkilenmektedir. Otonom sinir sistemi aracılığı ile kalp hızı, ritmi, myokard kontraktilitesi ve damar tonusunda değişiklikler olmaktadır. Genel anestezi uygulanan hastalarda indüksiyonda aşırı heyecana ve entübasyona bağlı ketokalamın artışı ve myokard kontraktilitesinin depresyonu, myokard iskemi ve postoperatif ağrıya bağlı hipertansiyon görülebilir. Bunun yanında yetersiz solunum sonucu gelişen hipoksi, hiperapni ve asidoz myokardı deprese edebilir ve aritmi eğilimini artarabilir. Genel anestezide kullanılan farmakolojik ajanların kardiyovasküler sistem üzerine etkileri doza bağımlı olarak değişebilir (Esener, 2004).

İnhalasyon ajanların hemen hepsi myokardiyal depresyon atım hacmi ve kan basıncında düşmeye neden olabilir. İnhaler ajanlardan Sevofluran, myokard kontraktilitesini hafif derecede deprese eder. Sistemik vasküler direnç ve arteriyal kan basıncında düşmeye neden olabilir. İzofluran ise, myokardı deprese eder ventriküler iletimi deprese etmez. Sistemik vasküler dirençte düşme ile kan basıncını düşürülebilir (Morgan ve Maget, 2008).

Troponin (Tn) çizgili kasın ince filamanlarının düzenleyici proteindir. Troponinler kana T, I, C kompleksleri (cTnT-I-C üçlü kompleksi ve cTnI-C ikili kompleksi) şeklinde ve serbest alt gruplar olarak salınırlar. Troponin T ve I çizgili kasta kasılma işleminin önemli bileşenleri olarak beraber görev alırlar. Çizgili kaslarda troponin kompleksi benzer şekilde yer alırsa da troponin T ve I'nın izoformları kardiyak kasta farklıdır, çünkü proteinler bu dokuda farklı genler tarafından kodlanırlar. Kardiyak troponinler kardiyomiyosit hasarına spesifik biyobelirteçlerdir (Liquori ve ark, 2014). Kardiyak hasar, miyosit yıkımını ve membran rupturunu indüklediğinde, serbest kalp troponin yüksek konsantrasyonlarda kan dolaşımına salınır. Bu süreci yapısal olarak bağlı troponinlerin yavaş ve sürekli bir şekilde salınması izler ve böylece sürekli yükselmiş serum konsantrasyonun nedeni açıklanmış olmaktadır (Wells ve Sleeper, 2008).

Köpek serumunda cTnI, 4-6 saatte saptanabilmekte ve insanlara göre daha hızlı, indüklenen bir travmadan (deneysel miyokardiyal infarktüs) sonra 10-16 saatte pik yaptığı bildirilmektedir (Cummins ve Cummins, 1987). Kardiyak Troponin ,mitral kapak hastalığına bağlı kalp yetmezliğinde tarif edilen patolojik değişikliklerde, arteriyoskleroz fibroz ile bağlantılıdır ve bu fibroz şiddetli derecede iskemi nedeniyle oluştuğu bildirilmektedir (Falk ve ark, 2013).

Kardiyak biyobelirteçlerden kardiyak troponin I ve kardiyak enzimlerden kreatin kinaz MB (CK-MB) insan hekimliğinde iskemi, travma ve septik miyokardiyal hasarın varlığının ortaya konulmasında tanı ve prognozun belirlenmesinde değerli bir belirteç olarak kullanılmaktadır (Slack ve ark, 2005). Birçok türde dolaşımdaki cTnI miktarının tespiti akut ve kronik miyokardiyal hasarın varlığının belirlenmesinde kullanılmaktadır ayrıca thoraks radyografisi, elektrokardiyografi ve ekokardiyografi gibi diğer tanı yöntemlerine yapılacak olan yönlendirmelerde öncülük etmekte ve yapılan bu testlere ek bilgi sağlamaktadır. Aynı zamanda dolaşımdaki cTnI miktarı kalpte meydana gelen hasarın ne derecede olduğu yönünde de bilgi vermektedir (Suzuki ve ark, 2012)

Kreatin fosfokinaz (CK-MB) izoenzimi miyokard infarktüsü tanısı için kullanılmakla birlikte, iskelet kası, vasküler düz kaslar, beyin, uterus ve plasenta gibi doku ve organlarda da bulunduğu için miyokardiyal hasarı belirlemedeki etkinliği tartışmalıdır (Abramov ve ark., 1996). Miyokardiyal hasar için, CK-MB diagnostik olarak sensitif olduğu halde, spesifik değildir. İskelet kası daha yüksek CK aktivitesine sahip olup, % 3 kadar CK-MB aktivitesine sahiptir (Adams ve ark., 1993). Ancak yinede serumda CK-MB'nin yüksek saptanması genellikle miyokardiyal hücre hasarı lehine değerlendirilmektedir. Kreatin kinaz organizmada kassal aktivasyonun bir ürünü olarak bulunmaktadır. İki alt ünitesi vardır. Alt ünitelerin birbirleri ile yapmış oldukları iletişim sonucu üç izo-enzimi bulunmaktadır. M (kas) ve B (beyin) alt ünite olmak üzere; CK-MM, CK-MB ve CK-BB izo-enzimler olarak nitelendirilmektedir (Boyd, 1983).

Organizmada farklı doku ve organlarda farklı oranlarda bulunmaktadır. Birçok türde iskelet kasında CK-MM %100 oranında tespit edilebilir. Kalp kasında CK-MM çoğunlukta olmak kaydı ile CK-MB köpeklerde %3, atlarda ise yaklaşık olarak %10 oranında bulunur (Aktas ve ark, 1994). İnsan hekimliğinde kalpte meydana gelen özellikle akut hasarlarda CK-MB prognostik amaçla kullanılmaktadır. Veteriner hekimliğinde ise tam olarak etkinliği bilinmemekle beraber üzerinde çalışmaların yapılmasının gerekliliği tavsiye edilmektedir (Guan ve ark, 2014).

D-Dimer koagülasyon sisteminin herhangi bir nedenle aktivasyonu ve fibrinolizin genel bir göstergesidir ve bu nedenle trombotik aktivitenin dolaylı bir belirteci olarak kullanılmaktadır. Tıp Hekimliğinde D-dimer seviyelerinin sağlıklı bireylerde çok nadiren artmış olabileceği saptanmıştır. D-dimer klinikte en sık olarak venöz tromboemboli (VTE) ve dissemine intravasküler koagülasyon (DİK) tanısı ve takibinde kullanılır. Ayrıca akut koroner sendromlar,

periferik damar hastalıkları, derin ven trombozu, pulmoner emboli, akut inme, gebelik, orak hücreli anemide hemolitik krizler, kötücül hastalıklar, cerrahi sonrası, konjestif kalp yetersizliği, kronik böbrek yetersizliği gibi fibrinin oluşumunu ve yıkılmasını arttıran her durumda D-Dimer seviyeleri yükseldiği bildirilmiştir ( Hager ve Platt., 1995; Chapman ve ark., 1990).

Natriüretik peptitler, vücut sıvısı homeostazını natriüretik ve diüretik etkiler yoluyla kontrol eden ve renin-anjiyotensin-aldosteron mekanizması üzerinde etkili olan bir hormon sınıfını temsil etmektedir (Liquori ve ark, 2014). ANP ve BNP dolaşımdaki ana kardiyak hormonlardır ve kardiyak natriüretik peptidler olarak adlandırılırlar. ANP'nin büyük kısmı atriyal miyositlerde sentezlenir. Sağ atriyumda sola göre daha fazla olan polipeptittir. Temel depolanma yeri atriyum olan ANP'nin aksine BNP'nin temel kaynağı kalp ventrikülleridir. Bu nedenle diğer natriüretik peptidlerden farklı olarak ventriküler hastalıkların tanısında BNP spesifik bir göstergedir ( İçen ve ark., 2009). Atriyal natriüretik peptid (ANP) ve B tipi natriüretik peptid (BNP), kardiyak hastalıkların tanısını değerlendirmede kullanışlı bulunduğu bildirilmekteyken, C-tipi natriüretik peptid (CNP) ekspresyonu parakrin fonksiyon ile ilişkilendirilmiş ve ayrıca vasküler tonunun düzenlenmesinde bir rolü bulunduğu bildirilmektedir. (Ciaramella ve ark, 1995; Van Kimmenade ve Januzzi, 2009).

Beyin natriüretik peptid (BNP) kalp ventriküllerinden salınmakta olup, ventrikül genişlemesi ve basınç artışıyla doğru oranda yükselerek kardiyak performans hakkında fikir vermektedir B-tipi natriüretik peptidin, dolaşıma bırakıldıktan sonra ANP'den daha kararlı olduğu kanıtlanmıştır (Van Kimmenade ve Januzzi, 2009)..BNP ile aynı duyarlılık ve özgüllük ile NT-pro BNP'nin biyolojik yarılanma ömrü yüksek olduğu bildirilmektedir (Fox ve ark., 2009).. BNP ve NT-proBNP'nin (N-terminal pro-beyin natriüretik peptit) iki fraksiyonu, kalp yetmezliğini, akut koroner sendromu veya iskemik kalp hastalığını değerlendirmek ve ayrıca beşeri hekimlikte kalp yetmezliği sağaltımının monitörizasyonu için başarı ile kullanılmış ve veteriner hekimliği için bir model olarak hizmet ettiği bildirilmektedir (Maisel ve ark, 2002; Braunwald, 2008; Liquori ve ark, 2014).

Özellikle NT-proBNP, son yıllarda veteriner hekimlikte kalp yetmezliği ve kalp hastalıklarının tanısında oldukça önemli rol almıştır. ProBNP; Özellikle asemptomatik kalp hastalıklarında, semptomlar ortaya çıkmadan hastalık hakkında bilgi verebilir (Uçar ve Turhan, 2005). Miyokardiyal lezyonların takibi için kardiyak fonksiyonun izlenmesi önem kazanmaktadır. Bu amaçla atriyal natriüretik peptid (ANP), B-tip natriüretik peptid (BNP), N-terminal pro-

BNP (NT-proBNP) ve kardiyak troponin gibi çeşitli hormonlar ve peptidler kalp yetmezliğinin tanısında kullanılmaktadır (Gönül ve ark., 2017).

Kardiyak sorunu olan hastalarda otonom sistem aktivitesi, vücut ısısı kan basıncı, ventriküler dolma basıncı, kalp hızı ve kan volümündeki değişiklikler ek stres oluşturur. Anesteziye ek olarak ameliyat ile ilişkili kanama, enfeksiyon, ateş, akciğer embolisi ve myokard infarktüsü gibi komplikasyonlarda düşünüldüğünde, kardiyovasküler sistem yükü artmaktadır. Kardiyovasküler komplikasyona bağlı gelişebilecek olası durumları azaltmak adına hastalardaki riskler önceden belirlenmeli ve önlem alınmalıdır. Bu kadar önemli bir konuda anestezinin hastalar için taşıdığı risk ile getireceği yararı seçilecek anestezi ajanları ile belirlemek önemlidir. Ameliyat sırasında kardiyak komplikasyonları arttıran çeşitli risk faktörleri vardır. Kardiyak risklerin bilinmesi intraoperatif dönemde meydana gelebilecek olumsuzluklara hazırlıklı yakalanmak için önemlidir.

Sunulan çalışmanın amacı, kastrasyon yapılan sağlıklı nonkardiyak köpekler de iki farklı anestezi protokolünün kardiyak etkilerini Troponin I, CK-MB, NT-proBNP ve D-Dimer değerine bakarak karşılaştırmaktır.

## **YÖNTEM**

### **1. Materyal:**

#### **1.1 Hayvan Materyali:**

Araştırmanın hayvan materyalini Siirt üniversitesi Hayvan Sağlığı Uygulama ve Araştırma Merkezine bağlı hayvan hastanesine kastrasyon amacı ile getirilen 1-3 yaş arasında, cinsel olgunluğa ulaşmış, sağlıklı, nonkardiyak 30 adet erkek köpek oluşturdu. Hastaların klinik ve laboratuvar değerlendirilmelerinde herhangi bir anormallik saptanmayan ve alınan anamnez bilgileri doğrultusunda sağlıklı olduklarına kanaat getirilen köpekler çalışmaya dahil edildi.

#### **2. Uygulanan anestezi protokolleri:**

Hastalara preanestezi döneminde ilk olarak V. cephalica antebrachi'den damar yolu açıldı. Ardından sedasyon için ksilazine Hcl 1-2 mg/kg i.m. (Xylazinbio %2, Bioveta, Çek Cumhuriyeti), indüksiyon için ketamine Hcl 8-10mg/kg i.m. (Ketasol %10, Arion, Türkiye) uygulandı. Anestezinin devam ettirilmesi için hasta entübe edilecek ve kapalı devre anestezi cihazına bağlandı (SMS 2000 Klasik Otomatik Anestezi Cihazı CWH 1020, SMS, Türkiye). Enjektale genel anestezi uygulamasının akabinde bir grup (n=15) % 2-3 oranında İsoflurane (Isoflurane USP, Pirimal Critical Care, ABD) ile, diğer grupta (n=15) % 2-3 oranında

Sevofluran (Sevofluran, Aeseica Qeenborough Ltd., İngiltere) inhaler uygulanmak sureti ile anestezinin devamı sağlandı.

### **3. Numunelerin Alınması ve Değerlendirilmesi:**

#### **3.1 Numunelerin alınması ve saklanması:**

Kastrasyon yapılacak köpeklerden anestezi öncesi ve sonrası 12. saat'te kan örnekleri steril jelli biyokimyasal tüplerine alınarak ivedilikle 3000 r.p.m de 15 dk. da santrifüj edilerek serum örnekleri çıkarılıp analiz yapılana kadar -20 derecede muhafaza edildi.

#### **3.1 D-Dimer analizi**

D-Dimer konsantrasyonunun ölçümü Flöresan Immunassay hızlı test (Fineware, Wondfo Biotech Co. Ltd, Fineware, Atateknik, Türkiye) cihazıyla ölçüldü. Serum D-dimer konsantrasyonu ölçümünde FIA meter ticari test kitleri (D-Dimer test, Fineware, Wondfo Biotech Co. Ltd) kullanıldı. Serum örnekleri analiz süresine kadar -20 °C'de saklandı.

#### **3.2 NT-proBNP analizi**

NT-proBNP konsantrasyonunun ölçümü Flöresan Immunassay hızlı test (Fineware, Wondfo Biotech Co. Ltd, Fineware, Atateknik, Türkiye) cihazıyla ölçüldü. Serum NT-proBNP konsantrasyonu ölçümünde FIA meter ticari test kitleri (NT-proBNP test, Fineware, Wondfo Biotech Co. Ltd) kullanıldı. Serum örnekleri analiz süresine kadar -20 °C'de saklandı.

#### **3.3 Troponin I ve CK-MB**

Serum Troponin I ve CK-MB konsantrasyonları ADVIA 1800 Otomatik Biyokimya analiz cihazı ile ölçüldü. Serum örnekleri analiz süresine kadar -20 °C'de saklandı.

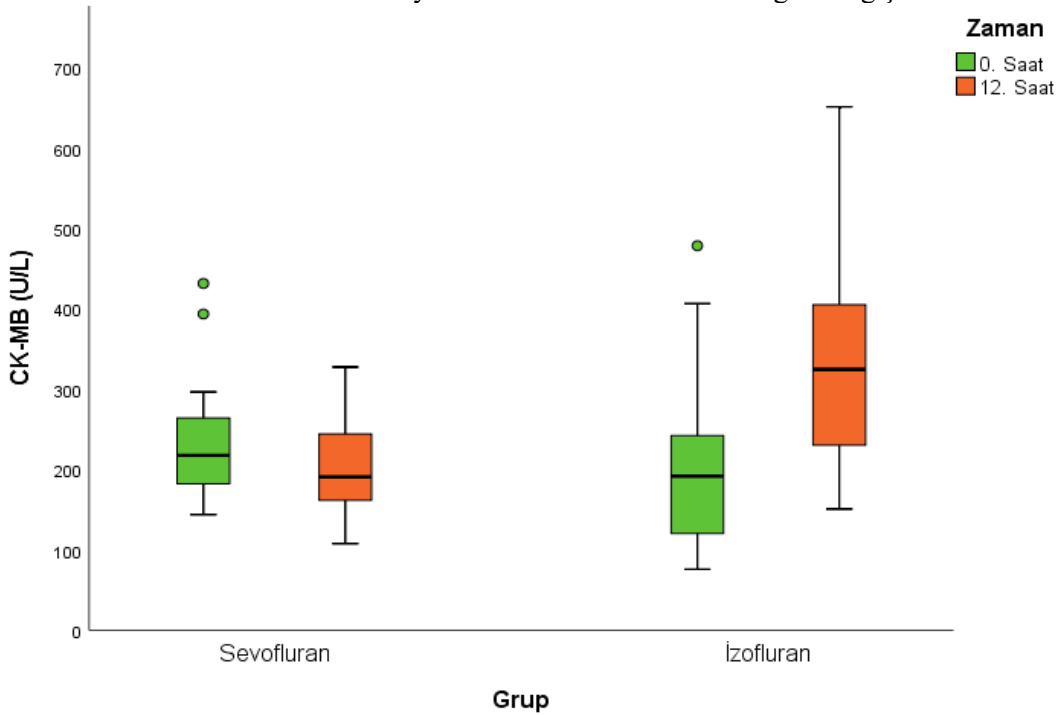
### **4. İstatistiksel Analizler**

Çalışmada anestezi uygulamasından 12 saat sonra yapılan ölçümler bağımlı değişken olarak kabul edilerek, 12.saat ölçümleri değişken olarak Sevofluran ve İzofluran grupları dışında anestezi öncesi (0. saat) ölçümleri bağımsız değişken üzerinde etkisi olan kovaryant olarak değerlendirildi. Bu amaç doğrultusunda, elde edilen verilerin istatistiksel olarak analizinde Kovaryant Analizi (Analysis of Covariance) kullanıldı. Hipotez testi öncesinde normal dağılım, doğrusallık ve regresyon eğimlerinde etkileşim varsayımlarının kontrolleri sağlandı. Kullanılan bütün testlerde anlamlılık kriteri olarak  $p < 0.05$  kabul edildi ve analizlerin yürütülmesinde SPSS v26 istatistik programından yararlandı.

## BULGULAR

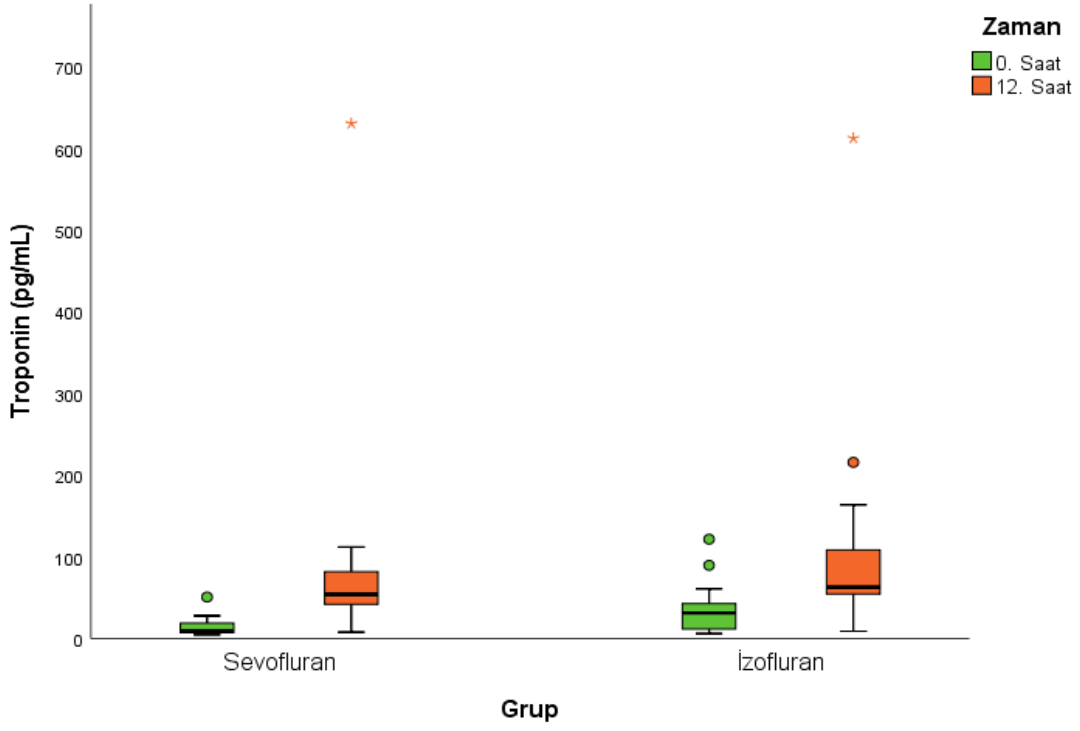
Sevofluran ve İzofluran uygulamaları sonrasında elde edilen CK-MB değerlerinde; 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yaratmadığı görülmüştür ( $p = 0.465$ ) ancak farklı anestezi ajanlarının kullanılması sebebiyle CK-MB değerlerinde farklılık oluştuğu gözlemlenmiştir ( $p = 0.002$ ) (Grafik 1). Troponin değerlerinde ise, 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yaratmadığı ( $p = 0.811$ ) ve farklı anestezi ajanlarının kullanılması sebebiyle Troponin değerlerinde istatistiksel açıdan aynı şekilde anlamlı farklılığa neden olmadığı gözlemlenmiştir ( $p = 0.829$ ) (Grafik 2). Sevofluran ve İzofluran uygulamaları sonrasında elde edilen Nt-ProBNB değerlerinde, 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yarattığı tespit edilmiştir ( $p < 0.001$ ) ancak bu değişim üzerinde Sevofluran ve İzofluran uygulamalarının anlamlı bir farklılık yaratmadığını gözlemlenmiştir ( $p = 0.198$ ) (Grafik 3). (Tablo 1). Serum D-Dimer değerleri normal sınırlar içinde ölçüldüğünden istatistik değerlendirmeye alınamamıştır.

**Grafik 1:** CK-MB düzeyinin zamana ve anesteziklere göre değişimi

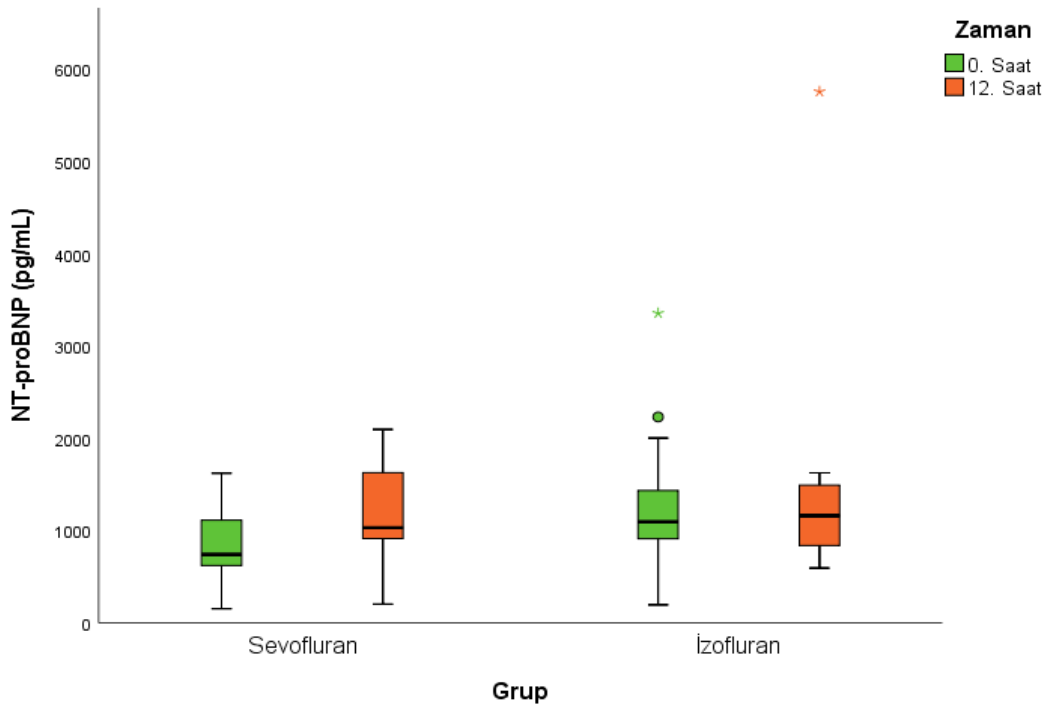




**Grafik 2:** Troponin düzeyinin zamana ve anesteziyelere göre değişimi



**Grafik 3:** NT-proBNP düzeyinin zamana ve anesteziyelere göre değişimi



**Tablo 1:** Ck-MB, Troponin ve NT-proBNP düzeylerinin zamana ve anesteziye göre değişimi

Parametre	Zaman	Sevofluran	İzofluran	p	
				Anestezik Ajan	Kovaryant (0. Saat)
CK-MB	0. Saat	236.7±21.6	207±31.6	0,002	0,465
	12. Saat	201.1±15.6	344.8±39.3		
Troponin	0. Saat	14.5±3.1	35.5±8.6	0,829	0,811
	12. Saat	94.1±39.2	113.2±38.4		
NT-proBNP	0. Saat	845.7±95.9	1255±206.8	0,198	<0.001
	12. Saat	1203±141.2	1415.5±323.3		

## TARTIŞMA VE SONUÇ

Cerrahi müdahale yapılması planlanan hastalarda girişim öncesi risk sınıflamasını içeren dikkatli bir değerlendirme, uygun bir anestezi yönetimi ile uygulanacak anestezi ajanlarının seçimi için büyük önem taşımaktadır. Seçilen anestezi yönetimi ve ajanı hastanın ve cerrahi girişimin tolere edilebileceği uygunlukta ve sınırlarda olmalıdır. Genel anestezinin bilinen kardiyovasküler etkilerinin hangi oranlarda olduğunun değerlendirmek için birçok parametre vardır. Biz çalışmamızda kastrasyon yapılan sağlıklı nonkardiyak köpekler de Troponin I, CK-MB, NT-proBNP ve D-Dimer değerlerine bakarak anestezi yöntemlerinin kardiyovasküler etkilerini değerlendirmeyi amaçladık.

Sevofluran 1960'lı yıllarda sentezlenen, ancak 1990'lı yıllarda klinik kullanıma giren kan gaz eriyebilirlik katsayısı 0.63 olan yeni bir inhalasyon anestetikidir. Kan gaz eriyebilirlik katsayısı düşük olduğu için anestezi indüksiyonu ve anestezi denetlenen izoflurana göre daha hızlı olmaktadır (Girard F ve ark, 2002; Rossignol B ve ark, 2003). Bundan dolayı çalışmamızda inhalasyon anestetikleri olarak Sevofluran ile izofluran'ı değerlendirmeyi amaçladık.

BNP ve NT-proBNP'nin iki fraksiyonu, kalp yetmezliğini, akut koroner sendromu veya iskemik kalp hastalığını değerlendirmek ve ayrıca beşeri hekimlikte kalp yetmezliği sağaltımının monitörizasyonu için başarı ile kullanılmış olduğu ve veteriner hekimliği için bir model olarak hizmet ettiği bildirilmektedir (Maisel ve ark, 2002; Braunwald, 2008; Liquori ve ark, 2014). Köpeklerde, 900 pmol/l'den az NT-proBNP konsantrasyonu, artmış miyokardiyal hasar ve stresle uyumlu değildir. Buna karşın Doberman pinschers'de 735 pmol/l'den fazla olması dilate kardiyomiopati için artmış bir riski gösterdiği bildirilmektedir (Baisan ve ark, 2016). Yapılan çalışmalarda sağlıklı köpeklere kıyasla mitral kapak hastalığı ve dilate kardiyomiopatisi bulunan köpeklerde, kardiyak hastalık ve şiddetinin derecesinin değerlendirilmesine yönelik

olarak, NT-proBNP'nin serum konsantrasyonlarının daha yüksek olduğunu göstermektedir. Ayrıca kardiyak hastalıklı köpeklerde, NT-proBNP konsantrasyonlarının kalp hızı, solunum sayısı, ekokardiyografik değişiklikler ve böbrek fonksiyonu ile korelasyon gösterdiği ve NT-proBNP konsantrasyonlarının kardiyak hastalıkların teşhisinde ve ayrıca şiddetin değerlendirilmesinde yararlı olabileceği sonucuna varıldığı bildirilmektedir (Oyama ve ark, 2008; Baisan ve ark, 2016). Önceki bir çalışmada, kardiyak ve kardiyak olmayan dispneyi ayırt etmek için BNP konsantrasyonunu değerlendirilmiştir. Konjestif kalp yetmezliği nedeniyle dispnesi bulunan 22 köpek ve kardiyak kökeni olmayan dispneli 26 köpek karşılaştırıldığında, konjestif kalp yetmezliği olan köpeklerde (ortalama 34.97 pg/ml) kardiyak olmayan dispnesi bulunan köpeklere oranla (ortalama 12.8 pg/ml) daha yüksek BNP konsantrasyonu olduğu bildirilmiştir (Prosek ve ark, 2007). Kas distrofisi kardiyomiyopatisi bulunan Golden retriever ırkı köpeklerin, sağlıklı köpeklere (ortalama  $\pm$  standart sapma  $46 \pm 22$  pg/ml) oranla daha yüksek (ortalama  $\pm$  standart sapma  $117 \pm 92$  pg/ml) konsantrasyonlarda BNP'si olduğu saptanmıştır (Chetboul ve ark, 2004). Ayrıca, NT-proBNP, babesiosisde farklı şiddet dereceleri ile gruplar arasında farklı konsantrasyonlarda gösterilerek değerlendirilmiş ve NT-proBNP konsantrasyonunun, hastalığın ciddiyetini ve indüklenen kardiyak stresini öngörebileceğini düşündürdüğü bildirilmektedir (Lobetti ve ark, 2012). Bizim çalışmamızda da diğer çalışmaları destekler nitelikte çalışmanın Sevofluran ve İzofluran uygulamaları sonrasında elde edilen Nt-ProBNB değerlerinde, 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yarattığı tespit edilmiştir ( $p < 0.001$ ) ancak bu değişim üzerinde Sevofluran ve İzofluran uygulamalarının anlamlı bir farklılık yaratmadığını gözlemlenmiştir ( $p = 0.198$ ).

D-dimer, koagülasyon sisteminin herhangi bir nedenle aktivasyonu ile çapraz bağlarla oluşan fibrin pıhtısının plazmin tarafından yıkılması sonucu oluşur (Blomback ve ark, 1978). D-dimer klinikte en sık olarak venöz tromboemboli (VTE) ve dissemine intravasküler koagülasyon (DİK) tanısı ve takibinde kullanılır. Tıp Hekimliğinde D-dimer seviyelerinin sağlıklı bireylerde çok nadiren artmış olabileceği saptanmıştır. Ayrıca akut koroner sendromlar, periferik damar hastalıkları, derin ven trombozu, pulmoner emboli, akut inme, gebelik, orak hücreli anemide hemolitik krizler, kötücül hastalıklar, cerrahi sonrası, konjestif kalp yetersizliği, kronik böbrek yetersizliği gibi fibrinin oluşumunu ve yıkılmasını arttıran her durumda D-Dimer seviyeleri yükseldiği bildirilmiştir (Hager ve Platt., 1995; Chapman ve ark., 1990). Bizim çalışmamızda

da diğer çalışmaları destekler nitelikte sağlıklı nonkardiyak hayvanlarda D-Dimer seviyelerinin normal sınırlar içinde ölçüldüğü saptanmış olup istatistiksel değerlendirmeye alınamamıştır. Kalp hasarında AST, CK, CK-MB ve LDH gibi enzim düzeylerinde artış şekillenebilir (Burgener ve ark 2006, Gupta ve ark 2008). Miyokard hücre hasarını en iyi yansıtan CK-MB (Wells ve ark 2002), kTnI (Bader ve ark 2006, Diniz ve ark 2007) ve nörohormonal belirleyicilerden markırlardan natriüretik peptidlerdir (Oyama ve ark 2008, Boswood 2009). İnsanlarda kardiyak belirleyiciler kTnI ve CK-MB, hastalarda işemik, travmatik ve septik miyokardiyal hasarın ve nekrozisin teşhisinde kullanılmaktadır. Kalp hasarını gösteren önemli bir enzimde CK-MB'dir. Kalp kası hasarında kanda bu enzim düzeyi 24 saat içinde yükselir ve kısa süre içinde düzeyi azalır (La vecchia ve ark 2000, Burgener ve ark 2006). Serum CK-MB düzeyinin, insan ve hayvanların kalp yetmezliği, aortik stenozu ve korener hastalıklarında önemli oranda yükseldiği bildirilmiştir (Vartner ve Ingwall 1984). Miyokardiyal hasarlarda kan kTnI düzeyi, ilk 4 saat içinde artar, 12 ve 24 saat içinde pik seviyeye ulaşır (Ooi ve ark 2000, Colantonio ve ark 2002, Diniz ve ark 2007). Bizde çalışmamızda benzer şekilde değerlendirmemizin daha sağlıklı olabilmesi için örneklememizi 0.saat ve 12. Saatte yaptık. (Oyama ve Sisson 2004) kardiomyopati, kalp kapağı yetmezlikli ve aortik stenozlu köpeklerde kTnI düzeylerinin arttığını belirlemişlerdir. (Çakıroğlu ve ark 2009) kardiyak kTnI'nin hayvanlarda önemli bir kardiyak belirleyici olmaya aday olabileceğini bildirmektedir. (Burgener ve ark 2006) köpeklerin akut miyokardiyal hasarlarında serum kTnI (>0.29 µg/L) ve CK-MB (>2.2 µg/L) düzeylerinin önemli ölçüde yükseldiğini bildirmişlerdir. (Cummins ve Cummins 1987, rucchiuti ve ark 1998) kTnI ve kTnT markırlarının köpeklerde miyokardiyal hasarının belirlenmesinde önemli indikatör olduğunu ortaya koymuşlardır. Sunulan çalışmada Sevofluran ve İzofluran uygulamaları sonrasında elde edilen CK-MB değerlerinde; 0. saat ölçümlerinin anesteziden 12 saat sonra elde edilen ölçümler üzerinde görülen istatistiksel açıdan anlamlı bir değişiklik yaratmadığı görülmüştür (p = 0.465) ancak farklı anestezik ajanların kullanılması sebebiyle CK-MB değerlerinde farklılık oluştuğu gözlemlenmiştir (p = 0.00). Ancak Troponin değerlerinde ise herhangi bir istatistiksel farklılık hem saatler hem de anestezik maddeler arasında saptanmamıştır (p = 0.829).

Genel anestezi uygulanan hastalarda otonom sinir sistemi aracılığı ile kalp hızı, ritmi, myokard kontraktilitesi ve damar tonusunda değişiklikler olmaktadır. Kardiyovasküler komplikasyona bağlı gelişebilecek olası durumları azaltmak adına hastalardaki riskler önceden belirlenmeli ve önlem alınmalıdır. Bu kadar önemli bir konuda anestezinin hastalar için taşıdığı risk ile

getireceği yararı seçilecek anestezi ajanları ile belirlemek önemlidir. Veteriner hekimlik alanında kalp üzerine birçok çalışma yapılmıştır ancak sunulan çalışmadaki gibi farklı anestezi protokollerinin kalp üzerine etkileri daha önce araştırılmamıştır. Sağlıklı nonkardiyak köpekler de iki farklı anestezi protokolünün kardiyak etkilerini Troponin I, CK-MB, NT-proBNP ve D-Dimer değerine bakarak karşılaştırılarak veteriner hekimlik alanında sürekli kullanılan anestezi ajanlarının kalp üzerine etkileri ortaya konulmuş olup anestezi seçiminde hastalar üzerindeki risk önceden belirlenerek anestezi seçimleri ona göre yapılması sağlanmıştır.

### **TEŞEKKÜRLER**

\*Bu çalışma Siirt Üniversitesi Bilimsel Araştırma Projeleri Koordinasyon Birimince Desteklenmiştir. Proje Numarası: 2021-SİÜVET-039

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## GİNGİVAL YARA MODELİNDE HONOKİOL'UN HİSTOPATOLOJİK DEĞİŞİKLİKLER ÜZERİNDEKİ ETKİSİ

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**Amaç:** Honokiol, çeşitli mekanizmalar yoluyla anksiyolitik, analjezik, antidepresan, antitrombotik, antimikrobiyal, antispazmodik, antitümörjenik ve nöroprotektif özellikleri uygulayan poli-fenolik bir bileşiktir. Geleneksel olarak Güneydoğu Asya'nın çoğunda tıbbi uygulamalarda kullanılmıştır, ancak son zamanlarda pleiotropik etkileri nedeniyle daha geniş çapta incelenmiştir. Bu çalışmadaki amacımız gingivida oluşturulan deneysel yara modelinde irrigatör olarak verilen honokiolün gingivida meydana gelen histolojik değişimleri araştırmaktır.

**Materyal ve metod:** Tüm deney protokolü, Dicle Üniversitesi Hayvan Deneyle Yere Etik Kurulu tarafından onaylandı. 12 haftalık 48 Sprague Dawley sıçanı paslanmaz çelik kafeslerde 22±2 °C'de normal diyet ve çeşme suyu ile 12 saat aydınlık ve 12 saat karanlıkta herhangi bir kısıtlama olmaksızın beslendi. Genel anestezi altında 90 mg/kg ketaminhidroklorür ve 8 mg/kg ksilazin (kas içi) kullanılarak Povidon iyot solüsyonu ile sterilizasyon sağlandı ve sol molar bölgeden 4 mm çapında gingivida flep kaldırılarak eksizyonel yara alanı oluşturuldu. İrrigasyon ajanı olarak honokiol gingiva yara modeli oluşturulduktan sonra 1cc irrigasyon solüsyonu şeklinde uygulanmaya başlandı ve her gün aynı saatte günde bir kez 30 saniyelik uygulamalar olarak 1 hafta boyunca verildi.

**Bulgular:** Yara grubundaki bulgularımıza göre gingiva epitel hücrelerinde çekirdek kaybı ve dejenerasyon, epitel altındaki bağ doku alanlarında kollajen lif kaybı ve organizasyon bozukluğu, inflamasyon ve vasküler dilatasyon ve konjesyon izlendi. Yara+Honokiol uygulanan grupta epitel tabakasında rejenerasyon, kollajen liflerde ve ara maddede artış, inflamasyonda azalış gözlemlendi.

**Sonuç:** Gingivada oluşturulan yara histopatolojik olarak değişikliklere neden olmuştur ancak honokiol anti inflamatuvar ve diğer özellikleri yoluyla bu değişiklikleri tersine çevirmiştir.

**Anahtar kelimeler:** Gingiva, histopatoloji, honokiol, yara modeli

## EFFECT OF HONOKIOL ON HISTOPATHOLOGICAL CHANGES IN A GINGIVAL WOUND MODEL

**Objective:** Honokiol is a poly-phenolic compound exerting anxiolytic, analgesic, antidepressant, antithrombotic, antimicrobial, antispasmodic, antitumorogenic and neuroprotective properties through various mechanisms. It has traditionally been used in medicinal applications throughout much of Southeast Asia, but has recently been more widely studied for its pleiotropic effects. Our aim in this study is to investigate the histological changes in the gingiva of the honokiol given as an irrigator in the experimental wound model in which the gingiva was created.

**Material and method:** All experimental protocol was approved by Dicle University Animal Experiments Local Ethics Committee. 48 12-week-old Sprague Dawley rats were fed in stainless steel cages at  $22\pm 2$  °C with normal diet and tap water for 12 hours in light and 12 hours in darkness without any restriction. Sterilization was achieved with Povidone iodine solution using 90 mg/kg ketamine hydrochloride and 8 mg/kg xylazine (intramuscular) under general anesthesia, and an excisional wound area was created by lifting a 4 mm diameter gingival flap from the left molar region. As an irrigation agent, honokiol was started to be applied in the form of 1cc irrigation solution after the gingiva wound model was created, and it was administered as 30-second applications once a day at the same time every day for 1 week.

**Results:** According to our findings in the wound group, nuclear loss and degeneration in gingival epithelial cells, collagen fiber loss and disorganization in the sub-epithelial connective tissue areas, inflammation and vascular dilatation and congestion were observed. In the group treated with Wound+Honokiol, regeneration in the epithelial layer, increase in collagen fibers and intermediate, and decrease in inflammation were observed.

**Conclusion:** The wound created on the gingiva caused histopathological changes, but honokiol reversed these changes through its anti-inflammatory and other properties.

**Key words:** gingiva, histopathology, honokiol, wound model

## **GİRİŞ**

Dişeti yaralanmaları kimyasal,fiziksel,termal ve mikroorganizma kaynaklı olabileceği gibi travmatik nedenlere bağlı olarak ta meydana gelmektedir.Önemli olan oluşan lezyonun semptomlarını,etiyojijisini ve anamnezini iyi bilmektir.Tedavide genellikle etkenin ortadan kaldırılması ya da semptomatik tedavi uygulanır.Kalıcı dişeti kusurları meydana gelmişse periodontal plastik cerrahiye kadar varabilen uygulamalar söz konusudur.

Nedeni ne olursa olsun ağız içinde meydana gelen lezyonlar diş etini de kapsar.(1)

Diş eti ve oral mukozanın kimyasal olarak yaralanmalarında hidrojen peroksit,fenol,gümüş nitrat,sodium hipoklorit,paraformaldhit gibi kimyasallar sayılabilir.(2,3)Salisilik asit,sıcak ve soğuk fiziksel etkenler de kimyasal yaralanmalara neden olmaktadır.Tütün ürünlerinin sürekli kullanımı dişetinde lezyonlara yol açmaktadır.(4,5)

Ayrıca kokainin topikal uygulamaları da kimyasal etkenler arasındadır.(6,7)Topikal alkol kullanımı oral mukozanın ve dişeti yaralanmalarının nedenlerinden biridir. (7,8)Travmatik lezyonlar genellikle kazara gerçekleşen fiziksel yaralanmalardır.Bunlar arasında tam ölçüsünde yapılmamış takma dişler,agresif ve uygun olmayan ağız hijyeni uygulamaları(fırçalama,diş ipi),oral piercingler,derin ısırılmalar,diş tedavilerinde kullanılan aletlerin kazara yaralamaları gibi nedenler sayılabilir.(9)Özellikle çocuklarda tırnaklar ve kalem batmaları keratoz,sıyrık gibi lezyonlara neden olmaktadır.(10)

Honokiol manolya ağaçlarının kabuk ve köklerinin ekstrakte edilmesiyle elde edilen polifenol bir bileşiktir.Antioksidan, antiinflamatuvar, antioksidan, analjezik ve nöroprotektif etkiler dâhil olmak üzere birçok farmasötik özelliğe sahiptir (11,12,13,14).

Yapılan bir çalışmada honokiolun in vivo ve in vitro şeklinde incelemesi sonucunda endoplazmik retikulum (ER) stresini teşvik ettiğini, kalretikülinin azalmış ekspresyonuna ve sonrasında tümör ilerlemesini önleyerek metastazın gerilemesine katkıda bulunduğu belirtilmiştir (15).

Oral skuamöz hücreli karsinomda Honokiol uygulmasının ardından anti-proliferatif etki sergilediği ve glioblastoma hücrelerinde kanser kök hücrelerini ortadan kaldırdığı ve ilaç direncini azalttığı kanıtlanmıştır. Kanser hücrelerinin kendini yenileyebilme özelliğini azalttığı görülmüştür. Ayrıca kanser biyobelirteci olan ALDH1 VE CD44'ü aşağı doğru regüle etmiştir (16).

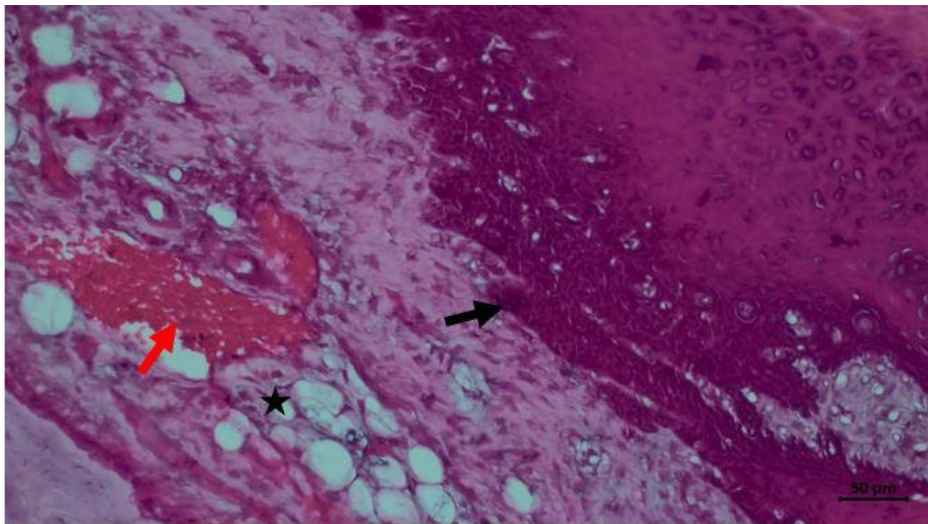
Bu maddenin esas olarak apoptozun indüklenmesi yoluyla birçok kanser türüne karşı antikanser etkileri vardır (17,18).

Yapılan başka bir çalışmada Honokiolden elde edilen nanopartiküllerin kanser ilacı olan fluorourasil'in toksik etkisini azalttığı tespit edilmiştir. Sistemik toksisitede belirgin bir azalma ile kanserojenler tarafından indüklenen tümörleri önemli ölçüde geriletmediği gösterilmiştir (19).

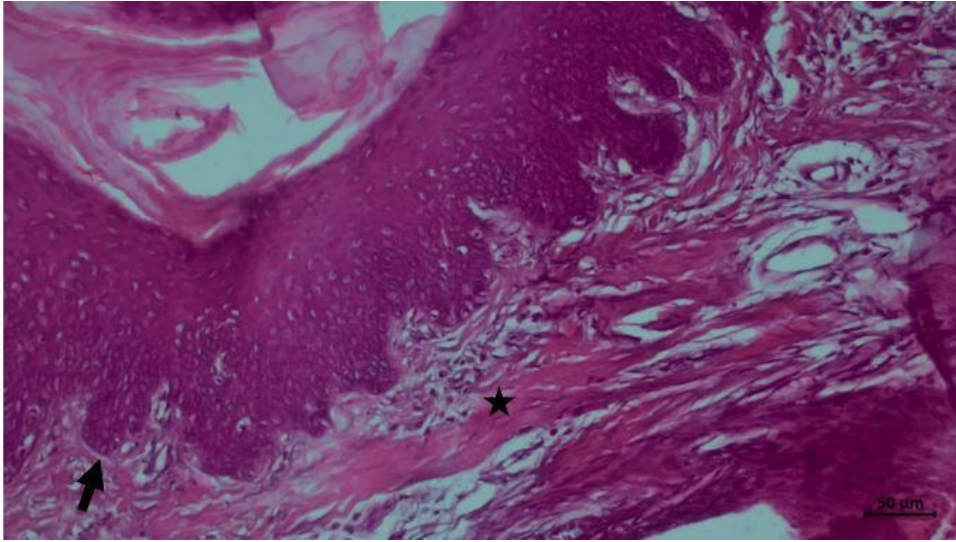
### **ARAŞTIRMA VE BULGULAR**

Tüm deney protokolü, Dicle Üniversitesi Hayvan Deneyleri Yerel Etik Kurulu tarafından onaylandı. 12 haftalık 48 Sprague Dawley sıçanı paslanmaz çelik kafeslerde  $22\pm 2$  °C'de normal diyet ve çeşme suyu ile 12 saat aydınlık ve 12 saat karanlıkta herhangi bir kısıtlama olmaksızın beslendi. Genel anestezi altında 90 mg/kg ketaminhidroklorür ve 8 mg/kg ksilazin (kas içi) kullanılarak Povidon iyot solüsyonu ile sterilizasyon sağlandı ve sol molar bölgeden 4 mm çapında gingivida flep kaldırılarak eksizyonel yara alanı oluşturuldu. İrrigasyon ajanı olarak honokiol gingiva yara modeli oluşturulduktan sonra 1cc irrigasyon solüsyonu şeklinde uygulanmaya başlandı ve her gün aynı saatte günde bir kez 30 saniyelik uygulamalar olarak 1 hafta boyunca verildi.

Yara grubundaki bulgularımıza göre gingiva epitel hücrelerinde çekirdek kaybı ve dejenerasyon, epitel altındaki bağ doku alanlarında kollajen lif kaybı ve organizasyon bozukluğu, inflamasyon ve vasküler dilatasyon ve konjesyon izlendi. Yara+Honokiol uygulanan grupta epitel tabakasında rejenerasyon, kollajen liflerde ve ara maddede artış, inflamasyonda azalış gözlemlendi.



**Yara grubu:** Diş etinin transversal kesitinde özellikle bazal membranın alt kısımlarına doğru dökülen agregat oluşturulmuş bazı dejeneratif hücre toplulukları yer almaktadır. Bununla beraber alt kısımda kollajenize yapıların bozulmuş olup arada yer yer ödem tablolarının geliştiği görüldü. Damar duvarında yırtılmayla birlikte serbest halde dağılmış eritrosit akümülyasyonu ve bunla yine küçük topluluklar şeklinde agregat oluşturmuş. Lökositler yapılar mevcut olup alt taraflara doğru geniş yağ hücreleri vakuoller yapılar dikkat çekmekteydi. Damar yapısının önemli ölçüde bozulduğu ve inflamasyonun kanamanın belirgin ölçüde arttığı görüldü.



**Yara+honokiol grubu:** Diş eti epitelinin yine transversal kesitinde parakeratinize epitel yapısının lümene doğru belirgin bir şekilde pembemsi görüldüğü alt kısımlara doğru bazal membran boyunca dizilmiş silindirik hücreler görüldü. Epitelde herhangi bir dejeneratif değişikliğe rastlanılmamakla birlikte bazı spinosum hücrelerinde vakuoler yapıların belirgin olduğu tespit edildi. Mikroskopik papillar derin olmamakla birlikte alt kısımlara doğru özellikle kollajen bantların belirgin bir demet oluşturduğu endotel yapısının damarda düzgün lümene doğru çıktığı yapıları soliter tarzda bağ doku hücrelerinin yer aldığı ancak inflamatuvar hücrelerin sayısında azalma olduğu görüldü.

## SONUÇ

Gingivada oluşturulan yara histopatolojik olarak değişikliklere neden olmuştur ancak honokiol anti inflamatuvar ve diğer özellikleri yoluyla bu değişiklikleri tersine çevirmiştir.

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**GİNGİVİDA OLUŞTURULAN DENEYSEL YARA MODELİNDE  
RESVERATROLÜN KORUYUCU ETKİSİNİN İNCELENMESİ**

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**Amaç:** Resveratrol, çeşitli terapötik etkileri olan bir nutrasötiktir. Kalorik kısıtlamanın etkilerini taklit ettiği, anti-inflamatuar ve anti-oksidatif etkiler uyguladığı ve çeşitli mekanizmalar yoluyla birçok hastalığın başlamasını ve ilerlemesini etkilediği gösterilmiştir. Resveratrol (3,4',5-trihidroksistilben), üzüm, yer fıstığı ve çilek gibi birçok bitkide bulunan bir fitoaleksindir. Resveratrol mikrobiyal ve mantar enfeksiyonuna karşı direnç sağlama yetenekleriyle bilinir. Bu çalışmadaki amacımız gingivida oluşturulan deneysel yara modelinde irrigatör olarak verilen resveratrolün histopatoloji üzerindeki etkisini incelemektir.

**Materyal ve metod:** Tüm deney protokolü, Dicle Üniversitesi Hayvan Deneyle Yerel Etik Kurulu tarafından onaylandı. 12 haftalık 48 Sprague Dawley sıçanı paslanmaz çelik kafeslerde 22±2 °C'de normal diyet ve çeşme suyu ile 12 saat aydınlık ve 12 saat karanlıkta herhangi bir kısıtlama olmaksızın beslendi. Genel anestezi altında 90 mg/kg ketaminhidroklorür ve 8 mg/kg ksilazin (kas içi) kullanılarak Povidon iyot solüsyonu ile sterilizasyon sağlandı ve sol molar bölgeden 4 mm çapında gingivida flep kaldırılarak eksizyonel yara alanı oluşturuldu. Irrigasyon ajanı olarak resveratrol travma oluşturulduktan sonra 1cc irrigasyon solüsyonu şeklinde uygulanmaya başlandı ve her gün aynı saatte günde bir kez 30 saniyelik uygulamalar olarak 1 hafta boyunca verildi.

**Bulgular:** Histopatoloji sonuçlarımıza göre yara oluşturulan grupta dişeti epitelinde dejenerasyon, bağ doku ara maddesinde ve kollajen liflerinde bütünlük kaybı, damarlarda dilatasyon ve konjesyon, ödem ve inflamatuvar hücre infiltrasyonu izlendi. Yara sonrası resveratrol uygulanan grupta epitel yenilenmiş, kolajen lifleri belli bir düzende yerleşmiş, inflamasyon azalmıştır

**Sonuç:** Gingival yara sonrası resveratrol doku bütünlüğünü korumuş ve antiinflamatuvar özelliği sayesinde inflamasyonu azaltmıştır.

**Anahtar kelimeler:** Gingiva, inflamasyon , resveratrol, yara modeli

**INVESTIGATION OF THE PROTECTIVE EFFECT OF RESVERATROL IN  
EXPERIMENTAL WOUND MODEL CREATED WITH GINGIVIDA**

**Objective:** Resveratrol is a nutraceutical with various therapeutic effects. It has been shown to mimic the effects of caloric restriction, exert anti-inflammatory and anti-oxidative effects, and influence the onset and progression of many diseases through a variety of mechanisms. Resveratrol (3,4',5-trihydroxystilbene) is a phytoalexin found in many plants such as grapes, peanuts, and strawberries. Resveratrol is known for its ability to provide resistance against microbial and fungal infection. Our aim in this study is to examine the effect of resveratrol given as an irrigator on histopathology in an experimental wound model created on the gingiva.

**Material and method:** All experimental protocol was approved by Dicle University Animal Experiments Local Ethics Committee. 48 12-week-old Sprague Dawley rats were fed in stainless steel cages at  $22\pm 2$  °C with normal diet and tap water for 12 hours in light and 12 hours in darkness without any restriction. Sterilization was achieved with Povidone iodine solution using 90 mg/kg ketamine hydrochloride and 8 mg/kg xylazine (intramuscular) under general anesthesia, and an excisional wound area was created by lifting a 4 mm diameter gingival flap from the left molar region. As an irrigation agent, resveratrol was started to be applied in the form of 1cc irrigation solution after trauma was created, and it was given as 30-second applications once a day at the same time every day for 1 week.

**Results:** According to our histopathology results, degeneration of the gingival epithelium, loss of integrity in the connective tissue intermediate and collagen fibers, dilatation and congestion in the vessels, edema and inflammatory cell infiltration were observed in the wound group. In the post-wound resveratrol group, the epithelium was renewed, the collagen fibers were arranged in a certain order, and the inflammation decreased.

**Conclusion:** Resveratrol preserved tissue integrity after gingival wound and reduced inflammation thanks to its anti-inflammatory properties.

**Keywords:** Gingiva, inflammation, resveratrol, wound model.

## **GİRİŞ**

1999’da Dünya Çalıştayında diş eti hastalıkları travmatik,termal,kimyasal ve fiziksel nedenler başlıkları altında sınıflandırılmıştır.Oral mukozada meydana gelen geniş termal yanıklar özellikle sıcak içeceklerden kaynaklanmaktadır.Kimyasal yanıklardan ise prifosfatlar, deterjanlar, tütün gibi maddeler sorumlu tutulmuştur(1).Diş etindeki fiziksel yaralanmalar A,B ve C olmak üzere üç katagoriye ayrılmıştır.A tipi fiziksel yaralanmada önceden var olan bir herpetik lezyon ya da lokalize diş eti enfeksiyonu söz konusudur.B tipi yaralanmalar parmak emme alışkanlıkları ile tırnak yemeye bağlı olan vakalardır.C tipi yaralanmalar ise psikolojik sorunlardan kaynaklanan bir durumdur(2).

Gingivada meydana gelen artefaktlar ise iki grupta incelenmiştir.Bunlardan gingivitis artefakta minor şiddeti az ve lokalize bir lezyon olarak değerlendirilmektedir(3).Gingivitis major ise tekrarlanan lezyonların ya da diş fırçalama işlemlerinin sert bir şekilde uygulanmasıyla ortaya çıkan ve yaygın lezyonlara neden olan bir vakadır(4).Bu durum kadın ve çocuklarda erkeklere oranla daha sıklıkla görülmektedir(5).

Son yıllarda terapotik etkisi keşfedilmiş olan resveratrol başta üzüm olmak üzere pek çok farklı bitkide var olan doğal bir fitoaleksindir. İlk keşfi 1982 yılında kardiyoprotektif etkiler olarak belirlenmiştir.Sonraki çalışmalarda cilt kanseri için kimyasal önleyici bir ajan olarak ortaya konmasının ardından sirtuin deasetilazları aktive ettiği ve daha düşük organizmaların yaşam sürelerini uzattığına dair raporlar bildirilmiştir (6,7).

Resveratrol antioksidan mekanizmasını, oksidatif stres sonucu ortaya çıkan reaktif oksijen türlerini temizleyerek hücre zarında meydana gelen DNA hasarını ve lipid peroksidasyonu azaltarak yaptığı rapor edilmiştir (8).

Yakın zamanda yapılan çalışmada resveratrolün omurgalı bir balıkta yaşa bağlı lokomotor aktivitenin ve bilişsel performansın bozulmasını geciktirdiği ve beyindeki nörofibriler dejenerasyonu azaltarak bu hayvanların yaşam süresini max %59 oranında uzattığı ortaya konulmuştur (9).

Farelerle yapılan başka bir çalışmada resveratrolün yüksek kalori tüketen farelerin fizyolojisini standart bir diyetteki farelerinkine doğru kaydırıldığı, hayatta kalma, motor fonksiyon, insülin duyarlılığı, organ patolojisi, PGC-1 $\alpha$  aktivitesi ve mitokondriyal sayıyı düzelttiği belirtilmiştir (10).

Resveratrolün iskemi referfüzyona etkisi (11) deneysel omurilik yaralanmasında (12) kullanılmıştır. Bunun yanında kulak dermişinde intradermal enfeksiyon modeli oluşturulduktan

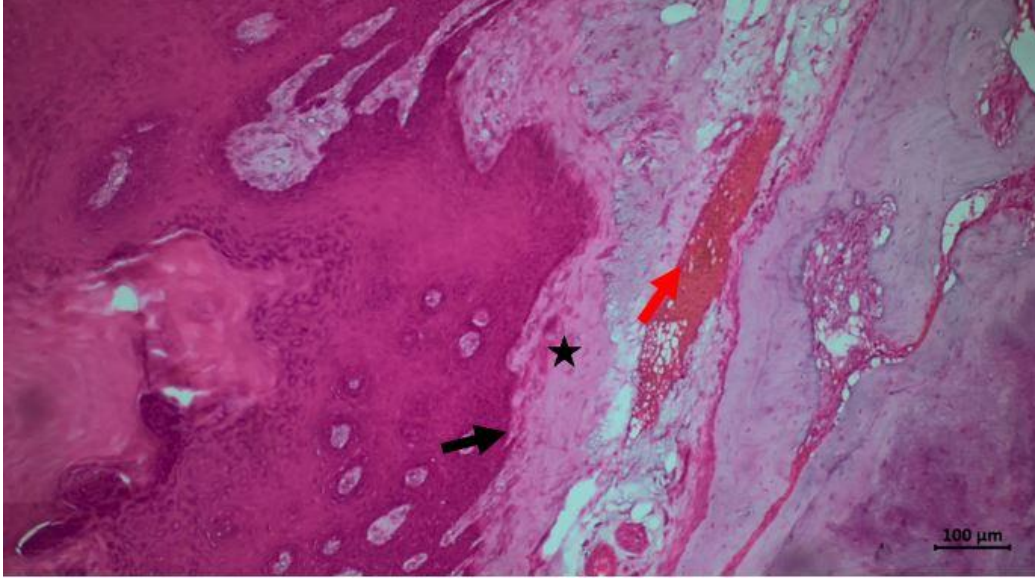
sonra, fotoaktive olarak resveratrol kullanılan havanların, drene olan lenf düğümünde bakteri yükünü azalttığı ve miyeloperoksidaz ekspresyonunda bir artışı desteklediği gözlemlenmiştir. Bunun yanında, fotoaktive edilmiş RSV ile tedavi edilen hayvanların drene olan lenf düğümü, IL-10 üretimi yoluyla iltihabı kontrol edilerek antimikrobiyal etkinliği ortaya konulmuştur (13). Ayrıca güçlü antioksidan (14), anti-inflamatuar , anti-kanserojenik etkisi, östrojenik aktivitesi birçok çalışmada ortaya konulmuştur (15,16).

Başka bir çalışmada, ratların tibialarında deneysel olarak oluşturulan kemik defektlerine resveratrolün sistemik olarak, dental pulpa kaynaklı mezenkimal kök hücrelerle birlikte uygulanmasının yeni kemik oluşumu üzerine olan etkilerinin immünohistokimyasal yöntemlerle incelenmiştir. İzole resveratrol ve izole dental pulpa kaynaklı mezenkimal kök hücre uygulamasının oluşturulan defekt sonrası kemik gelişimini kısmen uyardığı ve yeni kemik trabeküllerinin gelişimini desteklediği izlenmiştir (17).

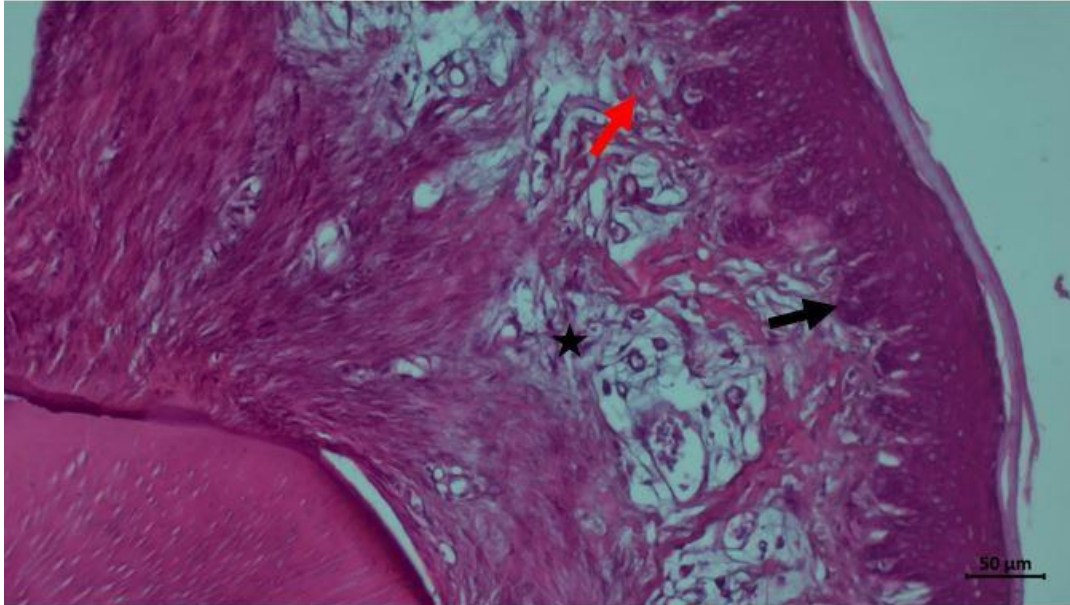
#### **ARAŞTIRMA VE BULGULAR**

Tüm deney protokolü, Dicle Üniversitesi Hayvan Deneyleri Yerel Etik Kurulu tarafından onaylandı. 12 haftalık 48 Sprague Dawley sıçanı paslanmaz çelik kafeslerde 22±2 °C'de normal diyet ve çeşme suyu ile 12 saat aydınlık ve 12 saat karanlıkta herhangi bir kısıtlama olmaksızın beslendi. Genel anestezi altında 90 mg/kg ketaminhidroklorür ve 8 mg/kg ksilazin (kas içi) kullanılarak Povidon iyot solüsyonu ile sterilizasyon sağlandı ve sol molar bölgeden 4 mm çapında gingivida flep kaldırılarak eksizyonel yara alanı oluşturuldu. İrrigasyon ajanı olarak resveratrol travma oluşturulduktan sonra 1cc irrigasyon solüsyonu şeklinde uygulanmaya başlandı ve her gün aynı saatte günde bir kez 30 saniyelik uygulamalar olarak 1 hafta boyunca verildi.

Histopatoloji sonuçlarımıza göre yara oluşturulan grupta dişeti epitelinde dejenerasyon, bağ doku ara maddesinde ve kollajen liflerinde bütünlük kaybı, damarlarda dilatasyon ve konjesyon, ödem ve inflammatuar hücre infiltrasyonu izlendi. Yara sonrası resveratrol uygulanan grupta epitel yenilenmiş, kolajen lifleri belli bir düzende yerleşmiş, inflamasyon azalmıştır



**Yara grubu:** Diş eti ve alveol kemik bölgesindeki bağlantı alanında kan damarlarında belirgin dilatasyon ve konjesyon görüldü. Kan damarı etrafında yer yer kollajen dejenerasyonları ve ara kısımlarda yer yer ödem tabloları görüldü. Bununla beraber epitel kısmında diş epitelinde yer yer dejeneratif özellikle bazal membran hizasında dejeneratif görüntülere rastlanıldı. Genelde ara kısımlarda yer yer inflamasyonların soliter tarzda dağıldığı gözlemlendi.



**Yara+resveratrol:** Oral kavitenin transversal kesitinde diş eti epitelinde parakeratize tablonun belirgin olduğu görüldü. Mikroskopik papillaların derinlik kazanmasıyla birlikte bazal hücrelerin silindirik ya da prizmatik görünümlü olduğu görüldü. Kollajen bağlantıları demet şeklinde yer almıştır. Damar yapıları düzenli endotelde değişiklik görülmemekle birlikte lifsel yapı ve ara maddenin belirgin olduğu bir lamina propria kısmı yer almaktadır.

## **SONUÇ**

Gingival yara sonrası resveratrol doku bütünlüğünü korumuş ve antiinflamatuvar özelliği sayesinde inflamasyonu azaltmıştır

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## HEMOPLAZMALAR VE KEDİLERİN ENFEKSİYÖZ ANEMİSİ

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### ÖZET

Kedi ve köpek dahil olmak üzere birçok memeli türünde hemolitik anemiye sebep olan hemotropik mikoplazmalar (hemoplazma), Gram negatif, küçük, pleomorfik morfolojiye sahip ve eritrosit yüzeyine tutunabilen mikroorganizmalardır. Daha önce *Haemobartonella* spp. ve *Eperythrozoon* spp. olarak bilinen etkenler, *Rickettsiales* dizisinden çıkarılıp *Mollicutes* dizisi içinde yeniden sınıflandırılmıştır. *Mycoplasma (M.) haemofelis*, *Candidatus M. turicensis* ve *Candidatus M. haemominutum* kedilerde enfeksiyöz anemiye neden olmaktadır. Kedilerde hastalığa neden olan hemoplazmalar arasında virülensi en yüksek türün *M. haemofelis* olduğu bildirilmektedir. Hastalığın bulaşmasında kan emen eklem bacaklılar önemli rol oynamaktadır. Enfekte hayvanlarda hemolitik anemi, ateş, anoreksi, dehidratasyon, durgunluk gibi klinik bulgular gözlemlenir. Akut olgular ölümle sonuçlanabilmektedir. Virülensi düşük etkenlerle enfekte hayvanlarda ise klinik bulgular görülmeyebilir. Hemoplazmaların mikroskopik teşhisinde şüpheli hayvanların kan frotileri Romanowsky boyama yöntemiyle boyanarak incelenmektedir. Ancak bu yöntemle hemoplazma etkenleri Howell-Jolly cisimcikleri ile karıştırılabilmekte ve türler arası ayırım yapılamamaktadır. Bu nedenlerden dolayı hemotropik mikoplazmaların teşhisinde 16S r RNA gen analizine dayalı kantitatif real-time PCR yöntemi tercih edilmektedir. Bununla birlikte etkenlerin teşhisinde Western immunoblot ve immunofluoresan gibi serolojik test yöntemlerinden de faydalanılmaktadır. Kedi enfeksiyöz anemisinin tedavisinde doksisisiklin, enrofloksasin ve marbofloksasin gibi antimikrobiyal maddeler kullanılabilir. Ayrıca kesin teşhis koyulamayan olgularda antimikrobiyal terapi ile birlikte prednizolon kullanımı da önerilmektedir. Sistemik lupus eritematosusa sahip insanların kan örneklerinde hemoplazma benzeri mikroorganizmaların bulunması bu etkenlerin zoonotik özelliklerinin araştırılması gerektiği gerçeğini ortaya koymaktadır.

**Anahtar kelimeler:** Hemotropik mikoplazma, *M. haemofelis*, *Candidatus M. haemominutum*, *Candidatus M. turicensis*

## HEMOPLASMAS AND FELINE INFECTIOUS ANEMIA

### ABSTRACT

Hemotropic mycoplasmas (hemoplasmas) that can cause haemolytic anemia in a wide range of mammalian species including cat and dog, are Gram negative, small, pleomorphic microorganisms attached to erythrocyte surface. These agents known as *Haemobartonella* spp. and *Eperythrozoon* spp. were excluded from *Rickettsiales* and reclassified in *Mollicutes*. *Mycoplasma (M.) haemofelis*, *Candidatus M. turicensis* ve *Candidatus M. haemominutum* cause infectious anemia in cats. It is reported that *M. haemofelis* is the most virulent species among the feline hemoplasmas. Arthropod vectors play important role in terms of transmission of infection. Clinical findings such as hemolytic anemia, fever, anorexia, dehydration and stagnation can be observed in infected animals. Acute cases can result in death. Clinical signs might not be observed in animals infected with low-virulent species. Blood smears of infected animals are examined by staining with Romanowsky method for the microscopic diagnosis of hemoplasmas. But, with this method, Howell-Jolly bodies can be identified as hemotropic mycoplasmas and the species can not be distinguish from each other. Because of these reasons, quantitative real-time PCR method based on the amplification of 16S r RNA sequence is preferred for the diagnosis of hemotropic mycoplasmas. In addition, serological test methods such as Western immunoblot and immunofluorescence are also used for the diagnosis of the agents. Antimicrobial agents such as doxycycline, enrofloxacin and marbofloxacin can be used in the treatment of feline infectious anemia. Also, the use of prednisolone together with antimicrobial therapy is recommended in cases that a definitive diagnosis can not be achieved. The presence of hemoplasma-like microorganisms in the blood samples of people with systemic lupus erythematosus reveals the fact that the zoonotic properties of these agents should be investigated.

**Keywords:** Hemotropic mycoplasma, *M. haemofelis*, *Candidatus M. haemominutum*, *Candidatus M. turicensis*

## 1. GİRİŞ

Daha önce *Haemobartonella* (*H.*) ve *Eperythrozoon* (*E.*) spp. olarak bilinen hemotropik mikoplazmalar küçük, pleomorfik, Gram negatif boyanma özelliğine sahip, *in vitro* kültürleri yapılamayan mikroorganizmalardır. Çomak biçimli, küresel veya yüzük şeklinde olabildikleri gibi bireysel ya da zincirler halinde birçok omurgalı hayvanın eritrositlerinin yüzeyinde bulunurlar. *Eperythrozoon* türleri daha sık olarak plazmada serbest halde ve yüzük formunda bulunurlar (Messick, 2004).

Farelerde (*E. coccoides*) ve köpeklerde (*H. canis*) kan parazitleri ilk defa 1928 yılında Almanya’da gözlenmiştir (Alder ve Ellenbogen, 1934). Bundan yaklaşık 6 ay sonra aynı araştırmacılar Filistin’de anemik sığırlarda benzer paraziter bulguları rapor etmişlerdir. 1930’lu yılların başında domuzlarda sarılık ve anemi ile karakterize *Eperythrozoon* enfeksiyonları ilk olarak Amerika’da fark edilmiştir. 1941 yılında, Lotze ve Yiengst Amerika’da bir sığırdaki *E. wenyonii* enfeksiyonunu rapor etmiş ve bundan kısa bir süre sonra Jensen (1943) yerli Louisiana koyunlarında yaygın bir kan paraziti olan *E. ovis*’i bildirmiştir. Daha sonra, *H. felis*’in kedilerin bulaşıcı hastalığı olan kedi enfeksiyöz anemisine neden olduğu bildirilmiştir (Flint ve Moss, 1953). Amerika Birleşik Devletleri’nde 1935’li yılların başında köpeklerde sporadik heamobartonellosis vakaları bildirilmiş (Knutti ve Hawkins, 1935; McNaught vd., 1935) ve 1959 yılında Benjamin ve Lumb tarafından yayınlanan bir raporda da köpeklerde benzer bir hastalık tanımlanmıştır.

Enfeksiyöz anemiye neden olan bu patojenler birçok memeli hayvanda enfeksiyona neden olabilmektedir. *Eperythrozoon* türlerine domuzlarda (*E. suis* ve *E. parvum*) (Henry, 1979; Uilenberg vd., 1981 ), koyun ve keçilerde (*E. ovis*) (Sheriff vd., 1966; Harbutt vd., 1969), sığırlarda (*E. wenyonii*, *E. teganodes* ve *E. tumoi*) (Sutton vd., 1977; Messick, 2004), farelerde (*E. coccoides*) (Messick, 2004) ve yarasalarda (*E. mariboi*) (Ewers vd., 1971) rastlanmıştır. *Haemobartonella* enfeksiyonları da köpeklerde (*H. canis*) (Benjamin ve Lumb, 1959; Donovan ve Loeb, 1960), ratlarda (*H. muris*) (Elko ve Cantrell, 1968), maymunlarda (Peters vd., 1974) ve insanlarda (Ristic ve Kreier, 1979; Archer vd., 1980) rapor edilmiştir.

Kedilerde iki *Haemobartonella* türü tanımlanmış olup, Ohio mikroorganizması olarak bilinen *H. felis*’in büyük formu kedi enfeksiyöz anemisine neden olurken, küçük formu olarak bilinen Kaliforniya mikroorganizmasının düşük virulense sahip olduğu bildirilmiştir (Foley vd., 1998; Berent vd., 2000).

*Haemobartonella* ve *Eperythrozoon* türlerine yönelik moleküler genetik yöntemler ile yapılan filogenetik ve taksonomik çalışmalar sonucunda her iki bakteri cinsi içindeki türlerin *Mycoplasma* cinsi içinde sınıflandırılması önerilmiştir (Messick, 2004; Willi vd., 2007; Barker ve Tasker, 2013).

## **2. HEMOPLAZMALAR**

### **2.1. Sınıflandırma**

*Rickettsiales* dizisi içinde değerlendirilen mikroorganizmalar, 1993 yılına kadar *Bartonellaceae*, *Rickettsiaceae*, ve *Anaplasmatacea* olmak üzere 3 ayrı ailede sınıflandırılmıştır (Messick, 2004). *Haemobartonella* ve *Eperythrozoon* türleri morfolojik olarak küçük olmaları, kan emen eklembacaklılar aracılığı ile bulaşmaları, Gram negatif boyanmaları dikkate alınarak *Anaplasmatacea* ailesine dahil edilmişlerdir. *Haemobartonella* ve *Eperythrozoon* türlerinin bu özelliklerine rağmen hücre duvarı ve flagellaya sahip olmamaları, intrasellüler olmamaları, penisilin ve türevlerine dirençli; tetrasiklinlere duyarlı olmaları nedeniyle Riketsiyal mikroorganizmalar içinde değil, daha çok Mollicutes dizisi içinde değerlendirilmesine yönelik şüpheler bulunmaktaydı (Willi vd., 2007). Buna bağlı olarak 1997 yılında *Haemobartonella* ve *Eperythrozoon* türlerinin 16 S rRNA genleri ilk kez polimeraz zincir reaksiyonu (PCR) ile amplifiye edilmiş ve sekans analizi yapılmıştır (Rikihiş vd., 1997). Yapılan çalışmalar sonucunda *Haemobartonella* ve *Eperythrozoon* türlerinin *Mycoplasma* cinsi ile filogenetik benzerliklerinin yansıtılması için taksonomik sınıflandırmanın değiştirilmesi ve tam olarak tanımlanamayan suşlara *Candidatus* ön ismi verilmesi önerilmiştir (Neimark ve Kocan, 1997; Neimark vd., 2002).

Bu doğrultuda *H. felis* suşlarının büyük formu (Ohio mikroorganizması) ile *H. muris* (ratlarda) ve *H. canis* suşları *Mycoplasma* cinsi içinde sırasıyla *Mycoplasma (M.) haemofelis*, *M. haemomuris* ve *M. haemocanis* olarak yeniden sınıflandırılmıştır (Rikihiş vd., 1997; Messick vd., 2002). *H. felis* suşlarının küçük formu (Kaliforniya mikroorganizması) ile kemirgen ve alpakadan izole edilen ve tam olarak tanımlanamayan yeni hemotropik mikoplazma suşları da *Candidatus M. haemominutum*, *Candidatus M. haemodidelphis* ve *Candidatus M. haemolamae* olarak tanımlanmıştır (Neimark vd., 2001; Foley ve Pedersen, 2001; Messick vd., 2002,).

### **2.2. Morfoloji**

Daha önce yapılan bir çalışmada *H. muris*'in transmisyon elektron mikroskopik özellikleri *E. coccoides* ve *M. pulmonis* ile karşılaştırılmış (Tanaka vd., 1965) ve morfolojik özellikleri

birbirine benzeyen *H. muris* ve *E. coccoides* türleri hücre duvarı olmayan, yuvarlak ve 350-700 nm çapında çekirdeksiz hücreler olarak tanımlanmıştır. *M. pulmonis* ise şekil ve büyüklük olarak daha pleomorfik olup, diğer morfolojik özellikleri *H. muris* ve *E. coccoides* ile benzerlik göstermektedir (Messick, 2004). *H. felis*, *H. canis*, *E. ovis*, *E. wenyonii* ve *E. suis* türlerinin ışık ve transmisyon elektron mikroskopik özellikleri incelendiğinde ise bu mikroorganizmaların yapısal özelliklerinin önemli ölçüde benzerlik gösterdiği bildirilmiştir (Messick vd., 2000). Bu mikroorganizmaların sitoplazmalarında çekirdek bulunmamakla birlikte küçük granüller ve birkaç filamentöz yapının tespit edildiği rapor edilmiştir. Eritrositlerin yüzeyine tutunabilen hemoplazmalar hücre içine penetre olamazlar ve eritrositlerin yüzeyindeki çöküntülerde ve derin katlanma bölgelerine yerleşirler. Hemoplazmaların eritrosit yüzeyinde yerleştikleri bölgede, etken ve eritrosit arasında 15-25 nm'lik açık bir bölge, etkeni eritrosit yüzeyinden ayırmakta ve etkenin hassas fibrilleri, bu bölge boyunca uzanarak etkenin konakçı eritrositlerine tutunmasını sağlamaktadır (Messick, 2004).

### **2.3. Konak Hücreye Adhezyon**

Mikoplazmalar hayvanlarda ve insanlarda ürogenital epitel hücrelerine ve solunum sistemi epitel hücrelerine tutunarak enfeksiyon oluşturmaktadırlar (Kirchhoff vd., 1984). Bu tutunma işlemini adezin ve yüzey proteinlerinden oluşan özel bir uç organeli bulunan bir eklenti sayesinde yapabilmektedirler. Benzer uç yapılara sahip olan hemoplazmalar, mikoplazmalardan farklı olarak eritrosit yüzeyine tam anlamıyla tutunabilmektedir. Hemoplazmalar bu özellikleri ile ilişkili genlere ve proteinlere sahip olabilir veya hemoplazmalarda alternatif bir yüzey parazitizm mekanizmasının gelişmiş olabileceği düşünülmektedir (Messick, 2004).

### **2.4. Genomik Özellikleri**

Hemoplazmalar, amino asit, yağ asidi, kolesterol ve vitamin gereksinimleri açısından konakçı hücreye bağımlı mikroorganizmalardır (Miles, 1992). Hemoplazmalar 0.3-0.6 µm büyüklük ve 745 kb'lık küçük bir genoma sahip, teorik olarak bölünebilen en küçük mikroorganizmalar arasında yer almaktadır (Messick vd., 2000). Hemoplazma DNA'sı sirküler yapıda, çift sarmallı moleküller olup, hücrenin replikasyon, transkripsiyon ve protein sentezi için gerekli genetik bilgileri taşımaktadır. Bu mikroorganizmalar ayrıca protein sentezini sağlayan ribozom ve sitoplazmayı dış çevreden ayıran tek katlı hücre zarına da sahiptir (Berent ve Messick, 2003).

### **3. FELİN ENFEKSİYÖZ ANEMİ**

#### **3.1. Etiyoloji**

*M. haemofelis*, *Candidatus M. haemominutum* ve *Candidatus M. turicensis* evcil ve yabani kedigillerde enfeksiyöz anemiye neden olan hemoplazma türleridir.

#### **3.2. Epidemiyoloji ve Patobiyoloji**

##### **3.2.1. Prevalans**

Evcil kedilerde PCR yöntemi ile yapılan çalışmalarda bu güne kadar *M. haemofelis*, *Candidatus M. haemominutum* enfeksiyonları ve *Candidatus M. turicensis* enfeksiyonları İsviçre, İngiltere, ABD, Güney Afrika, Japonya, Yeni Zelandada, Kanada ve Avustralya'da rapor edilmiştir (Willi vd., 2006a; Willi vd., 2006b; Barker ve Tasker, 2013). Kedilerde hemoplazma enfeksiyonlarına yönelik PCR tabanlı prevalans çalışmalarında *Candidatus M. haemominutum* prevalansının (%8.1 - %46.7), *Candidatus M. turicensis* (%0.1-%26.1) ve *M. haemofelis*'den (%0.6-%21.7) daha yüksek bulunduğu bildirilmiştir. Ayrıca hemoplazma DNA'sı tespit edilen hayvanların genellikle birden fazla felin hemoplazma türü ile enfekte olduğu belirlenmiştir (Barker ve Tasker, 2013).

##### **3.2.2. Bulaşma, taşıyıcı ve rezervuarlar**

Feline hemoplazmalar deneysel koşullarda enfekte taze kanın, deri altı, damar içi veya peritoneal yolla verilmesi suretiyle iatrojenik yolla bulaşabilmektedir. Enfekte kanın oral yolla verilmesi durumunda bulaşmanın başarısızlıkla sonuçlandığı bildirilmiştir (Flint vd., 1958; Willi vd., 2006a; Museux vd., 2009; Sykes, 2010). İsviçre'de yapılan bir çalışmada hayvanlardan direkt toplanan bazı *Ixodes* sp. ve *Rhipicephalus* spp. türleri felin hemoplazma DNA'sı yönünden pozitif bulunurken (Willi vd., 2007), Japonya'da yapılan bir çalışmada kan emmemiş *Ixodes ovatus* kenelerinde *Candidatus M. haemominutum* DNA'sı bulunduğu rapor edilmiştir (Taroura vd., 2005). Ayrıca kedilerden toplanan pirelerde (*Ctenocephalides felis*) ve pire dışkısında *Candidatus M. haemominutum* ve *M. haemofelis* DNA'sı tespit edilmiştir (Lappin vd., 2006; Shaw vd., 2004). Deneysel olarak *Candidatus M. turicensis* ve *Candidatus M. haemominutum* ile enfekte edilen kedilerin tükürük ve tükürük bezi örneklerinde hemoplazma DNA'sı saptandığı rapor edilmiştir (Willi vd., 2007). Kedi hemoplazmalarında anneden yavruya vertikal bulaşma da bildirilmiş, fakat bu hipotezi destekleyen deneysel bir veri henüz yayınlanmamıştır (Harvey ve Gaskin, 1977).

### 3.2.3. Patojenite

Kedilerde hemolitik anemiye sebep olan kedi hemoplazmaları, *M. haemofelis*, *Candidatus M. turicensis* ve *Candidatus M. haemominutum* türlerini içermektedir (Peters vd., 2008; Rosenqvist vd., 2016) ve enfeksiyon, kırmızı kan hücrelerine bu etkenlerin yapışıp bağlanması sonucunda meydana gelmektedir. *M. haemofelis*, feline hemoplazma türleri arasında en patojenik türdür (Tasker vd., 2003b; 2009). *M. haemofelis* ile enfekte olan kedilerde çoğunlukla şiddetli anemi ve hemoliz meydana gelirken, *Candidatus M. turicensis* ve *Candidatus M. haemominutum* ile enfekte olan kedilerde immunsupresyon dışında, genellikle klinik anemi oluşmaması ile birlikte, eritrosit parametrelerinde azalma görülmektedir. Bununla birlikte anemi belirtileri özellikle *Candidatus M. haemominutum* ve *Candidatus M. turicensis* enfeksiyonlarında ortak olarak bildirilmiştir (Hornok vd., 2008; Do vd., 2020). Bu nedenle bireysel olgularda anemi belirtileri ile bu etkenlerin ayırt edici teşhisi yapılamamaktadır (Willi vd., 2006b). Deneysel olarak intravenöz yolla *M. haemofelis* ile enfekte edilen kedilerde kanda hemoplazma sayısı hızlı bir şekilde artmakta ve enfeksiyondan yaklaşık 2-4 hafta sonra en üst düzeye ulaşmaktadır (Barker ve Tasker, 2013). *M. haemofelis* enfeksiyonlarının aksine *Candidatus M. haemominutum* ve *Candidatus M. turicensis* ile enfekte kedilerin kanında mikroorganizma sayısında zamanla meydana gelebilecek değişikliklerin daha az gözlemlendiği ileri sürülmüştür (Tasker vd., 2009). Retrovirus enfeksiyonlarının (Feline immunodeficiency virüsü (FIV) ve kedi lösemi virüsü (FeLV) ) hemoplazma enfeksiyonları için predispoze faktör olduğu ve hastalığın şiddetini arttırdığı rapor edilmiş (Bobade vd., 1988; Harrus vd., 2002; Bergmann vd., 2017) hatta yapılan retrospektif çalışmalarda FeLV enfeksiyonunun *M. haemofelis* ile enfekte olma riskini arttırdığı ve bu iki etkenin birlikte meydana getirdiği enfeksiyonlarda daha şiddetli anemi olgusunun meydana geldiği bildirilmiştir (George vd., 2002).

### 3.2.4. Klinik Bulgular

Hemoplazmalar vertebralı konakçılarda akut hemolitik anemi ve kronik hastalığa neden olabilmektedir. Konakçının duyarlılığına bağlı olarak hastalık asemptomatik olabilir veya öldürücü seyredebilir. Yaş, geçirilmekte olan diğer enfeksiyonlar, immunsupresyon ya da splenektomi yapılması hayvanları akut enfeksiyonlara karşı predispoze kılabilir (Messick, 2004). Kedilerde hem doğal hem de deneysel enfeksiyonlarda görülen başlıca bulgular durgunluk, anoreksi, ateş ve anemidir. Buna karşın *Candidatus M. haemominutum* gibi daha küçük hemoplazmalar ile deneysel enfekte edilen sağlıklı kedilerde akut hastalıkla ilgili olarak minimal düzeyde klinik belirtiler gözlenmiştir (Foley vd., 1998). Ayrıca,

enfeksiyonun bulaşma yolu ve maruz kalınan doz enfeksiyonun şiddetinde etkili olabilmektedir (Messick, 2004).

### **3.3. Teşhis**

#### **3.3.1. Mikroskopik**

Hemoplazmaların *in-vitro* olarak kültürleri yapılmamaktadır (Rosenqvist vd., 2016; Kamyngird vd., 2021). Etkenler, kan frotilerinin Romanowsky boyama yöntemi ile boyanması sonucunda kokoid formda görülmeleri ile teşhis edilmektedirler. Ancak bu yöntem ile görülen formlar Howell-Jolly cisimcikleri ile karıştırılabilmektedir (Tasker ve Lappin, 2002; Tasker vd., 2003a). Ayrıca *Candidatus M. haemominutum* ile *M. haemofelis*'in birbirinden ayırımının güç olması ve *Candidatus M. turicensis*'in mikroskopik olarak tespit edilememesi nedeniyle hemoplazmaların teşhisinde güvenilir bir yöntem olarak görülmemektedir (Willi vd., 2007).

#### **3.3.2. Moleküler ve genetik yöntemler**

PCR günümüzde hemoplazma etkenlerinin teşhisinde tercih edilen bir yöntemdir. Günümüzde kullanılan tüm PCR analizleri 16 S rRNA gen analizine dayalı olarak yapılmaktadır. Bu yöntemle EDTA katılmış kan örneklerinden veya enfekte hayvanların doku örneklerinden hedef olarak seçilen spesifik genlerin amplifikasyonu gerçekleştirilmektedir (Willi vd., 2007). Kedigillerde *M. haemofelis* ve *Candidatus M. haemominutum* tespitine yönelik konvansiyonel PCR yöntemleri geliştirilmiştir (Berent vd., 1998; Jensen vd., 2001; Criado-Fornelio vd., 2003). Fakat bu yöntemlerle *Candidatus M. turicensis* amplifiye edilememiş ve *M. haemofelis*' den ayırt edilememiştir (Willi vd., 2007). Bu nedenle bu üç hemoplazma türünü birbirinden ayırt etmek için kantitatif real-time PCR yöntemi geliştirilmiştir (Tasker vd., 2003b; Willi vd., 2005; Willi vd., 2006a). Bu yöntem hastaların kanındaki hemoplazma miktarının belirlenerek enfeksiyonun önemi ve hastaya uygulanan antibiyotik sağaltımının etkinliğinin değerlendirilmesinde yardımcı olabilmektedir (Willi vd., 2007).

#### **3.3.3. Serolojik testler**

Hemoplazma etkenlerinin *in-vitro* kültürlerinin yapılamaması ve bu sebeple antijenlerin deneysel yollarla üretilmesi (Wolf-Jackel vd., 2010) nedeniyle hastalığın indirekt teşhisine yönelik spesifik proteinlerin kullanıldığı serolojik testler geliştirilememiştir. Ancak, hastalığın serolojik teşhisi için Western immunoblot ve immunofluoresan yöntemi kullanılmıştır. Serolojik testler özellikle hemoplazma enfeksiyonunun izlenmesinde ve antibiyotikle tedavi edilen kedilerde tedavinin etkinliğinin değerlendirilmesinde yararlı olabilmektedir (Foley vd.,



1998; Alleman vd., 1999; Novacco vd., 2012). Son yıllarda hemoplazma enfeksiyonlarına yönelik yapılan genetik çalışmalar, rekombinant *M. haemofelis* DnaK antijeninin (ısı şok protein 70) kullanıldığı ELISA testinin geliştirilmesini sağlamıştır (Barker ve Tasker, 2013). Kedilerde yapılan deneysel çalışmalarda *M. haemofelis* r-DnaK antijeni, *M. haemofelis*, *Candidatus M. haemominutum*'a karşı oluşan humoral immun yanıtın tespiti ve karakterizasyonu amacıyla Western blot ve ELISA testlerinde kullanılmıştır (Barker vd., 2010; Wolf-Jackel vd., 2010; Navacco vd., 2012; Wolf-Jackel vd., 2012).

### 3.3.4. Sağlıkım ve koruma

Enfeksiyonun tedavisinde kullanılan marbofloksasin, doksisisiklin ve enrofloksasin gibi antibiyotikler her ne kadar enfekte kedilerin kanında bulunan mikroorganizmaların sayısını ve klinik belirtileri azalttığı görülsede (Berent vd.,1998; Dowers vd., 2002; Foley vd., 1998; Tasker vd., 2006a,b) henüz enfeksiyonu tam olarak ortadan kaldıran uygun antibiyotik tedavisi bulunmamıştır. Ayrıca yapılan çalışmalar üç kedi hemoplazması arasında antibiyotiklere verilen yanıt açısından farklılıklar olduğunu ileri sürmektedir (Tasker vd., 2006a,b; Willi vd., 2006a). *M. haemofelis* ve *Candidatus M. hemominutum* etkenleri üzerinde yapılan çalışmalar neticesinde 4 hafta boyunca günde 2 mg/kg oral olarak uygulanan marbofloksasinin, *M. haemofelis* ile enfekte olan kedilerin kanındaki bakteri sayısını azalttığı ve tedaviden sonra aralıklı negatif sonuçların alındığı, ancak *Candidatus M. hemominutum* ile enfekte olan kedilerde etkinin daha az olduğu bildirilmiştir (Willi vd., 2007; Baumann vd., 2013). Deneysel olarak enfekte olmuş kedilere günlük 5 mg/kg oral yolla verilen enrofloksasinin klinik olarak iyileşme sağladığı ve kanda bulunan mikroorganizma sayısında da azalma olduğu tespit edilmiştir. Ancak hayvanlarda akut körlük ve retina dejenerasyonu meydana getirebileceğinden günlük verilen dozun 5 mg/kg üzerinde olması tavsiye edilmemektedir (Dowers vd., 2002; Tasker vd., 2004). Kedi ve köpeklere oral olarak verilen doksisisiklinin tedavi sonrasında özofagus darlıkları ve özofajitise neden olduğu (McGrotty ve Knottenbelt, 2002; German vd., 2005) ve tahriş edici etkisinden dolayı ülser neden olabileceği bildirilmiştir. Ancak ülser oluşumunun tüm doksisisiklin formülasyonlarında görülmediği ve doksisisiklin hidroklorür tuzlarının oldukça asidik çözelti oluşturmasının yanında, doksisisiklin monohidrat tuzlarının daha az asidik olduğu bildirilmiş hatta kedi ve köpeklerde kullanım için macun tarzında kullanılacak formülasyonları da hazırlanmıştır (Willi vd. 2007; Baumann vd., 2013). Standart (5 mg/kg günlük oral) ve daha yüksek (10 mg/kg günlük oral) dozlarda pradofloksasin uygulanmasının *M. haemofelis* enfeksiyonunun eliminasyonunda doksisisiklinden daha etkili

olabileceği, böylece pradofloksasinin enfeksiyonun eliminasyonunun maksimize edilmesi istendiğinde veya inatçı olgularda kullanılması gerektiği ileri sürülmüştür (Dowers vd., 2009).

#### **4. SONUÇ**

Kene ve pire gibi kan emici artropodlar hemoplazmaların bulaşmasında vektör rolü oynamaktadırlar. Birçok çalışmada farklı konakçı türlerinde birbirlerine yakın hemoplazma türlerinin saptandığının bildirilmesi bu patojenlerin türler arasında bulaşmasının söz konusu olabileceğini düşündürmektedir. Sistemik lupus eritematosusa sahip insanların kan örneklerinde hemoplazma benzeri mikroorganizmaların bulunması (Kallick vd., 1972) bu etkenlerin zoonotik özelliklerinin araştırılması gerektiği gerçeğini ortaya koymaktadır.

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***Nasturtium officinale* (Su Teresi) UÇUCU YAĞININ ANTIOKSİDAN ÖZELLİĞİ  
ÜZERİNE ARAŞTIRMA**

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**ÖZET**

İnsan sağlığı sorunlarına yönelik birçok çözüm, büyük oranda çeşitli şifalı bitkilerden elde edilen fitokimyasalların zenginliğinde şifrelidir. Uçucu yağlar, belirli bitkilerden elde edilen doğal, uçucu ve aromatik yapıda sıvılar olup yağlı bir kıvama sahiptir. Bitki uçucu yağları bitkilerin çeşitli kısımlarından (kökler, çiçeklerden, tohumlardan, yapraklardan ve meyvelerden) elde edilmektedirler. Son zamanlarda, kullanımları eczacılık ve gıda endüstrinde önemli yer tutmaktadır. Avcılarına (mantarlar, böcekler vb.) karşı bitkiler evrimsel olarak uçucu yağlar gibi biyoaktif metabolitler üretmektedirler. Alkaloidler, flavonoidler, fenolik asitler, monoterenler, izoflavonlar, aldehitler, oksijenli ve oksijensiz terpen hidrokarbonları gibi bir dizi aromatik bileşen, uçucu yağların ana bileşenleri olarak bilinmektedir ve bunların çoğu basit lipofilik bileşiklerdir. Uçucu yağların antibakteriyel, antiviral, antikanser, antiparaziter, antifungal, antioksidan ve böcek öldürücü gibi biyolojik özellikleri kanıtlanmış ve bu doğal biyoaktif maddeler eski çağlardan beri insanoğluna hizmet etmektedir. Bu açıdan bitki bazlı gıda bileşenleri arasında uçucu yağlar gibi doğal bileşiklerin yapı ve işlevlerini keşfetmek ve karakterize etmekle uğraşan araştırmacıların büyük ilgisini çekmiştir. Atomik yörüngelerinde eşleşmemiş bir elektron içeren serbest radikaller memelilerde hücresel oksidasyon sonucunda meydana gelirler. Bunun sonucunda doku lezyonlarına ve sitotoksik olaylara neden olabilirler. Vücut bu zararlı etkilerden korunmak için serbest radikalleri bertaraf eden antioksidan ajanlara gereksinim duymaktadır. Bu zararlı kimyasal türlerin etkilerini kontrol etmek ve azaltmak için bitkiler tarafından antioksidan özellik gösteren sekonder metabolitler üretilmektedir. Son zamanlarda aromatik bitkilerden üretilen uçucu yağlar birçok biyolojik özelliklerinden dolayı ilgi çekmektedir. Bu amaçla yaptığımız çalışmada materyal olarak Dicle Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümü, Tıbbi Bitkiler Koleksiyon Bahçesinde bulunan su teresi (*Nasturtium officinale*) bitki herbalarından elde edilen uçucu yağın antioksidan etkisi araştırılmıştır. *N. officinale*'den elde edilen uçucu yağın, yapılan çalışmada güçlü antioksidan aktivite gösterdiği tespit edilmiştir.

**Anahtar Kelimeler:** Antioksidan, uçucu yağ, *Nasturtium officinale*.

**RESEARCH ON THE ANTIOXIDANT PROPERTIES OF *Nasturtium officinale*  
(Watercress) ESSENTIAL OIL****ABSTRACT**

Many solutions to human health problems are cryptic in the wealth of phytochemicals, largely derived from various herbs. Essential oils are natural, volatile and aromatic liquids obtained from certain plants and have an oily consistency. Plant essential oils are obtained from various parts of plants (roots, flowers, seeds, leaves and fruits). Recently, their use has an important place in the pharmaceutical and food industry. Against their predators (fungi, insects, etc.), plants evolutionarily produce bioactive metabolites such as essential oils. A number of aromatic compounds, such as alkaloids, flavonoids, phenolic acids, monoterpenes, isoflavones, aldehydes, oxygenated and nonoxygenated terpene hydrocarbons, are known to be the main components of essential oils, and most of them are simple lipophilic compounds. The biological properties of essential oils such as antibacterial, antiviral, anticancer, antiparasitic, antifungal, antioxidant and insecticide have been proven and these natural bioactive substances have been serving mankind since ancient times. In this respect, it has attracted great interest from researchers who are interested in discovering and characterizing the structure and functions of natural compounds such as essential oils among plant-based food ingredients. Free radicals containing an unpaired electron in their atomic orbital are formed as a result of cellular oxidation in mammals. As a result, they can cause tissue lesions and cytotoxic events. The body needs antioxidant agents that scavenge free radicals in order to be protected from these harmful effects. In order to control and reduce the effects of these harmful chemical species, secondary metabolites with antioxidant properties are produced by plants. Recently, essential oils produced from aromatic plants have attracted attention due to their many biological properties. For this purpose, the antioxidant effect of the essential oil obtained from the watercress (*Nasturtium officinale*) herb in the Medicinal Plants Collection Garden of Dicle University Faculty of Agriculture, Department of Agronomy was investigated as a material. It was determined that the essential oil obtained from *N. officinale* showed strong antioxidant activity in the study.

**Keywords:** Antioxidan, essential oil, *Nasturtium officinale*.

## 1. GİRİŞ

*Nasturtium officinale* (su teresi), Avrupa'da ve Asya'nın bazı bölgelerinde yayılış gösteren çok yıllık bir bitkidir. Avrupa'da yaprak, sebzeler, otlar ve yenilebilir çiçekler sınıfında olan güvenli yenilebilir bitki olarak kabul edilmektedir. Su teresi İran ve Türkiye'nin bazı bölgelerinde salatalarda, çorbalarda taze olarak yaygın olarak tüketilmektedir. (Karami vd., 2018; Doustimotlagh vd., 2020). *N. officinale*, besinsel özellikleri bilinen, ancak keşfedilmemiş ve yaygın olarak bilinmeyen değerli biyolojik özelliklere sahip bir bitkidir (Klimek-Szczykutowicz vd., 2018). Su teresi yaprakları yaygın olarak bir gıda ürünü olarak kullanılmasının yanında, ayrıca antiinflamatuvar, idrar söktürücü, balgam söktürücü, hipoglisemik, antihipertansif, idrar yolu enfeksiyonları ve kardiyovasküler hastalıklarda ve yara iyileşmesi için sıcak kompres olarak harici olarak uygulanır. kullanılmaktadır (Amiri, 2012; Boligon vd., 2013; Shahani vd., 2016). Bu etkilerinin birçoğu zaten bilimsel olarak kanıtlanmıştır (Hadjzadeh vd., 2015; Zeb, 2015; Shahani vd., 2016; Camponogaraa vd., 2019) Geleneksel ilaçlar olarak kullanılan bitkilerin taranması, yeni biyoaktif formülasyonlar bulma şansını artırmaktadır. Etnofarmakolojik ve etnobotanik çalışmalar, şifalı bitkilerin önemli biyoaktif etkiye sahip olabileceğini göstermiştir (İseri vd., 2014). Bu amaçla, yaptığımız çalışmada *N. officinale*'den elde edilen uçucu yağın etanol ekstraktlarının in vitro antioksidan aktivitelerini incelenmiştir.

## 2. MATERYAL VE METOT

### 2.1. Bitki Materyali

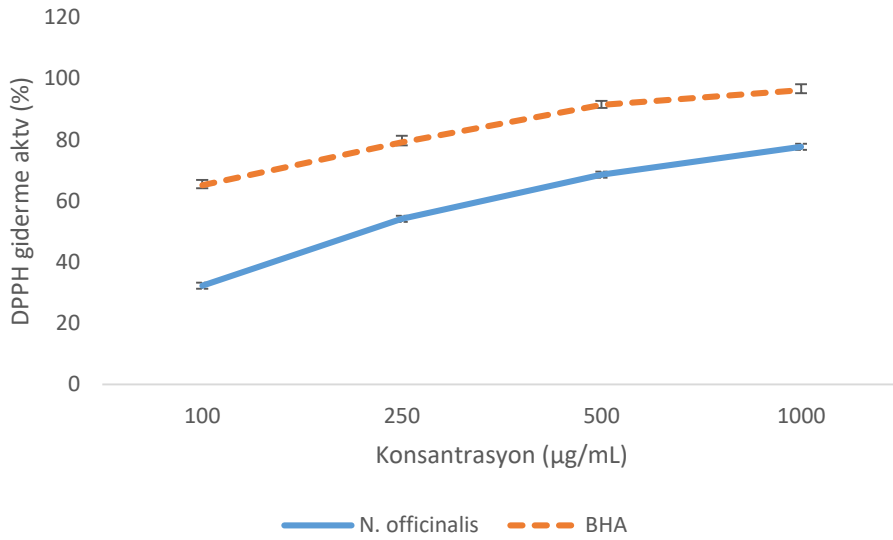
30 g kuru bitki numunelerinin (*N. officinale*) uçucu yağı, bir Clevenger tipi aparat kullanılarak sürekli buhar altında 2.5 saat boyunca hidrodistilasyon yoluyla izole edildi. İzole edilen uçucu yağ, analize kadar 4°C'de uygun kapta saklandı.

### 2.2. Antioksidan Aktivite

Su teresi ekstresinin antioksidan aktivitesi, Blois yöntemi ile stabil 1,1-difenil-2-pikril hidrazil radikali (DPPH) kullanılarak ölçüldü (Blois, 1958). Her numuneye 0,5 mM DPPH eklendi. Karanlık ortamda 30 dakika inkübasyondan sonra 517 nm'de absorbans alındı ve DPPH radikalinin % inhibisyonu hesaplandı (Burali vd., 2013). Standart kontrol olarak bütihidroksianisol (BHA) kullanıldı. Ferröz iyon şelatlama aktivitesi küçük değişiklikler ile Hsu'ya göre yapılmıştır (Hsu vd., 2004).

### 3. BULGULAR VE TARTIŞMA

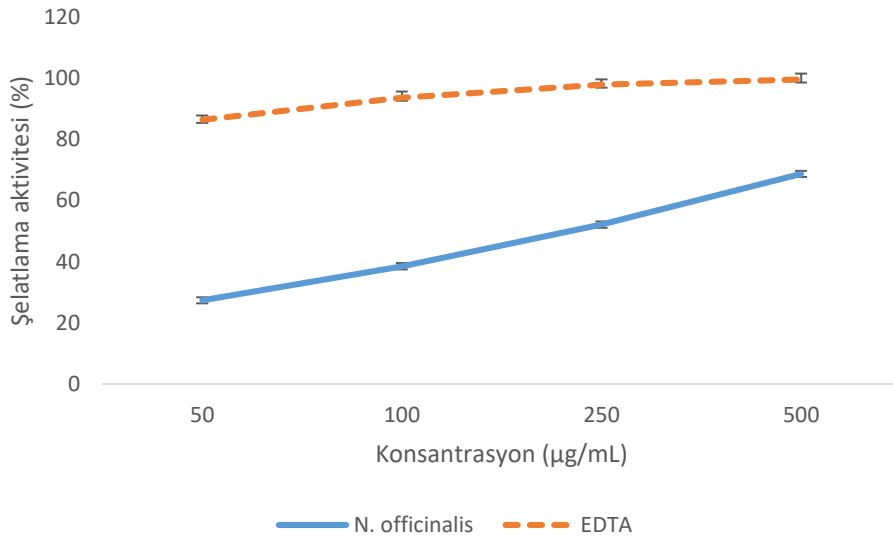
Bu çalışmada, su teresi ekstraktlarının antioksidan aktivitesi DPPH testi kullanılarak ölçüldü. Tüm veriler Şekil 1'de sunulmuştur. Serbest radikallerin biyolojik hasarlarda önemli bir faktör olduğu bilinmektedir ve DPPH, doğal radikallerin serbest radikal yakalama aktivitesini değerlendirmek için kullanılmıştır. Metanol, fenolik bileşenler de dahil olmak üzere antioksidan bileşenleri ekstrakte etmek için en yaygın şekilde kullanılır (Mehmod vd., 2011). Çakır'a göre metanol gibi polar organik çözücülerle elde edilen ekstraktların antioksidan aktivitesi de heksan ve kloroform gibi polar olmayan organik çözücülerle elde edilen ekstraktlardan daha yüksektir (Çakır vd., 2006). Fenolik gibi polar bileşiklerin esas olarak antioksidan aktiviteden sorumlu olduğunu önerebilir (Hossain vd., 2008; Haro vd., 2018).



Şekil 1. *N. officinale* uçucu yağının serbest radikal yakalama aktivitesi.

Su teresinin antioksidan aktivitesi, fenolik asitlerin ve ayrıca antioksidan lipo-çözünür beta-karotenin varlığına bağlanabilir. Hassimoto vd.. (2009) on sebze için  $\beta$ -karoten ağartma yöntemine göre antioksidan kapasiteyi belirlemiş, en yüksek antioksidan kapasite *N. officinale* için 9.6  $\mu$ mol BHT eşdeğer/g olarak bulunmuştur. Son yıllarda, şiddetli oksidatif strese muzdarip hastaların yaşam kalitesini iyileştirmek için antioksidan özelliklere sahip diyet bitkilerinin uygulamaları odak noktası olmuştur (Schubert vd., 2007; Boligon vd., 2009; Tung vd., 2009; Boligon vd., 2013). Serbest radikallerin katılımı, özellikle artan üretimleri, kardiyovasküler hastalıklar ve kanser de dahil olmak üzere tüm insan hastalıklarının olmasa da çoğunun özelliği. Bu nedenle, *N. officinale*, hücrel DNA, lipidler ve proteinlere serbest

radikal hasarına karşı koruma sağlayarak bu hastalıklarla mücadelede özellikle önemli olabilir.  $Fe^{2+}$  ferrozin kompleksinin absorbansı, ekstrakt tarafından doza bağlı bir şekilde erken azaltılmıştır, bu da ekstraktın şelatlama aktivitesine sahip olduğunu ve demir iyonlarını yakaladığını gösterir (Şekil 2). EDTA'nın bu koşullar altında metal yakalama etkisi pozitif kontrol olarak kullanıldı ve daha yüksek aktiviteye sahipti. Yapılan önceki bir çalışmada araştırmacılar, *N. officinale* uçucu yağının gözlemlenen  $Fe^{2+}$ -şelatlama kapasitesi, ekstrakttaki aktif bileşen(ler)in bu geçiş metali iyonu ile kararlı kompleksler oluşturabildiğini öne sürmüşlerdir (Hsu vd., 2004).



Şekil 2. *N. officinale* uçucu yağının şelatlama kabiliyeti.

#### 4. SONUÇ

Bu çalışmanın sonuçları *N. officinale* uçucu yağının in vitro olarak güçlü antioksidan aktiviteye sahip olduğunu açıkça göstermektedir. Serbest radikalleri yok etme özelliği, bu bitkinin hem bir gıda maddesi hem de geleneksel bir ilaç olarak faydalı olmasının mekanizmalarından biri olabilir. Gözlemlenen faaliyetlerden sorumlu spesifik biyoaktif bileşikleri karakterize etmek için ilave çalışmalara ihtiyaç vardır. Böylece *N. officinale*, erişilebilir bir doğal antioksidan kaynağı ve olası bir gıda takviyesi olarak görülebilir ve kullanılabilir.

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***Hyssopus officinalis* L. (ÇÖRDÜK OTU) UÇUCU YAĞININ ANTİBAKTERİYEL  
ETKİSİ ÜZERİNE ARAŞTIRMA**

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**ÖZET**

Bitki alemi, çeşitli ilaçların kaynağını temsil etmektedir. Gerçekten de, antik çağlardan beri şifalı bitkiler sağlık hizmeti popülasyonunda önemli bir rol oynamakta ve çoklu ilaca dirençli mikroorganizmalarla mücadele için önemli bir yeni antimikrobiyal ilaç kaynağını temsil etme potansiyeline sahiptir. Bu yeni antimikrobiyal ajanlar, şifalı bitki özleri ve uçucu yağlarda saklı olabilir. Uçucu yağlar, tohumlar, kökler, gövdeler, ağaç kabuğu, meyveler, çiçekler ve yapraklar olmak üzere farklı bitki kısımlarından çeşitli ekstraksiyon metotlarıyla elde edilmektedirler. Uçucu yağlar temel olarak fitokimyasallardan oluşan ve anti-kanser, anti-viral, anti-spazmodik, anti-bakteriyel, anti-diyabetik, antioksidatif özellikler gösteren doğal biyoaktif bileşiklerdir. Uçucu yağlar önemli oranda izoprenoid bileşikler içeren ve sadece organik çözücüler içinde ayrışabilen oldukça karmaşık bileşiklerdir. Yüksek moleküler reaktiviteleri terpenler, alkaloidler ve fenoller gibi içerdikleri düşük moleküler ağırlıklı maddelerden kaynaklanmaktadır. Ayrıca çeşitli özelliklerine göre uçucu yağlar farmasötik, kozmetik, parfüm veya aroma olarak çeşitli uygulamalara sahiptir. Doğal beslenmeye yönelik artan güçlü talep, kronik ve dejeneratif hastalıkların önlenmesini sağlayan çok çeşitli bitki türlerinden elde edilen uçucu yağların gıda koruyucuları olarak kullanılması gıda endüstrisinin dikkatini çekmiştir. Yaptığımız çalışmada, *Hyssopus officinalis* L. (Çördük otu) bitkisinden elde edilen uçucu yağın antimikrobiyal etkisini incelemek amacıyla farklı konsantrasyonlarda ve inkübasyon sürelerinde üç Gram pozitif (*Enterococcus hirae* ATCC 10541, *Bacillus cereus* ve *Staphylococcus aureus* ATCC 6538) ve üç Gram negatif (*Pseudomonas aeruginosa* ATCC 9027, *Escherichia coli* ATCC 10536 ve *Legionella pneumophila* ATCC 33152) olmak üzere altı patojen mikroorganizmaya karşı etkisine bakıldı. Elde edilen sonuçlara göre konsantrasyon miktarlarının artmasıyla birlikte zon çaplarında artışlar meydana gelmiştir. Elde ettiğimiz sonuçlar, gıdaların korunması için kullanılan sentetik kimyasallar yerine baharat uçucu yağlarının gıdaların korunmasında antimikrobiyal olarak kullanılabileceği fikrini desteklemektedir.

**Anahtar Kelimeler:** *Hyssopus officinalis*, uçucu yağ, antibakteriyel.

**RESEARCH ON ANTIBACTERIAL EFFECT OF *Hyssopus officinalis* L. (Hyssop grass) ESSENTIAL OIL****ABSTRACT**

The plant kingdom represents the source of various medicines. Indeed, herbs have played an important role in the healthcare population since ancient times and have the potential to represent an important source of new antimicrobial drugs to combat multidrug-resistant microorganisms. These new antimicrobial agents may be hidden in herbal extracts and essential oils. Essential oils are obtained by various extraction methods from different plant parts such as seeds, roots, stems, bark, fruits, flowers and leaves. Essential oils are natural bioactive compounds consisting mainly of phytochemicals and showing anti-cancer, anti-viral, anti-spasmodic, anti-bacterial, anti-diabetic, antioxidative properties. Essential oils are highly complex compounds that contain significant isoprenoid compounds and can only decompose in organic solvents. Their high molecular reactivity is due to the low molecular weight substances they contain such as terpenes, alkaloids and phenols. In addition, according to their various properties, essential oils have various applications as pharmaceuticals, cosmetics, perfumes or aromas. The growing strong demand for natural nutrition and the use of essential oils from a wide variety of plant species as food preservatives have attracted the attention of the food industry. In our study, in order to examine the antimicrobial effect of the essential oil obtained from the *Hyssopus officinalis* (hyssop grass) plant, its effect against six pathogenic microorganisms, three Gram positive (*Enterococcus hirae* ATCC 10541, *Bacillus cereus* and *Staphylococcus aureus* ATCC 6538) and three Gram negative (*Pseudomonas aeruginosa* ATCC 9027, *Escherichia coli* ATCC 10536 and *Legionella pneumophila* ATCC 33152), was examined at different concentrations and incubation times. According to the results obtained, the zone diameters increased with the increase in the concentrations. Our results support the idea that spice essential oils can be used as antimicrobials for food preservation instead of synthetic chemicals used for food preservation.

**Keywords:** *Hyssopus officinalis*, essential oil, antibacterial

## 1. GİRİŞ

Bitki kaynaklarından elde edilen uçucu yağlar, insan, hayvan ve organizmaların metabolizması ve fizyolojisinde hayati biyolojik roller oynar (Zucca vd., 2019; Sidiropoulou vd., 2020; Sattayakhom vd., 2021). Çok eski zamanlardan beri, aromaları ve kokuları nedeniyle uçucu yağlar ve bunların bileşenlerini içeren doğal aktif bileşikler kullanılmıştır. Bilinen 3000 çeşitten 300'ü ticari olarak gıda ve ilaç endüstrilerinde kullanılmaktadır. Son yıllarda, dikkat çekici biyolojik aktiviteleri ve sağlık yararları nedeniyle uçucu yağlar üzerine yapılan çalışmalar büyük ölçüde artmıştır. Sonuç olarak, farmakolojik özellikleri, doğal ve güvenli alternatif terapötikleri belirlemede çok büyük bir rol oynamışlardır (Ni vd.,2021). Uçucu yağlar, tüm bitki organları (tomurcuklar, çiçekler, yapraklar, tohumlar, ağaç, ağaç kabuğu vb.) tarafından sentezlenebilen güçlü bir aroma ile karakterize edilen doğal, karmaşık ve oldukça uçucu maddelerdir ve bitkilerin sekonder metabolizma ürünleri olup bitkilerin mantarlara, bakterilere, virüslere, böceklere ve otçullara karşı savunma mekanizmasında rol oynamaktadırlar (Teixeira vd., 2022). Uçucu yağların antimikrobiyal aktivitesi, genellikle, aromatik veya alifatik karbon zincirleri olan, çoğu terpenler ve terpenoidler olan düşük moleküler ağırlıklı bileşiklere atfedilir (Bakkali vd., 2008).

*Hyssopus officinalis* L. (Lamiaceae), genel olarak çördük olarak bilinir, güney Avrupa, Akdeniz ve Asya'nın ılıman bölgelerine özgü çok yıllık bir çalıdır. Ülkemizde Güney Anadolu ve Karadeniz'in kuzeyine özgüdür (Kızıllı vd., 2008; Dzamic vd., 2013). *H. officinalis* zengin bir aromatik kokuya ve güçlü bir tada sahiptir. Hafif acı bir tada sahip olmasına rağmen, *H. officinalis*, gıda endüstrisinde sıklıkla nane aroması ve çeşnisi olarak kullanılmaktadır (Fathiazad ve Hamedeyazdan, 2011). Özleri ve yağı, acı ve likörler dahil olmak üzere çeşniler ve içecekler gibi birçok gıda ürünüde kullanılmaktadır. Koku endüstrisinde sabunlarda, kozmetiklerde ve parfümlerde kullanılır (Wesolowska vd., 2010). *H. officinalis*'in yaprak özleri/uçucu yağları antimikrobiyal, antifungal, spazmolitik, antioksidandır ve HIV'e karşı güçlü antiviral aktivite sergiler (Letessier vd., 2001; Ozer vd., 2006; Wesolowska vd., 2010). Bitkinin antiviral aktivitesi muhtemelen kafeik asit, tanenler ve tanımlanamayan yüksek moleküler ağırlıklı bileşiklerin varlığından kaynaklanmaktadır (Letessier vd., 2001). *H. officinalis*'in uçucu yağ bileşimleri, Dünya'nın farklı bölgelerinde araştırılmış, farklı fenotiplerden veya bölgelerdeki bitki uçucu yağları kimyasal bileşiminde önemli ölçüde değişkenlik gösterdiği bulunmuştur (Pandey vd., 2014).

## **2. MATERYAL VE METOT**

### **2.1. Bitki Materyali ve Uçucu Yağ Ekstraksiyonu**

50 g kuru bitki numunelerinin uçucu yağı, bir Clevenger tipi aparat kullanılarak sürekli buhar altında 2.5 saat boyunca hidrodistilasyon yoluyla izole edildi. İzole edilen uçucu yağ, analize kadar 4°C'de uygun kapta saklandı.

### **2.2. Antimikrobiyal Test**

*H. officinalis*'in etanolik özütleri, *Enterococcus hirae* ATCC 10541, *Bacillus cereus*, *Staphylococcus aureus* ATCC 6538, *Pseudomonas aeruginosa* ATCC 9027, *Escherichia coli* ATCC 10536 ve *Legionella pneumophila* ATCC 33152 mikroorganizmalarına karşı disk difüzyon yöntemi kullanılarak in vitro antimikrobiyal özellikleri açısından araştırıldı. Uçucu yağ disklere 20 µl emdirildi. 24 saatlik inkübasyondan sonra, tüm petri kapları büyüme inhibisyonu bölgesi için incelendi ve bu bölgelerin çapı milimetre olarak ölçüldü. Pozitif kontrol olarak imipenem (IMP) 10 µg kullanıldı.

## **3. BULGULAR VE TARTIŞMA**

Son yıllarda yaygınlaşan antibiyotik kullanımı, enfeksiyonların tedavisinde kullanılan ilaçlara dirençli bakterilerin ortaya çıkmasına ve yayılmasına neden olmaktadır. Antibiyotik direncinin en önemli nedenlerinden biri de mikropların biyofilm yapılarında kalmasıdır. Bu yapı, antimikrobiyal ajanların penetrasyonunu engellediği gibi, bu ajanların etkin fonksiyonlarını da engellemektedir. Patojen bakterilerle başa çıkmak için yeni yolların edinilmesi gereklidir (Potera, 1999; Cowan, 1999). Bu alandaki araştırmalar özellikle biyolojik bileşikler üzerinde yoğunlaşmıştır, çünkü bu maddelerin biyolojik yapıları geleneksel kimyasal ajanlara kıyasla etkileri azaltmıştır. Biyolojik türevler arasında tıbbi bitki seçeneği daha çok patojenik bakterilerle mücadelede iyi bir yol olarak dikkat çekmektedir (Hayacibara vd., 2005; Abubakar vd., 2009; Hassanshahian vd., 2017).

**Tablo 1.** Uçucu yağ (*H. officinalis*) ve İmipenem antibiyotığının çeşitli mikroorganizmalara karşı antimikrobiyal etkisi.

Mikroorganizma	Uçucu yağ ( <i>H. officinalis</i> )	İmipenem
	Zon çapı	Zon çapı
<i>E. hirae</i>	18	36
<i>B. cereus</i>	20	30
<i>S. aureus</i>	18	34
<i>P. aeruginosa</i>	14	26
<i>E. coli</i>	12	28
<i>L. pneumophila</i>	16	20

**Not:** Zon çapları milimetre (mm) olarak ölçülmüştür.

Uçucu yağın farklı mikroorganizmalara karşı antimikrobiyal aktivitesinin sonuçları Tablo 1'de özetlenmiştir. Çördük otu esansiyel yağının antimikrobiyal aktivitesi 20 µl hacim kullanılarak test edildi. *H. officinalis* uçucu yağına karşı Gram-negatif bakteriler, Gram-pozitif bakterilerden daha az duyarlı görünmektedir. Bu durum güçlü geçirgenlik bariyeri görevi gören Gram negatif bakterilerin dış zarı ile ilişkili olabilir (Cabrera vd., 2006). Diğer şifalı bitkilere benzer şekilde bu bitkinin kimyasal yapısında fenolik ve aromatik metabolitler açığa çıkmıştır. Bu metabolitlerin antibakteriyel aktivitesi, diğer bitkilerdeki bazı yayınlarda açıklanmıştır. Farklı coğrafik bölgelerden elde edilen çördük otları farklı kimyasal içeriklere sahiptir. Uçucu yağların çok sayıda bileşenden oluşması nedeniyle belirli hedefleri yok gibi görünmektedir. Tipik lipofiller gibi hücre duvarından ve sitoplazmik zardan geçerek tabakalarının yapısını bozarlar. Ayrıca, sitoplazmayı pıhtılaştırabilirler (Gustafson vd., 1998; Carson vd., 2002) ve lipitlere ve proteinlere zarar verebilirler (Ultee vd., 2002; Burt, 2004). İmipenem antibiyotığına karşı bütün test bakterilerinde antimikrobiyal etki göstermiştir.

### 3. SONUÇ

Antibiyotiğe dirençli suşların prevalansı artmakta ve bu enfeksiyonlar için güvenli ve etkili alternatif ajanların belirlenmesi çok önemlidir. *H. officinalis* uçucu yağı, çalışmada kullanılan bakteriler üzerindeki antibakteriyel etkisi nedeniyle potansiyel bir antimikrobiyal ajan olarak değerlendirilebilir.

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**SIİRT BÖLGESİNDEN TOPLANAN *Agrocybe aegerita*'NİN ANTIOKSİDAN VE ANTIÖBEZİTE AKTİVİTELERİNİN BELİRLENMESİ**

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**ÖZET**

Tıbbi amaçla ve gıda endüstrisinde sık bir şekilde kullanım alanı olan sentetik antioksidanların sebep olduğu yan etkiler sürekli tartışma konusu olmaktadır. Bu alanlarda yaşanabilecek olumsuz durumlara karşı bilim insanları farklı doğal kaynaklardan yeni antioksidan ve antiobezite aktivitesine sahip bileşiklerin tespit edilmesi için araştırmalarına hız vermiştir. Tıbbi amaçla kullanılan mantarların, uzun yıllardan beri geleneksel ve yöresel tedavilerde kullanımı ile ilgili tarif ve kürler bulunmaktadır. Çin başta olma üzere birçok uzak doğu ülkesinde çeşitli mantar türleriyle hazırlanmış preparatların modern tıbbi uygulamaları yapılmaktadır. Son yıllarda yapılan araştırmalarda mantarların biyolojik aktiviteleri üzerine çok sayıda bilimsel çalışma mevcuttur. Ülkemizde de bu alanda önemli çalışmalar yürütülmektedir. Bu çalışmada, Siirt ili Eruh ilçesinden toplanan *Agrocybe aegerita* 'nın etanol özütü kullanılarak antioksidan ve antiobezite aktiviteleri belirlendi. Antioksidan aktiviteyi belirlemek için serbest radikal süpürme ve indirgeme gücü aktiviteleri test edildi. DPPH serbest radikal süpürme aktivitesi 20 mg/ml konsantrasyonda % 86.5 olarak ölçüldü. Ayrıca özütlerin lipaz enziminin inhibisyonu üzerindeki etkisi ölçülerek antiobezite aktiviteleri belirlendi. Etanol özütünün 2.0 mg/ml konsantrasyonunda yapılan deneyde, en yüksek lipaz enzimi inhibisyon oranının % 17.6 olduğu tespit edildi. Obezite tedavisinde kullanılan ve lipaz enzimi inhibitörü olan orlistat çalışmada standart referans madde olarak kullanıldı. Çalışma sonucuna göre yenilebilir bir mantar çeşidi olan *A. aegerita* 'nın doğrudan besin maddesi olarak tüketilerek veya işlenerek gıda, farmasotik ve tıp alanında kullanıma uygun olduğu gösterilmiştir.

**Anahtar Kelimeler:** *Agrocybe aegerita*, antioksidan, antiobezite.



**DETERMINATION OF ANTIOXIDANT AND ANTI-OBESITY ACTIVITIES OF  
*Agrocybe aegerita* COLLECTED FROM SIIRT REGION**

**ABSTRACT**

Side effects caused by synthetic antioxidants used for medical purposes and in the food industry are often the subject of discussion. Against undesirable situations in this regard, scientists have accelerated their research to detect compounds with new antioxidant and anti-obesity activities from different natural sources. There are recipes and cures for the use of mushrooms used for medicinal purposes in traditional and local treatments for many years. In many Far East countries, especially in China, modern medical applications of preparations prepared with various types of mushrooms are carried out. In recent years, there are many scientific studies on the biological activities of fungi. In our country, important studies are carried out in this field. In this study, antioxidant and anti-obesity activities of *Agrocybe aegerita* collected from Eruh district of Siirt province were determined by using ethanol extract. Free radical scavenging and reducing power activities were tested to determine antioxidant activity. DPPH free radical scavenging activity was measured as 86.5% at 20 mg/ml concentration. In addition, the effect of the extracts on the inhibition of Lipase enzyme was measured and their anti-obesity activities were determined. It was determined that the highest lipase enzyme inhibition rate was 17.6% at 2.0 mg/ml concentration of ethanol extract. Orlistat, a lipase enzyme inhibitor used in the treatment of obesity, was used as a standard reference substance in the study. According to the results of the study, it has been shown that *A. aegerita*, an edible mushroom variety, is suitable for use in the field of food, pharmaceuticals and medicine by directly consuming or processing as a nutrient.

**Keywords:** *Agrocybe aegerita*, antioxidant, anti-obesity.

## 1. GİRİŞ

Antioksidan özellik gösteren doğal ürünler, canlıları serbest radikallerden koruma amacıyla kullanılır. Tıbbi önemine ek olarak, antioksidan aktiviteye sahip bileşikler, gıda endüstrilerinde radikal türlere bağlı hasarları önleyebilir. Antioksidanlar, gıda bozulmasına ek olarak başta lipidler olmak üzere çeşitli muhtelif içeriklerin oksidasyonunu önleyerek gıda besin değerlerini destekleyen değerli gıda koruyucuları olarak tanımlanabilir (Salimi vd., 2022). Bütillenmiş hidroksitoluen ve bütillenmiş hidroksilanizol gibi sentetik antioksidanlar, 1940'larda gıda endüstrisine yer almaya başladı (Berdahl vd., 2010). Bunlar ucuz ve etkili antioksidanlardır, ancak potansiyel karsinogenez ile bağlantılıdır (Chen vd., 1992; Sun ve Fukuhara 1997). Rapor edilen yüksek maliyetler ve insan sağlığı üzerindeki tehlikeli etkileri ve tüketici tercihi ile birlikte bu risk, doğal antioksidanlar için artan bir talebe yol açmıştır (Berdahl vd., 2010). Doğal antioksidanların bir avantajı, kullanımdan önce kapsamlı güvenlik testleri gerektirmemeleridir (Huang vd., 2011). Günümüzde önemli sorunlardan olan obezite vücutta fazla yağ birikimi olarak karşımıza çıkmaktadır. Dünyada ve ülkemizde görülme oranı gittikçe artış gösteren obezite sağlık harcamalarındaki yük ve iş gücündeki kayıplardan dolayı ekonomik olarak ağır yükleri beraberinde getirmektedir. Lipaz inhibitörlerinden orlistat obezite tedavisinde kullanılmakla birlikte sindirim sistemi üzerinde çeşitli yan etkilere sahiptir. Bu çalışmadaki amaç, doğal ortamından toplanan *Agrocybe aegerita* 'nın etanol ve sıcak su özütleri kullanılarak antioksidan ve antiobezite aktivitelerini belirlemektir.

## 2. MATERYAL VE METOT

### Mantar Özütlerinin Hazırlanması

Etanol özütlemesi için, doğal ortamından mantarlardan 5.0 gram tartıldı. Örnekler blendırda öğütüldü ve oda sıcaklığında 100 mL etanol ile 24 saat boyunca 150 rpm'de çalkalayıcıya karıştırıldı. Sıcak su özütü için 50 ° C'de çalkalamalı inkübatöre 5.0 gram örnek ve 100 ml su 24 karıştırıldı. Toplanan özütler filtre kağıdından süzüldü. Etanol ve su özütü, kuru özüt elde etmek için 40 ° C'de evaporatörde uçuruldu. Balonun altında kalan kuru özüt tartıldı ve stok çözeltisi (20 mg/mL) hazırlamak için etanol ve saf su içinde çözüldü (Dündar ve ark., 2016).

### Serbest Radikal Süpürme, İndirgeme Gücü ve Lipaz İnhibisyon Aktiviteleri

Mantar özütlerinin serbest radikal süpürme ve indirgeme gücü aktiviteleri Chu ve ark. (2000) yaptığı yonteme belirlendi. Lipaz inhibisyon aktivitesini belirlemek için Venkatesagowda ve ark., (2012) yontemi kullanıldı.

### 3. ARAŞTIRMA VE BULGULAR

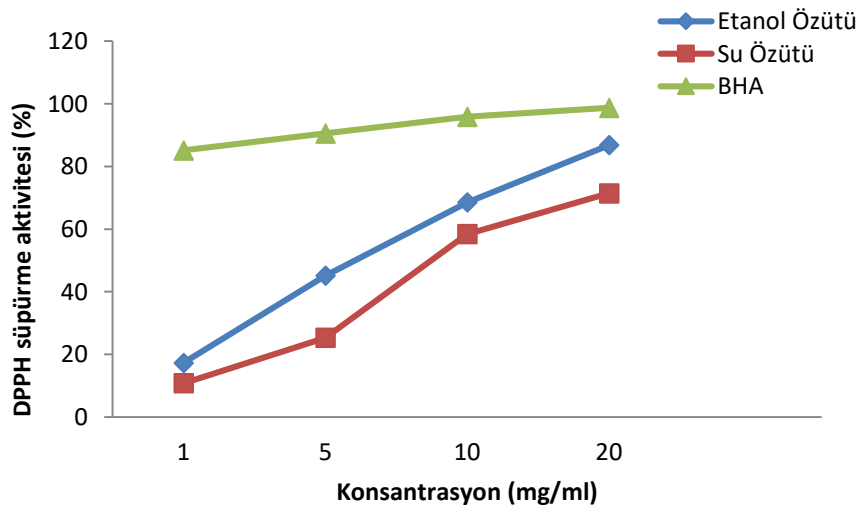
*A.aegerita* etanol ve su özütlerinin verimleri Tablo 1'de verilmiştir. Ekstraksiyon verimi etanol için % 12.2 ve sıcak su için % 7.4 olarak elde edilmiştir.

**Tablo 1. Mantar etanol ve su ekstraktlarının verimi**

Çözücü	Mantar kuru ağırlığı (g)	Ekstraksiyon verimi (g)	Ekstraksiyon (%)
Etanol	5	0.61	12.2
Su	5	0.37	7.4

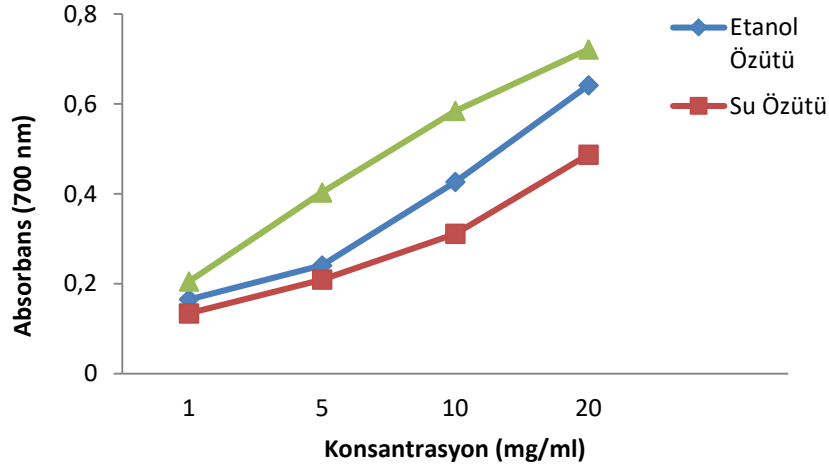
### Serbest Radikal Süpürme ve İndirgeme Gücü Aktivitesi

Mantar özütleri ve pozitif kontrol olarak kullanılan BHA standartının DPPH radikallerini süpürme kapasitesi, spektrofotometrede 517 nm'de absorbanstaki azalma ile belirlendi. Serbest radikal süpürme aktivitesinin yüzdesi olarak Şekil 1'de gösterilmiştir. Yapılan çalışmada mantar etanol özütünün, su özütüne göre daha iyi aktivite gösterdiği belirlenmiştir. 20 mg/ml konsantrasyonda aktivite etanol özütü % 86.5 ve su özütü için ise % 71.4 olarak ölçüldü.



Şekil 1. Serbest radikal süpürme aktivitesi

*A.aegerita* etanol ve su özütlerinin indirgeme gücü aktiviteleri Şekil 2'de gösterilmiştir. Yapılan çalışmada konsantrasyon artıkça (1-20 mg/ml), özütlerin indirgeme gücünün de arttığı belirlendi. Test edilen bütün konsantrasyonlarda pozitif kontrol olarak kullanılan BHA'nın her iki özütten de daha yüksek aktiviteye sahip olduğu belirlendi.



Şekil 2. İndirgeme Gücü Aktivitesi

### Antiobezitik Aktivite

*A. aegerita*'nın sıcak su ve etanol özütlerinin antiobezitik aktiviteleri Tablo 2'de verilmiştir. Sonuçlara göre, etanol özütü 2 mg/ml konsantrasyonda % 17.6 ile en yüksek lipaz inhibisyon aktivitesini göstermiştir. Aynı konsantrasyonda sıcak su özütü % 8.1 inhibisyon aktivitesi sergilemiştir. Özütlerin standart olarak kullanılan orlistat kadar etkili olmadıkları belirlenmiştir.

Tablo 2. Mantar özütlerinin lipaz inhibisyon aktivitesi

	Ekstrakt	Inhibisyon <sup>a</sup>
<i>A. aegerita</i>	Etanol	17.6 ± 0.42
	Su	8.1 ± 0.38
	Orlistat	63.2 ± 1.44

<sup>a</sup> Mantar ekstraktlarının 2.0 mg/ml konsantrasyonundaki % inhibisyonu

#### 4. SONUÇ

*A. aegerita*'nın sıcak su ekstraktlarının ortalama düzeyde, etanol ekstraktlarının ise iyi düzeyde antioksidan aktivite gösterdiği, bu nedenle bu mantar türünün kolayca erişilebilen bir doğal antioksidan kaynağı olarak kullanılabilceği açıkça görülmektedir. Ayrıca çalışma sonucunda ülkemizde doğal yayılış gösteren *A. aegerita*'nın lipaz inhibitör aktivitesi ile ilgili literatüre yeni bilgiler kazandırılmıştır.

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**YENİLEBİLİR MANTAR *Lactarius deliciosus*'un SICAK SU VE ETANOL  
ÖZÜTLERİNİN ANTİMİKROBİYAL VE ANTİDİYABETİK AKTİVİTELERİNİN  
BELİRLENMESİ**

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**ÖZET**

Yenilebilir mantarlar içerdikleri zengin polisakkarit, vitamin, protein ve minerallerden dolayı kaliteli besin maddeleri olarak kabul edilirler. Gıda olarak tüketilen birçok mantar türünün modern tıbbi tedavi yaklaşımlarına alternatif olarak, farklı terapötik özelliklere sahip olduğu belirlenmiştir. Yapılan çalışmalarda doğal ortamlarından toplanan birçok fungus türünün, yetiştiği bölgenin ekolojik koşullarına bağlı olarak aktif biyolojik maddeler içerdiği bilinmektedir. Bu çalışmada Siirt Eruh'ta doğal ortamından toplanan *Lactarius deliciosus*'un mantar sıcak su özütü ve mantar etanol özütü kullanılarak antimikrobiyal ve antidiyabetik aktiviteleri test edildi. Hazırlanan su ve etanol ekstraktları kullanılarak disk difüzyon yöntemi ile 2 Gram pozitif ve 2 Gram negatif bakteriye karşı oluşan inhibisyon zonlarına göre antibakteriyel aktivite belirlendi. Ayrıca özütlerin  $\alpha$ -amilaz enziminin inhibisyonu üzerindeki etkisi sonucunda antidiyabetik aktivite de belirlendi. *L. deliciosus*'un su ve etanol özütlerinin antimikrobiyal aktiviteleri incelendiğinde 0-14 mm çapında inhibisyon zonlarının olduğu ve en yüksek aktivite (14 mm zon çapı) *Bacillus cereus*'a karşı mantar etanol özütünde elde edildi. 2.0 mg/ml konsantrasyonunda ekstraktların antidiyabetik aktiviteleri test edildi. En yüksek enzim inhibisyon aktivitesinin % 20.7 olarak etanol özütünden elde edildiği ve sıcak su özütünde inhibisyon oranının % 11.5 olduğu gözlemlendi. Diyabet tedavisinde kullanılan ve  $\alpha$ -amilaz inhibitörü olan akarboz çalışmada standart referans madde olarak kullanıldı. Çalışma sonucunda antimikrobiyal ve antidiyabetik aktiviteye sahip olmasından dolayı, *L. deliciosus*'un aktif biyolojik bileşikler içerdiği, bu nedenle diyetle bulunmasının hastalıkların önlenmesi veya azaltılabilmesinde faydalı olacağı düşünülmektedir.

**Anahtar Kelimeler:** *Lactarius deliciosus*, antimikrobiyal, antidiyabetik.

**DETERMINATION OF THE ANTIMICROBIAL AND ANTIDIABETIC  
ACTIVITIES OF HOT WATER AND ETHANOL EXTRACTS OF THE EDIBLE  
MUSHROOM *Lactarius deliciosus***

**ABSTRACT**

Edible mushrooms are considered to be quality nutrients due to the rich polysaccharides, vitamins, proteins and minerals they contain. It has been determined that many mushroom species consumed as food have different therapeutic properties as an alternative to modern medical treatment approaches. It is known that many fungal species collected from their natural habitats contain active biological substances depending on the ecological conditions of the region where they grow. In this study, antimicrobial and antidiabetic activities of *Lactarius deliciosus* collected from its natural environment in Siirt Erüh were tested using mushroom hot water extract and mushroom ethanol extract. Antibacterial activity was determined according to the inhibition zones formed against 2 Gram positive and 2 Gram negative bacteria by disk diffusion method using prepared water and ethanol extracts. In addition, antidiabetic activity was determined by the effect of the extracts on the inhibition of  $\alpha$ -amylase enzyme. When the antimicrobial activities of the water and ethanol extracts of *L. deliciosus* were examined, it was observed that inhibition zones with a diameter of 0-14 mm were formed and the highest activity (14 mm zone diameter) was obtained in the ethanol extract of the fungus against *Bacillus cereus*. The antidiabetic activities of the extracts were tested at a concentration of 2.0 mg/ml. It was observed that the highest enzyme inhibition activity was obtained from the ethanol extract with 20.7%, while the inhibition rate was 11.5% in the hot water extract. Acarbose, an  $\alpha$ -amylase inhibitor used in the treatment of diabetes, was used as a standard reference substance in the study. As a result of the study, it is thought that *L. deliciosus* contains active biological compounds, due to its antimicrobial and antidiabetic activity, and therefore its presence in the diet may be beneficial in preventing or reducing diseases.

**Keywords:** *Lactarius deliciosus*, antimicrobial, antidiabetic.



## 1. GİRİŞ

Mantarlar flavonoidler, fenolik bileşikler ve terpenler gibi farklı doğal ürünler üretme yeteneğine sahip çok özel canlılardır. Besin çeşidi olarak mantarlar insan diyetinde önemli bir yer tutmaktadır. Mantarlar özütlerinin doğal antimikrobiyal özelliğe sahip olduğuna dair çok sayıda çalışma rapor edilmiştir. Binlerce yıl önce, uzakdoğuda mantar özütleri diğer bitkisel özütlerle beraber hastalıkları tedavi etmede ve besin maddesi olarak kullanılıyordu (Manzi ve ark., 1999). Antimikrobiyal ve antidiyabetik aktivite gösteren mantarların da içinde bulunduğu farklı gıdaların tüketiminin artması, hastalıkların önüne geçilmesi ve sentetik maddelerin yan etkilerinden korunmak için önemli etkenlerdir (Dündar ve ark., 2013). Yaptığımız bu çalışmada Siirt Erüh'tan toplanan ve yenilebilir mantarlardan olan, *Lactarius deliciosus*'un antimikrobiyal ve antidiyabetik özellikleri belirlenmeye çalışıldı.

## 2. MATERYAL VE METOT

### Mantar Özütlerinin Hazırlanması

Etanol özütlemesi için, doğal ortamından mantarlardan 5.0 gram tartıldı. Örnekler blendırda öğütüldü ve oda sıcaklığında 100 mL etanol ile 24 saat boyunca 150 rpm'de çalkalayıcıya karıştırıldı. Sıcak su özütü için 50 ° C'de çalkalamalı inkübatöre 5.0 gram örnek ve 100 ml su 24 karıştırıldı. Toplanan özütler filtre kağıdından süzüldü. Etanol ve su özütü, kuru özüt elde etmek için 40 ° C'de evaporatörde uçuruldu. Balonun altında kalan kuru özüt tartıldı ve stok çözeltisi (20 mg/mL) hazırlamak için etanol ve saf su içinde çözüldü (Dündar ve ark., 2016).

### Antimikrobiyal ve $\alpha$ -Amilaz İnhibisyon Aktiviteleri

Mantar özütlerinin antimikrobiyal aktivitesi Dündar ve ark. (2015) yaptığı yöntemle belirlendi. Özütlerin enzim inhibisyonu üzerindeki etkisi, Sayah ve arkadaşlarının (2017) yönteminde küçük değişiklikler yapılarak test edildi.

## 3. ARAŞTIRMA VE BULGULAR

*L. deliciosus*'un ekstraksiyon verimleri Tablo 1'de verilmiştir. 5 gr kuru mantar kullanıldığında etanolden 0.62 gram sudan ise 0.44 g ekstrakt elde edildi. Ekstraksiyon veriminin etanol için % 12.4 ve sıcak su için % 8.8 olduğu tespit edildi.

**Tablo 1.** Mantar etanol ve su ekstraktlarının verimi

Çözücü	Mantar kuru ağırlığı (g)	Ekstraksiyon verimi (g)	Ekstraksiyon (%)
Etanol	5	0.62	12.4
Su	5	0.44	8.8

### Antibakteriyel Aktivite

*L. deliciosus*'un sıcak su ve etanol özütlerinin antibakteriyel aktiviteleri Tablo 2'de verilmiştir. Özütlerin test edilen bakterilere karşı genel olarak zayıf aktivite gösterdiği belirlendi. Mantar özütlerinin ikisinin de test edilen iki Gram pozitif bakteriye karşı antibakteriyel aktiviteye sahip olduğu ve 8-14 mm aralığında inhibisyon zonu oluşturduğu ayrıca her iki özütün de *E.coli*'ye karşı herhangi bir antibakteriyel aktiviteye sahip olmadığı gözlemlendi. Standart olarak kullanılan streptomisin ve tetrasiklinin, mantar özütlerinden daha iyi aktivite gösterdiği gözlemlendi.

**Tablo 2.** Mantar etanol ekstraktlarının antibakteriyel aktivitesi

<i>L. deliciosus</i> Ekstraktları ve Standard Antibiyotik diskler <sup>a</sup>				
Bakteri	Etanol	Su	S	TE
<i>S. aureus</i>	11	8	16	24
<i>B.cereus</i>	14	9	19	22
<i>E. coli</i>	-	-	24	23
<i>P. aeruginosa</i>	7	-	15	21

<sup>a</sup> İnhibisyon zon çapı (mm) S= Streptomisin (10 µg) and TE= Tetrasiklin (30 µg)

### Antidiyabetik Aktivite

*L. deliciosus* mantarından elde edilen etanol ve su özütlerinin antidiyabetik etkinliğinin test edilmesi amacıyla amilaz inhibitör aktiviteleri analiz edildi (Tablo.3). Çalışma sonuçları hem inhibisyon yüzdesi hem de IC<sub>50</sub> konsantrasyonu olarak ifade edildi. Sonuçlara göre, etanol özütü 2 mg/ml konsantrasyonda % 20.7 ile en iyi aktiviteyi gösterdiği belirlendi. Aynı konsantrasyonda sıcak su özütü % 11.5 inhibisyon aktivitesi sergiledi. Pozitif kontrol olarak kullanılan akarbozun özütlerine göre daha yüksek enzim inhibisyon aktivitesine sahip olduğu görüldü.

**Tablo 3.** Mantar ekstraktlarının enzim inhibisyon aktivitesi

	<u>Ekstrakt</u>	<u>Inhibisyon</u> <sup>a</sup>	<u>IC<sub>50</sub> (µg/ml)</u>
<u>L. deliciosus</u>	Etanol	20.7 ± 0.72	2152.5 ± 40.3
	Su	11.5 ± 0.44	3876.4 ± 53.1
	<u>Akarboz</u>	84.6 ± 1.91	312.9 ± 11.7

<sup>a</sup> Mantar ekstraktlarının 2.0 mg/ml konsantrasyonundaki % inhibisyonu

#### 4. SONUÇ

Bu çalışmanın sonuçları, kullanılan mantar özütlerinin sentetik maddeler yerine doğal antidiyabetik ve antimikrobiyal ajanlar olarak kullanılabileceğini göstermektedir.  $\alpha$ - Amilaz inhibitörü olan akarbozun diyabet tedavisinde kullanımı sonucunda şişkinlik, karın ağrısı ve gaz yakınmaları gibi yan etkilerin ortaya çıktığı bilinmektedir. Mantarlar gibi biyolojik aktif maddeler bakımından zengin gıdaların tüketiminin toplum sağlığı bakımından yararlı olacağı düşünülmektedir.

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**FOTOVOLTAİK PANELLERDE FARKLI FDM KULLANARAK SICAKLIĞIN  
DÜŞÜRÜLMESİNİN ARAŞTIRILMASI**

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**ÖZET**

Yenilenebilir enerji kaynakları arasında büyük öneme sahip olan güneş enerjisi, yıllardan beri ısıtma, sıcak su uygulamaları ve havalandırma sistemlerinde kullanılmaktadır. Son yüzyılda gelişen teknoloji ile beraber güneş enerjisinden elektrik üretimine de başlanmıştır. Güneş enerjisi fotovoltaik (PV) hücreler ile elektrik enerjisine dönüştürülebilmektedir. PV hücrelerin verimi yaklaşık %15-20 civarındadır. Geri kalan enerji, ısı olarak atmosfere bırakılmaktadır. Aşırı sıcaklığın doğurduğu enerji kaybı sebebiyle güneş panelinin verimi %12 gibi değerlere düşmektedir. Güneş panellerinde verimi arttırmak ve sıcaklık faktöründen doğan bu enerji kaybını en aza indirmek için çeşitli çalışmalar mevcuttur. Hava soğutmalı, sıvı soğutmalı, faz değiştiren malzeme temelli ve ısı boru temelli soğutma sistemleri güneş panellerini soğutma alanlarından bazılarıdır. Bu sistemler sayesinde, PV hücrelerin yüzeyi zarar görmeden soğutulmaktadır. Bu çalışmada; parafin, yağ asidi ve faz değiştirici malzeme (organik birleşik) kullanarak panel sıcaklığını azaltma, sıcaklık farkıyla gözlemlenebilen enerji üretimindeki verim değişikliğini incelemeyi amaçlamaktayız. Güneş panelinin arkasına montajlanacak plaka ve levhaların içine; yağ asidi, parafin ve faz değiştirici malzeme (kalsiyum klorür heksahidrat) ayrı ayrı olarak konulacaktır. Güneş panelinin sıcaklığını azaltacağı ön görülen bu malzemelerin panellere montajından sonra ölçümleri yapılacaktır. Böylelikle güneş panelinde yüksek sıcaklıktan dolayı oluşan enerji üretim kaybını ne kadar azaltılabileceği ve oluşan gerilim miktarlarındaki farklılıklar tespit edilecektir. Bu çalışmamız güneş panellerinin sıcaklık yüzünden kaybettiği ortalama %3'lük enerji kaybını en aza indirmeyi amaçlayarak enerji verimini maksimum düzeye çıkarmayı hedeflemektedir.

**Anahtar Kelimeler:** Güneş Paneli, Güneş Enerjisi, Yağ Asidi ve Parafin, PV, Kalsiyum Hidrat

**INVESTIGATION OF TEMPERATURE REDUCING USING DIFFERENT FDM IN PHOTOVOLTAIC PANELS****ABSTRACT**

Solar energy, which is of great importance among renewable energy sources, has been used for years in heating, hot water applications and ventilation systems. With the developing technology in the last century, electricity production from solar energy has also started. Solar energy can be converted into electrical energy with photovoltaic (PV) cells. The efficiency of PV cells is around 15-20%. The remaining energy is released to the atmosphere as heat. Due to the energy loss caused by excessive heat, the efficiency of the solar panel drops to values such as 12%. There are various studies to increase the efficiency of solar panels and to minimize this energy loss arising from the temperature factor. Air-cooled, liquid-cooled, phase-change material-based and heat pipe-based cooling systems are some of the areas of cooling solar panels. Thanks to these systems, the surface of the PV cells is cooled without being damaged. In this study; We aim to reduce the panel temperature by using paraffin, fatty acid and phase change material (organic compound), and to examine the efficiency change in energy production that can be observed with temperature difference. Inside the plates and plates to be mounted behind the solar panel; fatty acid, paraffin and phase change material (calcium chloride hexahydrate) will be placed separately. These materials, which are predicted to reduce the temperature of the solar panel, will be measured after they are mounted on the panels. Thus, it will be determined how much energy production loss due to high temperature in the solar panel can be reduced and the differences in the amount of voltage generated. This study aims to maximize energy efficiency by aiming to minimize the average 3% energy loss lost by solar panels due to heat.

**Keywords:** Solar Panel, Solar Energy, Fatty Acid and Paraffin, PV, Calcium Hydrate

## **GİRİŞ**

Güneş panellerinde aşırı sıcaklık sebebiyle düşen verimi minimum maliyet ile soğutma yaparak enerji üretimini arttırmak ve hangi malzemenin daha verimli olduğunu gözlemleyebilmeyi hedeflemektedir. Bu amaç ile panellerin FDM kullanılarak verimleri araştırılacaktır. Herhangi bir malzemeyle kaplanmayacak panellerin sıcaklık, akım ve gerilim gibi parametreler ölçülecektir. İdeal sıcaklığın üzerine çıkan panellerdeki verim kaybının gözlemlenmesinin ardından kullanılacak malzemelerin bu yüksek sıcaklığı ne derece azaltacak ve enerji üretimine etkisi ne kadar olacak gibi sorulara bilimsel yanıt almak amaçlanmaktadır.

Örneğin; kurulu gücü 100 kW olan bir santralin günde 7 saat elektrik enerjisi ürettiği düşünülürse bu santralin getirisi günde 700 kWh'tir. Güneş panellerindeki aşırı sıcaklığın %1-3'e varan bir enerji kaybına neden olduğu bilinmektedir. Herhangi bir kayıp yaşanmadan bu sistemde ekonomik olarak yaklaşık (lisanssız elektrik birim satış fiyatı= 54 kuruş)  $700 \times 0.54 = 378$  TL aylık 11.340 TL gelire tekabül etmektedir. Sıcaklık sebebiyle oluşan kayıplar yüzünden günlük 700 kWh yerine 686 kWh üretim gerçekleşmiştir. Çok daha büyük güçteki GES'ler için büyük enerji ve mali kayıplarına sebep olan bu durumun önüne geçecek çalışmalar yapılarak GES'lerdeki bu dezavantaja son verilebilir. Fotovoltaik Panellerin sıcaklığının düşürülmesi ile Ortalama %1.5-3 verim artışı elde edilecek ve en verimli faz değiştiren malzeme analiz edilecektir.

Litaretür incelendiğinde; güneş panellerinin ideal sıcaklığın üstünde çalışması durumunda oluşan verim kayıplarının önüne çeşitli şekillerde soğutma yapılarak önüne geçmeye çalışılmış ve sıcaklığın bu olumsuz etkisi en aza indirilmeye çalışılmıştır. Panellerin soğutulması verimi arttıran çoğu çalışmalar başarılı olsa da maliyetlerin fazla olması, alternatif çalışmalara yönelmeyi zorunlu kılmıştır. Hava soğutmalı, sıvı soğutmalı, faz değiştiren malzeme temelli ve ısı boru temelli soğutma sistemleri güneş panellerini soğutma alanlarından bazılarında örnek olarak verilebilir.

Yapılması amaçlanan çalışmada ise panel yüzeyine zarar vermeyecek şekilde panelin arka yüzüne temasının gerçekleştirileceği üç farklı malzeme ile oluşan sıcaklığın düşüş değeri ile artan akım ve gerilim değerleri karşılaştırılacaktır. Piyasada bulunan en ucuz ve verimli faz değiştirici olan malzemelerden parafin ile soğutma yapılan çalışmalar mevcut olsa da bu malzemenin aynı koşullarda aynı güçte paneller ve aynı ortamda diğer malzemelerin kullanılması ile karşılaştırılabildiği bir çalışma mevcut değildir.

çalışmanın amacına uygun olarak güneş panelinin sıcaklığının düşürülmesinde hangi malzemenin daha etkili olacağı analiz edilecektir. Elde edilen bu analizlerin, yenilenebilir enerji sistemleri sahasında ve bilimsel çalışmalarda önemli bir referans olacağı düşünülmektedir. Bu konuda yapılan çalışmaları incelediğimizde; su ile soğutulan bir PV/T sisteminin performansı analiz edilmiştir ve sistemin elektriksel verimi soğutma işleminden önce %7.58 olarak hesaplanmıştır. Soğutma işleminden sonra ise soğutma yapılmayan duruma göre ısı veriminin %50 oranında artırıldığı tespit edilmiştir [1]. FDM'nin sistem üzerindeki etkisi araştırılmıştır ve FDM'nin sistem veriminde önemli ölçüde katkısı olduğu ifade edilmiştir [2]. Fotovoltaik sistemde soğutmanın nasıl bir etki oluşturabileceği deneysel olarak incelenmiştir. Spiral bir ısı değiştiriciyi fotovoltaik panelin arkasına yerleştirerek soğutma yaptıklarında verimi %13, yapmadıklarında ise %10 olarak bulmuşlardır [3]. Yine bir diğer çalışmada faz değişim malzemeleri ile birlikte kullanılan fotovoltaik panellerin yüksek gizli ısı depolama kapasitesine sahip olmasından ötürü panel yüzey sıcaklığının azabileceğini öngörmüşlerdir. Kullanmış oldukları akışkanlar dinamiği programı ile yaptıkları ısı transferi modellemeleri sonucunda yüksek rüzgâr hızı ve eğim açısının panelin sıcaklığının azalmasında önemli rol oynadığını bulmuşlardır [4]. Fotovoltaik panellerin çıkış gücü ve çıkış gerilimi (P-V) karakteristiğinin sıcaklık farklılığına bağlı değişimini gösteren çalışmalar da mevcuttur [5]. PV panellerindeki sıcaklık artışının, güneş pili hücrelerinde üretilen akımı önemli oranda azalttığını belirtmişlerdir [6]. PV kolektörünün yüzeyini soğutmak için panelin alt yüzeyinde hava kanalı oluşturan ve bu kanaldan hava geçirerek paneli soğutmaya çalışılmış örnekler de mevcuttur [7]. Türkiye'nin çeşitli bölgelerindeki sıcaklık farklarından doğacak kayıpların PV panellerin verimliliği üzerindeki etkileri incelemişler, kullanılacak panellerdeki kayıpların en aza indirgenmesi için öneriler geliştirilmişlerdir [8]. FDM'lerin kullanımı son yıllarda artmış ve bir başka çalışmada faz değiştirici malzeme olarak tuz hidrat kullanarak, güneş panelinin sıcaklığında %38 değerinde azalma sağlayarak güneş panelinin verimi arttırmayı sağladılar [9]. Faz Değiştirici malzemelerin güneş panellerinin soğutulması için kullanılmaya başlanması her sene giderek artmaktadır. Bilimsel çalışmalar sıcaklığı düşürmek için çeşitli faz değiştirici malzemeler kullanmıştır. Kalsiyum Hidrat en etkili olan faz değiştirici malzemelerden biridir. Parafin ve Yağ Asidi de hem ekonomik olarak hem de verime etkisinin yüksek olması gibi sebeplerden tercih edilmektedir. Ancak ülkemizde yağ asidi ile güneş paneli soğutulmasına dair çalışma yoktur. Parafin ile soğutulma yapılan deneysel çalışmalar mevcuttur fakat bu

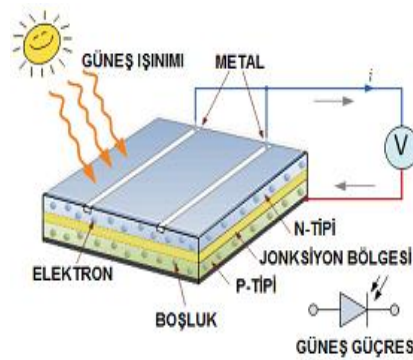


malzemelerin aynı koşullarda mukayeselerinin yapılması bilim dünyasında hemfikir olunacak sonuçlar elde edilmesine katkı sağlayacaktır

- 1- Fotovoltaik Panellerde aşırı sıcaklığın enerji üretimine etkisi gözlemlenecektir.
- 2- PV sistemlerde sıcaklık değerlerinden ötürü enerji kaybının azaltılması için yapılan soğutma çalışmalarında yağ asidi ile soğutma hakkında Türkiye’de herhangi bir bilimsel çalışmanın gerçekleşmediği tespit edilmiştir. Bundan ötürü gerçekleştirilecek çalışma sonucunda bu yönde meydana gelen literatür boşlukları doldurularak bilimsel katkı sağlayacağı düşünülmektedir.
- 3- Faz değiştirici malzemelerin güneş panellerini soğutmada sıklıkla kullanılmaya başlanması bu malzemelerin maliyetlerinin azalmasına yol açacaktır. Böylelikle büyük güçteki santrallerdeki enerji kaybı azaltılarak verim arttırılacaktır.
- 4- Gerçekleştirilecek bu çalışma sonucunda, ülkemizde ve dünyada son zamanlarda gelişme gösteren güneş enerjisi ile elektrik üretiminde çalışmalar yapan firmalar ve akademik topluluklar yararlanabilecektir.

### **PV Sistemler**

Güneş pilleri yüzeylerine gelen güneş ışınlarını doğrudan elektiriğe çeviren yarı iletken malzemelerdir. Fotonlar yarı iletken malzeme üzerine düştüğünde atomların dış yörüngesindeki kararsız ve gevşek elektronlar hareket eder ve elektrik akımını oluşturur.

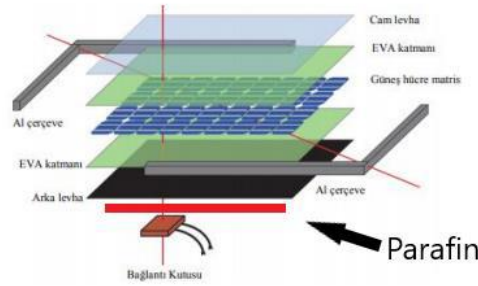


**Şekil 1.** Güneş pili şeması

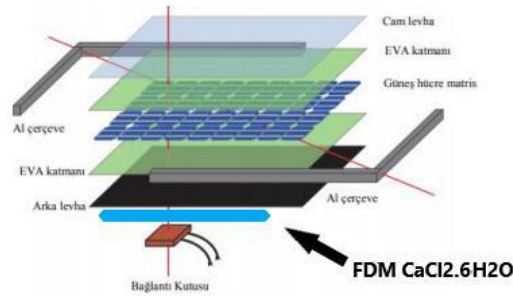
Bir fotovoltaik hücrenin yapısı P-tipi yarı iletken ve N-tipi yarıiletken malzeme birleştirilerek oluşturulur. Burada ışınım etkisiyle N tipi yarı iletken malzemedeki elektronlar P tipi yarı iletkendeki boşluklara geçiş yapar. Bu geçişle N tipi taraf pozitif yüklü iyon çekirdeklerini ortaya çıkarırken P tipi taraf ise negatif iyon çekirdeklerini açığa çıkarır. Bu durum iki tabaka arasında bir elektrik akımı oluşmasına neden olur.

### Faz Değiştiren Maddeler

Parafinler; faz değiştirebilen maddelerin organik kısmına giren işlenmemiş petrolden türetilmişlerdir. Yapıları genel olarak mumsu olup zehirleyici veya paslanabilir bir malzeme değildir [10]. Ekonomik olarak fiyatlarının uygun olması da sistemin verimliliği açısından aranan bir özelliktir. Depolanmaların kolay olması ve ısı iletkenlik değerlerinin düşük olması güneş panellerinde oluşan aşırı sıcaklığı azaltma amacıyla kullanılabilir en uygun malzemelerden biridir. Sahip olduğu bu özellikler sebebiyle yapılacak çalışmada, tercih edilmiştir.

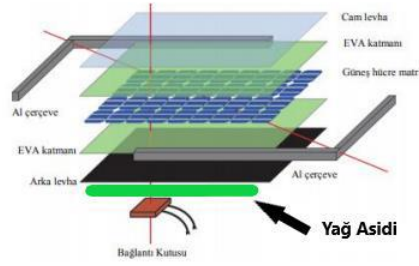


Şekil 2. Parafin Kaplamalı Güneş Panelinin Dizaynı



Şekil 3. FDM Kaplamalı Güneş Panelinin Dizaynı

Kalsiyum Hidrat; tuz hidratlar sınıfındadır ve yaygın olarak kullanılmaktadır. Isıl iletkenlikleri yağ asitleri ve diğer organik faz değiştiren malzemelerinden daha yüksektir. Kimyasal formülü “CaCl<sub>2</sub>.6H<sub>2</sub>O” olan bu faz değiştirici malzeme toksik değildir ve en önemlisi yanıcı değildir [11]. Deney çalışmasında kullanılması uygun bulunmuştur.



Şekil 4. Yağ Asidi Kaplamalı Güneş Panelinin Dizaynı

Yağ Asitleri; kimyasal yapıları “ $\text{CH}_3(\text{CH}_2)_{2n}\text{COOH}$ ” şeklinde gösterilen yağ asitleri faz değiştiren malzemelerin “organik” sınıfına girmektedir. Çok yüksek olmayan sıcaklıklarda gizli ısı depolama yöntemlerinden biri olarak kullanılabilir [12]. Miristik asit ve palmitik asit gibi seçenekleri olan yağ asitlerinin de gizli ısıları yüksek olduğu için tercih edilebilmektedirler.

## MATERYAL VE YÖNTEM

### Deney Setinin Hazırlığı

Proje Fotovoltaik Panellerde Sıcaklığın Verimi Düşürücü Etkisinin Parafin, Yağ Asidi ve FDM İle Azaltılmasının Araştırılması için izlenecek yöntemler aşağıdaki gibi olacaktır.

1- Deneyler için gerekli sarf malzemeler Güneş Panelleri, Faz Değiştirici Malzemeler ve ölçüm aletleriyle soğutma sistemi için gerekli malzemelerin temini;

Deneyler için;

- 4 adet PV Güneş Paneli,
- Yağ asidi,
- Faz değiştirici Malzeme
- Cam muhafaza,
- Dataloger ,
- Multimetre ihtiyacı bulunmaktadır.

Güneş Panellerinin arka yüzüne her panel için ayrı ayrı yapılacak kaplama için cam muhafaza kullanılacaktır. Panellerin yer ile temasını kesmek için takozlar kullanılacaktır. Belirlenen parametreler kullanılarak güneş panellerin kaplama işleminin gerçekleştirilmesi cam muhafazaların yardımıyla panel ile teması sağlanarak hazır hale getirilmiş olacaktır. Kaplamaya hazır olan malzemeler, cam çerçeve içerisine yerleştirilerek güneş paneline

sabitlenecektir. Üç Güneş Paneline montajlanmış malzemeler ve herhangi bir malzeme kullanılmamış bir adet güneş paneli 8 saat güneş ışığının altında bekletilecektir. Böylelikle herhangi bir soğutma işlemine sahip olmayan güneş paneli ile diğer üç panel arasındaki enerji üretim farkı multimetrelerle ölçülebilecektir.

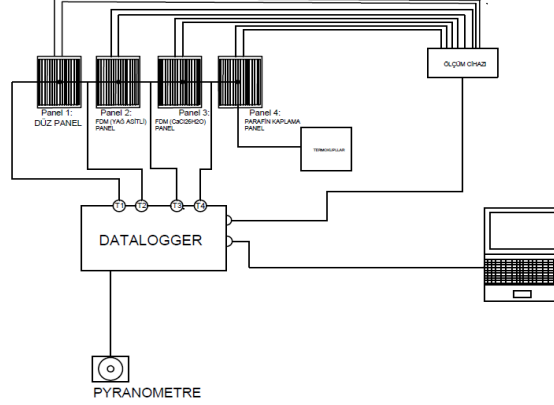
Kaplanan panellerin ve herhangi bir malzeme ile kaplanmayan panelin sıcaklık ölçümlerinin yapılması FDM ile soğutması yapılan güneş panellerinin ayrı ayrı sıcaklıkları ölçülecektir. İdeal sıcaklığın üstünde çalışan bu panellerdeki verim kaybı hesaplanacak soğutma yapılmış durumlarındaki verim ile karşılaştırılması yapılarak analizleri gerçekleştirilecektir.

Sonuçların değerlendirilerek gerekli yayın, sempozyum faaliyetlerinin yürütülmesi yapılan tüm çalışmalardan elde edilen veriler ara raporlarda verildiği gibi sonuç raporunda da detaylı olarak ele alınacaktır. Kaplama işleminde kullanılacak malzemeler, ölçüm cihazları ve güneş panelleri istenilen boyut ve ölçülerde yurtiçinde ilgili firmalardan temin edilecektir. Güneş panellerine kaplanması hedeflenen malzemeler Batman Üniversitesi Teknoloji Fakültesi Enerji Sistemleri laboratuvarlarında gerçekleştirilecektir. Güneş Panellerinin sıcaklık ölçümleri, deneyin yapılacağı ortamın rüzgâr hızı, güneş ışınım ve radyasyon miktarı, üretilen gerilim değerlerinin ölçümleri Batman Üniversitesi Batı Raman Kampüsü Teknoloji Fakültesi'nde yapılacaktır. Kaplama işlemi sonrası üretilen enerji miktarı ve sıcaklıktaki değişimlerin simülasyon üzerinde teyidi ve grafik incelemeleri yapılacaktır.

## **YÖNTEM**

Güneş Panelleri'nin ürettiği enerjinin, panelin ideal çalışma sıcaklığının üstüne çıkmasıyla verimin düşmesine sebep olduğu bilinmektedir. Yapacağımız çalışmada 3 adet fotovoltaik panelin arka kısmı şekillerde verildiği gibi 3 farklı malzeme ile kaplanacaktır. Kalan 1 diğer fotovoltaik panel herhangi bir malzemeyle kaplanmayacaktır. Aynı zaman aralıklarında malzemelerle kaplanmış diğer panellerle gerilim değerleri ölçülecektir. Fotovoltaik panellerin sıcaklığını düşürmek için kullanacağımız malzemelerin herhangi bir sızıntı, taşma veya dökülme yapmaması için kasaların içine yerleştirilecektir. Maximum gerilim değerlerine dirençler yardımı ile ulaşıldıktan sonra herhangi bir malzeme ile kaplanmamış olan fotovoltaik

panelin ürettiği enerji ile parafin, yağ asidi ve FDM ile kaplanan fotovoltaik panellerin ürettiği enerji miktarlarının ölçümleri yapılacaktır.



**Şekil 5.** Deney Setinin hazırlığı

Datalogerlar; veri kayıt cihazı olarak adlandırılan bu cihazları ile birden fazla parametreyi gözlemlenmesi mümkün olmaktadır. Deney sistemine uygun tipte olan dataloger seçilecektir. Ölçülen veriler bilgisayara aktarılarak grafiklerle gösterilecektir. Sonrasında simülasyon üzerinde; ölçüm, hata ve verim değerleri karşılaştırılarak deney ölçümlerinin doğruluğunun teyit edilmesi hedeflenmektedir.

Dataloger kullanımıyla elde edilen veriler ile gerekli verim analizleri yapılarak; sıcaklığın fotovoltaik panellerde verime etkisi incelenecektir.

Konstrüksiyon yardımıyla zemin ile teması kesilecek güneş panellerinin arka kısmına soğutma için kullanılacak malzemeler yerleştirilecektir. Böylece verimlilik açısından hangi malzemenin fotovoltaik panellerde kullanılmasının daha faydalı olacağına dair fikir elde etmemize yardımcı olacaktır. Sıcaklığın fotovoltaik panellerdeki etkisini azaltmaya yönelik deneysel çalışmaların artmasına yol açacaktır.

### **Panel Verimliliğin Sıcaklıkla İlişkisi**

Fotovoltaik sistemin güç analizini yapabilmek için panel gerilim ve akım değerlerinin bilinmesi gerekir. Ölçü aleti ile akım ve gerilim değerleri ölçülen panellerin güç analizi Denklem 1 kullanılarak yapılır [13].

$$P = I \times V \quad (1)$$

Sistemin elektriksel verim hesabında ise; panel yüzey alanı, panele düşen ışınım değeri ile akım ve gerilim değerlerinin bilinmesi gerekir. Sistemin elektriksel verimi Denklem 2 kullanılarak hesaplanabilir.

$$\eta P = (V \times I) / (A \times E) \quad (2)$$

PV panel hücre sıcaklığı ( $T_1$ ), hava sıcaklığı ( $T_2$ ) ve ışınım ( $E$ ) değeri için *NOCT* sıcaklığı için Denklem 3 kullanılır.

$$T_1 = T_2 + (NOCT - 20) / 0,8 \times E \quad (3)$$

Panelin çıkış gücü ( $Pm$ ); Denklem 4 yardımıyla ve bu denklemde  $T_1$  sıcaklık değeri ile standart test koşullarındaki panel gücü sıcaklığa bağımlılık katsayısı  $\eta P$  yerine konularak hesaplanabilir [13].

$$Pm(T_1) = Pm \times [1 - \eta P \times (T_1 - 25)] \quad (4)$$

Aşırı ısınmanın PV panellerin verimliliğini azalttığı bilinen bir gerçektir. PV panel sıcaklığı  $45^\circ\text{C}$ 'nin üstüne çıkmadan soğutma işlemi başlatılmalıdır [13]. PV/T panellerin ve PV panelin güç analizinin yapılabilmesi için öncelikle PV/T ve PV panellerin gerilim akım değerlerinin bilinmesi gerekmektedir. Panellerin artı (+) ve eksi (-) çıkışlarından gerilim ve akım değerini ölçmek için, iki adet multimetre kullanılır. Multimetrelerden biri, gerilim değerini ölçmek için devreye paralel bağlanırken diğeri akım değerini ölçmek için devreye seri bağlanır. Gerilim ve akım değerlerinin ölçümleri yapılan sistemin güç analizi aşağıdaki formül ile hesaplanır.

$$W = I \times V \quad (5)$$

Elektriksel verim hesabının yapılabilmesi için; Pyronometre cihazı ile ölçülen panel yüzeyine düşen ışınım değeri, panel yüzey alanı, gerilim ve akım değerlerinin bilinmesi gerekir. Elde edilen değerler ile eşitlik 6'da verilen formül kullanılarak sistemin elektriksel verim analizi yapılır [14].

$$\eta_{PV} = \frac{V.I}{A_{koll}.I_{ışınım}} \quad (6)$$

Isıl verim hesabının yapılabilmesi amacıyla paneli soğutmak için sistemde dolaştırılan suyun debisi, panele giriş – çıkış sıcaklıkları bilinmesi gereklidir. Bilinen değerler ile aşağıdaki formül kullanılarak ısıl verim hesabı yapılabilir.

$$\eta_{PV/Tsu} = \frac{\dot{m}.c_p.\Delta T}{A_{koll}.I_{ışınım}} \quad (7)$$

Burada,  $\Delta T$  paneli soğutmak için sistemde dolaşan suyun panele giriş – çıkış sıcaklık farkı aşağıdaki formül ile tanımlanır.

$$\Delta T = T_{\text{kollektör giriş}} - T_{\text{kollektör çıkış}} \quad (8)$$

## **SONUÇ VE ÖNERİ**

Bu çalışmayı ile her geçen yıl artan kullanımına rağmen sıcaklık sebebiyle yeterli verimi sağlayamayan fotovoltaik panellerin verimlerindeki kayıplar azaltılacaktır. En fazla verimin hangi sıcaklıkta hangi malzeme ile elde edileceği sonucuna varılacaktır. Çalışma yapılırken ayrı ayrı üç farklı malzeme ile kaplanmış aynı güçteki güneş panelleri aynı zaman diliminde ve aynı şartlarda 4 güneş paneli analiz edilecektir. Böylece kayıplarıyla beraber bir fotovoltaik panelin üretebileceği enerji değerlerine daha sağlıklı bir şekilde ulaşılabilecektir.

Fotovoltaik panellerin yüzey sıcaklıkları, ortam sıcaklığı, güneş radyasyonu gibi değerler toplanılacaktır. Fotovoltaik panellerin sıcaklığını azaltması için kullanılacak malzemelerin kaplanmasından sonra da gerekli sıcaklık ve gerilim değerlerinin ölçümleri yapılacaktır. Elde edilen bu veriler; yine gerekli formüller kullanılarak hesaplamalar yapılarak bu verilerin ışığında fotovoltaik panellerinin verim grafikleri elde edilecektir. Yapacağımız bu çalışma fotovoltaik panellerin verimlerini arttırarak güneş enerji santrallerinin ve diğer pv sistemlerin amortisman sürelerini azaltmak gibi ekonomik avantajlar sağlamakla beraber fotovoltaik panellerin verimlerini arttıracaktır.

Bu tür verimlilik arttırıcı çalışmalara bilimin merkezi olan üniversitelerde daha fazla önem verilir ise kaynakları giderek tükenen dünya ve yenilenebilir enerji potansiyeli yüksek olan ülkemiz için fotovoltaik sistemlerin kayıplarının azaltılarak dezavantajlarını ortadan kaldırmak güneş enerjisinin kullanımına yönelik artışları sağlayacaktır.

## **TEŞEKKÜR**

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## **OTONOM ARAÇLAR İÇİN JAVA TABANLI YAZILIM MİMARİSİ ÖNERİSİ**

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### **ÖZET**

Son yıllarda otomotiv endüstrisi, insan müdahalesi olmadan çevreyi algılayan ve çevreden aldığı ham verileri işleyerek kendi sürüş tekniklerini geliştirebilen otonom araçlar üzerine yoğunlaşmaktadır. Otonom araç teknolojisinin hedefi, sıradan bir taşıtta insanın üstlendiği, frenleme, hızlanma, direksiyon kontrolü, tabela ve şerit takibi, çevre kontrolü, yer-yön belirleme, park etme gibi işlemlerin araç tarafından otomatik olarak sağlanmasıdır. Otonom araçlarda, aracın sürüş esnasında yoldan sapmaması adına, kesintisiz olarak şerit takibi yapılmaktadır. Buna ek olarak seyahat güzergahındaki tabelaların tespit edilmesi ve tabelalardaki kurallar çerçevesinde sürüş yöntemine karar verilmesi için yazılım sistemleri geliştirilmektedir. Hız sensörü, lidar, radar, GPS gibi sensörler ve kameralar yardımı ile araç çevresinden veriler toplanmaktadır. Yazılım sistemi, kamera ve sensörlerden alınan bilgileri yorumlayarak aracın durumunu ve gerçekleştireceği stratejiyi belirlemektedir. Bu karar mekanizmasını oluşturabilmek amacıyla görüntü işleme ve derin öğrenme gibi yazılım teknikleri kullanılmaktadır. Bu çalışmada ele alınan yazılım sistemi, Java tabanlı bir merkezi kontrol yazılımı, nesne tespiti yapan derin öğrenme modeli ve soket tabanlı sunucu olmak üzere üç kısımdan oluşmaktadır. Derin öğrenme modeli ile tabela ve şerit tespiti gibi işlemler gerçekleştirilmektedir. Arka planda WebGL teknolojisi ve Tensorflow JS kütüphanesini kullanan söz konusu model, web tarayıcı üzerinde çalışacak şekilde tasarlanmıştır. Merkezi kontrol yazılımı, modelden elde edilen sonuçlar doğrultusunda aracın bir sonraki aksiyonu için gerekli stratejileri çalıştırmaktadır. Sunucu ise nesne tespit uygulamaları ile merkezi kontrol yazılımı arasında soket tabanlı bir iletim mekanizması sağlamaktadır.

**Anahtar kelimeler:** Otonom araçlar, sürücüsüz araçlar, derin öğrenme, yapay zekâ.

**JAVA-BASED SOFTWARE ARCHITECTURE PROPOSAL FOR AUTONOMOUS VEHICLES****ABSTRACT**

In recent years, the automotive industry has focused on autonomous vehicles that sense the environment without human intervention and can develop their own driving techniques by processing raw data from the environment. The goal of autonomous vehicle technology is to automatically provide operations such as braking, acceleration, steering control, sign and lane tracking, environmental control, location-orientation and parking, which are undertaken by humans in an ordinary car. In autonomous vehicles, lane detection is carried out uninterruptedly so that the vehicle does not deviate from the road while driving. In addition, software systems are being developed to detect the signs on the travel route and to decide on the driving method within the framework of the rules on the signs. With the help of sensors and cameras such as speed sensor, lidar, radar, GPS, data is collected from the vehicle environment. The software system interprets the information received from the camera and sensors and determines the status of the vehicle and the strategy to be implemented. In order to create this decision mechanism, software techniques such as image processing and deep learning are used. The software system discussed in this study consists of three parts: a java-based central control software, a deep learning model for object detection, and a socket-based server. With deep learning model, operations such as signage and pedestrian detection are carried out. The model, which uses WebGL technology and Tensorflow JS library in the background, is designed to run on a web browser. The central control software runs the necessary strategies for the next action of the vehicle in line with the results obtained from the model. The server, on the other hand, provides a socket-based transmission mechanism between object detection applications and central control software.

**Keywords:** Autonomous vehicles, self-driving vehicles, deep learning, artificial intelligence.

## 1. GİRİŞ

Geçtiğimiz son yirmi yılda yapay zekâ araştırmaları sağlık [1, 2], eğitim [3], güvenlik [4], endüstri [5], tarım [6, 7], robotik [8], akıllı şehirler [9] ve otonom araçlar [10-12] vb. gibi alanlara katkı sunmaktadır. Günlük yaşantımızın çoğu alanında hızla yayılan akıllı sistemler, son yıllarda otomotiv sektörünün de en önemli çalışma alanı haline gelmiştir. Otomobil şirketleri, insan desteğine ihtiyaç duymadan seyahat edebilen sürücüsüz araçlar üzerinde yoğunlaşmaktadır. Otomotiv sektörünün geleceğine yön veren otonom araçlar, daha az maliyet ile daha güvenli ve konforlu sürüş imkanı sunmaktadır. Ayrıca otonom araçların, çocuklar, yaşlılar ve engelli bireyler için ulaşımı kolaylaştıracağı düşünülmektedir. Otonom araçların verimli çalışabilmeleri için aracın mekanik kısmına ilave olarak, farklı kaynaklardan bilgi alan yüksek seviye teknolojilerin kullanılması gerekmektedir [13]. Hız sensörü, Lidar, radar, GPS gibi sensörler ve kameralar araç çevresini inceleyerek aracın dış algısını (eksterospsiyon) diğer sistemlere iletmektedir [14]. Sensör ve kameralardan alınan veriler yardımı ile karar mekanizması oluşturabilmek için görüntü işleme ve derin öğrenme gibi yazılım teknikleri kullanılmaktadır. Otonom sürüşte bir kontrol hareketinin sağlanması için öncelikle nesnenin algılanması ve ardından bu nesnenin tanınması gerekmektedir [15]. Nesne algılama ve tanıma yönünden güçlü makine öğrenmesi yöntemleri olması [16] sebebiyle otonom araçlarda sıklıkla derin öğrenme yöntemleri tercih edilmektedir. Region Based Convolutional Networks (R-CNN), Fast R-CNN, Faster R-CNN, Mask R-CNN, You Only Look Once (YOLO) ve Single Shot Multibox Detector (SSD) nesne tespitinde yaygın olarak kullanılan kütüphanelerdir [17]. Aracın yazılımları geliştirilirken, yazılım dili olarak Java ve Javascript, geliştirme ortamı olarak da Netbeans editörü kullanılmakta ve Açık Cezeri Kütüphanesinden (OJL) [18, 19] yararlanılmaktadır. OJL, matris, veri görselleştirme, makine öğrenmesi, derin öğrenme, sinyal ve görüntü işleme alt konularını ve modüllerini kapsayan, Java programlama dili ile yazılmış açık erişimli bir yazılım kütüphanesidir [20]. Bu kütüphanenin desteği ile kontrol yazılımı, veri etiketleme, nesne tespiti gibi neredeyse tüm işlemler özgün yöntemler ile kontrollü bir şekilde yürütülmektedir.

Bu çalışmada ele alınan yazılım mimarisi, Java tabanlı bir merkezi kontrol yazılımı, nesne tespiti yapan derin öğrenme modeli ve socket tabanlı sunucu olmak üzere üç kısımdan oluşmaktadır. Derin öğrenme modelleri ve Tensorflow JS kütüphanesi kullanılarak web tarayıcıda nesne tespiti işlemleri gerçekleştiren nesne tespiti uygulamaları oluşturulmaktadır. Merkezi kontrol yazılımı, şerit takibi, trafik lambası-trafik levhası tespiti, park yapma gibi

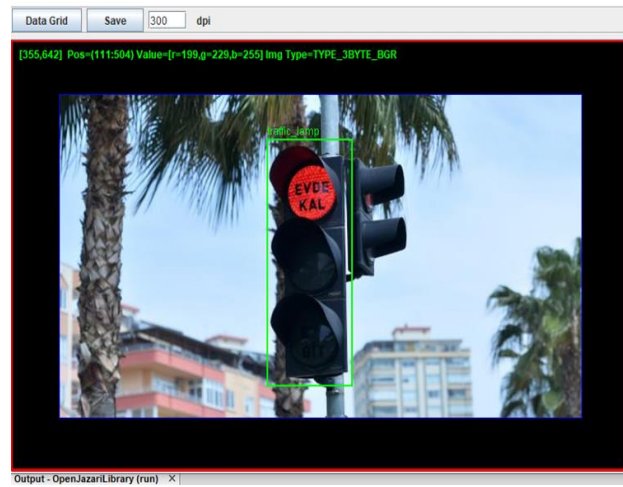
işlemleri gerçekleştiren alt programlar bulundurmakta ve nesne tespiti uygulamalarından elde edilen sonuçlar doğrultusunda aracın bir sonraki aksiyonu için gerekli stratejileri çalıştırmaktadır. Sunucu ise nesne tespit uygulamaları ile merkezi kontrol yazılımı arasında soket tabanlı bir iletim mekanizması sağlamaktadır.

## **2. TENSORFLOW JS İLE TARAYICIDA NESNE ALGILAMA**

Object detection yöntemlerinin her birinin kendine özgü güçlü ve zayıf yönleri bulunmaktadır. Önerilen mimaride Tensorflow JS kullanılarak web tarayıcıda çalışan bir nesne tespit web uygulaması geliştirilmektedir. Düşük bilgi işlem kapasitesine sahip cihazlarda dahi yüksek doğruluk performansı ile çalışan SSD MobileNet V2 modeli kullanılarak model eğitilmekte ve web uygulaması halinde web tarayıcısına eklenmektedir. Tensorflow JS, makine öğrenmesi modelleri oluşturmak, eğitmek ve çalıştırmak için geliştirilmiş, istemci tarafında çalışan, açık kaynaklı bir kütüphanedir. Tensorflow JS kütüphanesi, makine öğrenmesi işlemlerinde Javascript kullanımının önünü açmaktadır. Bu sayede hiçbir sürücü ve kütüphane kurmadan, tarayıcı üzerinden makine öğrenmesi modelleri çalıştırılabilmektedir.

### **Veri Hazırlığı**

Derin öğrenme işlemine başlamadan önce eğitim ve test aşamalarında kullanılacak olan etiketli verilerin toplanması gerekmektedir. Etiketleme işlemi ses, metin, görüntü gibi verilerde önemli olan unsur ve özelliklerin ön plana çıkarılarak isimlendirilmesi işlemidir. Etiketli veri seti oluşturmak önemli ve zahmetli bir süreçtir. Günümüzde bu işlem, bir iş kolu haline gelmiştir. Büyük şirketler etiketli veri elde etmek adına kapsamlı çalışmalar yürütmektedir. Veri etiketlemenin birçok farklı yolu bulunmaktadır. Bu kısımda görseller için kullanımı en yaygın olan etiketleme yöntemi açıklanmaktadır. İlk adım, çalışma alanına uygun görsellerin toplanmasıdır. Trafik levhası, trafik lambası, engel, yaya, şerit gibi unsurlar otonom araç tarafından dikkate alınacağından, gerçek hayattan ve simülasyon ortamından bu unsurlara ait çok sayıda görüntü toplanmaktadır. Veri toplama işlemi tamamlandıktan sonra etiketleme yazılımları kullanılarak elde edilen her veri tek tek etiketlenmektedir. Elde edilen görüntüler Şekil 1’de gösterildiği gibi OJL yazılımı ile etiketlenmektedir.



**Şekil 1.** OJL ile veri etiketleme

Etiketleme işlemi tamamladığında her bir görsel için, görsel adı, görsel yolu, görüntü genişliği ve yüksekliği, etiketli verinin sınırlayıcı kutusunun koordinatları, sınıf adı gibi bilgileri barındıran xml dosyası oluşturulmaktadır. Şekil 2’de örnek bir xml dosyası yer almaktadır. Bu dosyadaki bilgiler eğitim aşamasında kullanılmaktadır.

```
<annotation>
  <folder>sign_data</folder>
  <filename>1.jpg</filename>
  <path>sign_data/1.jpg</path>
  <source>
    <database>Unknown</database>
  </source>
  <size>
    <width>585</width>
    <height>350</height>
    <depth>3</depth>
  </size>
  <segmented>0</segmented>
  <object>
    <name>traffic_lamp</name>
    <pose>Unspecified</pose>
    <truncated>0</truncated>
    <difficult>0</difficult>
    <bndbox>
      <xmin>207</xmin>
      <ymin>153</ymin>
      <xmax>225</xmax>
      <ymax>207</ymax>
    </bndbox>
  </object>
</annotation>
```

**Şekil 2.** Etiketli veri örnek xml dosyası

### **3. TRAFİK İŞARETLERİ-ENGEL TESPİT ALGORİTMASI**

Bir aracın seyri esnasında tabelalar, trafik lambaları, durak işaretleri, yayalar, engeller gibi unsurların tespiti ve incelenmesi büyük önem arz etmektedir. Trafik işaretlerinin tespiti bir nesne tespit problemi olarak ele alınmaktadır. Tensorflow JS kullanılarak geliştirilen trafik işaretleri ve engel tespit modeli web uygulaması haline getirilmektedir. Araca yerleştirilen

kameradan alınan veriler bu uygulama tarafından kullanılmaktadır. Uygulama, gelen veriler üzerinde dur, sağa dönülmez, yaya geçidi, yol çalışması gibi trafik levhalarını, yayaları, zemin ve nesne engellerini tespit etmektedir. Tespit edilen unsurlara ait koordinat bilgileri ve tespit edilen unsurun sınıf bilgisi otonom sürüş algoritmasına iletilmektedir. Otonom sürüş algoritması tespit edilen unsurun sınıf bilgisine göre gerekli stratejiyi etkinleştirmektedir. Örneğin; kırmızı ışığın tespit edilmesi durumunda aracın hızını azaltarak durması ve yeşil ışık tespit edilinceye kadar belirli bir süre beklemesi sağlanmaktadır.

#### **4. ŞERİT TAKİP ALGORİTMASI**

Şerit takibi hem otonom araç kullanıcılarının hem de trafikteki diğer araç ve yolcuların güvenliği açısından önemli bir konudur. Otonom bir araç geliştirirken dikkat edilmesi gereken durumların başında gelmektedir. Otonom araçlarda şerit takibi genel olarak yan aynalar ya da aracın ön kısmına yerleştirilen kameralar vasıtası ile yapılmaktadır. Aracın ön kısmına yerleştirilen kamera, yolu taramakta ve şerit takibi için işlenecek olan girdi verilerini sağlamaktadır. Elde edilen veriler, Tensorflow JS kullanılarak geliştirilen şerit tespit uygulamasına iletilmektedir. Şerit tespit uygulaması, bu veriler yardımıyla şerit ve yol çizgisi tespiti sağlamaktadır. Şerit tespit işleminden sonra otonom sürüş algoritmasına şeritin ve yol çizgisinin alınan görüntü üzerindeki koordinat bilgileri verilmektedir. Bu koordinat verileri kullanılarak aracın şerit ve yol çizgisine göre konumu belirlenmektedir. Aracın mevcut konumuna göre yolu ortalaması adına uygun direksiyon açısı kontrol edilmekte ve aracın şeridi ortalaması sağlanmaktadır. Şerit takip algoritması arka planda sürekli olarak çalışmaktadır.

#### **5. OTONOM SÜRÜŞ ALGORİTMASI**

Önerilen mimaride kodlamalar, Netbeans ortamında, OJL kütüphanesi kullanılarak Java dili ile geliştirilmektedir. Otonom sürüş algoritması aracın çalışır durumdaki tüm işlevlerini kapsayan bir Java uygulamasıdır. Uygulamada Strategy isminde bir soyut sınıf yazılmakta ve aracın gerçekleştireceği tüm aksiyonları barındıran somut sınıflar bu ara yüzü implement edecek şekilde tasarlanmaktadır. Bu kapsamda, engel stratejisi, durak stratejisi, dur stratejisi gibi alt sınıflar bulunmaktadır. Uygulama, arka planda sürekli olarak trafik işaretleri ve engel tespit algoritması ile şerit takip algoritmasını çalıştırmaktadır. Trafik işareti ve engel tespit algoritması ile tabela, trafik lambaları, yayalar, engeller sürekli olarak denetlenmektedir. Örneğin; trafik lambası tespiti sağlanması durumunda trafik lambasının durumu incelenmekte ve gerekli gaz-

fren işlemini gerçekleştirecek strateji sınıfı çalıştırılmaktadır. Aynı şekilde sola mecburi dönüş tespiti durumunda, gerekli strateji sınıfı çalıştırılarak direksiyonun sola dönüşünü gerçekleştirecek açıyı alması sağlanmaktadır. Şerit takibi algoritması arka planda çalıştırılarak aracın şeridinde seyretmesi mümkün olmaktadır. Hedeflenen noktaya erişilmesi durumunda park algoritması devreye alınıp diğer algoritmaların çalışması durdurularak park işlemi ile görev sonlandırılmaktadır.

## **6. JAVA TABANLI SUNUCU**

Önerilen mimaride, Java tabanlı bir sunucu (server) yazılımı kullanılmaktadır. Bu sunucu, aslında low-code tarzında geliştirilen bir sunucu uygulamasıdır. Uygulamanın asıl hedefi, programlama dilinden bağımsız (programming language agnostic), kurulumu kolay, düşük donanımlar da bile gpu gücünü kullanabilen derin öğrenme algoritmalarının çalışmasına olanak tanıyan web socket temelli bir arayüz yazılımı geliştirmektir.

## **7. SONUÇ VE DEĞERLENDİRME**

Otonom araçlar, maliyet, güvenlik, konforlu sürüş gibi birçok avantaj sağlaması sebebiyle geleceğin otomotiv sektöründe büyük bir pazar payına sahip olacaktır. Bu çalışmada, bütüncül bir otonom araç sistemi geliştirilmesi için Java ve OJL tabanlı bir yazılım mimarisi sunulmaktadır. Önerilen mimari, merkezi kontrol yazılımı, nesne tespiti yapan derin öğrenme modeli ve socket tabanlı sunucu olmak üzere üç kısımdan oluşmaktadır. SSD MobileNet V2 modeli kullanılarak eğitim yapılmakta ve tabela, trafik lambası, yaya, yol şeridi gibi unsurların tespiti için derin öğrenme modelleri geliştirilmektedir. Geliştirilen nesne tespit modelleri, Tensorflow JS kullanılarak internet tarayıcıda çalıştırılabilen nesne tespit uygulamaları haline getirilmektedir. Nesne tespit uygulamaları, araç üzerindeki kamera ve sensörlerden alınan verileri işleyerek nesne tespiti sağlamaktadır. Merkezi kontrol yazılımı, nesne tespit uygulamalarından elde edilen sonuçlar ışığında bir karar mekanizması sağlamaktadır. Merkezi kontrol yazılımı Netbeans editöründe, Java dili kullanılarak kodlanmaktadır. Socket tabanlı sunucu ise nesne tespit uygulamaları ve merkezi kontrol yazılımı arasında, ortamdaki bağımsız bir köprü görevi görmektedir. Gelecekte yapılacak çalışmalarda, Tensorflow JS desteği ile nesne tespitini kolaylaştıran bu mimari kodlanacak ve programlama dilinden bağımsız, socket tabanlı bir arayüz geliştirilecektir.



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**CNN MIMARISI İLE MR GÖRÜNTÜLERİNDEN BEYİN TÜMÖRLERİNİN  
SINIFLANDIRILMASI**

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**ÖZET**

Beyin tümörlerini sınıflandırma, bilgisayar destekli tanıda önemli bir problemdir. Beyin tümörünün erken teşhisi hastalar için hayati öneme sahiptir. Hastalığa erken müdahale ve tedavi için hastalığın erken teşhisi çok önemlidir. Bu çalışmada, üç belirgin beyin tümörü tipini oluşturan glioma, meningioma ve hipofiz tümörlerini sınıflandırma problemine odaklanılmıştır. Derin öğrenme tabanlı mimariler beyin tümörü sınıflandırma için yaygın olarak kullanılmaktadır. Sınıflandırma için CNN mimarisi kullanılmıştır. Makine öğrenmesinde kullanılan diğer yöntemler, tümörün doğru sınıflandırılması için yetersiz kalabilir. Makine öğrenmesinde kullanılan diğer yöntemler zaman alıcı, yoğun ve insan hatasına açıktır. Kişiler bazen tümörün olduğu alanı gözden kaçırabilir veya hangi sınıfa ait olduğunu yanlış sınıflandırabilir. Bu ve benzeri durumlar, beyin tümörlerinin sınıflandırılması için derin öğrenmeye dayalı bir yaklaşımın önemini göstermektedir. Bir beyin tümörünün hızlı ve doğru bir şekilde sınıflandırılması, doğru klinik teşhis ve zamanında hastalığa müdahale etmek için hayati öneme sahiptir. Bu çalışmada, MRI görüntülerinde glioma, meningioma ve hipofiz dâhil beyin tümörünün doğru sınıflandırılması için derin evrişimli bir sinir ağı mimarisi önerilmiştir. Önerilen model, figshare Cheng aracılığıyla halka açık 3064 görüntüden oluşan bir beyin tümörü veri kümesi üzerinde eğitilmiştir. Önerdiğimiz CNN mimarisi ile Figshare veri seti üzerinde ki beyin tümörlerini (glioma, meningioma veya hipofiz) sınıflandırmada ortalama %96.95 doğrulukla başarı göstermiştir. Önerilen CNN mimarisini literatürde ki birçok araştırma sonucuna göre yüksek performans gösterdiği görülmüştür.

**Anahtar Kelimeler:** Beyin tümörü, CNN, Derin öğrenme

## **CLASSIFICATION OF BRAIN TUMORS FROM MR IMAGES WITH CNN ARCHITECTURE**

### **ABSTRACT**

Classifying brain tumors is an important problem in computer-assisted diagnosis. Early diagnosis of brain tumor is vital for patients. Early diagnosis of the disease is very important for early intervention and treatment. In this study, we focused on the problem of classifying glioma, meningioma and pituitary tumors, which are three distinct types of brain tumors. Deep learning-based architectures are widely used for brain tumor classification. CNN architecture was used for classification. Other methods used in machine learning may be insufficient for accurate classification of the tumor. Other methods used in machine learning are time consuming, intensive and prone to human error. Sometimes people may miss the area where the tumor is or misclassify which class it belongs to. These and similar cases demonstrate the importance of a deep learning-based approach for the classification of brain tumors. Rapid and accurate classification of a brain tumor is vital for accurate clinical diagnosis and timely disease intervention. In this study, a deep convolutional neural network architecture is proposed for accurate classification of brain tumor, including glioma, meningioma, and pituitary, on MRI images. The proposed model is trained on a brain tumor dataset of 3064 publicly available images via figshare Cheng. With the CNN architecture we proposed, it showed success with an average of 96.95% accuracy in classifying brain tumors (glioma, meningioma or pituitary) on the Figshare dataset. It has been seen that the proposed CNN architecture has high performance according to many research results in the literature.

**Keywords:** Brain tumor, CNN, Deep learning

## **1. GİRİŞ**

Kafa içi tümörler olarak da bilinen beyin tümörleri, beyinde, lenf dokusunda veya kan damarlarında kontrol edilemeyen hücre bölünmesinden kaynaklanan anormal şişlik veya hücre büyümesidir. Çoğu tıp kurumu, beyin tümörlerini tam olarak belirlemek için Dünya Sağlık Örgütü'nün (WHO) kategorizasyonunu kullanmayı tercih eder. WHO, beyindeki tümörü, hücrenin kökenine, hücrelerin davranışına ve tümörün ciddiyetine göre sınıflandırır. Not verilirken tümörün gelişimi göz önünde bulundurulur. Kategorizasyon ve bireysel tümör derecesi, davranışı tahmin etmek için kullanılır. Görüntü alma türü ve bilgileri, beyin tümörü tanısında önemli bir rol oynar. Tümör teşhisi için yaygın olarak kullanılan görüntüleme teknikleri manyetik rezonans görüntüleme (MRI), bilgisayarlı tomografi ve röntgendir. MRI taramaları, sağlıklı hücrelerden tümör hücrelerini vurgulamak için bir boya enjekte edilerek gerçekleştirilir [1-7].

Beyin tümörleri en yıkıcı hastalıklardan biridir. Hastalığın yüksek derecede olması hastalığın tedavi edilme şansını azaltmakta ve daha az bir yaşam beklentisine yol açmaktadır. Beyin tümörlerinin yanlış teşhisi, yanlış tıbbi müdahaleye neden olmakta ve hastaların hayatta kalma şansını azaltmaktadır. Beyin tümörünün doğru teşhisinin yapılması, beyin tümörü hastalığı olan hastaların varlığını iyileştirmek için uygun bir tedavi planlaması yapmak için kilit bir noktadır [8].

Beyin tümörlerinin doğru ve hızlı teşhisi, hastalığa etkili bir tedavi yönteminin uygulanması için kritik bir öneme sahiptir. Bir tedavi yönteminin seçimi, tanı anında tümörün evresine, patolojik tipine ve tümörün derecesine bağlıdır.

Gliomalar, meningeomalar ve hipofiz, araştırmacılar tarafından çalışma amacıyla üstlenilen ana beyin tümörleridir. Gliomlar kan damarları ve sinir hücreleri dışındaki beyin dokularından, meningeomalar ise merkezi sinir sistemi (CNS) çevresindeki zarlardan ortaya çıkar. Hipofiz tümörleri kafatasının içinde bulunan yumrulardır [9-12]. En sık görülen iyi huylu tümörlerden biri meningeomadır ve çoğunlukla erişkinlerde görülür. Ayrıca insanların %20'si büyüme hızının yavaş olduğu ve küre şeklinde olan meningeomadan etkilenir. Genellikle yavaş büyür ve bazıları hiç büyümeyebilir. Doktorlar, zamanla yapılan taramalarla tümörün olası büyümesini takip etmeyi seçebilir. Glioma tümörleri çoğunlukla kötü huyludur ve meningeoma tümörleri iyi huylu iken, hipofiz tümörleri iyi huylu olsa bile başka tıbbi hasarlara yol açabilir [11-12].

Menenjiomlar, beyin ve omuriliği çevreleyen ince zarlarda indüklenen en yaygın iyi huylu tümörlerdir. Gliomlar, beyin özünde büyüyen tümörlerin çeşitliliğidir. Hipofiz tümörleri beyin hücrelerinin düzensiz büyümesidir. Hipofiz tümörleri beyin hipofiz bezinde gelişir. Bu tümörler, beyin herhangi bir yerinde üretebilen düzgün bir şekle ve içsel yapıya sahiptir [13]. Bilgisayar destekli tıbbi tanı üzerine yapılan son çalışmalar, derin öğrenme kavramlarının ortaya çıkması ile birlikte gelişmiş performanslar sunmaktadır. CNN tabanlı sınıflandırıcı sistemlerin avantajı, manuel olarak segmentlere ayrılmış tümör bölgeleri gerektirmemeleri ve tam otomatik bir sınıflandırıcı sağlamalarıdır [14].

Makine öğreniminin bir alt kümesi olan derin öğrenme, beyin tümörü sınıflandırma, segmentasyon, gıda, sağlık, robotik vb. birçok farklı alanda yaygın olarak kullanılmaktadır [15-20]. Biyomedikal görüntülerin sınıflandırılmasında derin öğrenme modelleri sıklıkla kullanılır. Evrişimsel Sinir Ağları (CNN) iyi bilinen bir yöntemdir. Hiyerarşideki piksellerin uzamsal ilişkisi, görüntüleri öğrenilen filtreler aracılığıyla birleştirerek CNN yardımıyla öğrenilir ve özellik haritaları oluşturur.

Özellik çıkarımı için kullanılan manuel yöntemler, manuel olarak tanımlanmış tümör bölgelerine dayanmaktadır. Bu kısım için uzmanların tecrübe sahibi olmaları ve tümör bölgelerini gözden kaçırmamaları çok önemlidir. Önerdiğimiz mimari ile tümör bölgelerine ait özellikler Evrişimsel Sinir Ağları (CNN) ile otomatik olarak çıkarılacak ve doğru özelliklerin çıkarımı ile görüntülerin sınıflandırılması yapılacaktır.

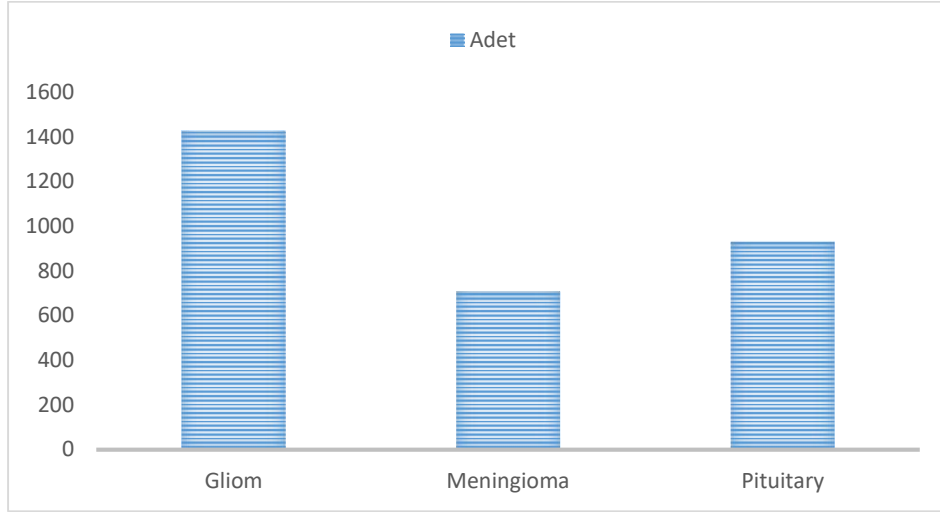
Bu çalışmada, üç patolojik beyin tümörü tipi (glioma, meningioma ve hipofiz tümörü(Pituitary)) için tasarlanmış otomatik bir sınıflandırma sistemi sunulmaktadır. Uygulama, beyin MRI görüntülerinden özellik çıkarımı için derin bir CNN modeli kullanılmaktadır. Çıkarılan özellikler, CNN mimarileri yardımıyla sınıflandırılmaktadır. Daha sonra önerilen mimarinin kapsamlı bir değerlendirmesi yapılmış ve deneysel sonuçlar analiz edilmiştir.

## **2. MATERYAL VE METOT**

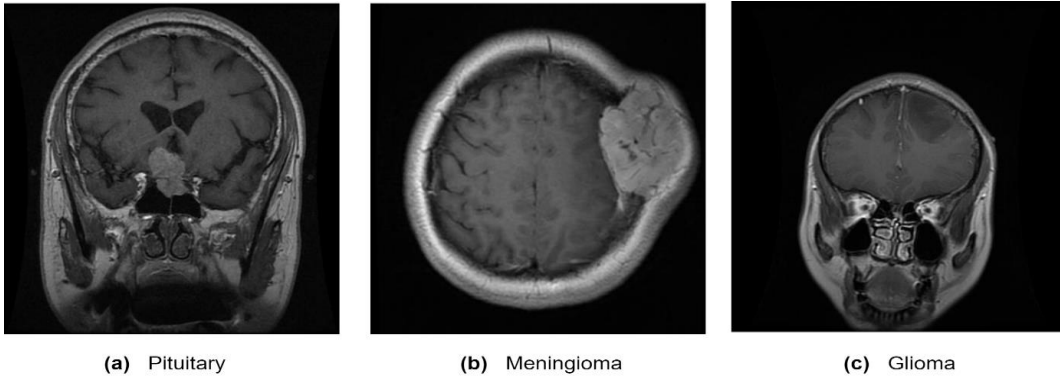
### **2.1. Veri Seti**

Figshare veri seti literatüre ilk olarak 2015 yılında tanıtılmış ve veri setinin güncel versiyonu Cheng tarafından 2017'de sunulmuştur [15]. Erişime açık olan veri setindeki görüntüler, yaygın beyin tümörlerinden üçünü (gliom, meningioma ve hipofiz tümörünü) içermektedir. Veri seti, 1426 adet gliom, 708 adet meningioma ve 930 adet hipofiz tümörü olmak üzere toplam 3064 görüntüden oluşmaktadır. Şekil 1 veri setindeki tümör tiplerinin histogramını göstermektedir.

Şekil 2’de veri setinde yer alan üç farklı patolojik beyin tümörüne ait birer örnek görüntü gösterilmiştir.



Şekil 1. Veri setinde ki her sınıfa ait görüntü sayılarının dağılımı



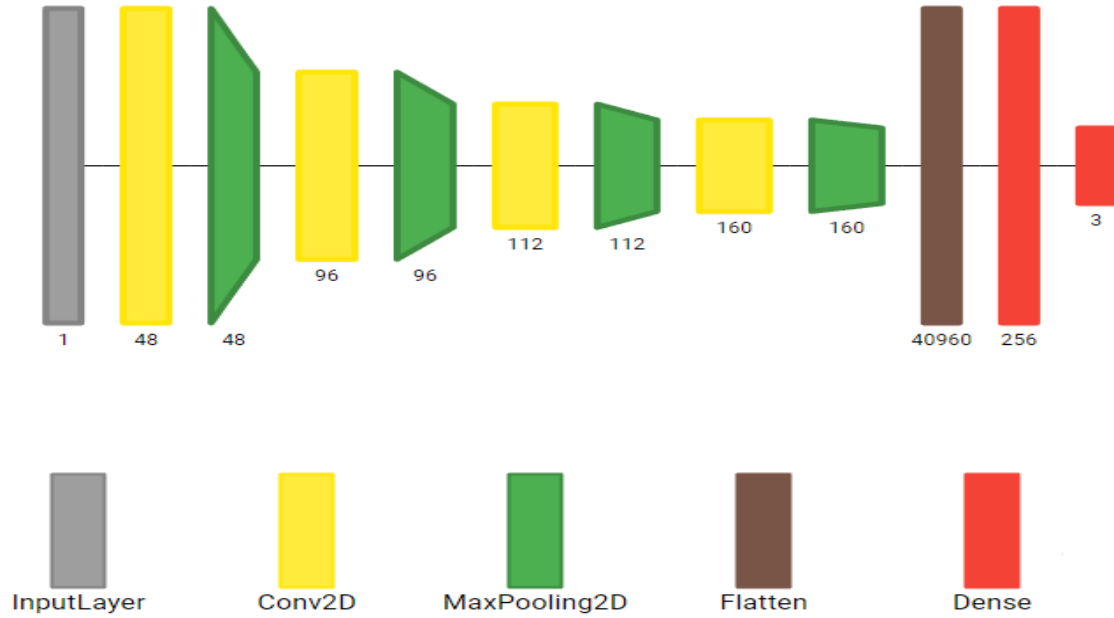
Şekil 2. Beyin tümörü türleri

## 2.2. METOT

Bu çalışmada, MRI'daki tümörlerin gliomalar, meningiomalar ve hipofiz tümörleri olarak sınıflandırılması için yeni bir CNN ağı tasarlanmıştır. Verisetindeki görüntüler incelendiğinde görüntülere ait görüntülerden bir kısmının 512 değerlerinin ise 256 piksel çözünürlükte kaydedildiği tespit edilmiştir. CNN ağına görüntüleri vermeden önce bu görüntüler üzerinde çeşitli ön işlemler yapılmıştır. Tüm görüntüler 256x256 olarak yeniden boyutlandırılmış ve CNN modeline görüntüler 256x256 olarak verilmiştir. Ön işleme aşamasında görüntüler üzerinde rastgele %15 döndürme, yatay olarak çevirme, %10 yakınlaştırma işlemleri



uygulanmıştır. Şekil 3’te de görüleceği gibi, önerdiğimiz model 3 evrişim, 3 havuzlama ve 2 tam bağlı katmandan oluşmaktadır.



**Şekil 3.** Önerilen CNN Mimarisi

Görüntüler ön işlem aşamasından geçtikten sonra Şekil 3’de gösterilen CNN modeline verilir. Şekil 3’ten görüldüğü gibi önerilen CNN mimarisinde girdiler ilk olarak 48 filtreden oluşan evrişim katmanına gelir ve bu işlemden sonra maksimum havuzlama katmanına verilir. Bu işlemin hemen ardından elde edilen çıktılar aynı şekilde 64 ve 128 filtreden oluşan evrişim ve maksimum havuzlama katmanına verilir. Evrişim katmanlarında filtre boyutu 3’e sabitlenmiştir. Aktivasyon fonksiyonu olarak ta RELU kullanılmıştır. Havuzlama katmanından elde edilen bilgi flatten katmanına verilir. Flatten katmanı, tam bağlı katmana gönderilecek çıktıları hazırlar. Flatten katmanında çok boyutlu veriler tek boyuta indirgenir. Flatten katmanından sonra elde edilen öznitelikler yapay sinir ağına verilir. Yapay sinir ağlarında 64 nörondan oluşan bir katman ve sonuç katmanında yer alan 3 çıkış için tam bağlantılı katman bulunmaktadır.

Modelden elde edilen çıktılar ile gerçek çıktılar arasında hatalar hesaplanarak geriye doğru yayılır. Bu yayılım ile modele ait ağırlıklar güncellenir ve minimum hata elde edilene kadar bu süreç sürdürülür. Bu süreçte kullanılan fonksiyonlara optimizasyon fonksiyonları denilir. Çalışmada optimizasyon fonksiyonu olarak “adam” yöntemi kullanılmıştır.

Havuzlama katmanı modelin ezberlemesini engellemek ve sonraki katmanların hesaplama yükünü azaltmak amacıyla kullanılır. Önerdiğimiz mimaride havuzlama katmanı olarak varsayılan değerlere sahip maksimum havuzlama katmanı kullanılmıştır.

Çalışmada, 64 nörona sahip tek tam bağlantılı katman kullanılmıştır. Sınıflandırma katmanı için çıktıların hangi sınıfa ait olduğunu belirlemek için 0-1 arasında olasılık değeri üreten softmax aktivasyon fonksiyonu kullanılmıştır.

### 2.3. Performans Metrikleri

Çalışmada, önerilen mimari ile elde edilen sonuçları, uzmanlarca belirlenen gerçek sonuçlarla kıyaslamak için duyarlılık, özgüllük ve doğruluk değerleri kullanılmıştır. Bu metriklere göre; örnek ve modelin elde ettiği sonuç pozitif (P) olarak sınıflandırılmışsa doğru pozitif (TP), örnek pozitif ancak model negatif (N) sınıflandırılmışsa yanlış negatif (FN), örnek ve model her ikisi de sonucu negatif bulmuşsa doğru negatif (TN), örnek negatif ancak model örneği pozitif sınıflandırılmışsa yanlış pozitif (FP) grupları olarak değerlendirilir. Bu gruplamaya göre duyarlılık, özgüllük ve doğruluk değerleri çıkarılır. Buna göre:

$$\text{Duyarlılık} = \frac{TP}{TP + FN}$$

Duyarlılık oranı, gerçekten tümöre yakalanan hastaların model tarafından da hastaya ait tümörün tespit edildiği bir metriktir. Hasta olanların model tarafından da hasta olarak tespit edilmesidir.

$$\text{Özgüllük} = \frac{TN}{TN + FP}$$

Özgüllük oranı, tümörün gerçekten var olmadığı durumda model tahmin sonucunun negatif çıkma olasılığı olarak tanımlanmaktadır. Hasta olmayanların model tarafından da hasta olmayanlar olarak tespit edilmesidir.

$$\text{Doğruluk} = \frac{TP + TN}{TN + TP + FP + FN}$$

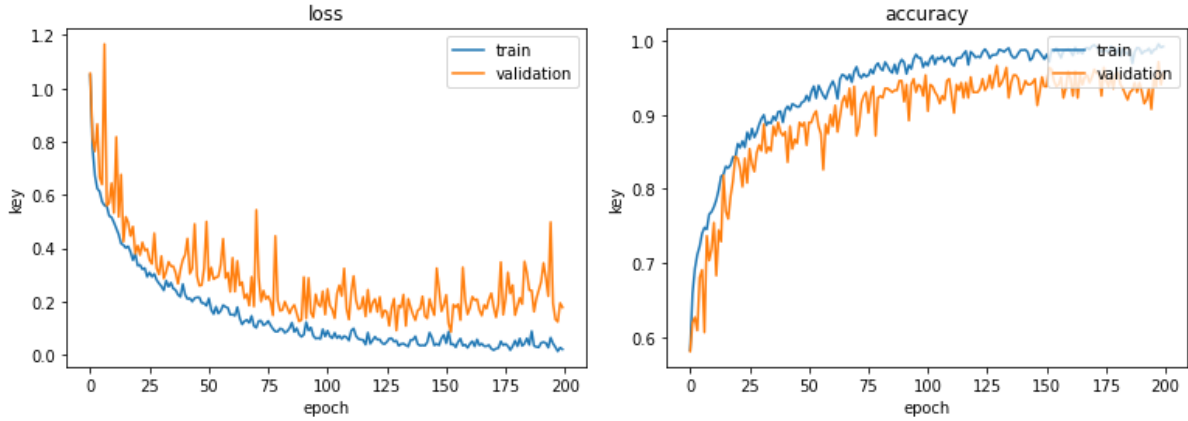
Doğruluk oranı, modelde doğru tahmin edilenlerin (pozitif ve negatif) toplam veri kümesine oranı ile hesaplanmaktadır.

## 3. DENEYSEL ÇALIŞMALAR

3 sınıf ve 3064 MR görüntüsünden oluşan Figshare veri seti için yeni bir CNN mimarisi önerilmiştir. Önerilen CNN mimarisinin veri seti üzerindeki başarısını artırmak için farklı

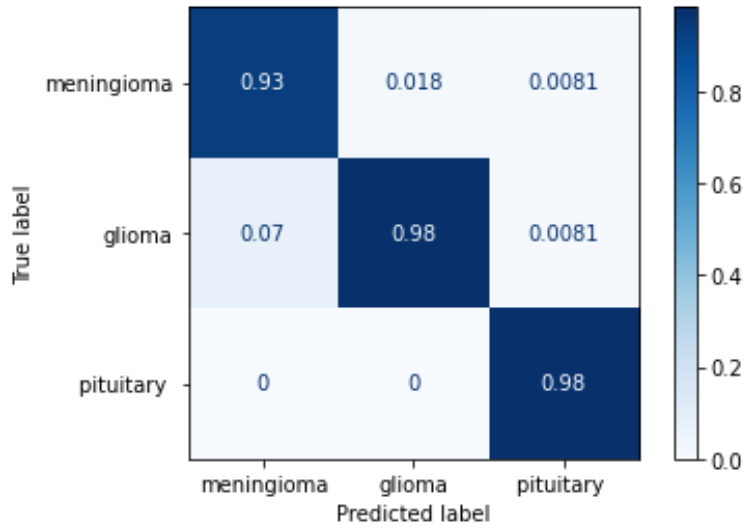
önişlemler uygulanmıştır. Ardından en iyi mimari için farklı çalışmalar yapılmış ve CNN mimarisi ile en yüksek skorlu sonuçlar elde edilmiştir.

Şekil 4'te önerilen modelin eğitim sürecindeki kayıp ve doğruluk grafiği verilmiştir.



Şekil 4. Önerilen modelin kayıp ve doğruluk gösterimi

Önerilen model veri kümesi üzerinde eğitildikten sonra modelin test verileri üzerindeki başarısının hata matrisi (Confusion Matrix) Şekil 5'te verilmiştir.



Şekil 5. Hata matrisi (Confusion Matrix)

Elde edilen sonuçların sınıflandırma raporu Tablo 2’de gösterilmiştir.

**Tablo 2.** Sınıflandırma Raporu

	Precision	Recall	F1-Score
Meningioma	0.93	0.96	0.94
Glioma	0.98	0.96	0.97
Pituitary	0.98	1.00	0.99
Accuracy		0.97	0.97
Macro Avg	0.97	0.97	0.97
Weighted avg	0.97	0.97	0.97

Tablo 2’den görüldüğü üzere önerdiğimiz model yaklaşık %97 doğruluk başarısı göstermiştir. Kesinlik (Precision), tümör olarak tahminlediğimiz görüntülerin gerçekten kaç adedinin tümör olduğunu göstermektedir. Önerilen model meningioma türü tümör ile ilgili %93, glioma türü tümör ile ilgili %98 ve pituitary türü tümör ile ilgili %98 kesinlik oranı elde etmiştir.

Duyarlılık (Recall) ise tümör olarak tahmin etmemiz gereken işlemlerin ne kadarının tümör olarak tahmin ettiğimizi gösteren bir metriktir. Önerilen model meningioma türü tümör ile ilgili %96, glioma türü tümör ile ilgili %96 ve pituitary türü tümör ile ilgili %100 duyarlılık oranı elde etmiştir.

F1 Score, Kesinlik (Precision) ve Duyarlılık (Recall) değerlerinin harmonik ortalamasını vermektedir.

#### **4. SONUÇLAR**

Bu çalışmada beyin MR görüntülerinden 3 tipteki beyin tümörlerinin sınıflandırılması için yeni bir CNN mimarisi önerilmiştir. 3064 MR görüntülerinin %85’i eğitim, %15’i test olarak ayrılmıştır. Eğitim setindeki görüntülerin %15’i model doğrulama (validasyon) için ayrılmıştır. Eğitim verileri ile eğitilen modelimiz test verileri üzerinde en yüksek %98.21 ve ortalama %96.95 doğruluk oranı ile görüntüleri doğru sınıflandırmıştır. Gelecekte mimarinin geliştirilimesi adına yapacağımız çalışmalar sonucunda sınıflandırma performansının artırılması hedeflenmektedir.

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## **PROCESSING İLE YENİ BİR OTONOM ARAÇ SİMÜLASYON YAZILIMI GELİŞTİRİLMESİ**

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### **ÖZET**

Günümüzde yapay zekâ; akıllı ulaşım, otonom araçlar, tarım, gıda, sağlık ve güvenlik başta olmak üzere birçok alanda verimli bir şekilde kullanılmaktadır. Akıllı ulaşım ve otonom araçlar kategorisinde bilgisayar grafikleri kullanılarak geliştirilmiş farklı simülasyon ortamları mevcuttur. Literatür incelendiğinde özellikle linux işletim sisteminde çalışabilen gazebo simülasyon yazılımı ilk etapta göze çarpmaktadır. Gazebo her ne kadar birçok simülasyon yazılımında başarılı bir şekilde kullanılıyor olsa da, programcının gazebo'nun sunmuş olduğu api'lerin dışına çıkamaması ve api öğrenme zorluğu özellikle işlemleri düşük seviyeli kod yazmak isteyen yazılımcılar açısından sorunludur. Bununla birlikte teorik olarak arka planda opengl veya directx kullanabilen bütün oyun motorları aslında simülasyon ortamınının oluşturulmasında aktif rol oynayabilir. Bu bağlamda unity ve unreal-engine oyun motorları önemli bir yer tutarlar. Ancak, bu tarz oyun motorları otonom simülasyonundan ziyade genellikle dijital oyun geliştirilmesi için tasarlandıklarından, programcuyu gazebo'da olduğu gibi yüksek öğrenme zorluğu eğrisi karşılamaktadır. Otonom araç teknolojisi üzerinde çalışan araştırmacılar için; esnek, hafif, hızlı, düşük-seviye kütüphane kodları içeren ve nispeten kolay kodlanabilen bir otonom araç simülasyon yazılım ortamına ihtiyaç duyulmaktadır. Bunun için java programlama dilini ve arka planda opengl kütüphanesini kullanan processing kütüphanesi iyi bir alternatif olabilir. Bu çalışmada, processing kütüphanesi temelli 3 boyutlu ve iki kamera açısından aracın kendisini perspektif bakış açısıyla ve parkuru üstten izleyebileceği bir otonom araç simülasyon yazılımı geliştirilmesi hedeflenmiştir. Önerilen yazılımın otonom araçlarla ilgilenen çalışmalar için sade, anlaşılır ve rahatlıkla kodlanabilir bir yardımcı kaynak olacağı düşünülmektedir.

**Anahtar kelimeler:** Yapay zekâ, modelleme ve simülasyon, otonom araçlar, bilgisayar grafikleri, processing, oyun motorları.

## **DEVELOPMENT OF A NEW AUTONOMOUS VEHICLE SIMULATION SOFTWARE WITH PROCESSING**

### **ABSTRACT**

Today, artificial intelligence is used efficiently in many fields, especially in smart transportation, autonomous vehicles, agriculture, food, health and security. There exists various simulation environments developed using computer graphics in the category of smart transportation and autonomous vehicles. When the literature is examined, especially the gazebo simulation software that can run on the linux operating system, stands out in the first place. Although gazebo is used successfully in many simulation software, the programmer's inability to go beyond the apis offered by gazebo and the difficulty of learning api are especially problematic for software developers who want to write low-level code for operations. Nevertheless, theoretically all game engines that can use opengl or directx in the background can actually play an active role in the creation of the simulation environment. In this context, unity and unreal-engine game engines have an important status. However, since such game engines are generally designed for digital game development rather than autonomous simulation, the programmer faces a high learning difficulty curve, just like the gazebo. For researchers working on autonomous vehicle technology; the requirements for an autonomous vehicle simulation software environment which are flexible, light, fast, contains low-level library implementations and can be easily implemented is inevitable. For this, the processing library established by the java programming language and the opengl library in the background, can be a good alternative. In this study, it is aimed to develop an autonomous vehicle simulation software based on the processing library, in which the vehicle can monitor itself from a perspective-view and the track from the top-view via two cameras. It is thought that the proposed software will be a simple, comprehensible and easily coded auxiliary resource for studies dealing with autonomous vehicles.

**Keywords:** Artificial intelligence, modeling and simulation, autonomous vehicles, computer graphics, processing, game engine.



## 1. GİRİŞ

Son günlerde yapay zekâ uygulamaları; dijital oyunlar ve simülasyon [1-5], otonom araçlar [6,7], sağlık [8-10], eğitim [11], güvenlik [12-15], endüstri [16, 17], robotik [18], akıllı şehirler [19] vb. alanlarında karşımıza çıkmaktadır. Özellikle yapay zekâ destekli akıllı şehirler, dijital oyunlar ve otonom araç sürüş simülasyonları günümüzde yoğun bir şekilde araştırılmakta ve yeni yeni simülasyon teknikleri ve yazılım araçları ile desteklenmektedir. Bu bağlamda Linux işletim sisteminde çalışabilen Gazebo [20] öne çıkmaktadır. Gazebo aracını diğerlerinden farklı kılan en önemli avantajlar sırasıyla [21];

- Gazebo'nun açık kaynak geliştiriliyor olması ve büyük bir kitle tarafından sürekli güncelleniyor olması.
- Unity oyun motorunun sağladığı destek ile Gazebo yazılımında 3D sahnelerin tasarlanabiliyor olması.
- Birçok sensörlerle uyumlu çalışabilmesi.
- Unity ve Blender programlarında üretilen 3D nesnelerin ortak standartlar çerçevesinde araca yüklenebilmesi.

Bunlarla birlikte Gazebo aracının bazı zayıf kaldığı yönler de mevcuttur:

- Linux ortamına odaklanılarak geliştirilmesi. Diğer işletim sistemleri için (Windows, MacOS vb.) kurulumunun çok güç olması ve çeşitli sorunlar çıkarabilmesi.
- Geliştirilen API'ler çerçevesinde problemlere müdahale edilmesi. Yapay zekâ kısımlarının geliştirilmesinin güç olması.
- Unity ile sıkı bağı olduğu için simülasyon varlıklarının neredeyse tümünü geliştirmek için Unity kullanma zorunluluğu.

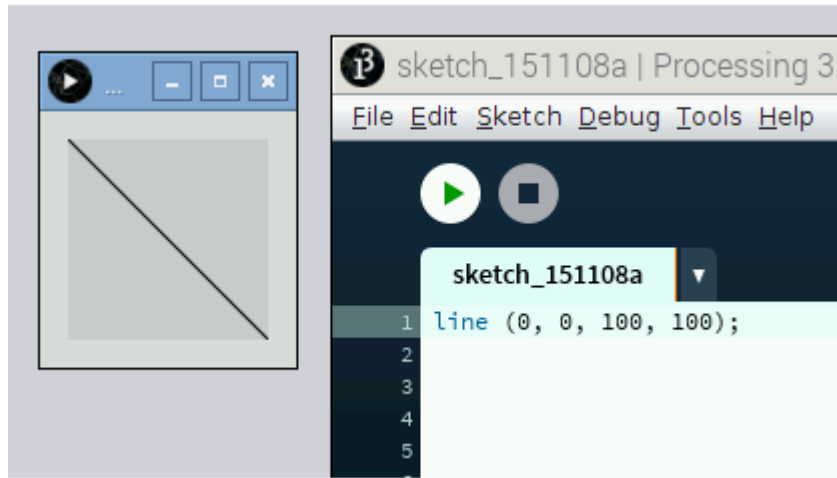
Anlaşılacağı gibi Gazebo uygulamasının avantajları yanında programcuyu kısıtlayıcı yönleri de bulunmaktadır. Gazebo dışında Google Waymo, Tesla ve Nvidia şirketlerinin kendi ürünleri için geliştirdikleri simülasyon ortamları da mevcuttur. Genellikle Gazebo'ya göre çok daha yüksek grafik kalitesi ve fizik motoru desteği sunan söz konusu simülasyon yazılımları açık kaynak değillerdir. Son zamanlarda piyasada en çok oyun motoru olarak tanıdığımız Unreal Engine-5 (UE5) uygulaması da simülasyon işlerinde oldukça profesyonel çıktılar üretebilmektedir. Ancak UE5 arka uçta C++ programlama dilini kullandığından programcı açısından karşısına oldukça güç bir öğrenme eğrisi çıkmaktadır. UE5'in görsel programlama araçlarından biri olan blueprint teknolojisi ise kullanıcıyı, geniş ve karmaşık olan API öğrenme zorunluluğu ile karşı karşıya bırakır. Benzer şekilde Matlab ve AnSYS araçları ile de

simülasyon geliştirilebilir ancak bu iki araç grafik açısından rakiplerine göre geri kalmakla birlikte genellikle matematiksel modllemelerde rakiplerinden bir adım öndedirler.

Bu bilgiler ışığında, otonom araç teknolojisi üzerinde çalışan araştırmacılara yönelik; esnek, hafif, hızlı, düşük-seviye kütüphane kodları içeren ve nispeten kolay kodlanabilen bir otonom araç simülasyon yazılım ortamına ihtiyaç duyulmaktadır. Bunun için Java programlama dilini ve arka planda opengl kütüphanesini kullanan processing kütüphanesi iyi bir alternatif olabilir. Bu çalışmada, processing kütüphanesi temelli 3 boyutlu ve iki kamera açısından aracın kendisini perspektif bakış açısıyla ve parkuru üstten izleyebileceği bir otonom araç simülasyon yazılımı geliştirilmesi hedeflenmiştir.

## 2. MATERYAL VE METOT

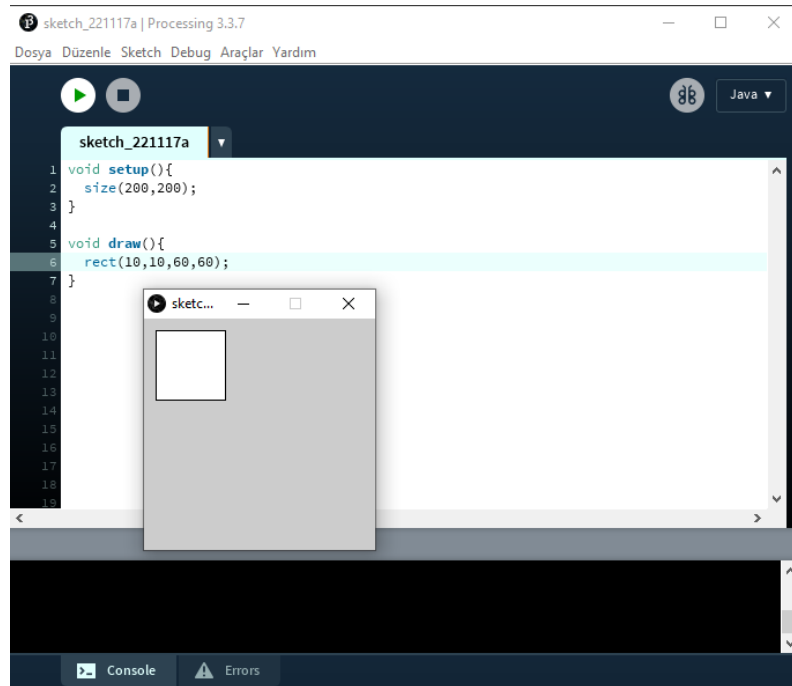
Processing [26] Java programlama dili ile açık kaynak kod olarak geliştirilmiş ancak JavaScript ve Python dillerine de çevrilebilen bir grafik pixel sanatı kütüphanesidir. Kendi geliştirdikleri Processing IDE'si kullanıcı dostu ve oldukça basit bir ara yüze sahiptir. Açık kaynak ve ücretsiz olan Processing IDE'si aynı zamanda Arduino IOT geliştiricileri tarafından da kullanıldığını görmekteyiz. Processing kütüphanesi, Şekil-1'den de görüleceği gibi düşük seviye ve karmaşık OpenGL komutları ile sizleri muhatap etmeden başarılı bir şekilde soyutlama yaparak yüksek seviyede komutları çağırmanıza imkân tanır. Bunu yaparken de performans bağlamında bir zayıflama ile karşılaşmazsınız. Processing ile hazırlanan uygulamalar masa üstünde, web sayfasında veya mobil cihazlarda çalıştırılabilirler.



Şekil 1. Processing IDE ve çıktısı. Programlama açısından sağladığı soyutlama kolaylığı.

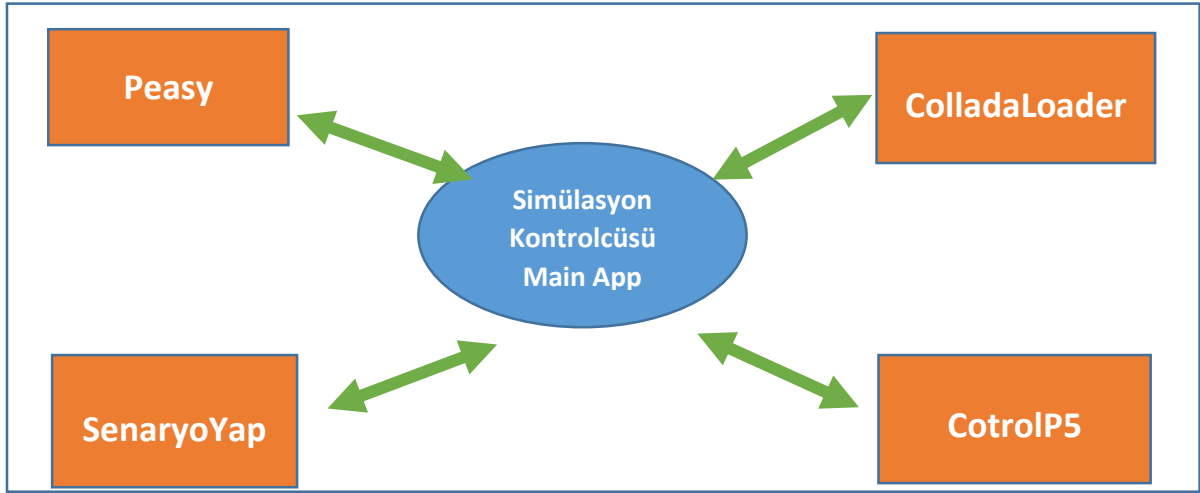
Küçük projelerde Processing IDE programcıya büyük rahatlıklar sağlar. Büyük projelerde Processing IDE'si yerine program geliştirmek için kullanılan popüler Java IDE'lerinden herhangi birisine (Netbeans, Eclipse, IntelliJ vb.) Processing core jar'ları eklenmelidir. Temel olarak bir processing uygulaması setup ve draw isimli iki metottan meydana gelir. Setup metodu program başlayacağı zaman bazı değişkenlere ilk değerlerini atamak veya processing uygulamasının grafiksel arayüz değerlerini set etmek için kullanılır. Draw metodu ise grafik kartının kabiliyetine göre varsayılan olarak saniyede 60 defa çağrılır. Şekil-2, (10, 10) sol-üst koordinatında 60x60 bir kareyi genişliği 200, yüksekliği 200 piksel olan bir pencere içine çizer. Bu görev için rect komutu kullanılır. [26] processing'de kullanılan tüm yüksek seviye metod ve sınıflarla ilgili bilgilerin ve örnek kodların tutulduğu web sayfasının linkidir.

Otonom sürüş simülasyonu geliştirirken standart Java (JDK 8)'nin yanında peasy, colladaloader, controlp5 yardımcı kütüphaneleri kullanılmıştır. Peasy simülasyondaki 3 boyutlu görünüm için gerekli olan kamera nesnesini ve ilgili metodları barındırır. ColladaLoader; simülasyonda gereksinim duyulan fiziksel varlıkların collada formundaki 3B modellerinin processing ortamına yüklenmesinden sorumludur. Benzer şekilde, ControlP5 yardımcı kütüphanesi ise, processing uygulamasına çeşitli grafiksel arayüz bileşenleri (buton, text box, label, combo vb.) eklemede işimize yarar.



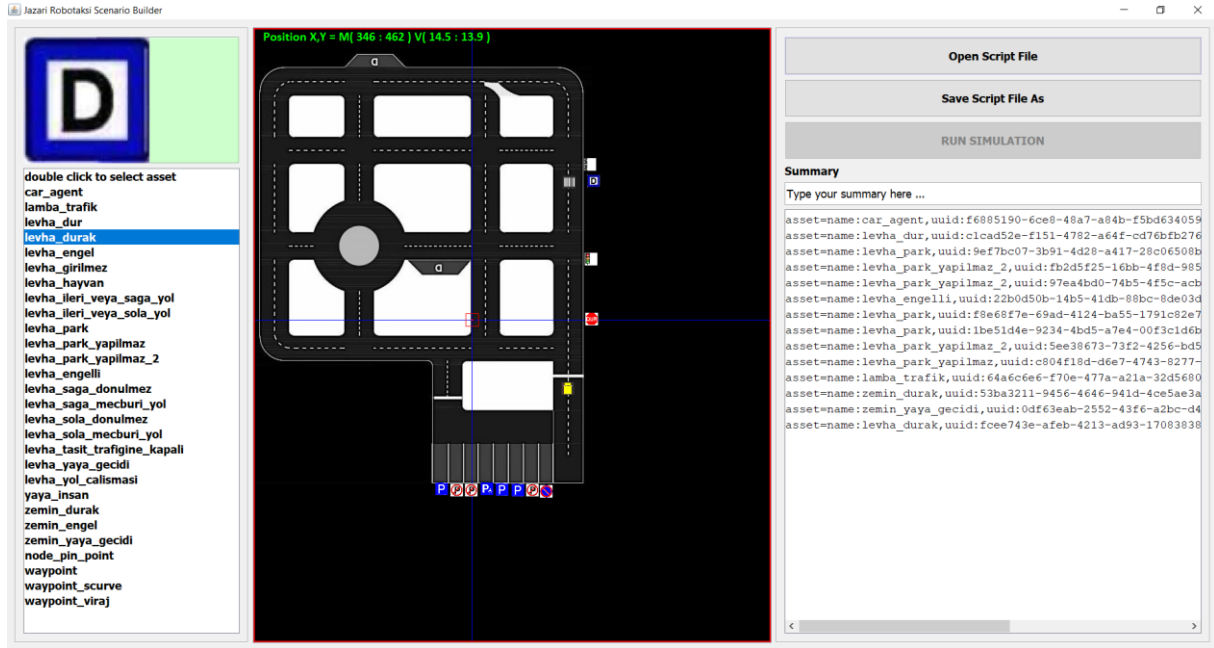
Şekil 2. Processing ile yapılmış küçük bir örnek uygulama.

Şekil-3, otonom sürüş simülasyonu yazılım mimarisinin bağlam (context) diyagramını göstermektedir. Az önce bahsi geçen yardımcı kütüphanelerin dışında modüler ve dinamik bir biçimde senaryo geliştirmemize olanak sağlayan Java swing kütüphanesi ile geliştirdiğimiz SenaryoYap aracımız da bağlam diyagramında yer almaktadır.



Şekil 3. Otonom sürüş simülasyonu bağlam (context) diyagramı.

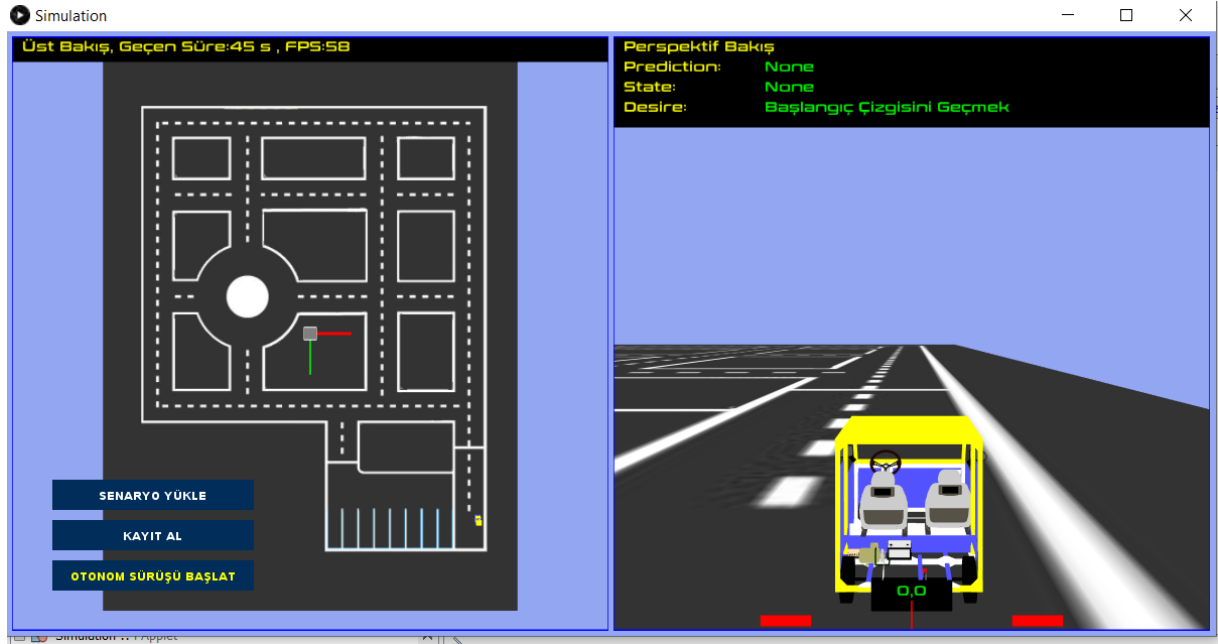
Şekil-4, SenaryoYap aracımızın genel bir görünüşünü temsil etmektedir. Arayüz temel olarak üç bölümden meydana gelmektedir. Sol kısımda parkura yüklemek istediğimiz varlıkların (assets) isimleri yer almaktadır. Kullanıcı isterse bu kısma yeni varlıklar da ekleyebilir. Bu kısımda kullanıcı parkura yüklemek istediği nesneyi seçtiğinde yukarıda ilgili nesnenin büyükçe bir resmi görünür. Kullanıcı bu kısımdan nesnenin üzerine çift tıklayıp sürükleyip bırakarak parkur üzerindeki herhangi bir koordinata varlığı taşıyabilir. İsterse parkur üzerindeki o nesneye mouse sol tuşu ile bir kez tıkladıktan sonra yeni bir yere taşıyabilir veya mouse sağ tuşuna bir kez basarak nesneyi istenilen açıda döndürerek parkur içerisinde o nesne ile ilgili doğru bakış açısı sağlayabilir. Orta kısım 2 boyutlu parkur alanına tepeden bakacak bir kamera açısını temsil eder. Bu kısımda nesnelerin ve mouse koordinatları gerçek ve sanal olarak üstte gösterilir. İstedikleri kadar nesneyi seçip parkur üzerinden silebilir. Sağ bölümde ise daha önceden katedilmiş script dosyalarını güncellememize olanak tanıyan “Open Script File” butonu ile scriptleri sabit diske kaydetmemize yarayan “Save Script File As” butonu yer alır. Hemen altında ise geliştirdiğimiz senaryoyu simülasyon ortamına yükleyen ve simülasyon programını açan “RUN SIMULATION” butonu yer almaktadır. Butonların altında ortadaki parkur alanı üzerinde yaptığımız her değişikliği text formatında kaydeden sadece okunur bir text editör yer alır.



Şekil 4. Parkur varlıklarının (assets) konumlarının belirlendiği Java swing tabanlı senaryo yapma aracı arayüzü.

### 3. DENEYSEL ÇALIŞMALAR

Otonom sürüş simülasyonu geliştirilirken geliştirici açısından karmaşıklığa neden olmayan basit bir mimari ve yaklaşım benimsenmiştir. Bunun için mümkün olduğunca simülasyon aracı yazılımında hazır üçüncü parti geliştiricilerin yaptığı açık kaynak kodlu kütüphanelerden faydalanılmıştır. Şekil-5 te görüldüğü gibi, kullanıcı simülasyon uygulamasını çalıştırdığı zaman karşısına iki farklı bakış açısını içeren bir uygulama penceresi gelmektedir. Sol tarafta tepeden bakış (top-view), sağda ise persepektif bakış (perspective-view) alt pencereleri bulunmaktadır. Peasy her bir pencereyi eş zamanlı render etmekten sorumludur.



Şekil 5. Otonom sürüş simülasyon uygulaması arayüzü.

Simülasyon üst-bakış penceresinde üç adet buton yer alır. Sağ pencerede ise aracımızı ve parkurun perspektif görünüşünün olduğu bölüm vardır. Bu kısımda mouse orta tekerliği ile araç ileri veya geriye alınabilir. Bu sayede kullanıcı isterse first person shooter veya third person shooter görünümü elde edebilir. En altta da aracın dönüş yönü ve hızının anlık olarak gösterildiği küçük bir bilgi ekranı mevcuttur. Kullanıcının klavyeden yön tuşlarına basmasıyla simülasyon bu haliyle çalışabilir bir durumdadır. Gerçek parkur senaryosunu yüklemek için “Senaryo Yükle” butonuna basılması gerekir. Buradan bir önceki bölümde anlattığımız senaryo scripti simülasyon uygulamasına yüklenir. Kullanıcı isterse parkurda gezdiği süreçleri saniyede 24 fps olacak biçimde kaydedebilir. Kayıt yaparken genelde png formatında belirli bir bölgeye odaklanarak sekans görüntüleri alınır. Ardından kullanıcı eğer isterse bu zaman sekansı imge dizisini processing ile birlikte gelen bir araç yardımıyla QuickMove video formatına dönüştürebilir. En altta bulunan “Otonom Sürüşü Başlat” butonuna tıklandığında ise programcının geliştirdiği yapay zekâ tabanlı otonom sürüş algoritması devreye girerek otonom aracın parkurda istenilen görevleri tamamlaması işlemi başlatılır.

#### **4. SONUÇ VE DEĞERLENDİRME**

Bu çalışmada Siirt Üniversitesi Bilgisayar Mühendisliğinde yer alan El-Cezeri Siberetik ve Robotik Laboratuvarındaki CezeriLab ekibi olarak 2019 yılından beridir katıldığımız Teknofest Robotaksi otonom araç kategorisinde geliştirdiğimiz otonom araç projemizin simülasyonu için Java, Processing ve Açık Cezeri Kütüphanesi [23] temelli bir otonom sürüş simülasyonu aracının tanıtımı yapılmıştır. Geliştirdiğimiz aracın piyasada bulunan ücretsiz uygulamalarla benzerliği bulunmakla birlikte özellikle arayüzünün sade, basit, anlaşılır ve kullanıcı dostu olmasından dolayı araştırmacılar tarafından kullanılabilme potansiyelinin olduğu düşünülmektedir.

#### **TEŞEKKÜR**

Bu çalışma, Siirt Üniversitesi Bilimsel Araştırma Projeleri (SIUBAP) tarafından 2022-SIUMÜH-015 numaralı proje olan “(Cezeri Campus Car) Otonom Araç Yazılımı Geliştirme Projesi” kapsamında desteklenmiştir. Bu çalışmada emeği geçen CezeriLab ekibine teşekkür ederiz.

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## **BİLGİSAYARLI GÖRÜ UYGULAMALARI İÇİN YENİ BİR VERİ ETİKETLEME ARACI**

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### **ÖZET**

Yapay zekâ ve makine öğrenmesinin alt alanlarından biri olan bilgisayarla görü uygulamaları tarım, gıda, sağlık, sanayi, güvenlik, askeri ve eğitim başta olmak üzere birçok alanda başarılı ve etkin bir şekilde kullanılmaktadır. Bilgisayarlı görü uygulamaları aynı zamanda nesne algılama, nesne izleme, bölütleme vb. konularını da içerir. Genellikle denetimli öğrenme stratejisinin benimsendiği bu alanda nesnelere görüntü veya video dosyası üzerinde sınırlayıcı kutu formatında etiketlenmesi gerekir. Bunun için piyasada ücretli ve ücretsiz birçok etiketleme aracı bulmak mümkündür. Her aracın, hem kullanıcı arayüzü hem de üretkenlik açısından birbirine göre güçlü veya zayıf yönleri bulunmaktadır. Özellikle büyük veri setlerinin etiketleme aşamasında, kullanılan veri etiketleme aracının pratik ve basit olmasının yanı sıra hızlı etiketlemeye imkân sunan yönleri sahip olması oldukça avantajlı olacaktır. Görüntü üzerindeki nesnelere sınırlayıcı kutu ile etiketlendikten sonra nesne algılama algoritmalarının yararlanabilmesi için PascalVOC, JSON veya YOLO formatında kaydedilir. Bu çalışmada Java programlama dili ile geliştirilen Open Cezeri Kütüphanesi ile doğrudan çağrılabilen, kullanımı kolay, basit bir arayüze sahip ve veri etiketleme hızı açısından rakiplerinden en az %30 daha iyi olan bir araç önerilmiştir. Sözü edilen aracın uzun ve meşakkatli bir iş olan veri etiketleme sürecini bir nebze olsun kolaylaştıracak hale getirmesi amaçlanmaktadır. Önerilen yeni etiketleme yazılımının açık kaynak kodlu olması, ücretsiz olması ve etiketleme süreçlerini hızlandırması nedeniyle veri bilimciler tarafından tercih edileceği öngörülmektedir.

**Anahtar kelimeler:** Yapay Zekâ, bilgisayarlı görü, derin öğrenme, nesne tespiti, nesne etiketleme araçları.

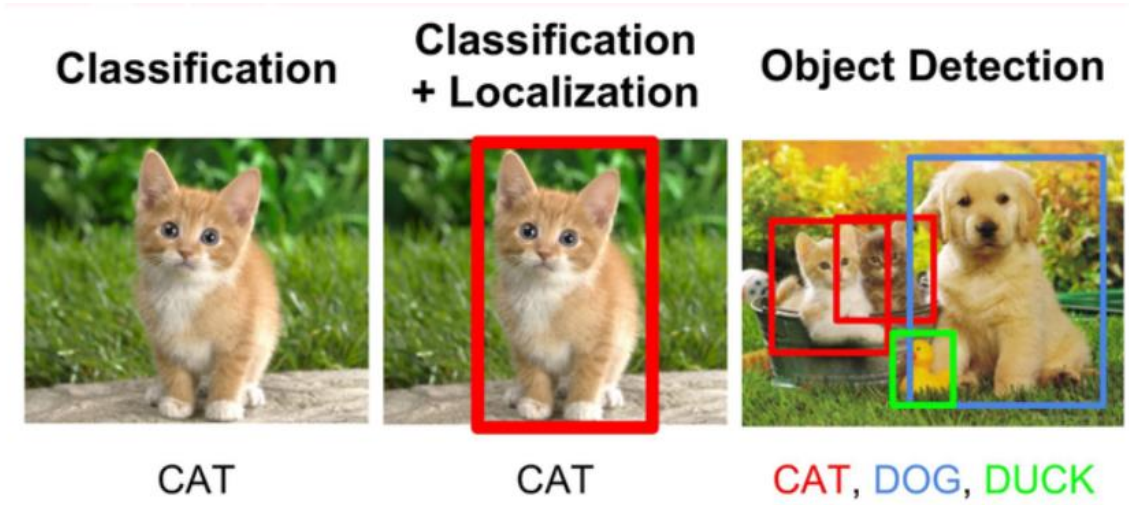
**A NEW DATA ANNOTATION TOOL FOR COMPUTER VISION APPLICATIONS****ABSTRACT**

Computer vision applications, one of the sub-fields of artificial intelligence and machine learning, are used successfully and effectively in many domains, especially in agriculture, food, health, industry, security, military and education. Computer vision applications also include object detection, object tracking, segmentation, etc. In this field, where the supervised learning strategy is generally adopted, objects need to be labeled and/or annotated in bounding box format on image or video file. For this, it is possible to find many paid and free labeling tools in the market. Each tool has certain strengths or weaknesses relative to each other, both in terms of user interface and productivity. Especially in the labeling phase of large data sets, it will be very favorable that the data annotation tool used is practical and simple, as well as having aspects that allow fast labeling. After the objects on the image are labeled with the bounding box, they are saved in PascalVOC, JSON or YOLO format so that object detection algorithms can utilize them. In this study, a tool that can be used directly from the Open Jazari Library, developed with the Java programming language, has an easy-to-use, simple interface and is at least 30% faster than its competitors in terms of data annotation performance is proposed. It is aimed to make the aforementioned tool to streamline the data labeling process, which is a long and tedious task, to some extent. It is predicted that the proposed new labeling software will be preferred by data scientists as it is open source, free and boosts labeling processes.

**Keywords:** Artificial intelligence, computer vision, deep learning, object detection, object annotation tools.

## 1. GİRİŞ

Günümüzde yapay zekâ, özelinde ise makine öğrenmesi ve son yıllarda oldukça popüler bir alt alanı olan bilgisayarlı görü ve derin öğrenme başarılı ve etkin bir şekilde sağlık, eğitim, güvenlik, endüstri, tarım, robotik vb. alanlarda uygulanmaktadır [1-11]. Derin öğrenme, Şekil-1’de de gösterildiği gibi herhangi bir görüntünün sınıflandırma, sınıflandırma+yerel sınırlarının belirlenmesi ve nesne tespiti işlemleri için kullanılmaktadır [12].



Şekil 1. Sınıflandırma, sınıflandırma+yerel sınırlandırma ve nesne tespitinin farkları [12]

Problemin türüne göre danışmanlı öğrenme yaklaşımı ile elde edilen görüntüler, sınıflandırma işlemi için kabaca gruplara ayrılırlar. Her bir grup bir sınıfı temsil eder. Sınıflandırma bilgisayarlı görü problemleri arasında en rahat olanıdır. Bunun nedeni sınıflandırmada bütün bir resmin hangi sınıfa ait olduğu tespit edilmeye çalışılır. İmgedeki nesnelerin nicelik olarak sayısının veya resim içerisindeki konumunun önemi yoktur. Diğer taraftan, nesnenin sayısının ve görüntü içerisindeki konumunun görece önemli olduğu problem türleri de mevcuttur. Örnek vermek gerekirse; otonom araçlar için geliştirilen bilgisayarlı görü kapsamındaki nesne tespit algoritmaları otonom sürüşü sağlayabilmek için kameradan elde ettikleri görüntülerde ne tür nesnelerin bulunduğunu ve yerlerini bilmeleri gerekir. Veya bilgisayarlı tomografi ile yakalanmış medikal görüntülerde çıplak gözle görülmeyecek kadar küçük bir ayrıntının dokunun neresinde olduğunu alan uzmanı doktora göstermek nesne tespiti algoritmalarının sorumluluğundadır.

Bilgisayarlı görü kapsamında ayrıca segmentasyon denilen bir alt alan daha vardır. Bu kısım her ne kadar nesne tespiti yaklaşımına benzerlik gösterse de arka planda çalıştırılan derin öğrenme algoritmaları farklılıklar gösterir [13]. Bu çalışmada segmentasyon konusuna girilmeden sadece nesne tespiti algoritmaları üzerinde araştırmalar yoğunlaştırılmıştır. Nesne tespitinin doğru çalışabilmesi için görüntülerin etiketleme aracı yardımıyla ön işlemden geçirilmesi gerekmektedir. Nesne tespiti için birçok görüntü etiketleme aracı geliştirilmiştir. Bu çalışmada piyasada mevcut en sık kullanılan etiketleme araçları fiyat-performans ve verimlilik açısından kıyaslanmış ve yerli açık kaynak olarak geliştirdiğimiz Cezeri Etiketleme Aracımız tanıtılmıştır. Genel anlamda etiketleme, literatürde veri etiketleme yani labeling kelimesinin karşılığıdır. Biz bu yazımızda etiketlemeyi veri etiketleme yerine görüntülerdeki nesnelere yerlerini etiketleme veya belirtme anlamında kullanacağız.

## 2. MATERYAL VE METOT

Nesne tespiti işi ile ilgilenen bir çalışma grubunun ilk yapması gereken işlem, eğitilecek model için uygun görüntü kümesini oluşturmaktır. Söz konusu veri kümesinin mümkün oldukça ilgilenilen nesnelere kapsayan, farklı varyasyonlar veya durumlar içermesi gerekir. Veri kümesindeki imgelerin sayıca çokluğu modelin öğrenimine katkı sunacaktır. Diğer taraftan [14, 15]'teki çalışmada farklı tipteki etiketleme kaynaklarının ücretlendirme, harcanan zaman, etiketleme kalitesi ve güvenlik eksenlerindeki etkileri Tablo-1'de listelenmektedir.

**Tablo 1.** Farklı kaynaklarca yapılan imge etiketleme işleminin zaman, maliyet, kalite ve güvenlik açısından değerlendirilmesi

Özellik	Dış kaynaklara yaptırma (outsourcing)	Kendi içinde (inhouse)	Kitle kaynaklı (Crowd Sourcing)
Zaman	Orta	Yüksek	Düşük
Maliyet	Orta	Pahalı	Ucuz
Kalite	Yüksek	Yüksek	Düşük
Güvenlik	Orta	Yüksek	Düşük

Tablo-1 incelendiğinde, dış kaynaklara yaptırılan (outsourcing) veri etiketleme işlemlerinin organizasyonlarca daha çok talep edildiği anlaşılmaktadır. Bu seçimde maliyet, zaman ve kalite kriterlerinin katkısı bulunmaktadır.

Tablo-2 piyasada en çok tercih edilen imge etiketleme araçlarını göstermektedir. Bu tabloda listelenen etiketleme araçlarından ücretli olanlar her ne kadar ücretsiz olanlara göre daha

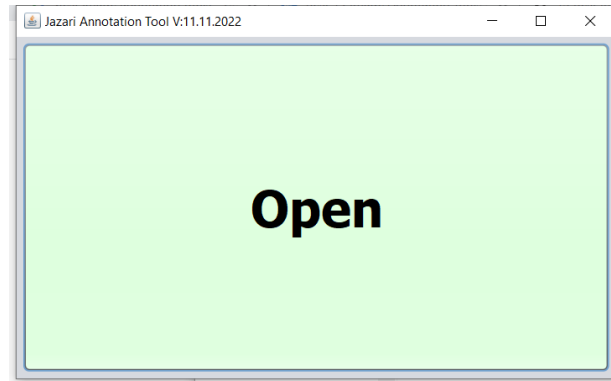
verimli hizmet sağlıyor olsalar da, işletmelere ekstra maliyet yükü getirdiğinden özellikle küçük işletmeler ücretsiz versiyonlara yönelmektedirler.

**Tablo 2.** En çok bilinen imge etiketleme araçları

İsim	Ücretlendirme	Zorluk	Kapsam
Eagle	Ücretli	Kolay	Geniş
V7	Ücretli	Kolay	Geniş
LabelBox	Ücretli	Kolay-Orta	Geniş
Scale AI	Ücretli	Kolay-Orta	Geniş
Super Annotate	Ücretli	Orta	Orta
Data Loop	Ücretli	Orta	Orta
Scalabel-AI	Ücretsiz	Yüksek	Orta
RectLabel	Ücretsiz	Yüksek	Dar
MakesenseAI	Ücretsiz	Yüksek	Dar
ImgLab	Ücretsiz	Yüksek	Dar
Cvat	Ücretsiz	Yüksek	Dar
Labelimg	Ücretsiz	Yüksek	Dar
Labelme	Ücretsiz	Yüksek	Dar

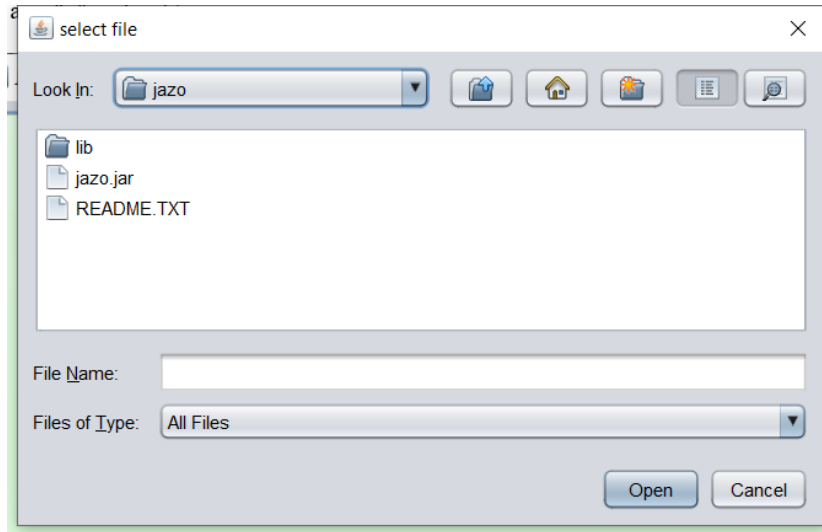
Bu çalışmada, arka uçta Siirt Üniversitesi Bilgisayar Mühendisliği El-Cezeri Siberetik ve Robotik Laboratuvarında geliştirdiğimiz Açık Cezeri Kütüphanesini [16, 17] kullanan, özellikle küçük işletmeler, öğrenciler ve araştırmacılar için faydalı olacağını düşündüğümüz JazariAnnotate isimli (kısa adıyla Jazo) açık kaynak ve ücretsiz bir görüntü etiketleme aracının tanıtımını yapacağız.

Jazo etiketleme aracı Java 8’de swing kütüphanesi kullanılarak geliştirilmiştir. Çalıştırılabilir sürümüne <http://ocl.cezerilab.com/jazo.zip> linkinden erişebilirsiniz. Jazo etiketleme aracı geliştirilirken kullanıcı dostu ve çok basit bir ara yüze sahip olması hedeflenmiştir. İndirme işlemi bittikten sonra zip dosyasını açıp “jazo.jar” dosyasına tıkladığınızda Şekil-2’deki gibi bir giriş arayüzü açılacaktır.



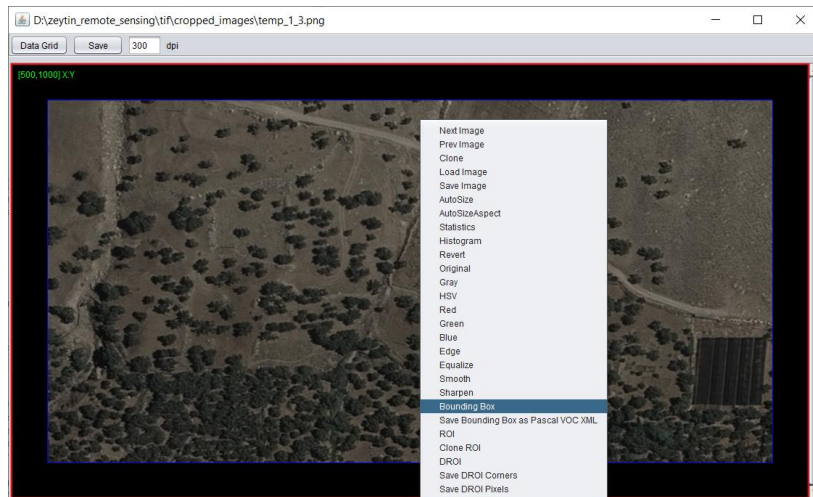
**Şekil 2.** Jazo etiketleme aracı başlangıç/giriş ara yüzü

Bu arayüzden “Open” yazılan buton tıklandığında resimleri etiketlemek istediğiniz klasöre konumlanmanızı sağlayacak Şekil-3’te gösterilen bir dosya seçme penceresi açılacaktır. Bu pencerede ilgili görüntü veri kümesini simgeleyen klasörün içindeki herhangi bir resim dosyasını açmanız gerekmektedir. Alternatif ve daha pratik bir yol olarak ta açmak istediğiniz resim dosyasını sürükleyerek “Open” yazan buton üzerine bırakabilirsiniz bu durumda da bir önceki gibi ilgili resim dosyası açılacaktır.



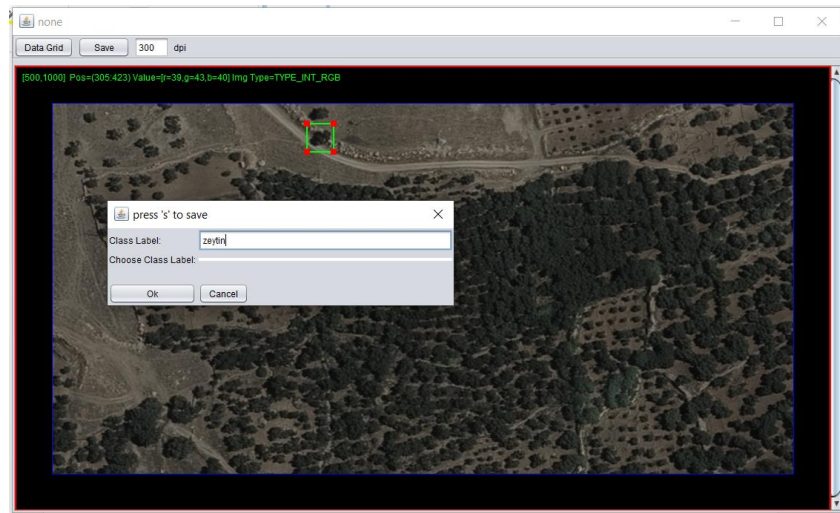
**Şekil 3.** Görüntü dosyası seçme penceresi

Jazo uygulaması png, jpg, bmp, tif resim formatlarını desteklemektedir. İlgilendiğiniz görüntü dosyası sürüklenip bırakıldıktan sonra Şekil-4’teki gibi nesne etiketleme arayüzü aktif olacaktır.




**Şekil 4.** Nesne etiketleme ara yüzü


Arayüz kullanıcıya resmin boyutlarını sol-üst köşede matris formatında sunmaktadır. Bununla birlikte mouse ile görüntü üzerinde gezildiği zaman koordinat bilgileri ve üzerindeki pikselin RGB değerleri de 8 bit olarak yazılmaktadır. Şekil-4'te uçak ile çekilmiş bir hava fotoğrafındaki ağaçların etiketlenmesi söz konusudur. Bunun için resim üzerindeki herhangi bir yerde mouse'a sağ tıklanınca açılan popup menü'den "Bounding Box" menüsü seçilir yani aktive edilir. Bir kez bu seçim yapıldıktan ve etiketlenen alanlar varsayılan olarak PascalVOC formatında kaydedildikten sonra gelen yeni imgeler için "Bounding Box" menüsünü seçme zorunluğu bulunmamaktadır. Aynı şekilde şayet ilgili klasör üzerinde ilk defa bounding box işlemi yapacaksanız hedef nesnenin çevresi dikkörtgensel olarak belirlendikten sonra ilgili nesne için sizden sınıf etiketinin girilmesi de istenir. Şekil-5, belirli bir yerin bounding box ile çizilmesi ve sınıf etiketi atanması işlemlerini göstermektedir.



**Şekil 5.** Belirli bir nesne için kapsayıcı bölge çizilmesi ve ilgili nesneye ait sınıf etiketinin verilmesi

"Class Label" yazan yere nesne sınıfı adını yazdıktan sonra "Ok" tuşuna basılır. Artık varsayılan olarak ilgili nesne ismi aktif olduğu için her işaretlenen bölgenin (bounding box) üzerinde sınıf etiketi yazılır. Farklı bir nesne etiketlenmek istendiğinde ise bounding box üzerine gelinip çift tıklanırsa yeni bir isim veya listedeki diğer sınıf etiketleri atanabilir. Silinmek istenen bounding box'lar mouse ile seçildikten sonra delete tuşuna basılarak silinebilir. Etiket değiştirilmek istenenler ise çift tıklanarak daha önceden var olan etiketlerden birine veya yeni bir etikete atanabilir. PascalVOC formatında kayıt yapmak için klavyeden "s" tuşuna basılır. Görüntü klasörü içerisindeki diğer görüntülere ulaşmak için ise yön tuşları kullanılır. Bu bağlamda bir sonraki görüntüye konumlanmak için sağ yön tuşu , bir önceki



resim için ise sol yön tuşu  kullanılır. Şekil-6 ve Şekil-7 sırasıyla birden fazla etiketlenmiş nesneyi ve ilgili görüntüyü kaydettiğimiz zaman üretilen PascalVOC formatındaki xml dosyasının içeriğini temsil etmektedir.



Şekil 6. Birden fazla nesnenin bir görüntü üzerinde etiketlenmesi

```
<annotation>
  <folder>D:\zeytin_remote_sensing\tif\images</folder>
  <filename>temp_1_4.png</filename>
  <path>D:\zeytin_remote_sensing\tif\images\temp_1_4.png</path>
  <source>
    <database>Unknown</database>
  </source>
  <size>
    <width>1000</width>
    <height>500</height>
    <depth>3</depth>
  </size>
  <segmented>0</segmented>
  <object>
    <name>zeytin</name>
    <pose>Unspecified</pose>
    <truncated>0</truncated>
    <difficult>0</difficult>
    <bndbox>
      <xmin>344</xmin>
      <ymin>28</ymin>
      <xmax>380</xmax>
      <ymax>66</ymax>
    </bndbox>
  </object>
  <object>
    <name>zeytin</name>
    <pose>Unspecified</pose>
    <truncated>0</truncated>
    <difficult>0</difficult>
    <bndbox>
      <xmin>145</xmin>
      <ymin>14</ymin>
      <xmax>178</xmax>
      <ymax>46</ymax>
    </bndbox>
  </object>
  <object>
    <name>zeytin</name>
    <pose>Unspecified</pose>
    <truncated>0</truncated>
    <difficult>0</difficult>
    <bndbox>
      <xmin>92</xmin>
      <ymin>14</ymin>
      <xmax>125</xmax>
      <ymax>42</ymax>
    </bndbox>
  </object>
</annotation>
```

Şekil 7. İlgili resmin etiketlenen bölgelerinin saklandığı PascalVOC formatındaki xml dosyasının içeriği

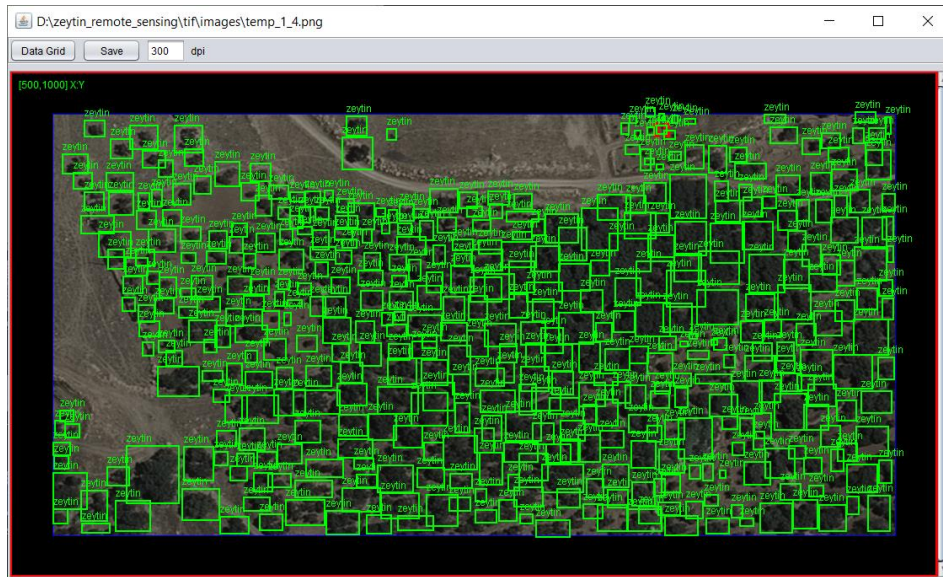
### 3. DENEYSEL ÇALIŞMALAR

Bu kısımda, ücretsiz olarak indirilebilen ve araştırmacıların en yoğun olarak kullandıkları ImgLab, LabelImg, RectLabel, Cvat ve LabelMe araçları ile geliştirdiğimiz Jazo uygulaması hız ve öğrenme eğrisi açısından bağımsız üç denek tarafından test edilmiştir. Deneklerin kendilerine verilen etiketleme işlerini ne kadar sürede bitirdikleri tutulmuş ve ortalamalar alınmıştır. Tablo-2, karşılaştırılan etiketleme araçlarının hızlarını, öğrenme zorluklarını Şekil-6 daki görüntü özelinde listelemektedir.

**Tablo 2.** Görüntü etiketleme araçlarının hız, öğrenme zorluğu ve verimlilik açısından karşılaştırılması

Etiketleme Aracı	Hız (sn)	Öğrenme Zorluğu veya Arayüz kolaylığı [ 1 en kolay ... 5 en zor]
ImgLab [18]	870 sn	4
LabelImg [19]	865 sn	3
RectLabel [20]	910 sn	3
Cvat [21]	900 sn	3
LabelMe [22]	950 sn	4
Jazo [17]	<b>610 sn</b>	<b>1</b>

Tablo-2 incelendiğinde geliştirdiğimiz Jazo uygulamasının diğer ücretsiz yazılımlara göre daha kolay öğrenme eğrisinin olduğu ve bunun sonucunda daha kısa sürede etiketleme işlemlerini bitirdiği gözlemlenmiştir. Etiketlenen örnek imge Şekil-8’de gösterilmektedir.



**Şekil 8.** Jazo etiketleme uygulaması ile etiketlenmiş örnek resim

#### **4. SONUÇ VE DEĞERLENDİRME**

Bu çalışmada Siirt Üniversitesi CezeriLab ekibi olarak 2019 yılından beridir katıldığımız Teknofest Robotaksi otonom araç kategorisinde geliştirdiğimiz otonom araç projemizdeki nesne tespiti yapabilen sürüş algoritmasında kullanılmak üzere Java ve Açık Cezeri Kütüphanesi temelli bir nesne etiketleme aracının tanıtımı yapılmıştır. Geliştirdiğimiz aracın piyasada bulunan ücretsiz uygulamalarla benzerliği bulunmakla birlikte özellikle arayüzünün sade, basit, anlaşılır ve kullanıcı dostu olmasından dolayı araştırmacılar tarafından kullanılabilme potansiyelinin olduğu gözlemlenmiştir. Gelecekte Jazo uygulamasının doğrudan video verisi ile de kullanılabilmesi için çalışmalar yürütülecektir.

#### **TEŞEKKÜR**

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**DERİN ÖĞRENME YÖNTEMLERİYLE CİLT LEZYONLARININ  
SINIFLANDIRMASI: CNN, MLP-MIXER ve VIT**

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**ÖZET**

Cilt kanseri, her yıl tüm dünyada yaklaşık 2 ile 3 milyon arasında yeni teşhis konulan vaka ile halk sağlığı sorunları arasında en ciddi ve ölümcül olanlardan biridir. Genellikle, bu hastalık cilt hücrelerinin anormal büyümesinden meydana gelmekte ve vücut güneş ışığına maruz kaldığında gelişmektedir. Bu hastalığın erken teşhisi, hastaların hayatta kalma oranını önemli ölçüde arttırmaktadır. Bu nedenle, cilt lezyonu tipinin önceden tespit edilmesi ve tedaviye geçilmesi önem arz etmektedir; aksi takdirde, yani hastalığın geç teşhis edilmesi durumunda diğer organlara da yayılmasına neden olabilmektedir. Uzman dermatologlar tarafından bile erken aşamada cilt görüntülerinden tümörleri ayırt etmek zordur. Son zamanlarda cilt lezyonlarını sınıflandırmak için yapay zekâ tabanlı birçok yaklaşım önerilmiştir; bu yaklaşımlar sınırlı sınıflandırma doğruluğundan mustarıptir. Günümüzde derin öğrenme tabanlı yaklaşımlar görüntü sınıflandırma alanında önemli başarılar sağlamak ve birçok sağlık alanındaki problemde karar destek mekanizması olarak kullanılmaktadır. Bu çalışmada derin öğrenme teknikleri ile yedi farklı cilt lezyon tipini (Melanocytic Nevi, Melanoma, Benign Keratosis, Basal Cell Carcinoma, Actinic Keratoses, Vascular Lesions, Dermatofibroma) tahmin etmek ve sınıflandırmak için deneysel çalışmalar gerçekleştirilmiştir. Bu kapsamda, derin öğrenme alanında güncel ve birbiri ile rekabet halinde olan Evrişimsel Sinir Ağları, MLP-mixer ve Vision Transformer modellerinin performansı incelenmiştir. Nicel metrikler kullanılarak bu derin sinir ağlarının performansları değerlendirilmiştir. Gözlemler ve sonuçlar, 10000 etiketli görüntüden oluşan MNIST:HAM10000 veri seti kullanılarak gerçekleştirilen deneylere dayanmaktadır.

**Anahtar kelimeler:** Cilt kanseri, derin öğrenme, evrişimsel sinir ağları, MLP-Mixer, vision transformer

**SKIN LESION CLASSIFICATION USING DEEP LEARNING METHODS: CNN,  
MLP-MIXER and VIT****ABSTRACT**

Skin cancer is one of the most serious and deadly public health problems, with approximately 2 to 3 million newly diagnosed cases worldwide each year. In general, this disease consists of abnormal growth of skin cells and spreads when the body is exposed to sunlight. Early diagnosis of this disease significantly increases the survival rate of patients. For this reason, it is important to detect the type of skin lesion beforehand and proceed to treatment; otherwise, if the disease is diagnosed late, it may spread to other organs. Early diagnosis of this disease from skin images is difficult even by expert dermatologists. Recently, many artificial intelligence-based approaches have been proposed to classify skin lesions; these approaches suffer from limited classification accuracy. Nowadays, deep learning-based approaches provide significant success in the field of image classification and are used as a decision support mechanism in many health problems. In this study, we performed experimental studies to predict and classify seven different skin lesion types i.e. Melanocytic Nevi, Melanoma, Benign Keratosis, Basal Cell Carcinoma, Actinic Keratoses, Vascular Lesions, Dermatofibroma, using deep learning techniques. In this context, we examined the performance of the the-state-of-the-arts deep learning methods i.e. Convolutional Neural Networks, MLP-mixer and Vision Transformer, which are in competition with each other. We evaluated the performances of the deep neural networks using quantitative metrics. Observations and results are based on experiments using the MNIST: HAM10000 dataset consisting of 10000 labeled images.

**Keywords:** Skin cancer, deep learning, convolutional neural networks, MLP-Mixer, vision transformer

## 1. GİRİŞ

Günümüzde radyasyon kaynaklarının artması, çevresel değişiklikler, virüsler, yeme ve içme tarzları nedeniyle kanser hastalarının sayısı her geçen gün artmaktadır (Alam vd., 2019). Cilt kanseri, dünya çapında yayılmakta olan en yaygın ve tehlikeli kanser türlerinden biridir (Tavakolpour v., 2017). Bu ve diğer kanser türlerinin erken teşhisi, iyileşme için önemli bir faktördür. Fakat çeşitli doku yaralanmaları nedeniyle cilt kanseri tespiti oldukça zor ve zaman alıcı bir işlemdir; bu nedenle, deride oluşan koyu renkli lekelere tanı koymak için dermoskopi tekniğinden yararlanılmaktadır. Dermoskopi farklı güçteki ışık ve büyütme sistemlerini kullanarak deri bütünlüğünü bozmadan deri dokusunu tüm katmanları ile değerlendirmeyi sağlayan bir tanı tekniğidir. Bu teknik, cilt kanseri tespitinde yardımsız gözlemlere göre daha başarılıdır. Ancak, tespit doğruluğu dermatolog 'un deneyimine bağlıdır (Bafounta vd., 2001). Dünya çapındaki uzman dermatolog'ların sayısı günümüzün sağlık hizmetleriyle ilgilenmek için yeterli değildir (Alam vd., 2022). Bu sebepten dolayı, uzman bilgisini makine öğrenmesi tabanlı modellere kazandırmak (karar destek mekanizması) için çalışmalar yapılmaktadır (Ataş ve Dogan, 2014; Ataş vd., 2016; Yetis vd., 2021).

Makine öğrenmesi teknikleri kullanılarak, tıbbi görüntülerden farklı kanser türlerinin tespiti üzerine birçok çalışma yapılmıştır (Ali vd., 2019; Tschandl vd., 2019; Eltrass ve Salama, 2020). Bu çalışmalarda, manuel olarak görüntülerden özellikler çıkarılmakta ve bir sınıflandırma algoritması ile performansı incelenmektedir; bu algoritmaların başarısı, kanserli bölgeleri karakterize etmek için çıkarılan özelliklerin seçimine bağlıdır. Yakın zamanda, makine öğrenmesinin bir alt dalı olan derin öğrenme tekniklerinin gelişmesiyle, görüntülerden otomatik sınıflandırma yapılabilmektedir (Ozdemir vd., 2021; Ataş vd., 2022). Bu kapsamda, ILSVRC (Russakovsky vd., 2015) görüntü sınıflandırma yarışmasında yüksek başarımlar sağlayan Convolutional Neural Network (CNN) tabanlı derin öğrenme modelleri (AlexNet (Krizhevsky vd., 2017), Inception (Szegedy vd., 2015), ResNet (He vd., 2015), DenseNet (Zhu ve Newsam, 2017), EfficientNet (Koonce 2021), VGG (Simonyan ve Zisserman, 2014) vb.) sağlık alanında sıklıkla kullanılmaya başlanmıştır.

CNN tabanlı yöntemler, model eğitimi için çok büyük sayıda görüntüye ihtiyaç duymaktadır. Sağlık alanındaki birçok problemde ise yapısında çok fazla parametre barındıran bu modelleri eğitmek için gerekli sayıda görüntü elde etmek zor olabilmektedir. Bu nedenle, veri eksikliğini, hesaplama ve bellek gereksinimlerini azaltmak için öğrenme aktarma (transfer learning) (Pan ve Yang, 2009) ve veri arttırma (Shorten ve Khoshgoftaar, 2019) tekniklerinden



yararlanılmaktadır. Öğrenme aktarma tekniğinde, CNN modellerini sıfırdan eğitmek yerine, farklı bir veri seti kullanılarak eğitilen bir CNN modelin ağırlık değerleri kullanılmakta ve yeni veri seti kullanılarak ince ayar (fine-tuning) yapılmaktadır. Veri artırma tekniğinde ise eğitim aşamasında aynı görüntünün farklı varyasyonları (döndürme, kaydırma, kırpma vb.) da modele girdi olarak sunulmaktadır. Cilt kanseri tespiti için önceden eğitilmiş CNN modelleri kullanılarak birçok çalışma yapılmış ve kabul edilebilir başarılar sunulmuştur (Jinnai vd., 2020; Salamaa vd., 2021; Hameed vd., 2021; Jaisakthi ve Devikirubha, 2021; Haggenmüller vd., 2021; Salma ve Eltrass, 2022).

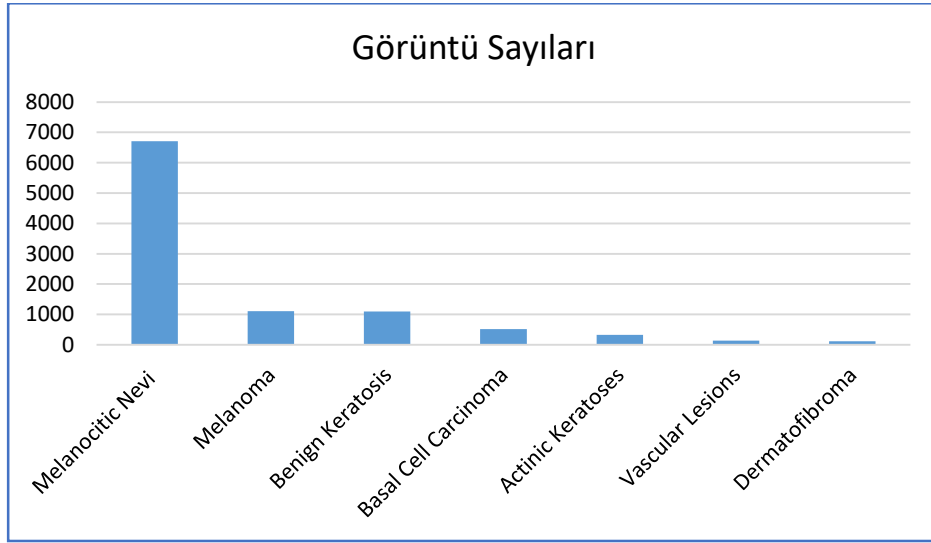
Bu çalışmada, son zamanlarda derin öğrenme alanında CNN tabanlı yöntemlere alternatif olarak sunulan modellerin yedi farklı cilt lezyon tipini (Melanocitic Nevi, Melanoma, Benign Keratosis, Basal Cell Carcinoma, Actinic Keratoses, Vascular Lesions, Dermatofibroma) tespit etmek ve sınıflandırmak için performansı karşılaştırılmıştır. Bu kapsamda, CNN yöntemlerinden ResNet50 modeli ile MLP-Mixer ve Vision transformer (ViT) yöntemleri deneysel olarak karşılaştırılmıştır.

## **2. MATERYAL VE METOT**

Bu kısımda, çalışma kapsamında kullanılan veri seti, derin öğrenme modelleri ve eğitim detayları verilmiştir.

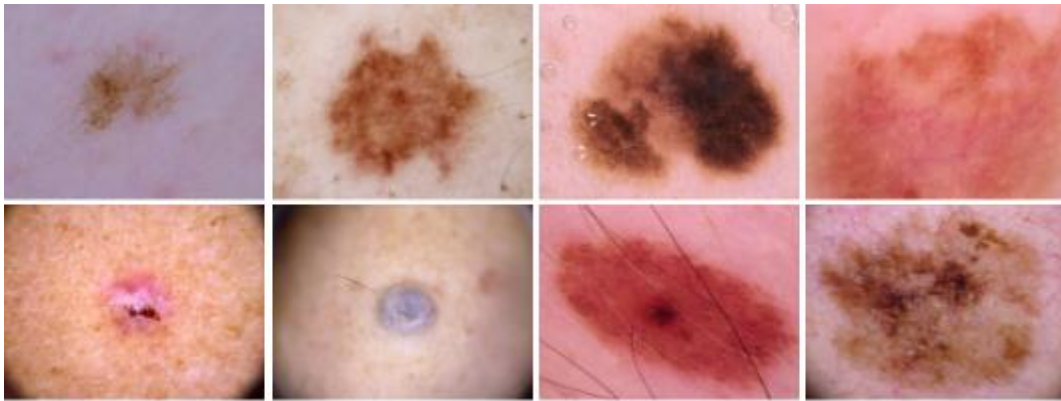
### **1. Veri Seti:**

Bu çalışmada, cilt lezyonların tespitinde sıklıkla kullanılan, halka açık MNIST HAM1000 (Tschandl vd., 2018) veri seti kullanılmıştır. Veri seti farklı modaliteler altında, farklı popülasyonlardan elde edilen toplamda 10015 görüntüden oluşmaktadır. Şekil 1'de veri setindeki her bir lezyon tipi için görüntü sayısı dağılımları verilmiştir.



**Şekil 1.** Veri setindeki her bir sınıf için görüntü sayıları dağılımı

Veri setindeki görüntüler rastgele %80 eğitim (8912) ve %20 test seti (1103) olmak üzere iki kısma ayrılmıştır. Görüntülerin çözünürlükleri 450x600x3'dir; derin öğrenme yöntemleri, genel olarak 224x224x3 girdiler ile beslendiğinden yeniden boyutlandırma işlemi gerçekleştirilmiştir. Şekil 2'de veri setinden alınan bazı görüntüler verilmiştir.

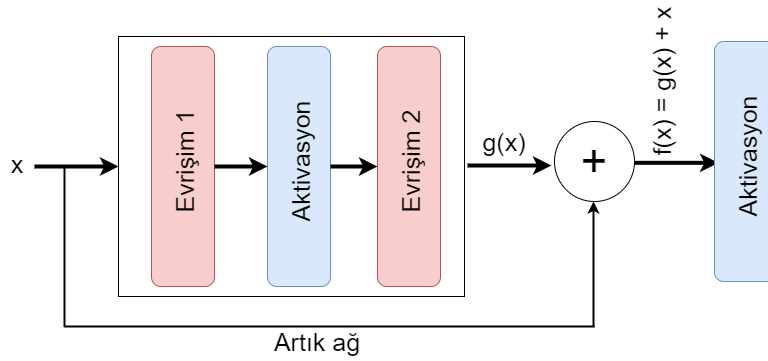


**Şekil 2.** Veri setinden alınan örnek görüntüler

## **2. Derin öğrenme modelleri:**

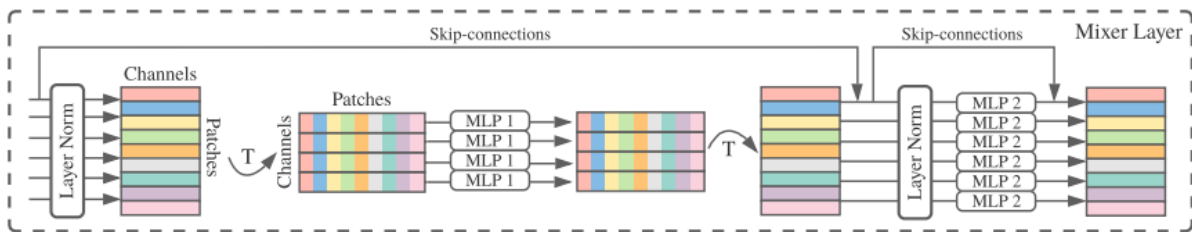
Bu kısımda derin öğrenme alanında birbiri ile rekabet halinde olan 3 farklı yaklaşım hakkında kısa tanımlamalar verilmiştir.

**ResNet50 [He vd., 2015]:** He ve diğerleri tarafından önerilen bu mimari ILSVRC 2015 yarışmasında top-5 hata oranı %3,57 ile en yüksek performansı elde etmiştir. CNN modellerin tanıtılması ile birlikte araştırmacılar gittikçe daha derin modeller oluşturmaya başlamıştır. Ancak, bu beraberinde gradyan azalması (vanishing gradient) olarak adlandırılan bir problemi ortaya çıkarmıştır. ResNet mimarisi ile tanıtılan artık ağlar (residual network) derin ağları eğitme problemini hafifletmektedir. Bu mimaride bazı katmanlar atlanarak istenen katmanlar arasında doğrudan bağlantılar oluşturulmaktadır. Şekil 3’de görüldüğü gibi “x” girdisi bir bloğa girdi olarak verilmenin yanında doğrudan bir kısa devre oluşturularak blok çıkışı ile birleştirilmektedir.



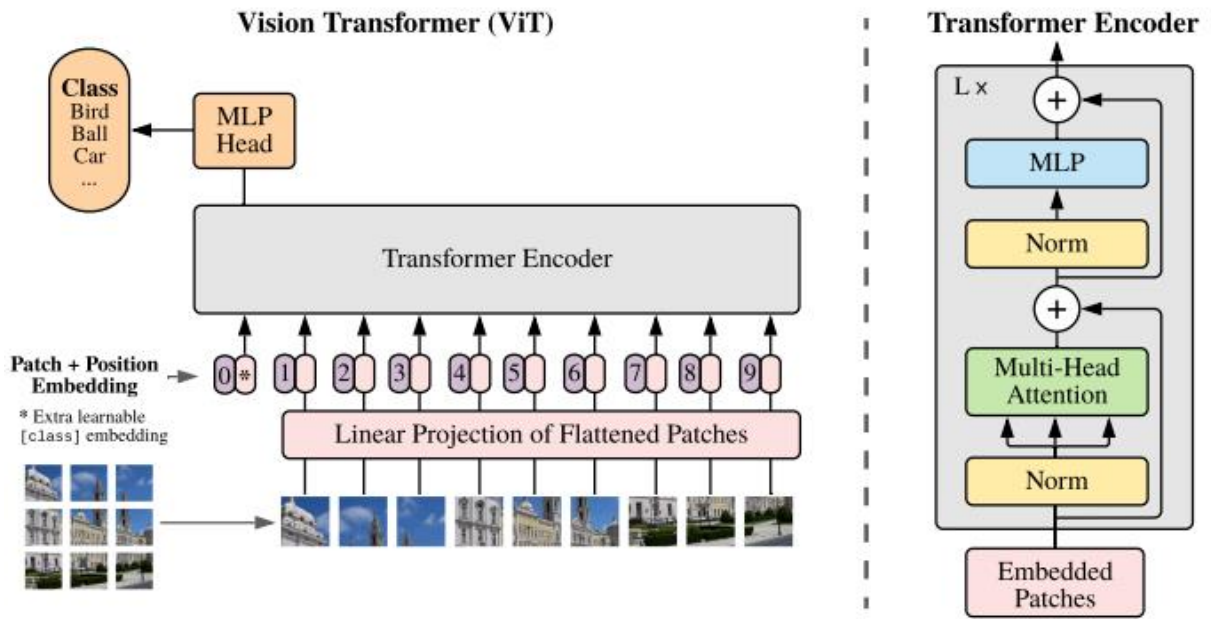
Şekil 3. ResNet mimarisinde artık ağ yapısı

**MLP-Mixer [Tolstikhin vd., 2021]:** Tolstikhin ve diğerleri tarafından geliştirilen bu mimari, yapısında evrişim ve öz dikkat mekanizmaları barındırmayan, teknik olarak basit bir yapıdan oluşmaktadır. MLP-mixer mimarisi, uzamsal konumlar ve özellik kanalları arasında tekrar tekrar kullanılan MLP katmanlarından oluşmaktadır. Kanallar parçalara bölündüğünden genel olarak model parametre sayısı düşük olmaktadır. Bu da IoT gibi cihazlarda kullanılmasına olanak sağlamaktadır. Şekil 4’te MLP-mixer mimarisi verilmiştir.



Şekil 4. MLP-Mixer mimarisi [Tolstikhin vd., 2021]

**ViT [Dosovitskiy vd., 2020]:** Dosovitskiy ve diğerleri tarafından, doğal dil işleme görevlerinde standart hale gelen transformer mimarisi bilgisayarla görme alanına uyarlanmıştır. ViT görüntünün parçaları üzerinde transformer benzeri bir mimari kullanan bir görüntü sınıflandırma modelidir. Bu mimaride; (1) görüntüler ilk olarak sabit boyutlu parçalara bölünmekte, (2) her bir parça doğrusal olarak yerleştirilmekte (embedding), (3) konum yerleştirmeleri eklenmekte ve (4) elde edilen vektör dizisi standart bir transformer kodlayıcıya girdi olarak verilmektedir. Şekil 5'te ViT mimarisi verilmiştir.



Şekil 5. ViT mimarisi [Dosovitskiy vd., 2020]

**Eğitim Detayları:** Modelleri adil olarak karşılaştırmak için temel mimarileri referans alınmıştır. Modeller sıfırdan eğitilmiştir; diğer bir deyişle, öğrenme aktarma uygulanmamıştır. Veri seti %80 eğitim ve %20 test olarak ayrılmış ve veri arttırma tekniği uygulanmamıştır. Her bir derin öğrenme modeli 20 epok (epoch) boyunca eğitilmiştir. Optimizasyon algoritması olarak Adam [Kingma ve Ba, 2014] algoritması kullanılmıştır; öğrenme oranı  $1e-3$  olarak verilmiştir.

### 3. DENEYSSEL ÇALIŞMALAR

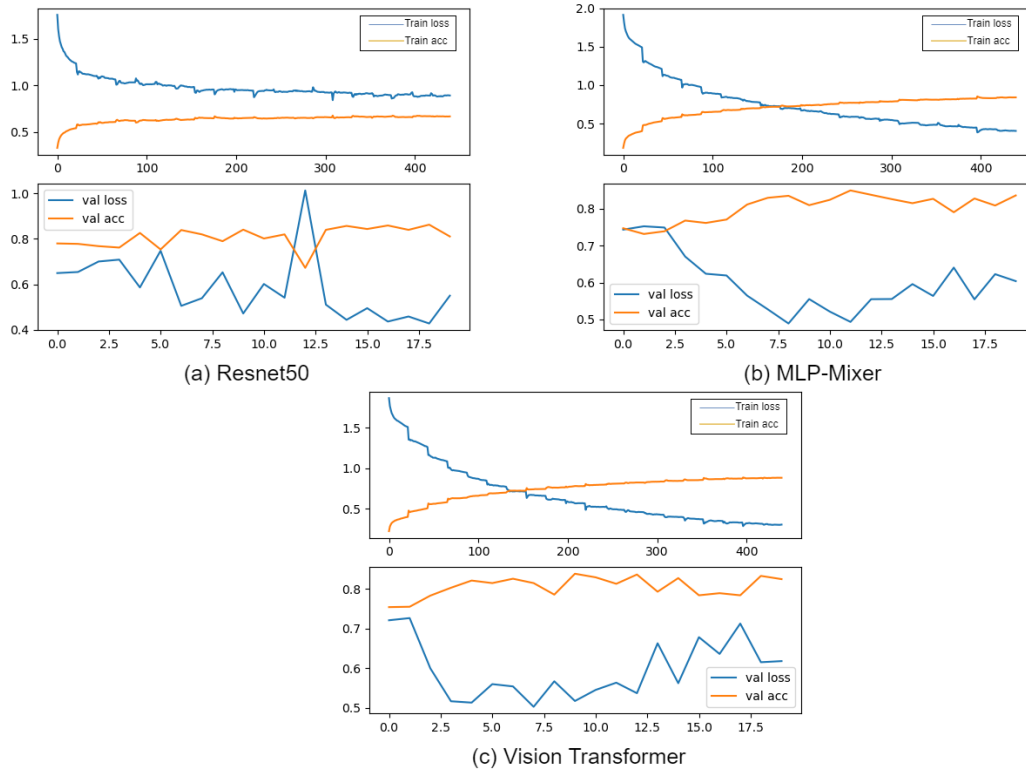
Bu kısımda, güncel derin öğrenme yöntemlerinin cilt kanseri tespiti performansı deneysel olarak karşılaştırılmıştır. Tablo 1'de bu modellerin eğitim doğruluğu, test doğruluğu ve

parametre sayıları verilmiştir. Tablo incelendiğinde, CNN tabanlı modelin en yakın performans gösteren MLP-mixer modelinden %1.26 daha fazla başarı gösterdiği görülmektedir. Parametre sayısı olarak bakıldığında ise ViT mimarisinin diğer modellere göre çok az parametre içerdiği gözlenmektedir.

**Tablo 2.** Derin öğrenme modellerinin cilt kanseri tespitinde performanslarının karşılaştırılması

	Eğitim doğruluğu (%)	Test doğruluğu (%)	Parametre sayısı
ResNet50 (He vd., 2015)	89.21	<b>86.22</b>	23.522.375
MLP-Mixer (Tolstikhin vd., 2021)	87.45	84.96	15.756.039
ViT (Dosovitskiy vd., 2020)	86.92	83.87	<b>4.574.456</b>

Şekil 6’da ResNet50, MLP-Mixer ve ViT modellerinin eğitimi boyunca elde edilen doğruluk ve validasyon grafikleri verilmiştir. Grafiklerde (üstte) eğitim fonksiyonu (altta) validasyon fonksiyonları verilmiştir. Dikkat edilirse, tüm modellerde eğitim boyunca kayıp değerinin azaldığı ve dolayısıyla doğruluk oranının arttığı görülmektedir.



**Şekil 6.** Her bir modelin eğitim ve validasyon doğruluk ve kayıp fonksiyonları

#### **4. SONUÇ VE DEĞERLENDİRME**

Cilt kanseri, geç teşhis edilmesi durumunda en ölümcül hastalıklardan biridir. Bu çalışmada, güncel derin öğrenme modellerinin cilt kanserini tespit etme performansı irdelenmiştir. Yapılan deneysel çalışmalarda, CNN tabanlı ResNet50 modelinin diğer güncel derin öğrenme modellerine (MLP-Mixer ve ViT) göre daha iyi performans sağladığı gözlenmiştir. MLP-Mixer ve ViT modelleri, CNN modellerine göre daha az parametre içermektedir; bu, modellerin IoT cihazlarda kullanılmasına olanak sağlayabilir. Çalışmanın devamında bu modellerin performansını arttırmaya yönelik çalışmalar yapılacaktır. Ayrıca veri seti incelendiğinde, sınıf başına düşen görüntü sayısının dengeli olmadığı ve modellerin performansını sınırladığı gözlenmiştir; veri arttırma teknikleri ile sınıflardaki görüntü sayısı dengelenerek modellerin performansları arttırılmaya çalışılacaktır.

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**UÇAKTAN ÇEKİLMİŞ HAVA İMGELERİNDEN COĞRAFİ İŞARETLİ ZEYTİN  
AĞACI SAYISININ DERİN ÖĞRENME YÖNTEMLERİ İLE TAHMİNİ**

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**ÖZET**

Havadan çekilmiş görüntüler, günümüzde uzaktan algılama kapsamında özellikle tarım, güvenlik, askeri, şehir ve afet yönetimi başta olmak üzere birçok alanda başarılı ve etkin bir şekilde kullanılmaktadır. Söz konusu imgeler uydu teknolojisi kullanılarak ya da uçağa bağlı görüntü yakalama sistemleri aracılığıyla elde edilir. 30 cm uzamsal çözünürlük ile uçaktan alınan renkli hava fotoğrafları, genellikle 1 metre ve üzeri uzamsal çözünürlüğe sahip uydu görüntülerine göre daha çok bilgi barındırdığı için çalışmamızda uçaktan çekilmiş renkli hava görüntüleri tercih edilmiştir. Bununla birlikte, yapay zekâ alanındaki gelişmeler sonucunda tahminleme yeteneği artan bilgisayarlı görü ve özelinde nesne tespiti algoritmaları uzaktan algılamada etkin bir şekilde kullanılmaktadır. Bu çalışmada, Mardin ili Derik ilçesinde zeytin ağacı popülasyonunun nispeten yüksek olduğu bölgelerden alınan toplam 3 adet yüksek çözünürlüklü tiff formatındaki imge, açık cezeri kütüphanesi yardımıyla ön işlemden geçirildikten sonra yine aynı yazılımla zeytin ağaçları ve imgede bulunan diğer nesnelere etiketlenerek nesne tespit algoritmasının eğitimi için veri seti oluşturulmuştur. Nesne tespit modeli ile tahmin edilen zeytin ağaçlarının sayısı ile saha uzmanının görüntü üzerinde tespit ettiği zeytin ağaçlarının sayıları karşılaştırılmıştır. Ulaşılan %90 ve üzeri tahminleme oranı ile geliştirdiğimiz java ve python tabanlı nesne tespit ve sayımı algoritmasının özellikle coğrafi bilgi sistemleri ve uzaktan algılama alanlarında çalışmalar yürüten araştırmacılar için bir yardımcı kaynak olacağı öngörülmektedir.

**Anahtar kelimeler:** Uzaktan algılama, yapay zekâ, bilgisayarlı görü, derin öğrenme, nesne tespiti.

**ESTIMATING THE NUMBER OF GEOGRAPHICALLY MARKED OLIVE TREE  
FROM SATELLITE IMAGES WITH DEEP LEARNING METHODS****ABSTRACT**

Today, aerial images are used successfully and effectively in many fields, especially in agriculture, security, military, city and disaster management, within the scope of remote sensing. These images are acquired using satellite technology or by means of image capture systems attached to the aircraft. Since aerial photographs captured from the aircraft with a spatial resolution of 30 cm usually contain more information than satellite images with a spatial resolution of 1 meter or more, colored aerial images taken from the aircraft were preferred in this study. In addition to these, computer vision, whose predictive ability has increased as a result of developments in the field of artificial intelligence, and in particular, object detection algorithms are used effectively in remote sensing. In this study, a total of 3 high-resolution tiff images taken from the regions where the olive tree population density is relatively high in Derik district of Mardin province were pre-processed via the open cezeri library. Then, the olive trees and other objects in the image were annotated and the data set for the training of the object detection algorithm was established. The number of olive trees estimated by the object detection model and the number of olive trees detected by the field expert were compared. It is predicted that the java and python-based object detection and counting algorithm, which we have developed with an estimation rate of 90% or more, will be a favorable resource for researchers working in the fields of geographic information systems and remote sensing.

**Keywords:** Remote sensing, artificial intelligence, computer vision, deep learning, object detection.

## 1. GİRİŞ

Teknolojinin gelişimi ile birlikte hava ve uydu kaynaklı veri toplama yöntemleri doğru bilgi ihtiyacı ile birlikte hız ve maliyet kazanma tarafında büyük avantajlar sağlamaktadır. Havadan çekilmiş görüntüler günümüzde yapay zekâ bileşeni olan bilgisayarlı görü tarafından makinelerin, görüntü içeriğini görmesini ve anlamasını sağlamak için insan görme sistemini taklit etmeye çalışırlar. Bilgisayarlı görü yöntemleri, nesnelere algılamada ve lokalizasyonunda ilgili alanda uğraşan saha uzmanlarına stratejik bilgi sağlarlar. Bu bilgiler içerisinde nesnenin bağlı olduğu sınıf bilgisi, nesnenin imge içerisindeki konumu ve nesne sayısı sayılabilir. Makine öğrenmesi, bilgisayarlı görü ve derin öğrenme yöntemleri, özellikle hassas tarım [1, 2], gıda güvenliği [3, 4] , eğitim [5], uzaktan algılama [6-8], sağlık [9,10], biyometri [11] vb. alanlarda başarılı bir şekilde uygulanmaktadır. Nesne algılama ve sınıflandırma gibi bilgisayarlı görme uygulamaları, en son teknoloji donanımla birleştiğinde, insanlığa ve üretime büyük miktarda ve kayda değer oranda katkı sunar.

Şekil-1’de gösterildiği gibi herhangi bir meyve ağacındaki portakal görüntülerinin tanımlanması nesne tespit algoritmaları ile mümkün olmaktadır.



Şekil 1. Tanımlamada nesne tespitinin kullanımı [12]

Bu çalışmamızda, Google Colab üzerinden çalıştırdığımız son teknolojik ürün (state of the art) olan Yolo v7 nesne tespit algoritmasını kullanarak zeytin ağaçlarının algılanmaları ve toplam sayıları tahmin edilmeye çalışılmıştır. Çalışmamızda kullandığımız yüksek çözünürlüklü RGB hava imgeleri Mardin İl Tarım Orman Müdürlüğünden temin edilmiştir.

## 2. MATERYAL VE METOT

Bu çalışmada Mardin ilinin Derik ilçesinde geniş bir alanı kaplayarak yetiştirilen coğrafi işaretli zeytin ağaçları imgeleri kullanılmıştır. Yüksek çözünürlüklü (15.000x10.000) tif formatında ve renkli (RGB) imgeler arasında nesne tespiti eğitimi ve testinde kullanacağımız görüntüler filtrelenmiştir. Seçilen imgeler yüksek çözünürlüklü olduğundan etiketleme ve eğitim süreçlerinde yavaşlamaya neden olabilir. Bu yüzden ön işlem olarak Siirt Üniversitesi Bilgisayar Mühendisliği El-Cezeri Siberetik ve Robotik Laboratuvarında geliştirilen Open Jazari Library (OJL) kütüphanesi [13, 14] yardımıyla orjinal 15.000x10.000 imge alanı  $I_{M[20,15]}$  imge alanlarına bölütlenmiştir. Bu durumda, her bir tif imgesinden 300 adet 1000x500 çözünürlüğünde kesilmiş resimler elde edilmiştir.

Bilgisayarlı görü problemlerinde etiketleme en fazla zaman alan, dikkat, titizlik ve iş gücü gerektiren bir işlem olduğundan kullanılacak etiketleme yazılımının; kullanıcı dostu, hızlı ve en az hata yapılmasına olanak sağlayan bir araç olması son derece önemlidir. Nesnelere etiketleme işlemi için yine OJL’de bulunan imge etiketleme aracı kullanılmıştır. Şekil-2 imge üzerindeki zeytin ağaçların bulunduğu bölgelerin PascalVOC xml formatındaki kapsayıcı kutu (bounding box) ile işaretlenmesini göstermektedir.



**Şekil 2.** OJL etiketleme aracı ile etiketlenen coğrafi işaretli Derik zeytin ağaçları.

Şekil-2’den de anlaşılacağı üzere, sadece coğrafi işaretli Derik zeytin ağaçları etiketlenmiştir. Dışında kalan nizami ölçülerde dikilen ve alan olarak küçük olarak nitelendirebildiğimiz yeşil bölgeler üzüm bitkisine ait olduğu için üzerinde herhangi bir etiketlendirme işlemi gerçekleştirilmemiştir. Bunun nedeni, nesne tespit algoritmamızın eğitimi sürecinde sadece bir

nesneye odaklanmasını ve tespit başarısına olumlu katkı sunmasını sağlamaktır. Veri kümesindeki imgelerin %80'i eğitim geriye kalan %20'si ise test için kullanılmıştır.

Günümüzde nesne tespit alanında kullanılan birçok algoritma vardır. Bu algoritalardan biri olan YOLO (You Only Look Once) algoritması oldukça başarılı sonuçlar üretmektedir. Bu nedenle yapılan çalışmada Yolo-V7 algoritması tercih edilmiştir [15]. Algoritmanın 7 farklı versiyonundan tespit doğruluğu ve hız olarak en iyi sonuç üreten Versiyon-7 algoritmasında karar kılınmıştır. OJL yardımıyla üretilen etiket bilgileri varsayılan olarak PascalVoc xml formatında kaydedilir. Yolo-V7 json formatına çevrimi için Şekil-3'teki Java kodu kullanılmıştır.

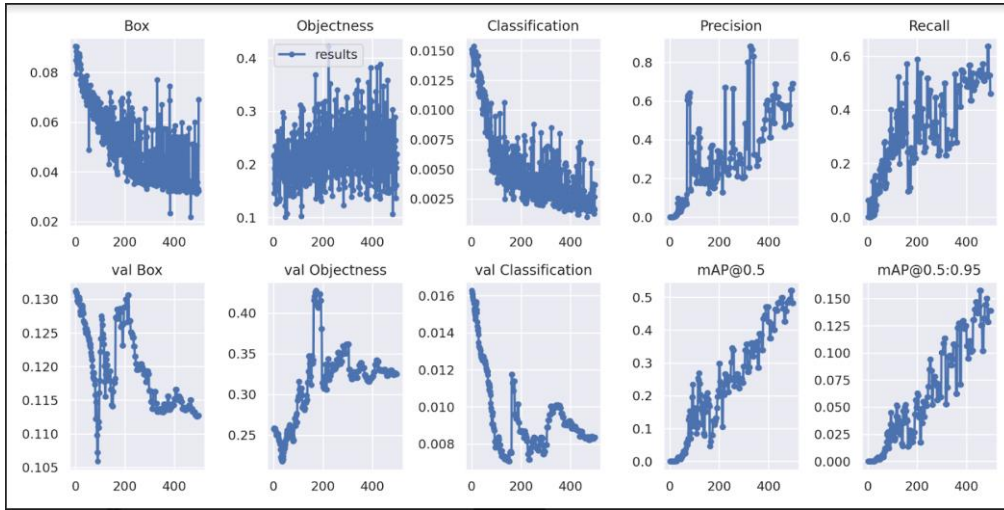
```
public static void convertPascalVoc2YoloFormat(String mainFolderPath, String labels_map_file) {
    File[] files = FactoryUtils.getFileListInFolder(mainFolderPath);
    int x1, x2, y1, y2, w, h, n, class_index;
    float px1, px2, py1, py2;
    String[] refList = FactoryUtils.readFile(mainFolderPath + "/" + labels_map_file).split("\n");
    Map<String, Integer> map = new HashMap();
    for (String str : refList) {
        String s = str.split(" ")[1];
        int i = Integer.parseInt(str.split(" ")[0]);
        map.put(s, i);
    }
    String globalRet = "";
    for (File f : files) {
        if (f.isFile() && FactoryUtils.getFileExtension(f).equals("xml")) {
            BoundingBoxPascalVOC bbp = deserializePascalVocXML(f.getAbsolutePath());
            w = bbp.size.width;
            h = bbp.size.height;
            String ret = "";

            for (PascalVocObject pv : bbp.lstObjects) {
                x1 = pv.bndbox.xmin;
                y1 = pv.bndbox.ymin;
                x2 = pv.bndbox.xmax;
                y2 = pv.bndbox.ymax;
                px1 = (x1 + x2) / 2.0f / w;
                py1 = (y1 + y2) / 2.0f / h;
                px2 = (x2 - x1) * 1.0f / w;
                py2 = (y2 - y1) * 1.0f / h;
                class_index = map.get(pv.bndbox.name);
                ret += class_index + " " + px1 + " " + py1 + " " + px2 + " " + py2 + "\n";
            }
            globalRet += ret;
            FactoryUtils.writeToFile(mainFolderPath + "/" + FactoryUtils.getFileName(bbp.fileName) + ".txt", ret);
        }
    }
    FactoryUtils.writeToFile(mainFolderPath + "/" + "yolov7.txt", globalRet);
}
```

**Şekil 3.** PascalVOC xml formatındaki nesne etiket bilgilerinin Yolo json formatına çevrimini sağlayan Java kodu.

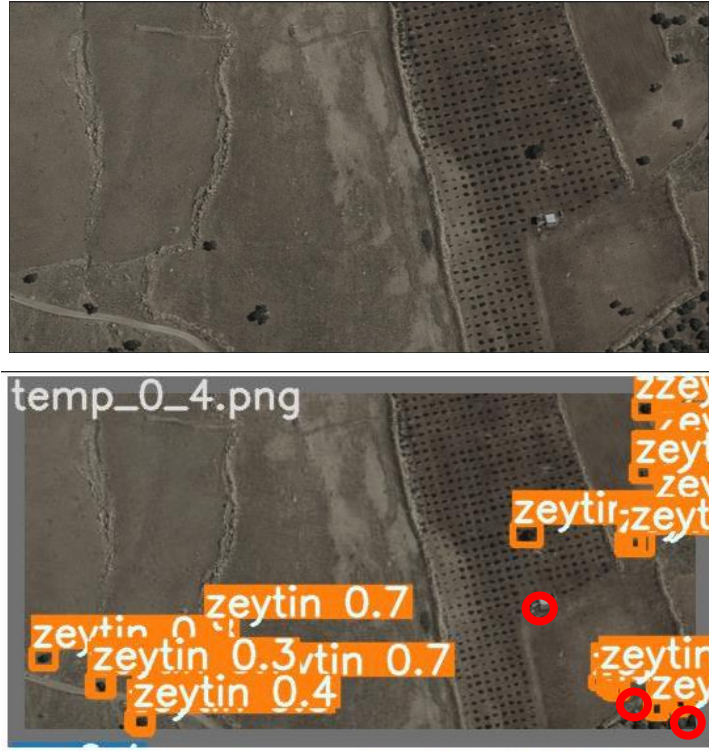
### 3. DENEYSEL ÇALIŞMALAR

Çalışmada geliştirme ortamı olarak Google Colab (Google Collaboratory) [16] tercih edilmiş olup, yapay zekâ ve derin öğrenme projeleri üzerinde çalışanlar için etkileşimli, tamamen bulut tabanlı, kullanımı kolay ve ortak çalışmaya dayalı bir yazılım platformudur. Ücretsiz olan ve kurulum gerektirmeyen Google Colab, 2017 senesinde Google firması tarafından piyasaya sürülmüştür. MsCOCO nesne tespit veriseti ile eğitilmiş hazır YoloV7 modelinin ağırlıkları transfer edildikten sonra kendi verisetimiz üzerinden 500 epok süresince bir eğitime tabi tutularak ağırlıklar optimize edilmiştir. Google Colab bulut hizmeti sınırlı kaynak tahsisi yaptığı ve eğitimde kullandığımız resim boyutunun yüksek olmasından kaynaklı, eğitimdeki batch\_size değeri 4 ile sınırlandırılmıştır. Eğitim yaklaşık 3 saat sürmüştür. Şekil-4 coğrafi şarteli Derik zeytin ağaçları veri setinin YoloV7 modeli ile eğitiminde elde edilen sonuçları temsil etmektedir. Şekil-4 incelendiğinde, özellikle mAP (mean average precision), Box, Precision, Recall ve Classification değerlerindeki iyileşmelerin ilerleyen epok sayısına göre arttığı anlaşılmaktadır.



Şekil 4. Eğitim sürecindeki YoloV7 modelinin zeytin ağaçlarını tespit metrikleri.

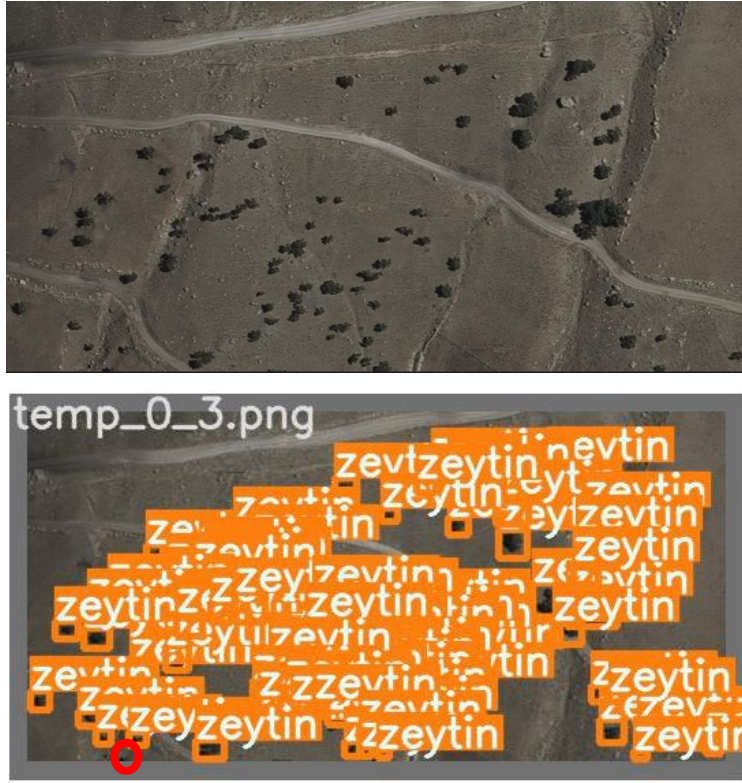
500 epok süresince en iyi skorlar checkpoint'ler yardımıyla Google drive' a kaydedilmiştir. Ardından en başarılı model seçilerek test işlemi başlatılmıştır. Yapılan kapsamlı test denemelerinde Şekil-5, ve Şekil-6'de de görüleceği üzere YoloV7 nesne tespit modelinin %90 ve üzeri nesne tespit başarısı ile zeytin ağaçlarını algıladığını ve sayısını hesaplayabildiği gözlemlenmiştir.



**Şekil 5.** Eğitilmiş YoloV7 modelinin test başarısı. Üstte orjinal resim altta nesne tespiti yapılan resim.

Şekil-5'te gösterilen görüntüde manuel olarak yaklaşık 30 adet zeytin ağacı sayılmaktadır. YoloV7 modelinin yaklaşık 27 adet sayım yaptığı gözlemlenmiştir. Tespit edilemeyen üç adet zeytin ağacı kırmızı çemberlerle gösterilmiştir.





**Şekil 6.** Eğitilmiş YoloV7 modelinin test başarısı. Üstte orjinal resim altta nesne tespiti yapılan resim.

Benzer şekilde, Şekil-6 daki üstteki test imgesinde, yaklaşık 80 civarında zeytin ağacı sayılmaktadır. Bu örnekte 1 adet zeytin ağacı sayılamamıştır. Coğrafi işaretli Derik zeytin ağaçları için geliştirdiğimiz YoloV7 nesne tespit modelimizin test görüntülerinden yola çıkarak ortalama %90 başarı ile zeytin ağaçlarını tespit ettiği gözlemlenmiştir.

#### **4. SONUÇ VE DEĞERLENDİRME**

Bu çalışmada Mardin ili Derik ilçesine ait coğrafi işaretli zeytin ağaçlarının tespitine dair YoloV7 tabanlı nesne tespit modeli eğitilmiştir. Derik zeytin ağaçları endemik bir tür olup çalışmamızın bu ağaçların korunması ile birlikte sonradan yapılacak çalışmalar için bir envanter ve alt yapı oluşturması hedeflenmiştir. Çalışmamızda nesne tespit modeli geliştirirken görüntülerin hazırlanması ve etiketlenmesi işlemlerinde kullandığımız OJL imge etiketleme aracının kolay kullanımı ve verimliliği de ayrıca test edilmiştir. Bu bağlamda bilgisayarlı görü ve nesne tespiti alanlarında çalışmalar yapan araştırmacıların söz konusu ürünü kullanmaları önerilmektedir. Gelecekte yapacağımız çalışmalarda zeytin ağacının dışındaki bitki türleri ve nesnelere (ev, taşıt, üzüm, ceviz vb) araştırmamıza dahil edilerek nesne tespiti modeline etkileri

detaylı olarak incelenecek ve diğer nesne tespit algoritmaları (SSD, Fast RCNN, R-FCN vb) ile performans karşılaştırması (benchmark) yapılacaktır.

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**THERMOGRAVIMETRIC ANALYSIS IN NITROGEN AMBIENT OF  
COPPER/TITANIA SELECTIVE CATALYTIC REDUCTION CATALYST  
POISONED WITH CALCIUM**

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**ABSTRACT**

The selective catalytic reduction (SCR) system is an exhaust emission control system used to reduce nitrogen oxide ( $\text{NO}_x$ ) emissions in diesel engines with the help of catalysts and reductants. In this study, copper (II) chloride ( $\text{CuCl}_2$ ), titanium dioxide ( $\text{TiO}_2$ ), and calcium hydroxide ( $\text{Ca}(\text{OH})_2$ ) nanoparticles were used to produce powder catalysts. While copper was used as an active metal particle, titanium dioxide was preferred as a wash coat material. Calcium is known as a critical poison that causes the deactivation of the SCR catalyst. The purpose of this study is effects of calcium (Ca) addition and calcination temperature on thermogravimetric analysis (TGA) of copper-based catalyst. TGA analysis of the catalyst samples were conducted by heating at a rate of  $20\text{ }^\circ\text{C}/\text{min}$  from  $25\text{ }^\circ\text{C}$  to  $1100\text{ }^\circ\text{C}$  temperature at nitrogen ambient, before and after calcination process. In view of thermogravimetric analysis, the weight loss of samples was determined. The analysis results show that the addition of Ca nanoparticles to the catalyst raises the weight loss approximately two times.

**Keywords:** Thermogravimetric analysis, Selective catalytic reduction, Catalyst, Nanoparticles

## 1. INTRODUCTION

Nitrous oxide ( $\text{NO}_x$ ) emissions are an emission resulting from the combustion of fuel in diesel engines. These emissions are among the disadvantages of diesel vehicles as they are not an environmentally friendly product due to their harmful properties. Diesel engines can get rid of this disadvantage, thanks to selective catalytic reduction (SCR) technology, which is an effective and efficient system. The SCR system has a structure consisting of catalyst and reductant. By using ammonia ( $\text{NH}_3$ ) which is the most familiar reductant that takes an active role in this structure, it transforms  $\text{NO}_x$  emissions into  $\text{H}_2\text{O}$  and  $\text{N}_2$  with the help of a catalyst and renders them harmless.  $\text{V}_2\text{O}_5\text{-WO}_3/\text{TiO}_2$  catalyst is commercially used in this system. However, fly-ash emitted from combustion comprises various poisonous substances, such as  $\text{SO}_2$ , alkali metals and alkaline-earth metals. They are in tendency to reduce gradually the effectiveness of  $\text{NO}_x$  removal and restrict the operating life-time of the SCR catalyst (Li et al., 2017; Nicosia, Czekaj, and Kröcher, 2008). It is generally accepted that lubricating oil and its additives, engine corrosion and wear, metals mainly cause fly ash in diesel fuel (Tornehed and Olofsson, 2011; Wang et al., 2019; Sappok and Wong, 2007). Among these sources, lubricating oil is considered the primary source and makes up the majority of the ash (Bagi, Bowker, and Andrew, 2016; Van Kooten et al., 2000). The chemical composition of ash stemmed from lubricating oil principally consists of Mg, Ca, S, and P (Liati et al., 2012; Nemoto et al., 2004). The calcium forms deposits in the combustion systems and thus, it is known as a fly ash that causes the deactivation of the SCR catalyst (Xiang Li et al., 2017; Shu-ming Liu et al., 2017, Albert et al., 2019). Many researchers have conducted studies by using thermogravimetric analysis (TGA) analysis method to investigate the thermal stability and decomposition, weight loss of the catalyst produced with different nanoparticles (Du et al., 2021; X. Liu et al., 2020; Putluru et al., 2015; Shi et al., 2021). Pang et al. synthesized a series of Ce doping Copper/zeolite and Copper/zeolite catalysts utilizing impregnation of wetness process. They performed the TGA to define the passivate factors composed on face of the sulfated Copper cerium-2/zeolite and Copper/zeolite catalysts. The weight losses of the both sulfated catalysts were observed over three temperature regions. They thought that above  $500\text{ }^\circ\text{C}$ , which is the final temperature region, may be the result of the separation of Copper (II)sulfate composed on the face of catalyst. In addition, they reported that for the sulfated CuCe-2/ZSM-5 catalyst, the loss of weight in the final temperature region were surplus lesser than that of the sulfated Copper/Zeolite catalyst, due to forming of more  $\text{CuSO}_4$  on the face of Copper/Zeolite catalyst.

As a result of TGA, they asserted that in the presence of SO<sub>2</sub>, the formation of Copper(II)sulfate on the face of Ce doping Cu/ZSM-5 catalysts could be hindered (Pang et al., 2014). Thermogravimetric analysis (TGA) comes to the fore in determining thermal reaction characterization with its precision in temperature control and mass measurement, and ease of use. TGA analysis helps to determine weight losses over a wide temperature range in an O<sub>2</sub> or N<sub>2</sub> atmosphere and also to observe both the pyrolysis and combustion profiles of the analyzed material. Its greatest advantages include reduced sample sizes and relative speed. With the result of thermogravimetric analysis, a data is obtained about how the weight of a sample changes with temperature. TGA analysis results allow for use in the analysis of reaction kinetics and in proposing reaction mechanisms (Fang et al., 2019; Shen et al, 2021; Toniolo et al., 2008; Xiang et al., 2018). Zhang et al. (Zhang et al., 2020) investigated the thermal characteristics of the materials by applying TGA analysis to Cu-BTC (benzene-1,3,5-tricarboxylate) and Ce-Cu-BTC materials. At temperatures above 300 °C, weight losses were found to be approximately 41% for Cu-BTC and 28% for Ce-Cu-BTC. They noted that when the temperature exceeded 400 °C, the organic materials were completely thermally separated in three stages. In the thermal gravimetric analysis study examining the thermal behavior of NiMn-MOF (Metal-organic frameworks)-74 particulate matter (Shi et al., 2021), it was determined that there was mass loss in four regions in the samples in the temperature range of 50 to 600 °C in the TGA graphs. It was observed that the increase of Mn content in the samples provided a higher decomposition temperature. Rami et al. (Rami et al., 2020) investigated the thermal characteristics of these materials by forming nanoparticles with Fe<sub>2</sub>O<sub>3</sub>, CuO, ZnO and Co<sub>2</sub>O<sub>3</sub> materials. Thermal analysis results revealed that Fe<sub>2</sub>O<sub>3</sub> lost weight between 127 °C and 227 °C, while other materials decomposed at higher temperatures. In their study using Fe<sub>2</sub>O<sub>3</sub> material, Liao et al. (Liao et al., 2001) found that a high rate of weight loss was experienced in particulate material between 50 °C and 200 °C.

In this study, Ca-Cu/TiO<sub>2</sub> and Cu/TiO<sub>2</sub> catalysts were used. The effect of Ca poisoned Cu/TiO<sub>2</sub> catalyst on its thermal stability and decomposition temperatures was studied through TGA analysis for situations of before and after calcination process.

## **2. MATERIAL AND METHODS**

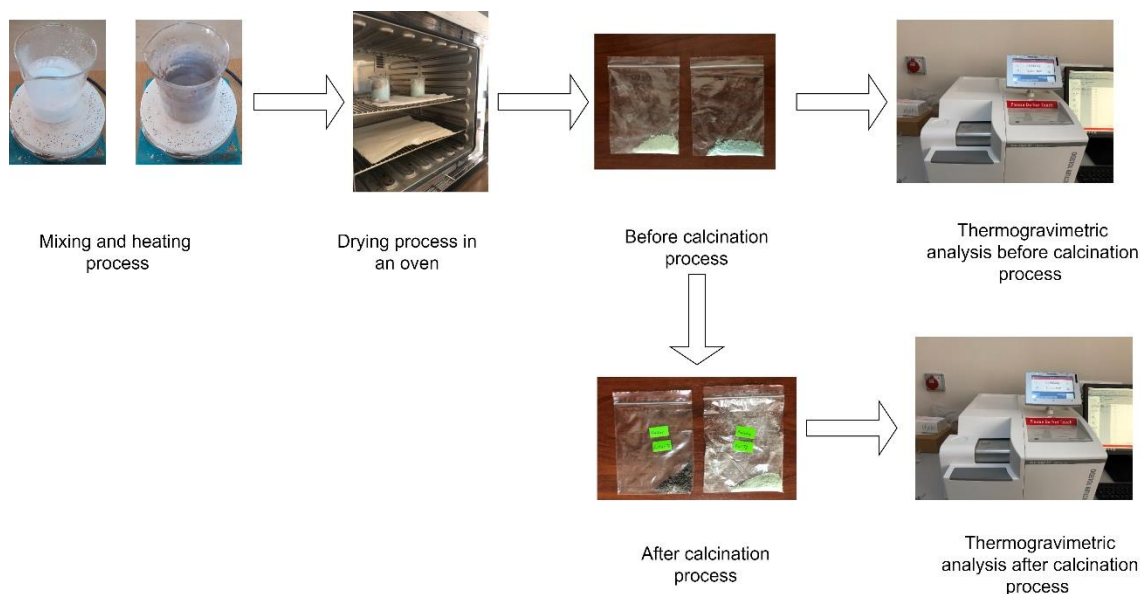
Among of nanoparticles used in catalyst production includes copper (II) chloride (CuCl<sub>2</sub>), titanium dioxide (TiO<sub>2</sub>) and calcium hydroxide (Ca (OH)<sub>2</sub>). It was also used in the amounts

given in the Table 1. The necessary amounts of materials were mixed in 150 mL distilled water by heating with a magnetic stirrer to prepare the solution. Excess water of the solution was evaporated during mixing. Then, a mud-like slurry was formed in the beaker. Last, it was dried in an oven at 130 °C for 12 h (Figure 1).

**Table 1.** Amounts of material in catalyst preparation

Catalysts	Materials		
	CuCl <sub>2</sub>	Ca (OH) <sub>2</sub>	TiO <sub>2</sub>
Cu/TiO <sub>2</sub>	0.01 mol	-	0.1 mol
Ca-Cu/TiO <sub>2</sub>	0.01 mol	0.01 mol	0.1 mol

After these procedures, TGA analysis was performed for both samples. TGA analysis conditions of the samples were carried out heating from 25 °C to 1100 °C at a rate of 20 °C/min in nitrogen ambient. According to the results of TGA analysis, catalyst samples were calcined at 400 °C for 2 hours. And then TGA analyzes were performed again under the same conditions.



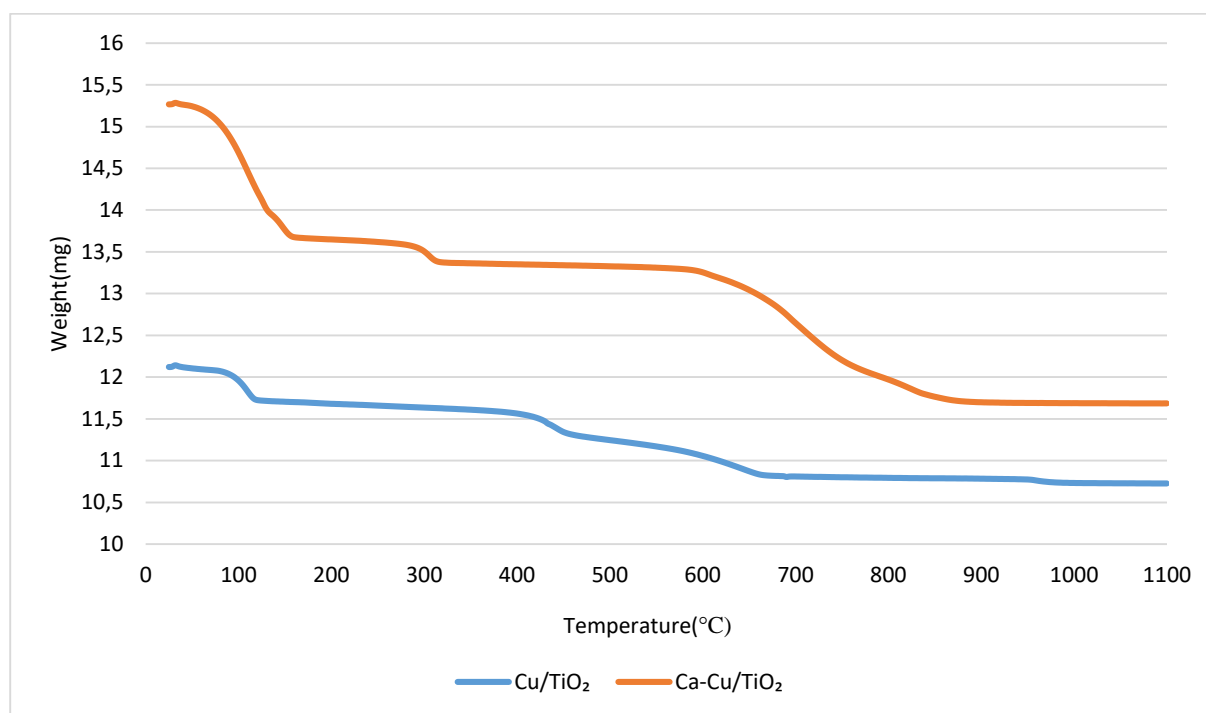
**Figure 1.** Preparing and analysis of the catalyst samples

### 3. RESULTS AND DISCUSSION

TGA analysis results of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> specimen before calcination are indicated in Figure 2. Initial weight drop was detected in both samples at approximately 110 °C. While the Ca-Cu/TiO<sub>2</sub> sample exhibited a thermally stable behavior up to a temperature of about 600 °C, a deterioration was noticed in the Cu/TiO<sub>2</sub> sample at a temperature of around 440 °C. After 600



°C, the Cu/TiO<sub>2</sub> specimen indicated weight loss at 610 °C and 960°C temperatures, while the Ca-Cu/TiO<sub>2</sub> specimen indicated a weight loss of around 700 °C and 830 °C.



**Figure 2.** Before the calcination process TGA graph of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> specimens

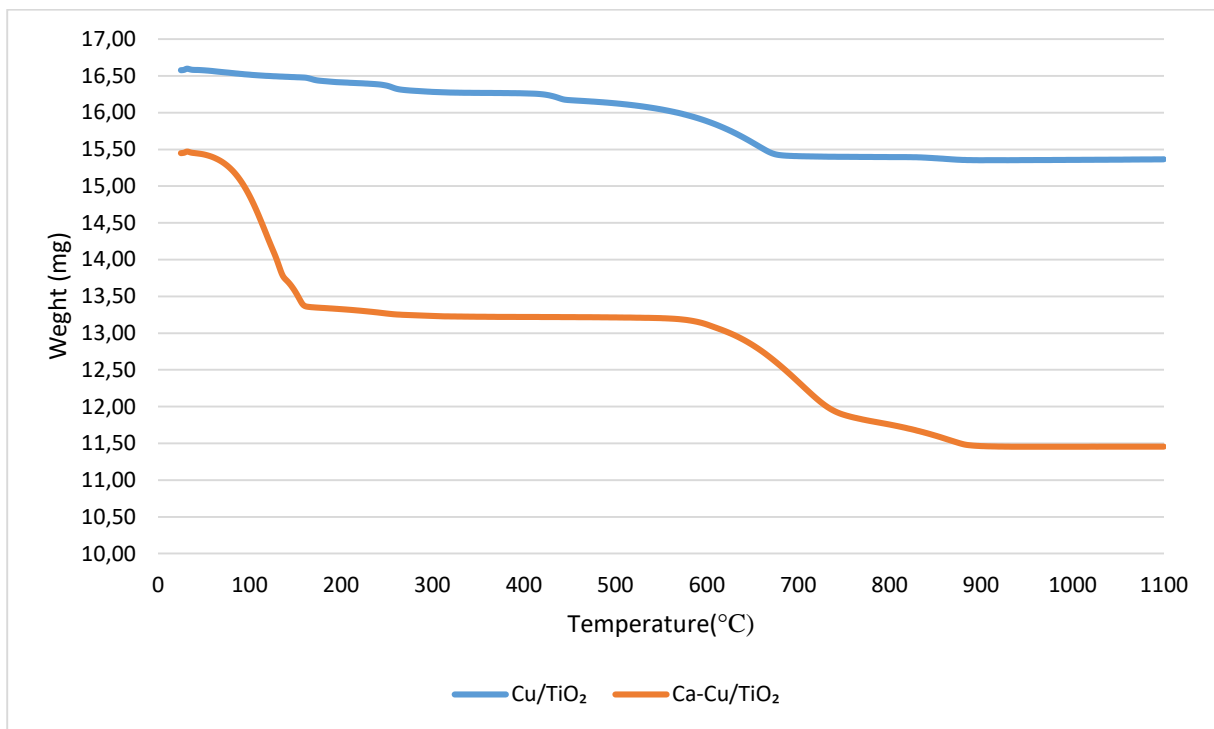
Table 2 indicates the initial and final weights and decomposition temperatures of the samples before the calcination process. While the weight loss was 11.55% in Cu/TiO<sub>2</sub> samples, this loss rate was 23.46% in Ca-Cu/TiO<sub>2</sub> samples. The addition of Ca to Cu/TiO<sub>2</sub> samples increased the weight loss approximately 2 times. However, the final decomposition temperature reached 962 °C without the addition of Ca, and the amount of sample remaining after combustion is higher.

**Table 2.** Initial weight, final weight and onset temperatures of samples before calcination process

Samples	Initial weight(mg)	Final weight(mg)	Onset temperatures(°C)
Cu/TiO <sub>2</sub>	12.12	10.72	110/430/615/962
Ca-Cu/TiO <sub>2</sub>	15.26	11.68	105/152/304/698/829

The TGA graph of the samples after the calcination process is shown in figure 3. As before the calcination process, a weight decrease is observed due to the removal of H<sub>2</sub>O in the samples between 100-150 °C temperatures. Weight reduction was detected in Cu/TiO<sub>2</sub> samples up to approximately 850 °C. In the Ca-added Cu/TiO<sub>2</sub> samples, on the other hand, thermal stability

was achieved up to about 700 °C, and a weight decrease was detected in the sample near 690 °C and 850 °C. It is seen that thermal stabilization is achieved after 850 °C in both samples. When compared with the temperature data in figure 2 before calcination, the point that it was seen that there was no weight loss in Cu/TiO<sub>2</sub> samples and where the thermal stabilized temperature started was determined at 860 °C before 960 °C. In Ca-Cu/TiO<sub>2</sub> samples, nevertheless, it was determined that the temperature at which thermal stabilization started increased by 25 °C from 830 °C to 855 °C after the calcination process.



**Figure 3.** After the calcination process TGA graph of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> specimens

The initial and final weights and decomposition temperatures of the samples after the calcination process are given in Table 3. While there was a 7.42% weight reduction in Cu/TiO<sub>2</sub> samples, a 25.82% weight loss was detected in Ca-Cu/TiO<sub>2</sub> samples. The addition of Ca after the calcination process increased the weight loss approximately 3.48 times. Parallel to the change in thermal stabilization temperatures, while the weight loss rate in Cu/TiO<sub>2</sub> samples decreased, the weight loss amount increased in Ca-Cu/TiO<sub>2</sub> samples. After the calcination process, the maximum decomposition temperatures of both samples were almost the same.

**Table 3.** Initial weight, final weight and onset temperatures of samples after calcination process

Samples	Initial weight(mg)	Final weight(mg)	Onset temperatures(°C)
Cu/TiO <sub>2</sub>	16.58	15.35	135/259/439/632/853
Ca-Cu/TiO <sub>2</sub>	15.45	11.46	110/158/691/852

#### 4.CONCLUSION

In this study, the thermal performance of copper-based catalysts used in exhaust emission systems was investigated. The effect of the calcination process on this thermal performance comparison is also given in the study results. In the thermal tests of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> samples up to 1100 °C, it was determined that the addition of Ca increased the weight loss both before and after the calcination process. While the calcination process has a negative effect by decreasing the final thermal stability temperature in the Cu/TiO<sub>2</sub> sample, it has a positive effect on this sample by increasing the final thermal stability temperature in the Ca-Cu/TiO<sub>2</sub> sample.

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**SIİRT ERUH BÖLGESİNDE YETİŞEN *ALLIUM VINEALE* L.'NİN  
ANTİMİKROBİYAL ETKİLERİNİN BELİRLENMESİ**

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**ÖZET**

Halk arasında sirik veya sirmo (*Allium vineale* L.) olarak adlandırılan bu bitki Türkiye’de Istranca Bölgesi, Çatalca-Kocaeli Bölgesi, Yukarı Sakarya Bölgesi Yukarı Kızılırmak Bölgesi, Yukarı Fırat Bölgesi, Yukarı Murat-Van Bölgesi ve Hakkari Bölgesi’nde doğal olarak bulunmaktadır. Bu bitki, peynire hoş bir tat ve koku verdiği için dolayı bölge halkı tarafından yaygın bir şekilde kullanılmaktadır. Bunun yanında, *Allium* cinsi doğal bir besin maddesi olması nedeniyle birçok topluluk tarafından da tüketilmektedir. Türkiye’de *Allium* cinsine ait 233 doğal takson bulunmaktadır. Bu çalışmada elde edilen metanol ekstraktının 100 mg mL<sup>-1</sup> olacak şekilde ayarlanan çözeltisinin kuru madde miktarı, renk özellikleri, *B. cereus*, *B. subtilis*, *S. aureus*, *E. faecalis*, *E. coli* ve *S. Typhimurium* gibi patojen bakterilere karşı antimikrobiyal etkileri incelenmiştir. Bunun yanında Eritromisin 15 µg (Oxoid, E15), Streptomisin 10 µg (Oxoid, S10), Penisilin 10 µg (Oxoid, P10), Amoksisilin/Klavulanik asit 30 µg (2:1; Oxoid, AMC30) ve Cephalexin 30 µg (Oxoid, CL30) gibi ticari antibiyotiklerin bakterilere karşı etkinliği incelenmiştir.

**Anahtar kelimeler:** *Allium Vineale* L., antimikrobiyal, kroma, antibiyotik

**DETERMINATION OF ANTIMICROBIAL EFFECTS OF *ALLIUM VINEALE* L.  
GROWING IN SIIRT ERUH REGION****ABSTRACT**

This plant, which is popularly called sirik or sirmo (*Allium vineale* L.), is found naturally in the Istranca Section, Çatalca Kocaeli Section, Upper Sakarya Section, Upper Kızılırmak Section, Upper Fırat Section, Upper Murat Van Section and Hakkâri Section in Turkey. This plant is widely used by the people of the region as it gives a pleasant taste and a pleasant smell to the cheese. Besides, Allium genus is a natural food and is consumed as food by many communities. There are 233 natural taxa belonging to the genus Allium in Turkey. The amount of dry matter and color properties of the methanol extract obtained in this study, adjusted to be 100 mg mL<sup>-1</sup>, showed resistance to pathogenic bacteria such as *B. cereus*, *B. subtilis*, *S. aureus*, *E. faecalis*, *E. coli* and *S. Typhimurium* antimicrobial effects were studied. In addition, The effectiveness of commercial antibiotics such as Erythromycin 15 µg (Oxoid, E15), Streptomycin 10 µg (Oxoid, S10), Penicillin 10 µg (Oxoid, P10), Amoxicillin/Clavulanic acid 30 µg (2:1; Oxoid, AMC30) and Cephalexin 30 µg (Oxoid), CL30) against bacteria was investigated.



## 1. GİRİŞ

Allium L. (Soğan) cinsinin dünya genelinde yaklaşık olarak 850 taksonu bulunmaktadır (Keusgen vd., 2011). Yapılmış olan en son cins içi sınıflandırmaya göre bu cinsin içerdiği taksonlar tüm dünyada 15 alt cinse ayrılmakta ve bu alt cinslerden sekiz tanesine ait türler Türkiye’de doğal yayılış göstermektedir (Friesen vd. 2006). Allium cinsi doğal bir besin olarak birçok topluluk tarafından tüketilmektedir. *A. vineale*, Türkiye’de yüzyıllardır otlu peynir üretiminde kullanılan önemli bir taksondur. Peynirle karıştırıldığında hoş bir tat ve koku (Şelem et al. 2020) verdiği için vatandaşlar tarafından tüketilmi oldukça fazladır (Durmaz et al. 2006; Tegin et al. 2019)

Allium türleri, baharat, kan şekerini düzenleyici, bağırsak sorunlarını giderici, ağrı kesici, yara iyileştirici, akne tedavisi gibi çok çeşitli alanlarda kullanılmasına karşın doğu bölgelerinde otlu peynir yapımında, salamura şeklinde ve çeşitli yemeklere katılarak tüketilmektedir (Şelem et al. 2020).

*Allium vineale*’nin hekzan, etanol ve metanol ekstraktlarının *Listeria monocytogenes* serotiplerine karşı yüksek antimikrobiyal aktivite gösterdiği saptanmıştır (Sagun et al. 2006).

Organik çözücü ekstraktları (metanolik ve etanolik ekstraktlar vb.) ile yapılan çalışmalarda, *A. vineale*’nin antibakteriyel aktivitesinin oldukça yüksek olması, bu bitkinin peynir ve çeşitli gıda ürünlerine katılmasının doğal antibakteriyel etki sağlayacağı belirtilmiştir. Otlu peynire katılan *A. vineale*’nin diğer türlerle karşılaştırıldığında etkinsin çok daha yüksek olduğu belirtilmiş ve bunun yanında *Proteus mirabilis*’e karşı etkili olduğu belirtilmiştir (Tarakci and Temiz 2009; Şelem et al. 2020).

*A. vineale*’nin metanol ekstraktının UHPLC-ESI-MS/MS’de yapılan fenolik bileşik analizinde ekstralarında 14,79 ve 29,90 mg g<sup>-1</sup> ile en fazla bileşik, sırasıyla quinik ve malik asit bulunurken; bunların yanında klorojenik asit, Protocatechuic asit, Tannik, tr-caffeic asit, Vanillin, p-Coumaric asit, rutin, hesperedin, Quercetin, Kaempferol, Luteolin, Apigenin ve Rhamnetin de tespit edilmiştir. rakonitik asit, tanik asit, vanilin, luteolin, ramnetin, kumarin, gallik asit, rosmarinik asit, 4-OH benzoik asit, salisilik asit ve kuersetin gibi bileşikler tespit edilmiştir (Tegin et al. 2019).

Yapılan bu çalışmada, bölgede sıklıkla tüketilen bu bitkinin antibakteriyel özelliklerinin ticari antibiyotiklerle karşılaştırılması amaçlanmıştır. Üretici ve tüketicilerin bu bitki hakkında farkındalık düzeylerinin artırılması, ekonomik yönden dikkate alınmasının gerekliliği hedeflenmiştir.

## **2. MATERYAL VE YÖNTEM**

Çözeltilerin kuru madde miktarının belirlenmesinde Cemeroğlu (2013)'nin önerdiği metoda göre (Hanna, HI96801, Romanya) dijital refraktometre, renk değerleri de Hunt ve Pointer (2011) tarafından önerilen metoda göre taşınabilir renk tayin cihazı (Pen Color Art USB, 1L-Artoksi MSM, İstanbul, Türkiye) ile ölçülmüştür.

Standart bakteri suşlarının standart antibiyotiklere duyarlılığının belirlenmesinde; Temiz (2010) tarafından önerilen disk diffüzyon yöntemine göre, *B. cereus* ATCC 10876, *B. subtilis* ATCC 6633, *S. aureus* ATCC 29213, *E. faecalis* ATCC 29242, *P. aeruginosa* ATCC 8027, *E. coli* ATCC 25922 ve *Salmonella Typhimurium* ATCC 14028 bakteri suşları ve Eritromisin 15µg (Oxoid, E15), Streptomisin 10 µg (Oxoid, S10), Penisilin 10 µg (Oxoid, P10), Amoksisilin/Klavulanik asit 30 µg (2:1; Oxoid, AMC30) ve Cephalexin 30 µg (Oxoid, CL30) standart antibiyotikler kullanılmıştır.

İlk önce, bakteri suşları Tryptic Soy Agar (TSA, Merck) ortamında (37 °C'de 18-24 saat) yeniden aktive edildi. Saf kültürler, fizyolojik solüsyon içeren test tüplerinde 0,5 McFarland standardına göre yoğunlukları ayarlandı. Önceden hazırlanmış 4-6 mm kalınlıkta Mueller Hinton agar besiyeri içeren petrilere her bakteri suşu ayrı ayrı inoküle edildi. Bakteri suş solusyonunun emilmesi için petri kapları yaklaşık 15-20 dakika süreyle bekletildi. Ardından standart antibiyotikler (Eritromisin 15 µg (Oxoid, E15), Streptomisin 10 µg (Oxoid, S10), Penisilin 10 µg (Oxoid, P10), Amoksisilin/Klavulanik asit 30 µg (2:1; Oxoid, AMC30) ve Cephalexin 30 µg (Oxoid, CL30)) disk difüzyon yöntemine göre minimum 2 cm mesafe ile ortam üzerine yerleştirildi. Bu işlemden sonra petri kapları 37 °C'de 18-24 saat aerobik koşullarda inkübe edilmiş ve inkübasyon sonunda oluşan şeffaf zon çapları dijital kumpas ile ölçülerek değerlendirilmiştir (Temiz, 2010).

*A. vineale*'nin metanol ekstraktının antibakteriyel etkilerinin belirlenmesinde delik agar diffüzyon yöntemi kullanılmıştır. Bu yöntemde; her bakteri suşu Mueller-Hinton besiyerine inoküle edildi ve bakteri solüsyonu besiyerinde emildikten sonra besiyeri üzerinde her bir oyuk 0,5 cm çapında ve her oyuk arasında en az 2 cm olacak şekilde kuyular açılmıştır. Hazırlanan *A. vineale*'nin metanol ekstraktından 30 µL kuyucuklara aktarıldı ve yaklaşık 20 dakika boyunca besiyerinde absorbe edildi. Kontrol (C) olarak da bakteri içermeyen serum fizyolojik sudan 30 µL kuyucuklara aktarıldı. Petri kapları daha sonra aerobik koşullar altında 37 °C'de 18-24 saat inkübe edildi. İnkübasyon sonunda oluşan şeffaf zon çapları dijital kumpas ile

ölçülerek değerlendirildi (Ponce et al. 2003). Zon çapına bağlı olarak antimikrobiyal etkinin değerlendirilmesi Tablo 1'e göre yapılmıştır.

**Tablo 1.** Zon çapına göre antimikrobiyal etki şiddetleri (Ponce et al. 2003)

Zon çapı (mm)	Antimikrobiyal etkisi	Sonuç
Çapı<8.00	Etkisiz	-
9.00<Çapı<14.00	Düşük etkili	+
15.00<Çapı<19.00	Etkili	++
Çapı>20.00	Aşırı etkili	+++

Yapılan bu çalışmada, test edilen parametreler (kuru madde miktarı, renk (*L*, *a*, *b*) verileri, bakterilerin ticari antibiyotiklere etkinlikleri ve *A. vineale*'nin antibakteriyel özellikleri 3 kez tekrarlanarak, renk değerlerinden de kroma ve hu açısı formülize edilerek değerlendirilmiştir.

### 3. BULGULAR ve Tartışma

*A. vineale*'nin antibakteriyel özellikleri üzerine yapılan bu çalışmada; bitkinin metanoldeki ekstraktının kuru madde değerleri (Briks) değerleri  $7,63 \pm 0,12$  belirlenmiştir. Bu değer artışına bağlı olarak, içermiş olduğu yağ, protein gibi organik bileşikler de yüksek düzeyde içerdiğini ayrıca antibakteriyel ajanların da çeşit ve miktar yönünden zengin olduğunu akla getirmektedir

*A. vineale* metanoldeki ekstraktının renk özellikleri Tablo 2'de, patojen bakterilere karşı etkinliği Tablo 3 ve Şekil 2'de, ticari antibiyotiklerin bakterilere karşı etkinliği de Şekil 3-4 ve Tablo 4'te sunulmuştur.

Kuru madde miktarının belirlenmesi gıdalarda besleyici değer artmasının yanında içerdiği antimikrobiyal maddelerin seviyesiyle de ilgilidir. Yapılan bir çalışmada belirlenen çözünen madde miktarı ortalama değeri %38,08 olarak bulunmuştur (Kutlu et al. 2018).

Renk gıdalar için önemli tercih nedenlerinden biridir. Bu bitkinin gıdalarda, katkı maddesi olarak kullanılması tat-aroma ve kokusu dışında rengi üzerine de etkili olduğu, renk yoğunluğunun fazla oluşu da kurumadde miktarına paralel olarak antibakteriyel etkide önemli rol oynayabileceğini düşündürmektedir. Tablo 2'den de anlaşılacağı üzere; ekstraktın koyu, yeşil reng ve sarı renge hakim olduğu, renk yoğunluğu kromanın ise bunu desteklediği söylenebilir.

**Tablo 2.** *A. vineale* ekstraktının renk analizinin belirlenmesi

Örnek					Hu açısı (arctan(b/a))	
	<i>L</i>	<i>a</i>	<i>b</i>	Kroma	Radyal	Derece
<i>A. vineale</i>	5,7	-0,06	0,35	0,06	-1,40	-80,18

\* renk değerlerinden kroma= $(a^2+b^2)^{1/2}$  formülüyle, hu açısı değeri  $h=\arctan(b/a)$  eşitliğiyle hesaplanmıştır. *L*: koyuluk/açıklık(0-100);

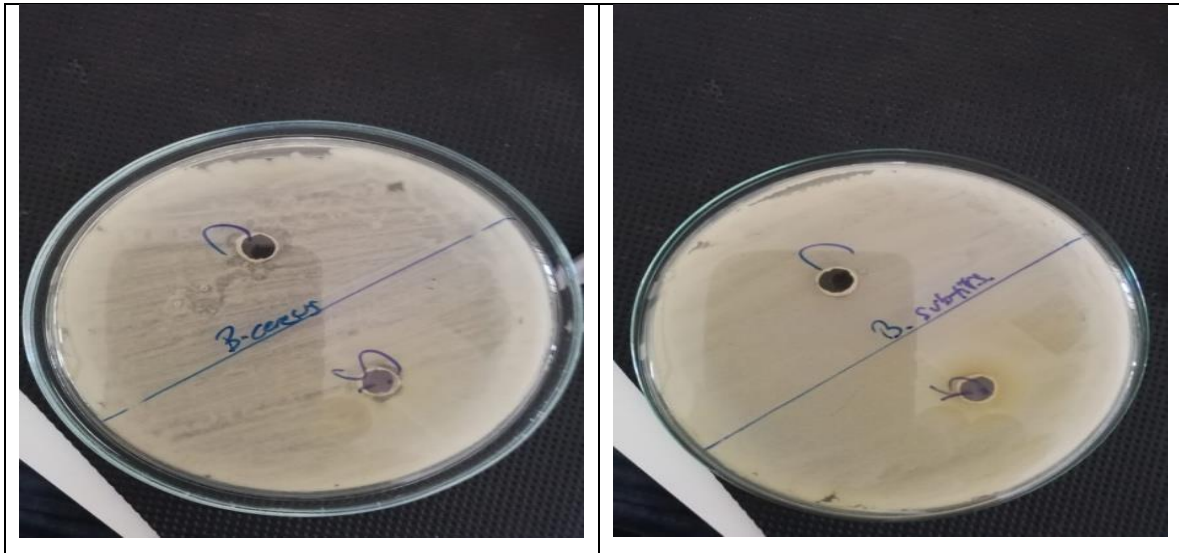
*a*: (-)yeşillik/(+)kırmızılık; *b*: (-)mavilik/ (+)sarı olarak bilinmektedir.

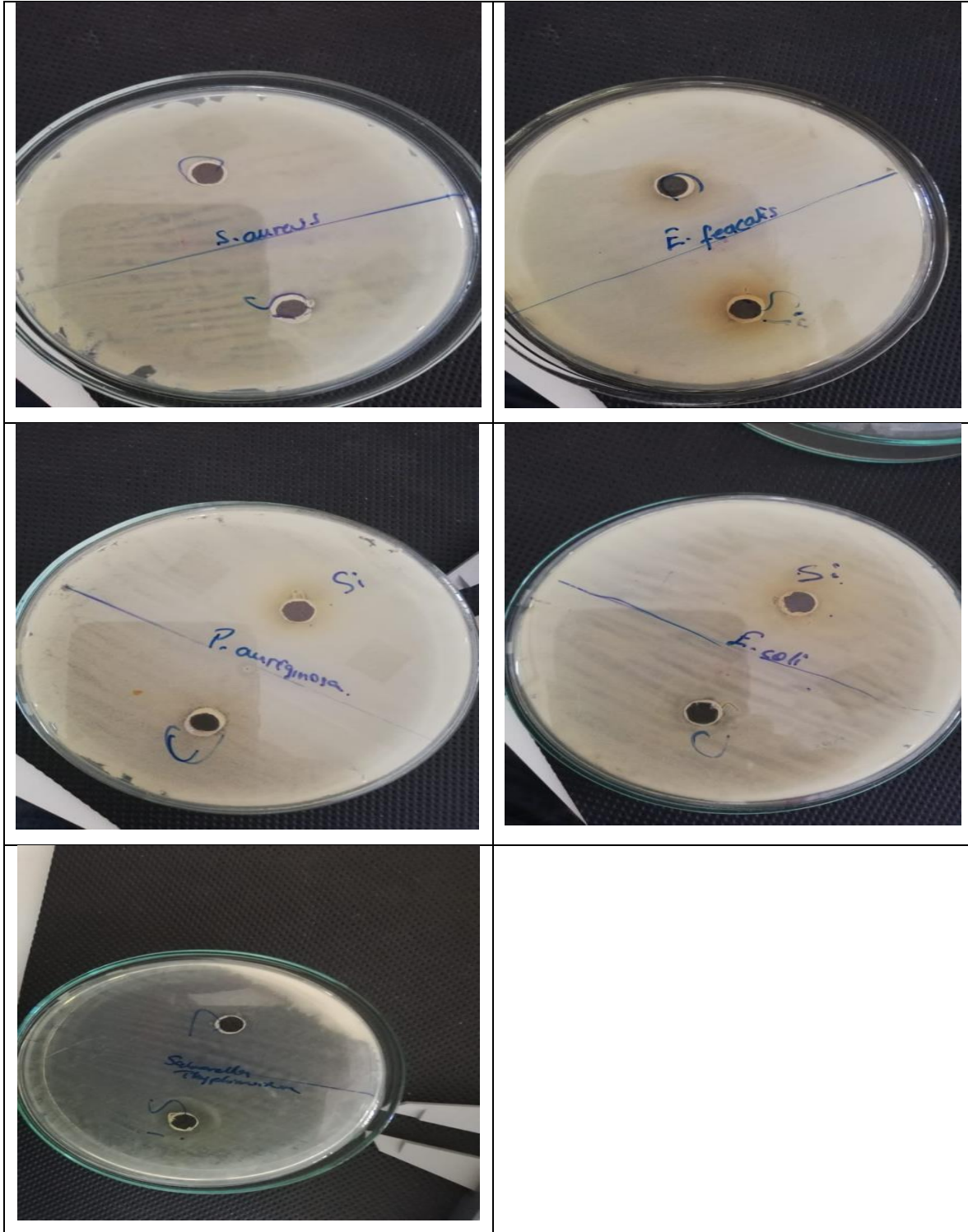
Yapılan bu çalışmada, Tablo 3 incelendiğinde *A. vineale* ekstraktının gıda kaynaklı patojen bakterilerden sadece *B. cereus*'a karşı düşük etki gösterdiği diğer bakterilere karşı antimikrobiyal etki göstermediği anlaşılmaktadır.

**Tablo 3.** *A. vineale* ekstraktının patojen bakterilere karşı antimikrobiyal etkisi

Bakteriler	<i>A. vineale</i>			Ortalama	Standart sapma
<i>B. cereus</i>	8	8	9	8,33	0,58
<i>B. subtilis</i>	-	-	-		
<i>S. aureus</i>	-	-	-		
<i>E. faecalis</i>	-	-	-		
<i>P. aeruginosa</i>	-	-	-		
<i>E. coli</i>	-	-	-		
<i>S. Typhimurium</i>	-	-	-		

\*. Ölçümler 3 tekrarlı olarak gerçekleştirilmiştir.



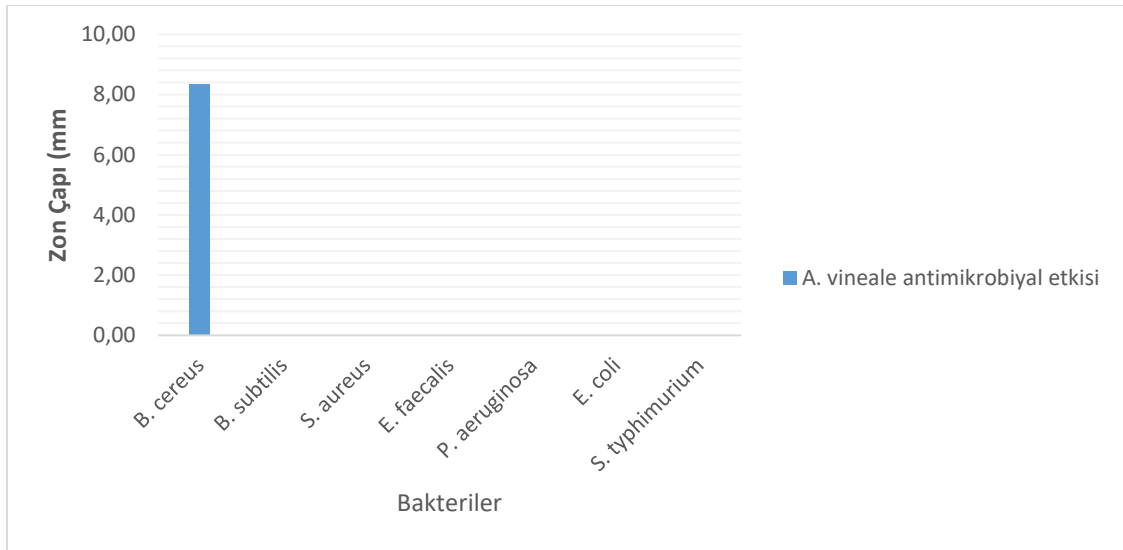


**Şekil 1.** *A. vineale* L. bitkisinin metanoldeki ekstraktının çalışmada incelenen bakterilere karşı antibakteriyel etkileri (Mueller Hinton besiyerinde)

Köse ve Ocak (2018) yaptıkları çalışmada bazı önemli gıda patojenlerine karşı salamura sirmonun metanoldeki ekstraktlarının kısmen de olsa taze sirmonun metanoldeki ekstraktlarına göre antibakteriyel etkisinin fazla olduğunu, *E. faecalis* ile *S. Typhimurium*'a

karşı antibakteriyel etki göstermediğini diğer bakterilere karşı da bakteri türüne göre düşük ve etkili olduklarının belirlemişlerdir (Köse and Ocak 2018).

Fırat (2015) *A. vineale* bitkisi çiçeklerinin antibakteriyel madde olarak peynirlere katıldığı bildirilmiştir (Fırat, 2015). Yapılan bu çalışmada, *E. faecalis* ile *S. Typhimurium*'a karşı saptanan antibakteriyel etki Köse ve Ocak (2018)'in bulgularıyla benzerlik göstermekle beraber diğer bakterilere karşı belirledikleri antimikrobiyal etkiden düşük bulunmuştur. Bunun önemli nedenleri kullanılan materyalin farklı şekilde işlenmiş olması, kullanılan bakteri suşlarının farklı olması, bitkinin elde edildiği iklim ve coğrafyanın etkisi ile açıklanabilir.

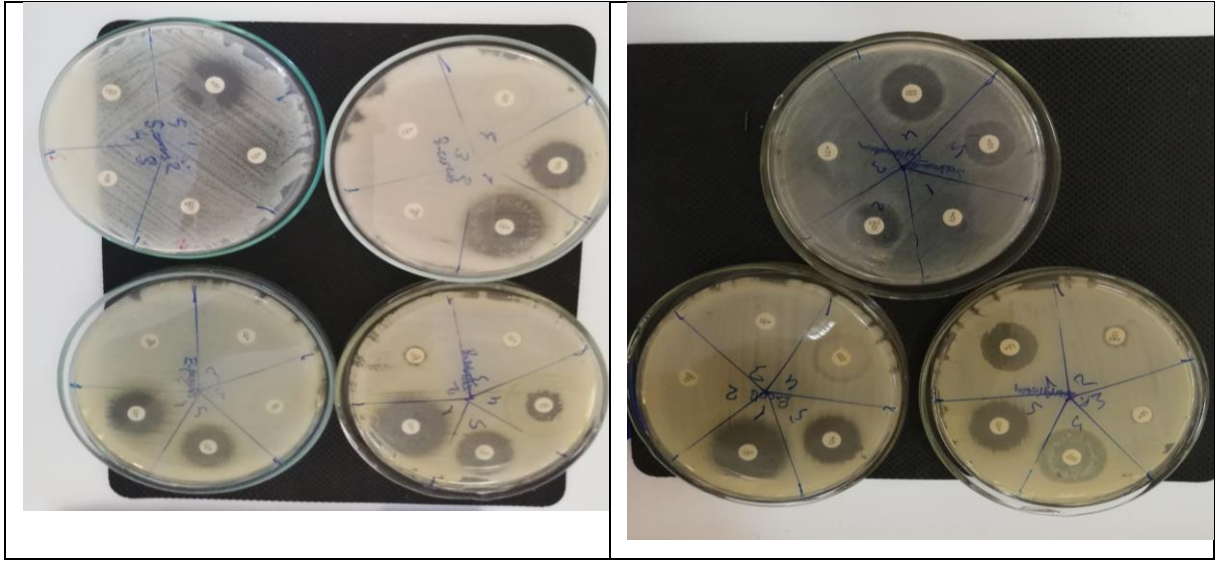


Şekil 2. *A. vineale* ekstraktının patojen bakterilere karşı antimikrobiyal etkisi

Tablo 4. Ticari antibiyotiklerin bakterilere karşı etkinliği

Bakteriler	E15	AMC30	P10	CL30	S10
<i>B. cereus</i>	27,33±0.58	-	-	-	20,33±0.58
<i>B. subtilis</i>	30,67±0.78	9,00±0.00	6,00±0.00	14,33±0.58	20,67±0.58
<i>S. aureus</i>	-	-	-	-	22,33±0.58
<i>E. faecalis</i>	23,67±0.58	-	-	-	21,67±0.58
<i>P. aeruginosa</i>	18,33±0.58	-	7,00±0.00	22,33±0.58	19,00±0.00
<i>E. coli</i>	25,00±2.65	8,00±0.00	-	-	19,33±0.58
<i>S. Typhimurium</i>	-	18,33±0.58	-	20,33±0.58	17,33±0.58

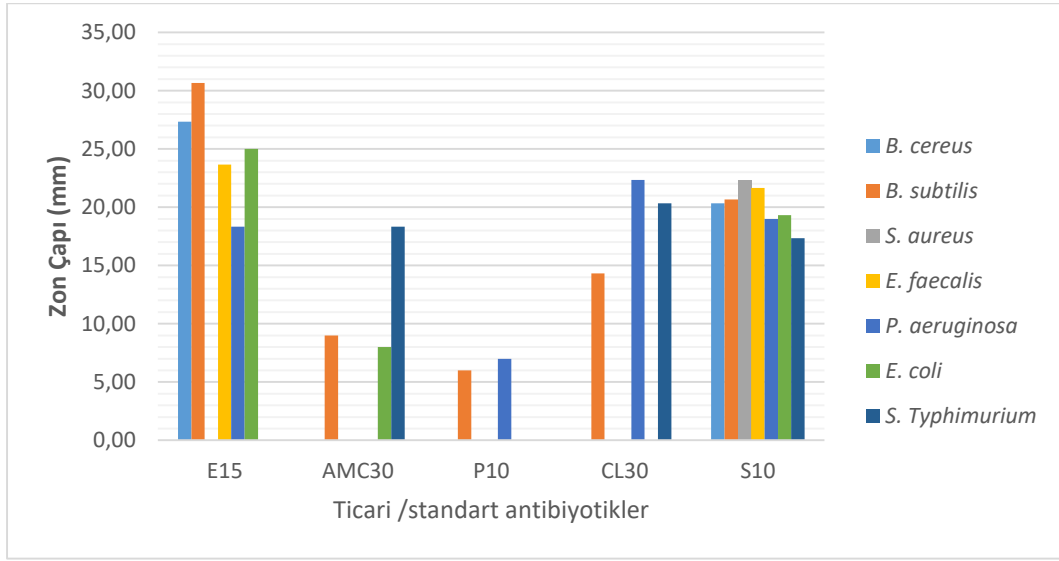
\*Eritromisin 15µg (Oxoid, E15), Streptomisin 10 µg (Oxoid, S10), Penisilin 10 µg (Oxoid, P10), Amoksisilin/Klavulanik asit 30 µg (2:1; Oxoid, AMC 30) ve Cephalexin 30 µg (Oxoid, CL 30)



**Şekil 3.** Analizde kullanılan ticari antibiyotiklerin bakterilere karşı etkileri  
(1:E15;2: AMC30; 3: P10;4: CL30;5: S10)

Ponce ve ark (2003)'e göre değerlendirildiğinde *B. cereus* için AMC30, P10 ve CL30'a göre *A. vineale* bitkisi ekstraktının daha yüksek antibakteriyel etki gösterdiği, düşük etkili olarak (+) da değerlendirilebileceği anlaşılmıştır. Diğer bakterilere karşı bir kısım antibiyotiklere göre de antibakteriyel etkisi yüksek bulunmuştur.

Tablo 4 incelendiğinde, bu çalışmada ticari antibiyotiklerin bakteri türlerine göre değişik düzeylerde antibakteriyel etkilerinin olduğu belirlenmiştir. Köse ve Ocak (2018) tarafından yapılan çalışmada Ampisiline karşı antimikrobiyal zon çaplarının *P. aeruginosa* ile benzer olduğu, *B. cereus* (10.5mm)'un bizim çalışmamızdaki değerden yüksek(8.33mm) olduğu anlaşılmaktadır. Araştırmacıların diğer bakterilerde belirledikleri antimikrobiyal etkinlik bu çalışmaya göre yüksek bulunmuştur. Bu durum, aynı bakteri kullanılsa bile suş farklılığından kaynaklanabildiği ve kullanılan yöntemle göre farklılıklar olabileceğini düşündürmektedir.



**Şekil 4.** Ticari antibiyotiklerin bakterilere karşı etkinliği

Şekil 4'ten de anlaşılacağı üzere yapılan bu çalışmada antimikrobiyal aktivitede, kullanılan antibiyotik türlerinin ve bakteri suş farklılığının önemli olduğu söylenebilir.

#### **4, SONUÇ VE DEĞERLENDİRME**

*A. vineale* bitkisinin yetiştiği bölgelerde önemli ekonomik değerinin olması ve besleyici fonksiyonel özellikleri yanında antimikrobiyal, antioksidan özelliklere sahip oluşu ve birçok sağlık problemlerini engellediği bilinmektedir. Siirt ilinde bu çalışmanın ilk defa yapılmış olması önemli bir referans özelliği taşıyacaktır. Antibakteriyel etkisinden dolayı, bu özelliklerinin geliştirilmesi suretiyle özellikle peynir üretiminde bu bitkilerin kullanımı artırılarak birçok hastalığın önlenilebileceği düşünülmektedir. İlde bu bitki ile bilimsel çalışmaların artırılmasının, daha önemli ekstraktlar ile zenginleştirilmesinin, bu ürünlerden katma değeri yüksek yeni ürünler üretilmesinin gerekliliği sonucuna varılmıştır.



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**SIİRT ERUH BÖLGESİNDE YETİŞEN *ALLIUM KHARPUTENSE* FREYN ET SİNT.  
EKSTRAKTININ KURU MADDE, RENK, ANTİMİKROBİYAL ETKİLERİNİN  
BELİRLENMESİ**

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**ÖZET**

*Allium kharputense* Freyn & Sint. bitkisi, Türkiye'nin Batı Karadeniz Bölümü, Yukarı Kızılırmak Bölümü, Yukarı Fırat Bölümü, Yukarı Murat-Van Bölümü, Orta Fırat Bölümü, Dicle Bölümü ve Irak ile İran'da doğal olarak yayılış gösteren bir türdür. Bu bitkinin geleneksel tıpta kullanımı ile birlikte antimikrobiyal ve mutajenik özellikleri de bulunmaktadır. Bitkiye ait toprak üstü kısımlar, yöre halkı tarafından gıda amaçlı (özellikle bulgur pilavına, böreğe, çorbaya katılır veya yumurta ile kavrulur) tüketilmektedir. Bu çalışmada, *Allium kharputense*'nin metanol ekstraktından elde edilen 100 mg mL<sup>-1</sup> olan ekstraktın kuru madde miktarı, renk özellikleri bazı patojen bakterilere (*B. cereus*, *B. subtilis*, *S. aureus*, *E. faecalis*, *E. coli* ve *S. Typhimurium*) karşı antimikrobiyal etkileri araştırılmıştır. Bununla birlikte, Eritromisin, Streptomisin, Penisilin, Amoksisilin/Klavulanik asit ve Cephaleksin ticari antibiyotiklerinin de bu bakterilere karşı etkinliği incelenmiştir. Kuru madde miktarı % 9,07±0,25, renk *L* 5,46±, renk *a* -0,37±0,12, renk *b* -0,36±0,12, kroma değeri 0,13 ve h° açısı 44,22 derece olarak belirlenmiştir. *Allium kharputense*'nin *B. cereus*, *B. subtilis*, *E. faecalis*, *E. coli* ve *S. Typhimurium* bakterilere karşı etkinliği bulunurken, *S. aureus* üzerinde etkinlik göstermemiştir. En fazla etkinliği *E. coli* üzerinde göstermiştir.

**Anahtar kelimeler:** *Allium kharputense*, Antibakteriyel aktivite, Kroma, Kuru madde miktarı

**DETERMINATION OF DRY MATERIAL, COLOR, ANTIMICROBIAL EFFECTS  
OF *ALLIUM KHARPUTENSE* FREYN ET SINT. EXTRACT GROWN IN SIİRT  
ERUH REGION****ABSTRACT**

Known as a non-endemic herbaceous plant, *Allium kharputense* Freyn Et Sint is found in eastern Turkey (Siirt, Şırnak, Tunceli, Muş, Bitlis, Hakkâri, Van provinces), Iraq and Iran, at an altitude of 900-2000 m, grassy slopes, calcareous grows naturally in fields and slopes. Along with the use of this plant in traditional medicine, it also has antimicrobial and mutagenic properties. Aerial parts of the plant are consumed by the local people for food purposes (especially added to bulgur pilaf, pastry, soup or fried with eggs). In this study, the dry matter content, color characteristics, and pathogens such as *B. cereus*, *B. subtilis*, *S. aureus*, *E. faecalis*, *E. coli* and *S. Typhimurium* of the 100 mg mL<sup>-1</sup> extract obtained from the methanol extract of *Allium kharputense* were investigated. antimicrobial effects against bacteria were investigated. However, the efficacy of commercial antibiotics Erythromycin, Streptomycin, Penicillin, Amoxicillin/Clavulanic acid and Cephalexin against bacteria were also investigated. Dry matter content 9.07±0.25 %, color L 5.46±, color a -0.37±0.12, color b -0.36±0.12, chroma value 0.13 and h° angle was determined as 44.22 degrees. While *Allium kharputense* had activity against *B.cerreus*, *B. subtilis*, *E.faecalis*, *E. coli* and *S. Typhimurium* bacteria, it did not show activity on *S. aureus*. It showed the most activity on *E. coli*.

**Keywords:** *Allium kharputense*, chroma, dry matter content

## 1. GİRİŞ

Ülkemizde 196 *Allium* türü bulunmakta ve bunlardan 60'a yakını endemiktir (Şelem et al. 2020). *Allium kharputense* Türkiye'nin doğusu (Firat 2015; Arslan et al. 2017; Mesut et al. 2021), Irak ve İran'da (Eftekharinasab et al. 2012), çok yıllık, otsu, 900- 2000 m rakımda, çimenlik yamaçlar, kalkerli tarlalar ve yamaçlarda doğal olarak büyüyen endemik olmayan bir türdür (Şelem et al. 2020).

Siirt ve çevre illerde *A. kharputense*'nin yöresel (Kürtçe) ismi Soryaz'dır. *Allium*'a ait türler yüzyıllardır ekonomik, beslenme ve geleneksel tıbbi faydaları nedeniyle dünya çapında kullanılmaktadır (Block 1985; Yabalak and Gizir 2017).

Birçok araştırmacı, *Allium* türlerini kemopreventif ve antitümör aktivite (Reuter 1995), antibakteriyel ve antimikrobiyal (Fritsch and Keusgen 2006), antifungal (Corea et al. 2003), antikoagülan, antihipertansif ve antikanser (Kimbaris et al. 2006) aktivite dahil olmak üzere farmakolojik ve terapötik etkileri açısından araştırmıştır. Ayrıca *A. kharputense*'den elde edilen metanolik ekstraktın mutajenik ve antimikrobiyal etkisi tespit edilmiştir (Erdogan et al. 2015; Yabalak and Gizir 2017).

*Allium kharputense*, ilkbahar aylarında toprak üstü kısımları toplanır ve özellikle bulgur pilavında, çorba çeşitlerinde kullanılır. İlkbaharda toplanan kısımları kışın kullanmak için kurutulur veya salamurası yapılır. Mevsiminde çarşıda taze satılır. İnsanlar soğanlarını söküp bahçelerine diker ve yapraklarını sebze olarak kullanırlar. Yerel adı "Soryaz" olan bu bitkinin çiçeklenme zamanı Mayıs-Haziran aylarıdır. Dağılımı Tunceli, Muş, Bitlis, Hakkari, Van bölgesi olarak bildirilmektedir (Firat, 2015).

*Allium kharputense* (*A. kharputense*), toplam polifenol içeriğini, antioksidan aktiviteyi, kimyasal bileşimi ve mineral ve iz element bileşimi yapılmıştır. Toplam polifenolik içerik Folin-Ciocalteu yöntemi kullanılarak 257 mg GA 100 g<sup>-1</sup> kuru örnek, antioksidan aktivite analizi için DPPH testi kullanılarak Gallik asit ve Trolox'un IC50 değerleri sırasıyla 0,02642 mg mL<sup>-1</sup> ve 0,225 mg mL<sup>-1</sup> ve *A. kharputense*'nin IC50 değeri 2,186 mg mL<sup>-1</sup> olarak bulunmuştur. *A. kharputense*'nin metanolik ekstraktlarında 28 bileşik tespit edilmiş ve mikrodalga parçalama prosedürü kullanılarak ICP-MS ile 20 mineral ve iz element belirlenmiştir (Yabalak and Gizir 2017).

Yapılan bu çalışmada, bölgede sıklıkla tüketilen bu bitkinin antibakteriyel özelliklerini belirlemek ve bazı ticari antibiyotiklerle karşılaştırılması amaçlanmıştır.

## **2. MATERYAL VE YÖNTEM**

Çözeltilerin kuru madde miktarı (Briks), Cemeroğlu (2013)'nun önerdiği metoda göre (Hanna, HI96801, Romanya) dijital refraktometrede, renk değerleri de Hunt ve Pointer (2011) tarafından önerilen metoda göre taşınabilir renk tayin cihazı (Pen Color Art USB, 1L-Artoksi MSM, İstanbul, Türkiye)'nda belirlenmiştir.

Standart bakteri suşlarının standart antibiyotiklere duyarlılığının belirlenmesinde; *B. cereus* ATCC 10876, *B. subtilis* ATCC 6633, *S. aureus* ATCC 29213, *E. faecalis* ATCC 29242, *P. aeruginosa* ATCC 8027, *E. coli* ATCC 25922 ve *Salmonella Typhimurium* ATCC 14028 bakteri suşları ve Eritromisin 15µg (Oxoid, E15), Streptomisin 10 µg (Oxoid, S10), Penisilin 10 µg (Oxoid, P10), Amoksisilin/Klavulanik asit 30 µg (2:1; Oxoid, AMC30) ve Cephalexin 30 µg (Oxoid, CL30) standart antibiyotikler materyal olarak kullanılmıştır. Antibakteriyel aktivite Temiz (2010) tarafından önerilen disk diffüzyon yöntemine göre gerçekleştirilmiştir.

İlk önce, bakteri suşları Tryptic Soy Agar (TSA, Merck) ortamında (37 °C'de 18-24 saat) yeniden aktive edildi. Saf kültürler, fizyolojik solüsyon içeren test tüplerinde 0,5 McFarland standardına göre yoğunlukları ayarlandı. Önceden hazırlanmış 4-6 mm kalınlıkta Mueller Hinton agar besiyeri içeren petrilere her bakteri suşu ayrı ayrı inoküle edildi. Bakteri suş solüsyonunun emilmesi için petri kapları yaklaşık 15-20 dakika süreyle bekletildi. Ardından standart antibiyotikler (E15, S10, P10, AMC30 ve CL30) disk difüzyon yöntemine göre minimum 2 cm mesafe ile ortam üzerine yerleştirildi. Bu işlemden sonra petri kapları 37 °C'de 18-24 saat aerobik koşullarda inkübe edilmiş ve inkübasyon sonunda oluşan şeffaf zon çapları dijital kumpas ile ölçülerek değerlendirilmiştir (Temiz, 2010).

*Allium kharputense*'nin metanol ekstraktının antibakteriyel etkilerinin belirlenmesinde delik agar diffüzyon yöntemi kullanılmıştır. Bu yöntemde; disk diffüzyon yönteminden farklı olarak besiyeri üzerinde antibiyotiklerin yerleştirileceği noktalara 0,5 cm çapında küçük kuyucuklar açılmıştır. Hazırlanan *Allium kharputense*'nin metanol ekstraktından 30 µL kuyucuklara aktarıldı ve yaklaşık 20 dakika boyunca besiyerinde emilmesi sağlandı. Kontrol (C) olarak da bakteri içermeyen serum fizyolojik sudan 30 µL kuyucuklara aktarıldı. Petri kapları daha sonra aerobik koşullarda 37 °C'de 18-24 saat boyunca inkübe edildi. İnkübasyon sonunda oluşan şeffaf zon çapları dijital kumpas ile ölçülerek değerlendirildi. Ponce ve ark. (2003) tarafından yapılan çalışmada, zon çapına göre antimikrobiyal etki şiddetleri ölçülmüştür. Zon çapı <8,00 mm ise antimikrobiyal etki "etkisiz" olmakta, zon çapı 9.00 ile 14.00 mm arasında

antimikrobiyal etki "düşük etkili", zon çapı 15,00 ile 19,00 mm arasında antimikrobiyal etki "etkili" olmakta ve zon çapı >20.00 mm ise antimikrobiyal etki "aşırı etkili" olmaktadır.

Yapılan bu çalışmada, test edilen parametreler kuru madde miktarı, renk (*L*, *a*, *b*) değerleri, bakterilerin ticari antibiyotiklere etkinlikleri ve *A. kharputense*'nin antibakteriyel özellikleri 3 kez tekrarlanarak, renk değerlerinden de kroma ve  $h^\circ$  açısı bulunmuştur.

### **3. BULGULAR VE TARTIŞMA**

*A. kharputense*'nin antibakteriyel özelliklerinin belirlenmesi için bitkinin metanoldeki ekstraktının kuru madde değerleri (Briks) değerleri  $9,07 \pm 0,25$  belirlenmiştir. Bu değer artışına bağlı olarak, içermiş olduğu yağ, protein gibi organik bileşikler de yüksek düzeyde içerdiğini ayrıca antibakteriyel ajanların da çeşit ve miktar yönünden zengin olduğunu akla getirmektedir. Nitekim Şelem ve arkadaşları (2020), otlu peynir yapımında kullanılan *Allium* türlerinin antimikrobiyal, antioksidan, antifungal, antibakteriyel, antikanserojen ve antienflamatuar özelliklere sahip olduğunu bildirmişlerdir. Tegin ve arkadaşları (2019) da yapmış oldukları bir çalışmada aynı familyaya ait *A. vineale*'nin toplam fenolik içeriğini ve DPPH radikalinin sırasıyla 12.00  $\mu\text{g/mL}$  ve %58.60 olarak belirlemişlerdir.

*A. kharputense*'nin metanoldeki ekstraktının renk özellikleri Tablo 1'de, patojen bakterilere karşı etkinliği Tablo 2 ve Şekil 2'de, ticari antibiyotiklerin bakterilere karşı etkinliği de Şekil 3-4 ve Tablo 3'te sunulmuştur.

Bir gıdanın suda çözünen madde miktarı (Briks), suyun dışında kalan ve suda çözünen bileşiklerin olduğunu ifade eder. Bu değer yüksek oluşu gıdanın besleyici özelliğinin iyi olduğu kadar suda çözünen antimikrobiyal maddelerin de fazla olduğunu göstermektedir. Yapılan bir çalışmada belirlenen çözünen madde miktarı ortalama değeri %38,08 olarak bulunmuştur (Kutlu et al. 2018).

Renk gıdalar için önemli tercih nedenlerinden biridir. Bu bitkinin gıdalarda, katkı maddesi olarak kullanılması tat-aroma ve kokusu dışında rengi üzerine de etkili olduğu, renk yoğunluğunun fazla oluşu da kurumadde miktarına paralel olarak antibakteriyel etkide önemli rol oynayabileceğini düşündürmektedir. Tablo 1'den de anlaşılacağı üzere; ekstraktın koyu, yeşil ve sarı renge hakim olduğu, renk yoğunluğu kromanın ise bunu desteklediği söylenebilir.

**Tablo 1.** *A. vineale* ekstraktının renk analizinin belirlenmesi

Örnek					h açısı (arctan(b/a))	
	L	a	b	Kroma	Radyal	Derece
<i>A. kharputense</i>	5,46	-0,37	-0,36	0,13	0,77	44,22

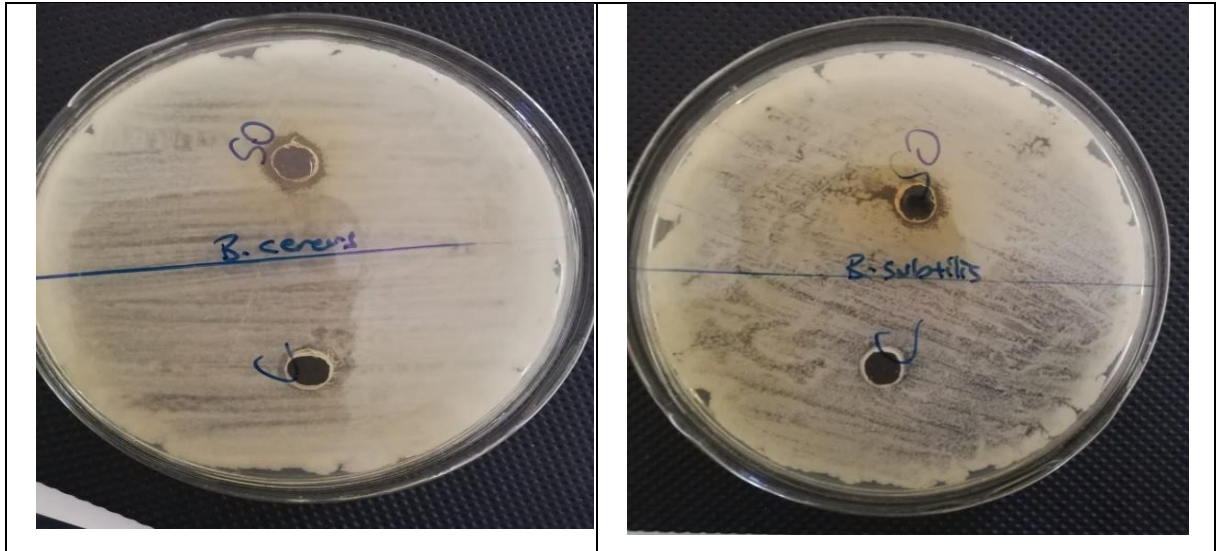
\* renk değerlerinden kroma= $(a^2+b^2)^{1/2}$  formülüyle, hu açısı değeri  $h=\arctan(b/a)$  eşitliğiyle hesaplanmıştır. L: koyuluk/açıklık(0-100); a: (-)yeşillik/(+)kırmızılık; b: (-)mavilik/ (+)sarı olarak bilinmektedir.

Yapılan bu çalışmada, Tablo 2 incelendiğinde *A. kharputense*'nin ekstraktının gıda kaynaklı patojen bakterilerden sadece *S. aureus*'a karşı hiç etki göstermediği, *E. faecalis*'e karşı etkisiz olduğu ancak diğer bakterilere karşı "düşük etkili" olduğu anlaşılmıştır.

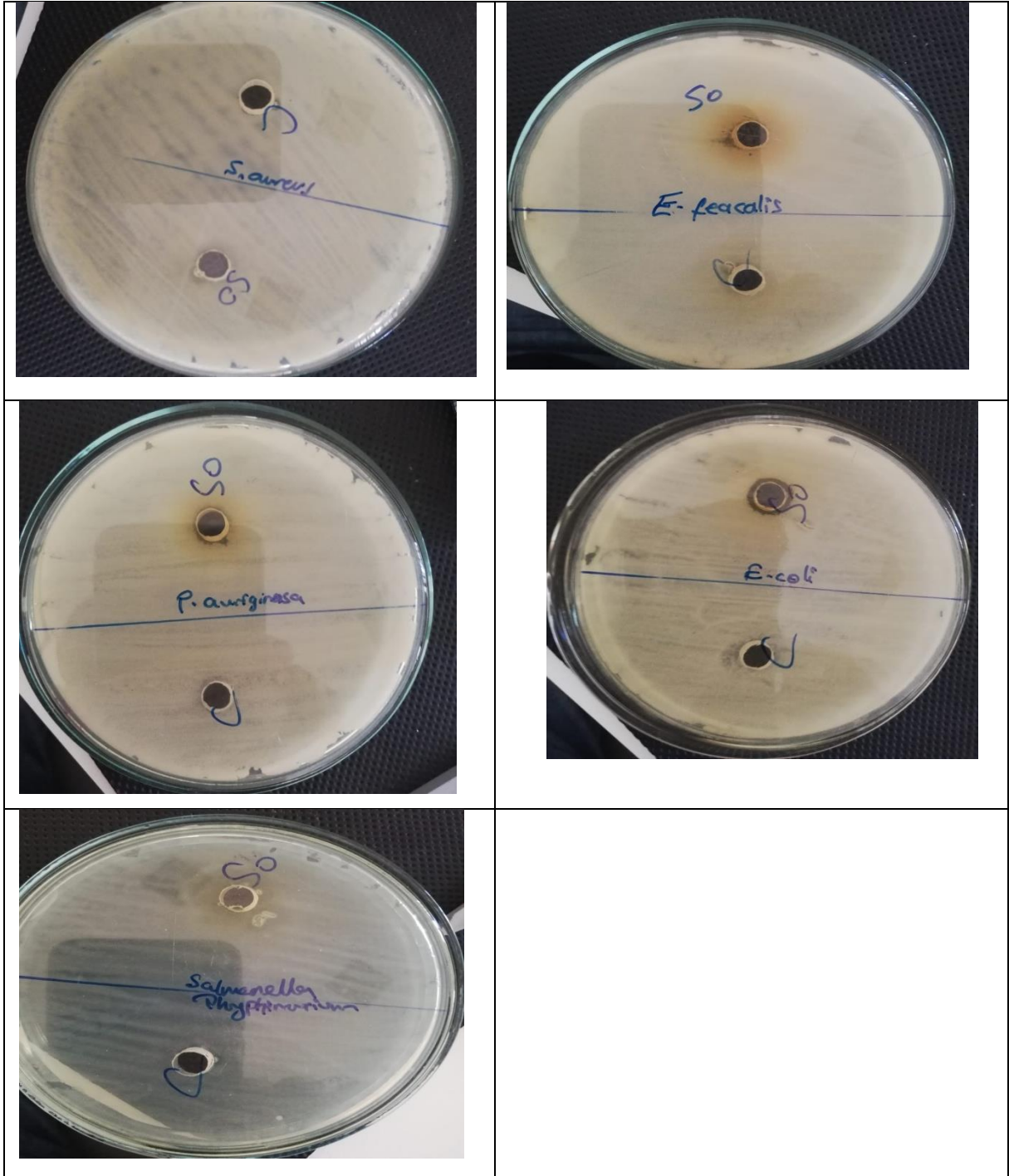
**Tablo 2.** *A. kharputense* ekstraktının patojen bakterilere karşı antimikrobiyal etkisi

Bakteriler	<i>A. kharputense</i>			Ortalama	Standart sapma
<i>B. cereus</i>	10	11	11	10,67	0,58
<i>B. subtilis</i>	10	10	9	9,67	0,58
<i>S. aureus</i>	-	-	-	-	-
<i>E. faecalis</i>	7	7	7	7,00	0,00
<i>P. aeruginosa</i>	9	9	8	8,67	0,58
<i>E. coli</i>	11	11	12	11,33	0,58
<i>S. Typhimurium</i>	9	9	8	8,67	0,58

\*. Ölçümler 3 tekrarlı olarak gerçekleştirilmiştir.





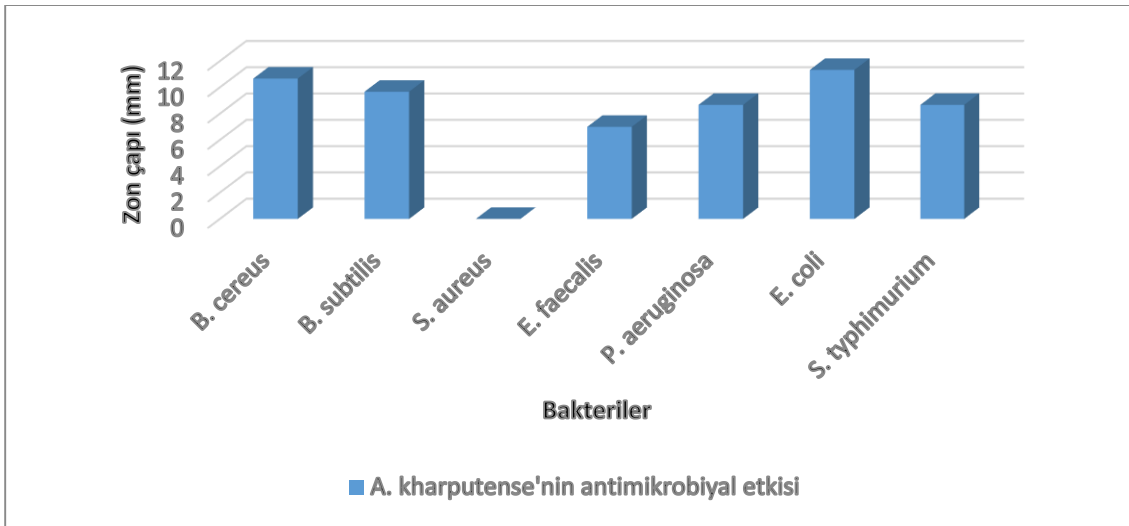


**Şekil 1.** *A. kharputense* bitkisinin metanoldeki ekstraktının çalışmada incelenen bakterilere karşı antibakteriyel etkileri

Köse ve Ocak (2018) yaptıkları çalışmada bazı önemli gıda patojenlerine karşı salamura sirmonun metanoldeki ekstraktlarının kısmen de olsa taze sirmonun metanoldeki ekstraktlarına göre antibakteriyel etkisinin fazla olduğunu, *E. faecalis* ile *S. Typhimurium*'a karşı

antibakteriyel etki göstermediğini diğer bakterilere karşı da bakteri türüne göre düşük ve etkili olduklarının belirlemişlerdir (Köse and Ocak 2018).

Fırat (2015) *A. vineale* bitkisi çiçeklerinin antibakteriyel madde olarak peynirlere katıldığı bildirilmiştir (Fırat, 2015). Yapılan bu çalışmada, *E. faecalis* ile *S. Typhimurium*'a karşı saptanan antibakteriyel etki Köse ve Ocak (2018)'in bulgularıyla benzerlik göstermekle beraber diğer bakterilere karşı belirledikleri antimikrobiyal etkiden düşük bulunmuştur. Bunun önemli nedenleri kullanılan materyalin farklı şekilde işlenmiş olması, kullanılan bakteri suşlarının farklı olması, bitkinin elde edildiği iklim ve coğrafyanın etkisi ile açıklanabilir.

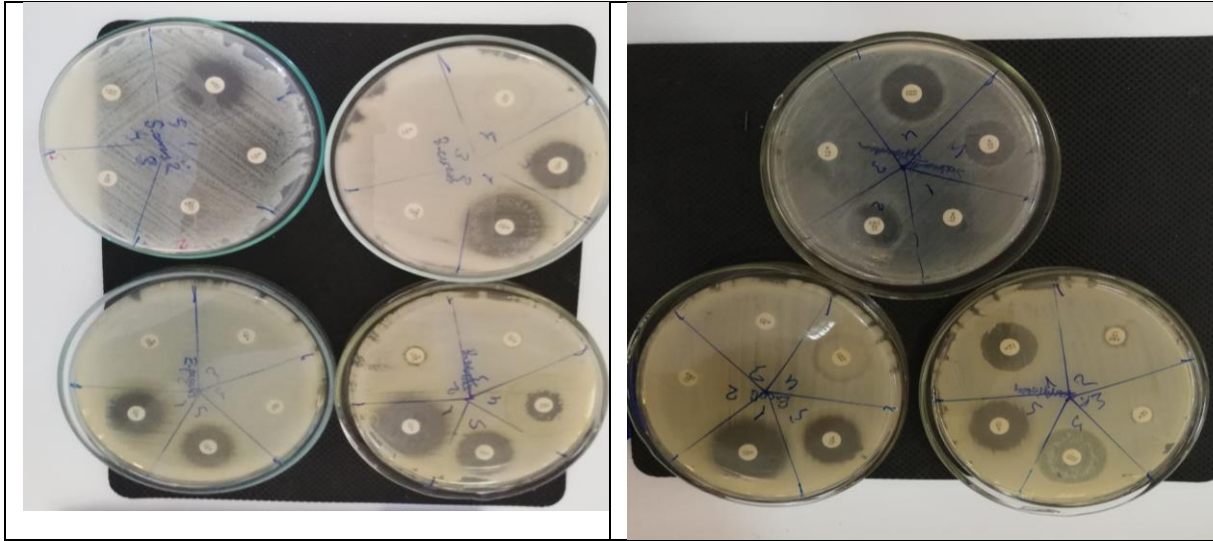


**Şekil 2.** *A. kharputense* ekstraktının patojen bakterilere karşı antimikrobiyal etkisi

**Tablo 3.** Ticari antibiyotiklerin bakterilere karşı etkinliği

Bakteriler	E15	AMC30	P10	CL30	S10
<i>B. cereus</i>	27,33±0.58	-	-	-	20,33±0.58
<i>B. subtilis</i>	30,67±0.78	9,00±0.00	6,00±0.00	14,33±0.58	20,67±0.58
<i>S. aureus</i>	-	-	-	-	22,33±0.58
<i>E. faecalis</i>	23,67±0.58	-	-	-	21,67±0.58
<i>P. aeruginosa</i>	18,33±0.58	-	7,00±0.00	22,33±0.58	19,00±0.00
<i>E. coli</i>	25,00±2.65	8,00±0.00	-	-	19,33±0.58
<i>S. Typhimurium</i>	-	18,33±0.58	-	20,33±0.58	17,33±0.58

\*Eritromisin 15µg (Oxoid, E15), Streptomisin 10 µg (Oxoid, S10), Penisilin 10 µg (Oxoid, P10), Amoksisilin/Klavulanik asit 30 µg (2:1; Oxoid, AMC 30) ve Cephalexin 30 µg (Oxoid, CL 30)



Şekil 3. Analizde kullanılan ticari antibiyotiklerin bakterilere karşı etkileri  
(1:E15;2: AMC30; 3: P10;4: CL30;5: S10)

Ponce ve ark (2003)'e göre değerlendirildiğinde *A. kharputense* bitkisinin *B. cereus*'a karşı için AMC30, P10 ve CL30'a göre daha etkili (+), *B. subtilis* P10'dan daha etkili (+) ve AMC30 ile benzer (+), *S. aureus* için S10 hariç diğer antibiyotiklerle benzer (-), *E. faecalis* için AMC30, P10 ve CL30 ile benzer (-), *P. aeruginosa* için AMC30 ve P10'dan daha etkili (+), *E. coli* için AMC30, P10 ve CL30'dan daha etkili (+) ve son olarak *Salmonella Typhimurium* için de E15 ve P10'dan daha etkili (+) olduğu saptanmıştır.

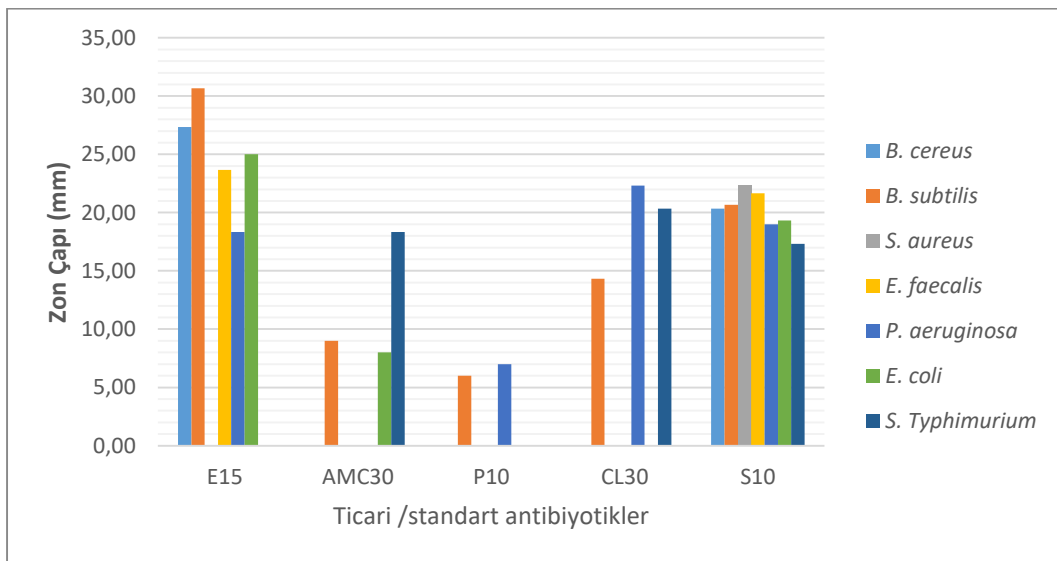
Şekil 4 incelendiğinde, bu çalışmada ticari antibiyotiklerin bakteri türlerine göre değişik düzeylerde antibakteriyel etkilerinin olduğu belirlenmiştir. Köse ve Ocak (2018) tarafından yapılan çalışmada Ampisiline karşı antimikrobiyal zon çaplarının *P. aeruginosa* ile benzer olduğu, *B. cereus* (10.5mm)'un bizim çalışmamızdaki değerden yüksek(8.33mm) olduğu anlaşılmaktadır. Araştırmacıların diğer bakterilerde belirledikleri antimikrobiyal etkinlik bu çalışmaya göre yüksek bulunmuştur. Bu durum, aynı bakteri kullanılsa bile suş farklılığından kaynaklanabildiği ve kullanılan yöntemle göre farklılıklar olabileceğini düşündürmektedir.

Başka bir çalışmada *A. kharputense*'in önemli gıda patojenlerinden *B. subtilis*'e karşı daha etkili ancak *E. coli*, *E. faecalis*, *Salmonella Typhimurium* ve *S. aureus*'a etkisinin daha az olduğu belirlenmiştir (Erdoğan ve ark. 2015). Yapılan bu çalışmayla araştırmacıların bulguları, yaptığımız çalışmada en dirençli olanların sırasıyla *S. aureus*, *E. faecalis*, *Salmonella Typhimurium*, *P. aeruginosa* iken en duyarlı olanların ise sırasıyla *E. coli*, *B. cereus* ve *B. subtilis* olduğu görülmüştür (Şekil 2, Şekil 3.)

Yeniçeri ve Hallaç (2021) sumak konsantresi düzeyinin artmasına bağlı olarak inceledikleri patojenler üzerine etkilerinin arttığını, *S. aureus* için iki kat seyreltilen sumak konsantresinin 23.20mm zon çapı göstermesine karşın 64 kat seyreltide ise zon çapının 9.80 mm'ye gerilediğini belirlemişlerdir.

Hallaç ve ark (2022) nar kabuğu tozu konsantrasyonunun bakteriler üzerinde önemli ( $p<0.01$ ) etkilerinin olduğunu, *S. aureus* üzerine %10 ve % 20 NKT'nun antimikrobiyal etkisi ile E15, P10, AMC30 ve CL30 ile “aşırı etkili” olmasıyla, % 5 ve % 2.5 NKT ise S10 ile “etkili” olmasıyla benzerlik gösterdiğini belirlemişlerdir. Ayrıca, *E. coli* için %20 NKT ile AMC30 ve S10'nun “etkili” şiddette oluşları benzerlik gösterirken, *B. cereus*'ta % 20 NKT ile E15 ve S10'nun “aşırı etkili” olması benzerlik gösterdiğini, diğer konsantrasyonlardaki ( % 2.5, 5, ve 10 NKT) uygulamalarının ise diğer antibiyotiklere nazaran daha etkili olduğunu ortaya koymuşlardır. MİK değerlerinin *Staphylococcus aureus*, *Escherichia coli* ve *Bacillus cereus* için sırasıyla 1/64, 1/8 ve 1/128 mg/mL olarak saptandığını bildirmişlerdir. Bahsedilen bakteriler üzerine en etkili konsantrasyonunun % 20 olduğunu, bu tozun *Bacillus cereus* ve *Escherichia coli* üzerine penicillinden, *Bacillus cereus* üzerine ise amoxycillin/clavulanic asit'ten daha etkili olduğunu ortaya koymuşlardır.

İzol ve ark. (2021) *A. kharputense*'in kök kısımlarının yaprak kısımlarına göre bakterilere karşı daha etkili olduğunu, kök kısımlarının *E. coli*, *P. aeruginosa* ve *S. aureus*'a sırasıyla 600, 600 ve 300 µg/mL; yaprak kısımlarının ise 300, 300 ve 150 µg/mL düzeyinde MİK değerlerinin olduğunu belirtmişlerdir.



Şekil 4. Ticari antibiyotiklerin bakterilere karşı etkinliği

Şekil 4'ten de anlaşılacağı üzere yapılan bu çalışmada antimikrobiyal aktivitede, kullanılan antibiyotik türlerinin ve bakteri suş farklılığının önemli olduğu söylenebilir.

#### **4. SONUÇ VE DEĞERLENDİRME**

*A. kharputense* bitkisinin yetiştiği bölgelerde önemli ekonomik değerinin olması ve besleyici fonksiyonel özellikleri yanında antimikrobiyal, antioksidan özelliklere sahip oluşu ve birçok sağlık problemlerini engellediği bilinmektedir. Siirt ilinde bu çalışmanın ilk defa yapılmış olması önemli bir referans özelliği taşıyacaktır. Yapılan bu çalışmada *A. kharputense* bir kısım antibiyotiklere göre üstünlük sağladığı belirlenmiştir. Antibakteriyel etkisinden dolayı, bu özelliklerinin geliştirilmesi suretiyle özellikle peynir üretiminde bu bitkilerin kullanımı artırılarak birçok hastalığın önlenebileceği düşünülmektedir. İlde bu bitki ile bilimsel çalışmaların artırılmasının, daha önemli ekstraktlar ile zenginleştirilmesinin, bu ürünlerden katma değeri yüksek yeni ürünler üretilmesinin gerekliliği sonucuna varılmıştır.

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## **HALLOYSİT NANOTÜPÜN POLİSTİREN NANOKOMPOZİTLERİN MEKANİK ÖZELLİKLERİ ÜZERİNE ETKİSİ**

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### **ÖZET**

Bu çalışmanın amacı, halloysit nanotüp (HNT) kilinin polistiren (PS) nanokompozitlerin çekme ve eğme mekanik özellikleri üzerine etkisini hakkında bilgi vermektir. Bu yüzden ilk olarak polar ve hidrofilik yapıdaki HNT kilinin apolar ve hidrofobik yapıdaki polimer matris ile kimyasal yapılarının benzemesini sağlamak için stiren–maleik-anhidrit (SMA) kopolimeri ile HNT'ye yüzey modifikasyonu uygulanmıştır. Böylece, HNT kili, organokile (SMA-HNT) dönüştürül müştür. Daha sonra ağırlıkça farklı %'de oranlarında SMA-HNT, stiren monomerine eklenerek ekstrüzyon, enjeksiyon ve polimerizasyon yöntemleri ile polimer nanokompozitler üretilmiştir. Daha sonra bu köpüklere ASTM D638 standardına göre çekme testi, ASTM D790 standardına göre üç nokta eğme testi uygulanmıştır. Test sonuçlarına göre polimer nanokompozitlerin çekme mukavemeti belirli %'de oranlarında artarken %'de oranı arttıkça aglomerasyonun da artması nedeni ile belirli bir orandan sonra azalma başlamış ve daha yüksek oranlarda kopma gözlenmiştir. Eğilme mukavemeti ise PS matrise ilave edilen %SMA-HNT oranı arttıkça sertlik de arttığı için azalmıştır. Çekme ve eğme mekanik test sonuçlarına dayanarak SMA-HNT takviyeli kompozit köpüklerin üretiminde SMA-HNT oranının yüksek (>%10) tutmamanın daha uygun olacağına karar verilmiştir. Aynı zamanda, SMA-HNT'lerin polimer matris içinde homojen olarak dağıldığı, ancak ilave edilen SMA-HNT oranı arttıkça matris içinde aglomerasyonun arttığı görülmüştür.

**Anahtar Kelimeler:** Polistiren, Nanokompozit, HNT, Çekme testi, Eğme testi



## **EFFECT OF HALLOYSITE NANOTUBE ON MECHANICAL PROPERTIES OF POLYSTYRENE NANOCOMPOSITES**

### **ABSTRACT**

The aim of this study is to give information about the effect of halloysite nanotube (HNT) clay on the tensile and bending mechanical properties of polystyrene nanocomposites. Therefore, firstly, surface modification was applied to HNT with styrene-maleic-anhydride (SMA) copolymer in order to make the polar and hydrophilic HNT clay resemble its chemical structure with the apolar and hydrophobic polymer matrix. Thus, HNT clay was converted to organoclay (SMA-HNT). Then, polymer nanocomposites were produced by adding SMA-HNT at different wt% ratios to styrene monomer by extrusion, injection and polymerization methods. FTIR analysis was first applied to the obtained nanocomposites and it was observed that the surface morphology of the polymer matrix changed. At the same time, it was observed that SMA-HNTs were homogeneously dispersed in the polymer matrix, but agglomeration increased in the matrix as the added SMA-HNT ratio increased. Then, tensile test according to ASTM D638 standard and three point bending test according to ASTM D790 standard were applied to these foams. According to the test results, while the tensile strength of the polymer nanocomposites increased at certain %, as the % ratio increased, agglomeration began to decrease after a certain rate and higher rupture rates were observed. Flexural strength decreased as the percentage of SMA-HNT added to the PS matrix increased as the hardness increased. Based on the SEM analysis and tensile bending mechanical test results, it was decided that it would be more appropriate not to keep the SMA-HNT ratio high (>10%) in the production of SMA-HNT reinforced composite foams.

**Keywords:** Polystyrene, Nanocomposite, HNT, Tensile test, Flexural test

## **GİRİŞ**

Bugün hem dünyada hem de ülkemizde enerji tüketimi nüfus artışına paralel olarak hızla artmaktadır. Bu sebeple mevcut enerji kaynakları hızla tükenmekte bu da yeni enerji kaynakları arayışına neden olmaktadır. Bu nedenle enerji kaybının önüne geçmek için 1970'lerde binalarda ısı izolasyonuna başlanmış, 1990'larda hız kazanmış ve günümüzde kentsel dönüşüm nedeni ile hızla devam etmektedir (Koçyiğit, 2022).

Günümüzde, ısı izolasyonu için cam yünü, taş yünü, EPS, XPS, poliüretan köpük, cam köpüğü, polietilen köpük gibi polimer köpükler yalıtım malzemesi olarak kullanılmaktadır. Bunlardan EPS, hem ekonomik olması hem de üstün özelliklere sahip olması nedeni ile hem dünyada hem ülkemizde en çok tercih edilen ısı yalıtım malzemesidir. Fakat EPS yanıcıdır ve bu da EPS'nin kullanım alanını sınırlandırmaktadır (Jeon ve Baek, 2010). Bu durumun önüne geçmek için EPS'nin yanmazlık özelliğinin geliştirilmesi için çok sayıda çalışma yapılmıştır. Bu çalışmalardan biri de EPS'nin içine inorganik nanopartikül ilave edilerek yanmazlık özelliği kazandırmaktır. Bu yüzden geçen on yılda polimerlere, talk, kalsiyum karbonat, karbon siyahı, perlit, grafit, karbon nanotüp gibi bazı organik inorganik dolgu maddeleri takviye edilerek, polimer köpüklerin termal kararlılık, yanmazlık ve mekanik özellik gibi özelliklerin iyileşmesi sağlanmıştır (Wang ve Xiao, 2009).

Polimer köpüklerin özelliklerini geliştirmek için tercih edilen inorganik takviye malzemelerinden biri de kildir. Sepiyolit, montmorillenit, bentonit, kaolinit ve halloysit nanotüp (HNT) en çok tercih edilen kil grubudur (Mauroy vd., 2015). Bunlardan özellikle HNT, kimyasal yapısının karbon nanotüpe benzemesi nedeni ile bilim dünyasının dikkatini çekmiştir. Halloysit, doğada bol miktarda bulunan kaolinit tipi bir alüminosilikat ( $Al_2Si_2O_5(OH)_4 \cdot nH_2O$ ) kildir. Nano ölçekli boyutta, yani 50-100 nm çapında, içi boş çok katmanlı boru şeklinde bir yapıya sahip olması bakımından benzersizdir. Dış yüzeyde 1:1 silika tabakası ve iç duvarda alümina bulunması halloysit nanotüpleri geometrik olarak çok duvarlı karbon nanotüplere benzer kılar. HNT'nin dış yüzeyi siloksan bağlarıyla (Si-O-Si) oluşan tetrahedral silikat tabakasından, iç yüzeyi ise alüminol (Al-OH) gruplarından oluşan oktahedral alümina tabakasından meydana gelir. HNT'nin nanotüp kenarlarında bulunan silanol (Si-OH) ve alüminol grupları, yüzeye kazandırdıkları polarlık sayesinde nanokilin polar polimerik matrislerde etkili bir şekilde dağılmasına olanak sağlar. Sahip olduğu hidroksil grupları sayesinde yüzey modifikasyonuna oldukça müsait olan HNT, hem polar hem de apolar polimerik matrislerde karışabilirliğinin iyileştirilmesinin yanında yüzeyin farklı özellikteki

moleküllerle fonksiyonlandırılması amacıyla yüzey modifikasyon arařtırmalarına konu olmuřtur. Montmorillonit gibi diđer katmanlı silikatların aksine, halloysit polimer zincirlerinin araya girmesiyle pul pul dökülemez ve bu nedenle morfolojisi polimer matrislerinde bozulmadan kalır (Arat, 2018; Koçyiđit, 2022).

Polimer matrise ilave edilen takviye malzemesinin bir polimerin mekanik özellikleri üzerindeki güçlendirme etkileri partiküllerin boyutu, řekli ve en-boy oranı, polimer matrisindeki dađılım derecesi ve takviye partikülleri ile polimer matris arasındaki ara yüzey etkileřimi gibi bir dizi faktöre bađlıdır. Son zamanların popüler takviye malzemelerinden biri olan HNT dođada hidrofilitir ve bu nedenle genellikle onları hidrofobik polimerle uyumlu hale getirmek için yüzey modifikasyonu gerektirir. Bu da polimer matrisinde kil parçacıklarının topaklařmasını önler. Aksi takdirde PS matris içinde topaklanma olur ve polimer köpüđün geliřmesi beklenen özelliklerinde gerileme olur. Bunun önüne geçmek için, kil yüzeyi genellikle organik iřlem yoluyla deđiřtirilir. Bu sayede polimerlerle daha etkili bir řekilde etkileřime girmesi ve böylece mekanik özelliklerin, termal kararlılık, yanmazlık özelliđi ve diđer özelliklerin geliřmesi sađlanır. Bu geliřmiř özellikler, otomotiv endüstrisinden biyomedikal cihazlara kadar geniř bir ürün yelpazesinin üretilmesini sađlar (Arat, 2018;Khan vd., 2009; Shamsi vd., 2010; Lin vd., 2011).

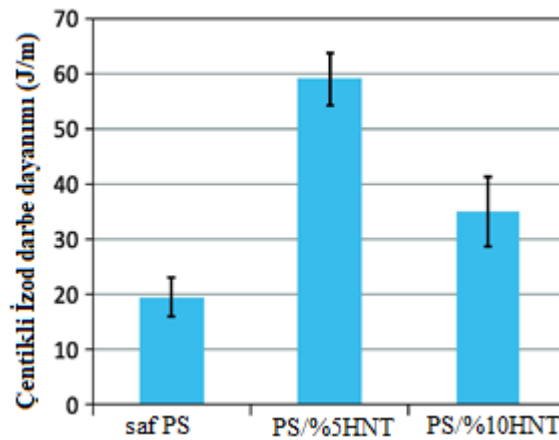
Bu güne kadar yapılan çalıřmalarda; Daitx ve arkadaşları (2015), APTES ile yüzey modifikasyonu uygulanmıř HNT nanokili poli(hidroksibütirat-ko-hidroksivalerat) (PHBV) matrisle karıřtırarak eriyik karıřtırma yöntemiyle APTES-HNT/PHBV nanokompozitler hazırlamıřlardır. Modifiye ve saf HNT iđereren PHBV nanokompozitlerin mekanik ve termal özellikleri incelendiđinde, saf HNT iđereren nanokompozitlerin mekanik özellikleri ve termal dayanımlarında saf PHBV'ye göre artıř gözlenirken; APTES ile modifiye edilmiř HNT iđereren nanokompozitlerin mekanik özellikleri ve termal dayanımlarında azalma görölmüřtür. Bu durum, modifiye HNT yüzeyinde bulunan amino gruplarının, PHBV zincirindeki karbonil gruplarıyla etkileřmesi durumundan kaynaklandıđına karar verilmiřtir (Daitx vd., 2015). Qiao ve arkadaşları (2017), HNT yüzeyini APTES ve oleik asit ile modifiye etmiř ve bu modifiye nanokili UHMWPE ile karıřtırarak eriyik karıřtırma yöntemiyle UHMWPE/HNT nanokompozitler hazırlamıřlardır. Modifikasyonun etkisiyle PE matriste homojen dađılım gösteren modifiye HNT, aynı zamanda nanokompozitlerin mekanik özelliklerini ve termal dayanımlarını da arttırmıřtır (Qiao vd., 2017). Pasbakhsh ve çalıřma arkadaşları (2010), HNT yüzeyini MPS ile modifiye etmiř ve HNT'nin etilen-propilen-dien-monomer (EPDM)'ye ilave

ederek MPS-HNT/EPDM nanokompozitleri üretmişlerdir. Mikroskobik analiz sonuçları MPS-HNT'nin EPDM matriste daha homojen bir dağılım gösterdiği; MPS-HNT ve saf HNT içeren EPDM nanokompozitlerin mekanik test sonuçları ise MPS-HNT içeren nanokompozitlerin çekme dayanımları ve çekme modüllerinde saf HNT içeren nanokompozitlere göre artış olduğu gözlemlenmiştir (Pاسبakhsh vd., 2010).

## 2. MEKANİK ÖZELLİKLER ÜZERİNE ETKİSİ

Literatürde yapılan çalışmalarda modifiye edilmiş HNT'nin PS nanokompozitlerin mekanik özellikleri üzerine etkisini belirlemek için HNT/PS nanokompozite uygulanan mekanik test sonuçları saf EPS köpüğün mekanik test sonuçları ile karşılaştırılmıştır. Örneğin; arkadaşları yapılan bir çalışmada HNT'yi sodyum dodesil sülfat (SDS) ile modifiye etmişler ve ağırlıkça %5 ve %10 oranlarında stirene ekleyerek emülsiyon polimerizasyonu ile PS nanokompozitler elde etmişlerdir. Bu nanokompozitlere mekanik test uygulamışlardır.

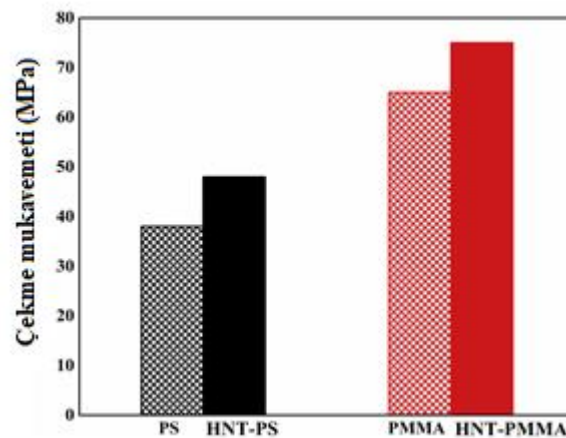
PS/%5HNT ve PS/%10HNT ve saf PS'nin nanokompozitlerinin çentikli izod darbe mukavemeti sırasıyla  $59,1 \pm 4,8$  ve  $35,0 \pm 6,9$  J/m,  $19,5 \pm 3,6$  J/m olup saf PS'den daha yüksek çıkmıştır (Şekil 1). Bu sonuçlar ağırlıkça %5 HNT'lerin eklenmesi PS'nin darbe mukavemetini %300 arttırırken, HNT'lerin yüklenmesindeki ilave bir artış PS/HNT nanokompozitlerinin darbe mukavemetini önemli ölçüde azalttığını göstermiştir. Saf PS ve PS/HNT nanokompozitlerinin depolama modülü, PS nanokompozitlerinin sertliği, HNT'lerin eklenmesiyle 25 °C'de yaklaşık %30 artmıştır (Lin vd., 2011).



Şekil 1. Saf PS ve PS/HNT nanokompozitlerinin çentikli İzod darbe dayanımı (Lin vd., 2011)

Polimer nanokompozit kaplamalar sertlik, tokluk açısından mükemmel mekanik özellikler ve sürtünme ve aşınma açısından olağanüstü tribiyolojik özellikler gösterdikleri için önemli araştırma ilgisini çekmiştir. Bu yüzden son yirmi yılda camı fiziksel hasardan, çevresel bozulmadan korumak ve ayrıca işlevselliğini veya mekanik ve termal özelliklerini geliştirmek amacıyla camın alt tabakalar için çeşitli yüzey kaplamaları geliştirilmiştir. Bunlardan biri de HNT takviyeli polimer kaplamalardır. Kaplamada kullanılacak HNT/PS ve HNT/PMMA polimer nanokompozitlerin sentezi, ağırlıkça %5 HNT, PS ve PMMA polimerlerine takviye edilerek eriyik harmanlama yöntemi ile yapılmıştır.

HNT takviyeli polimer nanokompozitlerle kaplama öncesi ve sonrası camın mekanik davranışının değerlendirilerek, kaplamanın, yüzeyin mekanik kararlılığı üzerindeki etkisi anlaşılmasına çalışılmıştır. Bu nedenle, elde edilen HNT takviyeli nanokompozit kaplamaların mekanik davranışını incelemek için çekme testi yapılmıştır. Şekil 2’de, HNT’lerin eklenmesinin PS ve PMMA nanokompozitlerinin gerilme mukavemeti üzerindeki etkisi görülmektedir. HNT’lerin polimere eklenmesi, her iki durumda da nanokompozitin gerilme mukavemetini artırmıştır. Bu davranış, nanokompozitlerde etkili stres transfer ajanları olarak hareket eden HNT’nin geniş en boy oranına bağlanabilir. Bu, polimer matrisinde plastik deformasyona neden olur ve sonuç olarak gerilme mukavemetini artırır. Kaplamaların çekme mukavemeti ve çizilme direnci gibi mekanik davranışları da saf muadillerine kıyasla nanokompozitler için daha yüksek bulunmuştur (Buruga ve Kalathi, 2018).



**Şekil 2.** HNT-PS ve HNT-PMMA nanokompozitlerinin çekme mukavemeti ve bunlara karşılık gelen saf polimer değerleri (Buruga ve Kalathi, 2018).

#### **4. SONUÇ**

Modifiye HNT ilavesi ile üretilen PS/HNT nanokompozitler saf PS'ye göre geliştirilmiş mekanik özelliklere sahiptir. Bu durum modifiye HNT'nin polimer matris içinde daha homojen dağılması ve dolayısıyla modifiye HNT ile polimer matrisin tabakaları arasında sinerjik etkinin artmasından kaynaklanmaktadır.

Modifiye HNT takviyeli polimer nanokompozitlerin özelliklerinin gelişmesi için kullanılan modifikasyon malzemesi kullanılan polimerin türüne göre değişir. O yüzden HNT modifiye edileceği zaman kullanılacak polimerin türüne uygun madifikasyon kimyasalına karar verilmelidir.

Modifiye HNT ilave edilmiş PS nanokompozitlerinin mekanik özellikleri gelişirken bunun yanı sıra termal kararlılık, yanmazlık ve izolasyon kabiliyeti de artar. Çünkü HNT aynı zamanda alev geciktirici özelliğe de sahiptir.

Modifiye HNT takviyeli PS nanokompozit ile ilgili çalışmalar sınırlı sayıdadır. Modifiye HNT'nin PS üzerindeki etkisini araştırmak için daha fazla çalışma yapılması tavsiye edilir.

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## ÇOCUK İSTİSMARI FARKINDALIĞI İLE İLGİLİ YAPILAN YEREL ÇALIŞMALARIN EĞİLİMİ<sup>1</sup>

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### ÖZET

Çocuk istismarı, tüm bireylerin ruh sağlığını bozan toplumsal bir problemdir. Çocuk istismarı olgusu vakalarının artış eğiliminde olduğu yapılan araştırmalara da yansımaktadır. Çocukların istismara karşı korunması açısından yapılan araştırmaların eğiliminin ve önerilerinin bilinmesine ihtiyaç duyulmaktadır. Bu doğrultuda araştırmada çocuk istismarı ile ilgili yerel alan yazındaki çalışmaların eğilimlerini ortaya koyabilmesi amaçlanmıştır. Araştırmanın temel problemi “Çocuk istismarı ile ilgili yerel alan yazındaki çalışmaların eğilimlerini nasıldır?” şeklindedir. Araştırma nitel araştırma yaklaşımlarından doküman incelemesi desenine dayanmaktadır. Araştırmanın veri kaynakları ölçüt örnekleme yöntemiyle 45 lisansüstü tez ve makaleden oluşmaktadır. Araştırmada araştırmanın künye bilgisi formu ile veriler toplanmıştır. Araştırmada verileri analiz etmek amacıyla tematik analiz yöntemi kullanılmıştır. Yapılan analizler sonucunda çocuk hakları, risk faktörleri ve koruyucu faktörler ile yordanan ve yordayıcı değişkenler temalarına ulaşılmıştır. Çocuk hakları temasına bağlı olarak sosyal yaşantılar ve öznel yaşantılar alt temaları bulunmuştur. Risk faktörleri ve koruyucu faktörler temasına bağlı olarak negatif ilişkili değişkenler ve pozitif ilişkili değişkenler alt temalarına ulaşılmıştır. Yordanan ve yordayıcı değişkenler temasına bağlı olarak etkilenen değişkenler ve etkileyen değişkenler alt temalarının olduğu görülmüştür. Araştırma sonuçları, çocukları istismardan korumada öz-yeterlilik ve psikolojik sağlamlık gibi koruyucu faktörlerin önemsenmesi gerektiğini göstermektedir. Araştırma sonuçlarına bağlı olarak araştırmacı ve uygulayıcılara yönelik önerilerde bulunulmuştur.

**Anahtar kelimeler:** Çocuk istismarı, doküman incelemesi, koruyucu faktörler.

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**THE TENDENCY OF LOCAL STUDIES ON CHILD ABUSE AWARENESS****ABSTRACT**

Child abuse is a social problem that impairs the mental health of all individuals. It is also reflected in the studies that the cases of child abuse tend to increase. There is a need to know the trends and recommendations of the research conducted in terms of protecting children against abuse. In this direction, it is aimed to reveal the trends of studies in the local literature on child abuse. The main problem of the research is “How are the trends of the studies in the local literature on child abuse?” is in the form. The research is based on the document analysis pattern, one of the qualitative research approaches. The data sources of the research consist of 45 postgraduate theses and articles by criterion sampling method. In the research, data were collected with the imprint information form of the research. In the research, thematic analysis method was used to analyze the data. As a result of the analyzes, the themes of children's rights, risk factors and protective factors, and predicted and predictive variables were reached. Depending on the theme of children's rights, sub-themes of social and subjective experiences were found. Depending on the theme of risk factors and protective factors, sub-themes of negatively correlated variables and positively correlated variables were reached. Depending on the theme of predicted and predictive variables, it was observed that there were sub-themes of affected variables and influencing variables. Research results have shown that protective factors such as self-efficacy and psychological resilience should be considered in protecting children from abuse. Depending on the results of the research, suggestions were made for researchers and practitioners.

**Keywords:** Child abuse, document analysis, protective factors

## **1. GİRİŞ**

Çocuk istismarı, yaşça büyük bir bireyin, toplumun veya ülkenin farkında olarak veya farkında olmayarak çocuğun bedensel, duygusal ve sosyal gelişimini engelleyen veya durduran her türlü eylemdir (WHO, 2016). Çocuk istismarı genel olarak dört sınıfta ele alınmaktadır. Bunlardan ilki olan fiziksel istismarda çocuğun fiziksel olarak zarar görmesini içeren bedensel gelişiminin engellenmesi söz konusudur. İkincil sınıf olan duygusal istismarda çocuğa yeterli ilgiyi bilerek göstermeyerek ve kendi duyguları için çocuğu sömürerek çocuğun duygusal gelişimini engellenmesi ifade edilmektedir. Üçüncü istismar tipi olan cinsel istismarda başka birinin cinsel hazları için çocuğun kullanılmasıdır. Son tür pasif çocuk istismarı olarak da bilinen ihmalidir. İhmalde ise, çocuğun gelişimi için fiziksel, duygusal, cinsel, tıbbi ve eğitimsel açıdan yeterli bir şekilde ilgi gösterilmemesini, bakımının yerine getirilmemesini içermektedir (UNICEF, 2016; WHO, 2016).

Çocuk istismarı, çoğu insan için konuşulması zor olan konuların başında gelmektedir. Toplumun ve ailenin ruh sağlığı için çocuk istismarının ve temel kavramlarının somut olarak ortaya konulmasına ihtiyaç duyulmaktadır. Özellikle ailenin ne tür durumların istismar olduğunu bilmeleri, çocuklarını istismardan koruma ve çocuk istismarını önleme açısından önemlidir. Alanyazında çocuk istismarıyla ilgili pek çok araştırma (Polat, 2019) yapılmasına karşın çocuk istismarının temel kavramlarının aile ve toplum tarafından anlaşılabilmesi için açıklanmasının ve somutlaştırılmasının yeterli olmadığı söylenebilir. Bu doğrultuda bu çalışmanın çocuk istismarının temel kavramlarını somutlaştırma görevini yerine getirdiği için değerli olduğu belirtilebilir. Sözü edilen gerekçelere ek olarak bu çalışmanın lisans ve lisansüstü eğitimi sırasında öğrencilerin çocuk istismarı kavramlarını öğrenmelerine ve pekiştirebilmelerine katkı sunacağı öngörülmektedir. Bu gerekçelerden hareketle araştırmada çocuk istismarı farkındalığı ile ilgili yürütülmüş olan yerel çalışmaların incelenmesi amaçlanmıştır.

## **2. YÖNTEM**

### **Araştırma Metodu**

Bu çalışmada psikoeğitim uygulamasında kullanılacak çocuk istismarı farkındalık programının içeriğini oluşturmada doküman analizi çalışması yapılmıştır (Yıldırım & Şimşek, 2016). Yıldırım ve Şimşek'in (2016) önerilerinden hareketle çocuk istismarı farkındalığı ile ilgili

kavramları ortaya koymak için dokümanın orijinaliği, inandırıcılığı ve temsil edilebilirliği ölçütleri sağlandıktan sonra analiz aşamasına geçilmiştir.

### **Veri Kaynakları**

Bu açıdan 2016-2020 yılları arasında YÖK Tez Merkezi, Google Akademik ve Ulakbim TR Dizin tarama sayfalarında bir takım anahtar kavramlar ile taramalar yapılmıştır. Aramalar sonucunda ulaşılan akademik çalışmalar aşağıda verilen dâhil edilme ve hariç tutma kriterleri göz önüne alınarak sınırlandırılmıştır. Bu sınırlandırmanın dışında olan araştırmalar çalışmaya dâhil edilmemiştir. Dâhil edilme ve hariç tutma kriterleri göz önüne alınarak ilgili veri tabanlarında yapılan araştırmaların seçim ve değerlendirme süreçlerini içeren aşamalar sonucunda 727 araştırma içerisinde kriterleri taşıyan 45 çalışma araştırmaya dâhil edilmiştir. Bu bağlamda dâhil edilme ve hariç tutma kriterleri doğrultusunda YÖK Tez Merkezi veri tabanından erişime açık olan 22 lisansüstü tez ile 23 araştırma makalesinin doküman incelemesi yapılmıştır.

### **Verilerin Toplanması**

Çalışmada doküman incelemesi kapsamında incelenen tez ve makalelerin verileri toplanmıştır. Doküman analizine alınan tez ve makalelere ilişkin künye bilgileri kod, çalışma adı, araştırma türü, çalışma grubu ve veri kaynakları, anahtar kavramlar ve genel bulgular başlıkları bulunmaktadır.

### **Veri Analizi**

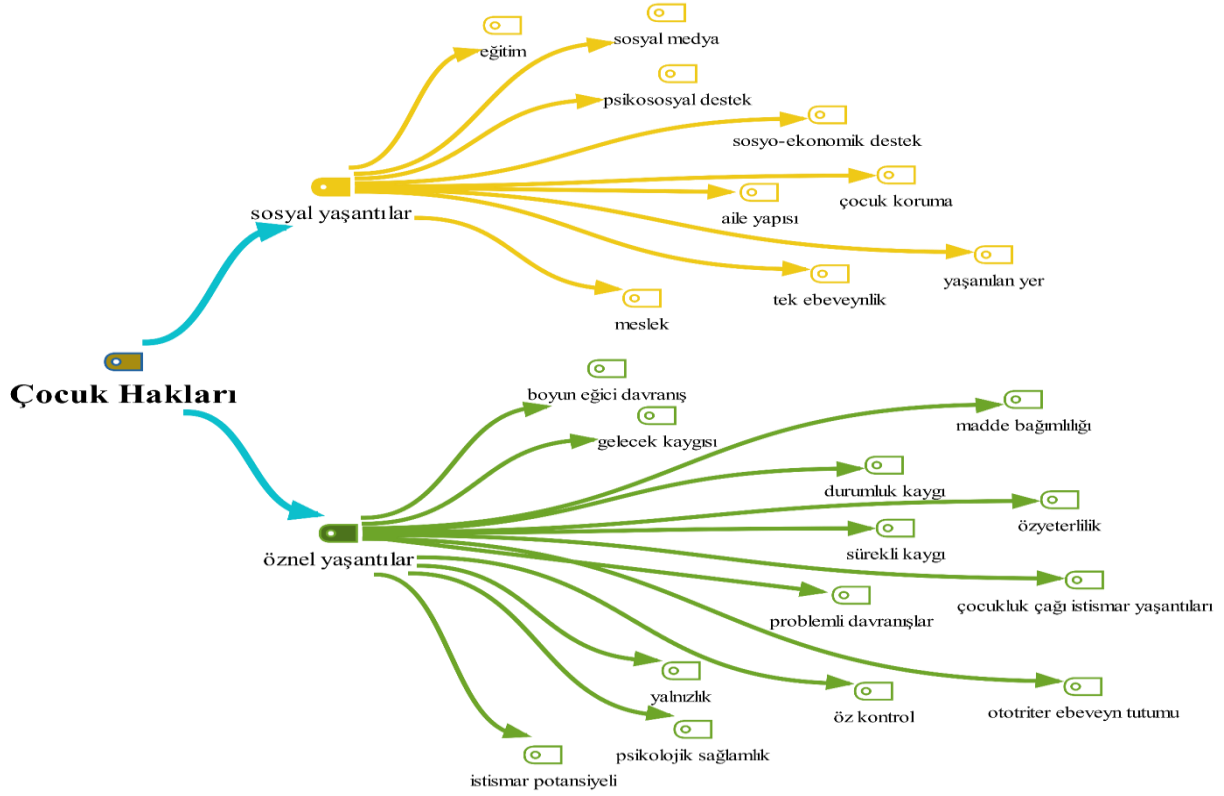
Çalışmada tematik analiz yöntemi kullanılmıştır. Tematik analiz, tümevarımsal ve/veya tümdengelsel kodlama söz konusu olup belirli temalara ulaşma amaç edinir (Braun & Clarke, 2019). Tematik analiz, veri setini en küçük boyutlarda düzenlemeyi, derinlemesine betimlemeyi sağlayan ve verilerdeki örüntüleri ortaya çıkaran bir nitel veri analiz yöntemidir (Braun & Clarke, 2019; Creswell, 2017). Araştırmada öncelikle ham verilerle aşına olunmuştur. Sonrasında ilk kodlar oluşturulmuş ve temalar aranmıştır. Daha sonra temalar gözden geçirilip tanımlama ve isimlendirme çalışması yapılmıştır. Son aşamada ise rapor hazırlanmıştır (Braun & Clarke, 2019).

## **3.BULGULAR**

Çalışmada ebeveynlere yönelik çocuk istismarı farkındalığı programını geliştirmek amacıyla son beş yıl içerisinde yerel alanyazında yayınlanmış çalışmaların doküman incelemesi çalışması yapılmıştır. Veri seti araştırma sorusu doğrultusunda ortaya çıkan temalara göre sunulmuştur.

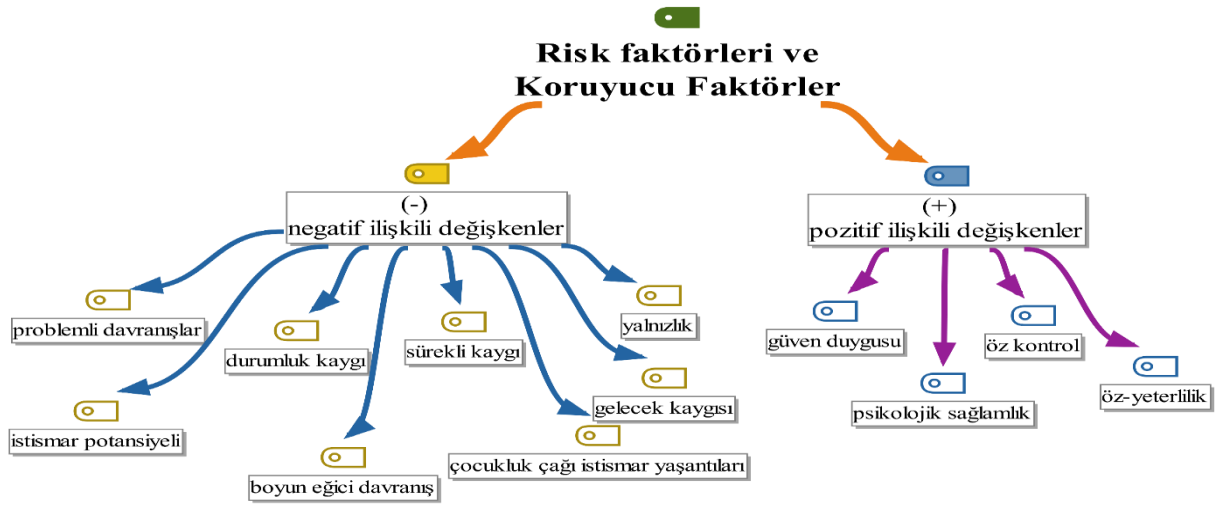
**Araştırma Sorusu :** “Çocuk istismarı ile ilgili yerel alan yazındaki çalışmaların eğilimlerini nasıldır?

Bu kapsamda 45 çalışma ile yapılan doküman analizi sonuçları çocuk hakları (çocuk istismarı farkındalığı ile ilgili ele alınan değişkenler), çocuk istismarının risk faktörleri ve koruyucu faktörler (çocuk istismarı ile negatif ve pozitif olan değişkenler), çocuk istismarı farkındalığını etkileyen ve farkındalığından etkilenen değişkenler olmak üzere üç tema altında açıklanmıştır. Çocuk hakları temasına ilişkin kodlar Şekil 1’de verilmiştir.



Şekil 1. Çocuk Hakları Temasına İlişkin Hiyerarşik Kod Alt Kod Modeli

Çocuk istismarının risk faktörleri ve koruyucu faktörler (çocuk istismarı ile pozitif ve negatif olan değişkenler) teması ilişkin kodlar Şekil 2’de sunulmuştur.



**Şekil 2.** Çocuk İstismarı Risk Faktörleri ve Koruyucu Faktörler Temasına İlişkin Hiyerarşik Kod Alt Kod Modeli

Veri setindeki diğer değişkenler ile birlikte ele alınmak üzere ilgili değişkenler çocuk istismarı farkındalığının yordayıcı etkisi olan değişkenler ve çocuk istismarı farkındalığını yordayıcı etkisi olan değişkenler temasına ilişkin hiyerarşik kod alt kod modeli Şekil 3'te verilmiştir.



**Şekil 3.** Çocuk İstismarı Farkındalığının Yordayıcı Etkisi Olan Değişkenler ve Çocuk İstismarı Farkındalığını Yordayıcı Etkisi Olan Değişkenler Temasına İlişkin Hiyerarşik Kod Alt Kod Modeli

#### 4.SONUÇ ve ÖNERİLER

Çocuk istismarı odaklı yürütülen yerel araştırmalarda çocuk haklarının öznel ve sosyal yaşantılar ile ilişkilendirildiği sonucuna varılmaktadır. Çocuk istismarı odaklı yürütülen yerel araştırmalarda çocuk istismarı farkındalığı ile ilgili risk faktörlerinin (negatif ilişkili değişkenler) problem davranışlar, yalnızlık, boyun eğici davranış, durumluk kaygı, sürekli kaygı, gelecek kaygısı, istismar potansiyeli ve çocukluk çağı istismar yaşantıları olduğu tespit edilmiştir. Çocuk istismarı farkındalığı ile ilgili ve koruyucu faktörler (pozitif ilişkili değişkenler) ise psikolojik sağlamlık, öz-yeterlilik, güven duygusu ve öz kontrol olduğu saptanmıştır. Çocuk istismarı farkındalığı ile ilgili yapılmış araştırmalarda problemlı davranış,

boyun eğici davranış ve yalnızlık değişkenlerinin çocuk istismarı farkındalığını etkilediği (yordayıcı) sonucuna ulaşılmıştır. Çocuk istismarı farkındalığı tarafından yordanan değişkenlerin ise psikolojik sağlık, öz-yeterlik ve öz kontrol olduğu anlaşılmaktadır.

Bu çalışma doküman incelemesine dayalı betimsel bir araştırmadır. İlerleyen çalışmalarda araştırmacıların çocuk istismarı olgusunu daha iyi açıklayabilmeleri amacıyla durum çalışması gibi nitel ve anket gibi nicel desenleri birlikte kullanmalarında yarar bulunabilir. Çocuk istismarının risk faktörlerinin azaltılması ve koruyucu faktörlerinin artırılması istismarın önleminde yarar sağlayabilir. Çocuk istismarı farkındalığını yordayan ve çocuk istismarı farkındalığının yordayıcı olduğu yapısal eşitlik modellemesi odaklı araştırmalar yürütülebilir.

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**BİLİŞSEL DAVRANIŞÇI TERAPİ ODAKLI PROGRAMIN EBEVEYNLERİN  
ÇOCUK İSTİSMARI FARKINDALIKLARINA ETKİSİ: KARMA YÖNTEM  
ÇALIŞMASI<sup>2</sup>**

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**ÖZET**

Bu çalışmada ebeveynlerin çocuk istismarı farkındalıklarını arttırmaya yönelik Bilişsel Davranışçı Terapi (BDT) odaklı psikoeğitim programının geliştirilmesi ve karma araştırma yöntemiyle test edilmesi amaçlanmıştır. Araştırma gömülü karma desene dayanmaktadır. Araştırmanın nicel boyutu eşleştirilmiş yarı deneysel desen; nitel boyutu ise olgu bilim desen ekseninde yürütülmüştür. Katılımcılar çok düzeyli iç içe örnekleme yöntemiyle seçilmiştir. Araştırmanın nicel boyutunda on ebeveyn ile yedi haftalık BDT odaklı psikoeğitim programı uygulanmıştır. Nitel boyutunda ise deney grubundaki beş ebeveyn ile görüşme gerçekleştirilmiştir. Nicel veriler çocuk istismarı farkındalık ölçeği, çocuk ihmali farkındalık ölçeği ve çocuk istismarına ilişkin bilişler ölçeği (Ebeveyn formu) aracılığıyla; nitel veriler ise yarı-yapılandırılmış görüşme formlarıyla toplanmıştır. Araştırma verileri ardışık veri analizi yöntemiyle çözümlenmiştir. Nicel veriler tek faktörlü kovaryans analizi, nitel veriler tematik analiz yöntemleriyle analiz edilmiştir. Nitel ve nicel sonuçlar, harmanlama ve çapraz durum karşılaştırması yöntemleriyle bütünleştirilmiştir. Araştırma sonuçları, BDT odaklı programın ebeveynlerin çocuk istismarı farkındalıklarını arttırmada etkili bir yaklaşım olduğunu göstermiştir. Sonuçlar, BDT odaklı programın ebeveynlerin aile içi iletişimlerine katkı sağladığını ve çocuk istismarıyla ilgili farkındalıklarının arttığını ortaya koymuştur. Nitel bulguların nicel bulgularla örtüştüğü sonucuna varılmıştır.

**Anahtar kelimeler:** Çocuk istismarı farkındalığı, bilişsel davranışçı terapi, ebeveyn eğitimi, gömülü karma desen

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**THE EFFECT OF COGNITIVE BEHAVIORAL THERAPY-FOCUSED PROGRAM  
ON PARENTS' AWARENESS OF CHILD ABUSE: A MIXED METHOD STUDY****ABSTRACT**

In this study, it was aimed to develop a Cognitive Behavioral Therapy (CBT) focused psychoeducation program to increase parents' awareness of child abuse and to test it with a mixed research method. The research is based on the embedded mixed pattern. Quantitative dimension of the study was matched quasi-experimental design; the qualitative dimension was carried out in the axis of phenomenology design. Participants were selected by multilevel nested sampling method. In the quantitative dimension of the study, a 7-week CBT-focused psychoeducation program was applied with 10 parents. In the qualitative dimension, interviews were conducted with 5 parents in the experimental group. Quantitative data through child abuse awareness scale, child neglect awareness scale and child abuse cognitions scale (Parent form); qualitative data were collected with semi-structured interview forms. Research data were analyzed by sequential data analysis method. Quantitative data were analyzed by single factor covariance analysis and qualitative data were analyzed by thematic analysis methods. Qualitative and quantitative results are integrated with blending and cross-case comparison methods. The results of the research showed that the CBT-focused program is an effective approach to increase parents' awareness of child abuse. The results revealed that the CBT-focused program contributed to parents' intra-family communication and increased their awareness of child abuse. It was concluded that the qualitative findings overlapped with the quantitative findings.

**Keywords:** Child abuse awareness, cognitive behavioral therapy, parent education, embedded mixed pattern

## 1.GİRİŞ

Çocuk istismarı, çocukların bilişsel, duyuşsal, fiziksel ve sosyal gelişimlerine zarar veren bir toplum ruh sağlığı sorunudur. Çocuk istismarı vakası olan bir yerde çocuğun ve ailesinin yaşamında onarılması güç yaralar olabilmektedir (İnsan Hakları Derneği [İHD], 2008; Sarıbaş, 2013). Çocuk istismarı birçok ülkede gizlenen veya gizli kalan bir problemdir. Bu sorun gelişmiş ülkelerde daha çok raporlara yansımalarının yanı sıra diğer ülkelerdeki araştırmalar da gün geçtikçe artmaktadır (Alzoubi et al., 2018). Türkiye gibi gelişmekte olan ülkelerde çocuk istismarının önlenmesine ve istismarla başa çıkılmasına gereken önem verilememektedir (Çeçen, 2007). Dünyada meydana gelen sosyo-ekonomik değişimler sonucunda çocuk istismarı olaylarında da büyük artışlar yaşanmaktadır. Alanyazında çocuk istismarının yaygınlığıyla ilgili farklı oranlar olduğu görülmektedir. Araştırmacıların farklı kriterler kullanması, verilerin alındığı örneklemelerin ve bölgesel özelliklerin farklı olması, veri toplama araçlarının değişkenliği gibi faktörlerden dolayı sağlıklı verilere ulaşmak mümkün olmamaktadır (Polat, 2017, 2019).

Türkiye’de çocuk istismarı ile ilgili tedavi çalışmalarının sayısının oldukça sınırlı olduğu görülmektedir (Bahadır Yılmaz, 2013; Bakır & Kapucu, 2017; Sarı et al., 2016). Ayrıca ailelere ve risk gruplarına yönelik müdahale ve önleme çalışmalarının görece az olması dikkat çekicidir. Türkiye’de ebeveynler için çocuk istismarı farkındalıklarını arttırmaya yönelik BDT odaklı psikoeğitim uygulamasına rastlanmamıştır (Çokamay Yılmaz, 2018). Ebeveynlerin ve çocukların yaşamlarını travmatik hale getirebilen çocuk istismarına yönelik önleyici çalışmalarda kullanılacak sistematik bir müdahale programına ihtiyaç olduğunu göstermektedir (Wen et al., 2017). Bu noktadan hareketle çalışmada Türk ebeveyn örneğinde çocuk istismarı farkındalıklarını arttırmaya yönelik BDT odaklı psikoeğitim programı geliştirilmiş ve karma araştırma yöntemiyle etkililiği test edilmiştir.

## 2.YÖNTEM

### Araştırma Deseni

Bu çalışmada gömülü (iç içe) müdahale karma deseni kullanılmıştır (Christensen et al., 2015; Cohen et al., 2007; Creswell, 2014; Creswell & Plano Clark, 2015). Çalışmanın nicel deseninde deneysel çalışması yürütülmüş olup ardından nitel deseninde görüşmeler gerçekleştirilmiştir.

### Çalışma Grubu

Çalışmada *çok aşamalı iç içe karma yöntem örnekleme* ile belirlenmiştir (Baki & Gökçek, 2012; Johnson & Christensen, 2014; Tashakkori & Teddlie, 2010). Bu çalışmanın hedef evrenini Siirt il merkezinde çocuk istismarı ile ilgili farkındalık düzeyi düşük olan ilköğretim öğrencilerinin ebeveynleri oluşturmaktadır. Hedef evrenden çalışma gruplarını belirlemek için aşamalı bir yol haritası izlenmiştir. Alan uzmanları, ebeveynler ve dokümanlardan elde edilen verilerin bütünleştirilmesi sonucunda 7 haftalık BDT odaklı psikoeğitim programı geliştirilmiştir. Psikoeğitim uygulaması çalışmasında küme örnekleme ve ölçüt örnekleme ile 20 ebeveyn, psikoeğitim uygulamasının değerlendirilmesi çalışmasında ölçüt örnekleme ile 5 ebeveyn sürece dâhil edilmiştir.

### **Veri Toplama Araçları**

**Çocuk istismarı ve ihmali farkındalık ölçekleri:** Celiloğlu (2018) tarafından çocuk istismarına ve ihmaline yönelik farkındalık düzeylerini ölçmek amacıyla geliştirilmiştir. İstismar ölçeği 23 madde ve üç alt boyuttan oluşmaktadır. İhmal ölçeği ise 38 madde ve 4 alt boyuttan oluşmaktadır. Ölçeğin model uyumunun iyi düzeyde olduğu tespit edilmiştir.

**Çocuk istismarına ilişkin bilişler ölçeği (Ebeveyn formu):** Ölçek, Aktu ve Dilekmen (2021) tarafından ebeveynlerin çocuk istismarına ilişkin bilişsel hatalarını ölçmek üzere geliştirilmiştir. Doğrulayıcı faktör analizi sonucunda üç faktörlü yapıya ait model uyumunun yeterli düzeyde olduğu bulunmuştur.

**Yarı yapılandırılmış görüşme formu:** Çalışmada araştırmacılar tarafından geliştirilen form, müdahale programından sonra programı değerlendirmek amacıyla uygulanmıştır. Bu formda BDT odaklı psikoeğitim programının içerik, zaman, deneyim, etkinlik vb. konulardaki değerlendirmeleri ve algulamaları ölçmeye çalışan sorular bulunmaktadır. Formlar geliştirilirken uzman ve akran görüşleri alınarak gerekli düzeltmeler yapılmıştır. Bu kapsamda yapılan görüşmelerin süresi 15-40 dakika arasında değişmektedir.

### **Veri Analizi**

Bu çalışma karma yöntem desenlerinden gömülü müdahale deseniyle kurgulandığı için elde edilen veriler *ardışık veri analizi* yöntemiyle çözümlenmiştir (Creamer, 2020; Creswell & Plano Clark, 2015; Johnson & Christensen, 2014). .bu doğrultuda çalışmanın hipotezi için nicel veri analizi olarak tek faktörlü kovaryans analizi yapılmıştır (Çokluk et al., 2018; Seçer, 2015). Görüşme verilerini analiz etmek için tematik veri analizi yöntemi kullanılmıştır (Braun & Clarke, 2019; Creswell & Plano Clark, 2015). Araştırmada tematik veri analizi, Maxqda 2020 paket programı kullanılarak gerçekleştirilmiştir. Tematik veri analizini gerçekleştirmek için

Braun ve Clarke'ın (2019) önerileri doğrultusunda altı aşamalı bir analiz yolu izlenmiştir. Karma verileri analiz etmek için harmanlama ve çapraz durum karşılaştırması yöntemleri kullanılmıştır. Bu yöntemlerin sonucunda ise meta-çıkarımlara ulaşılmıştır (Creamer, 2018/2020, s. 124).

### **Araştırmanın Geçerliliği ve Güvenirliği**

Araştırmanın karma boyutunda sıralı geçerlik, politik geçerlik, iç-dış, dönüşüm geçerliği ve eş ölçülebilir karma geçerlik çalışmaları yürütülmüştür (Creswell & Plano Clark, 2015; Johnson & Christensen, 2014).

## **3.BULGULAR**

### **Nicel Bulgular**

Deney ve kontrol gruplarının çocuk ihmali farkındalığı, çocuk istismarı farkındalığı ve çocuk istismarına ilişkin bilişler ölçeklerine ilişkin tek faktörlü kovaryans analizi sonuçları incelenmiştir. Buna göre ön test puanları kontrol altına alındığında BDT odaklı psikoeğitim programına katılan ebeveynler ile katılmayan ebeveynlerin çocuk ihmali farkındalığı son test puanlarında [ $F(1, 19) = 15.759, p = 0.001, \eta^2 = 0.481$ ] ve çocuk istismarı farkındalığı son test puanlarında [ $F(1, 19) = 4.866, p = 0.041, \eta^2 = 0.2239$ ] istatistiksel olarak anlamlı düzeyde bir farklılık olduğu ifade edilebilir. Ön test puanları kontrol altına alındığında BDT odaklı psikoeğitim programına katılan ebeveynler ile katılmayan ebeveynlerin çocuk istismarına ilişkin bilişleri son test puanlarında anlamlı bir farklılık olduğu anlaşılabilir [ $F(1, 19) = 6.832, p = 0.018, \eta^2 = 0.287$ ]. Gruplar arasındaki bu farklılığın kaynağını belirlemek üzere yapılan Bonferroni testi sonuçları deney grubu lehine olduğunu göstermiştir ( $p = 0.000$ ). Elde edilen bu bulgular bağlamında, deney grubunda uygulanan çocuk istismarı farkındalık psikoeğitim programının ebeveynlerin çocuk ihmali ve istismarı farkındalığı puanlarını arttırmada ve çocuk istismarına ilişkin bilişleri puanlarını azaltmada etkili olduğu söylenebilir.

### **Nitel Bulgular**

Araştırmanın deneysel süreci sonrasında fenomenoloji çalışması ile ebeveynlerin süreçteki deneyimlerinin nasıl şekillendiği açıklanmaya çalışılmıştır. Bunun sonucunda ulaşılan bulgular üç tema ve beş kategori altında toplanmıştır. Tema ve kategorilere ilişkin görüş bildiren katılımcılar Tablo 2'de sunulmuştur.

**Tablo 1.** Katılımcıların Temalara İlişkin Görüşleri

Tema	Kategori	Katılımcılar
Aile içi iletişim	İletişim hatalarını düzeltme	<p>“Bu eğitim iyi oldu benim için. Önyargularım yıkıldı resmen... Bu eğitim bu konuda yardımcı oldu diyebilirim. Kızımın olan iletişim iyiydi ama onu şimdi çok baskı altında tuttuğumu fark ettim. Bazen onun kendi ayakları üzerinde durması için serbest bırakmayı öğrendim.” (E5)</p> <p>“...Çocuğum 12 yaşında. Bizde bir kısır döngü vardı. Sürekli onu uyarıp öğüt veriyordum. O da yanlışlarını benden saklıyordu... Artık evde çocuğum konuşunca ben de lafa dalıp öğüt vermiyorum. Sabırla dinliyorum.” (E3)</p>
	Empati Kurma	<p>“Çocuklara davranırken daha hassas olmaya çalışıyorum. Onlarla vakit geçirmeye, onları dinlemeye bazen oyun oynamaya çalışıyorum. Duygularımızı fark ettik bu süreçte.” (E1)</p> <p>“Çocuklarının hataları olduğunda sizin yaptığınız gibi empati kuruyorum. Daha sakin kalıyorum. Ve onlar da beni daha çok takmış oluyorlar.” (E4)</p>
Bilişsel farkındalık	İstismar Farkındalığı	<p>“...İstismar denilince ilk aklıma gelen cinseldi. Diğerlerini hatırlamıyordum, bilmiyordum açıkçası. İstismar çeşitlerini öğrenmiş oldum.” (E1)</p> <p>“İstismar çeşitlerine farklı bakmaya başladım... Duygusal istismarı ve mahremiyet eğitimini yeni öğrendim. Bunları yaşamıma yansıtmaya çalışıyorum.” (E5)</p>
Düşünceleri işlevsel hale getirme	Düşünce hatalarını fark etme	<p>“Ben felaketleştirmeyi çok kullanıyordum. Kızım fırına tek başına gitmek istediğinde çok korkuyordum. Ben de onunla gidiyordum. Fırın hemen evimizin ilerisinde. Olmaz diye bağırdığım oluyordu. Aklımda hep onun başına bir şey gelecek diye bir düşünce vardı. Tabi bir şey yapamıyordum. Kızıma yaşam alanı vermiyordum...” (E5)</p> <p>“Ya olursa? Hep kızımın başına bir şey gelecek diye onu korumaya çalışıyordum. Aman düşmesin, başına bir şey gelmesin diyordum...” (E2)</p>
	Düşünce hatalarıyla başa çıkma	<p>“...Fark ettim ki bu onun bireyselleşmesine ve kendi başına karar vermesine engel oluyormuş. Şimdi öğrendim ki onun kendi başına bir şeylere girişmeye çalışması normal bir durum. Bu yüzden biraz daha az korumacıyım. Elbette başına istemediğim şeyler gelebilir, ama başına önleyeceğim diye onu sürekli sınırlandırmam da iyi değil.” (E2)</p>

Nicel ve nitel sonuç bütünleştirildiğinde ulaşılan karma sonuçlar veya meta-çıkarımlar şu şekilde ifade edilmiştir:

- Ebeveynlerin çocuk ihmali ve istismarı farkındalıklarını arttırmasını test etmeye ilişkin yapılan ön test-son test analizleri ve psikoeğitim uygulamasının değerlendirilmesine ilişkin yapılan görüşmelerden elde edilen bulgular doğrultusunda, BDT odaklı psikoeğitim uygulamasının ebeveynlerin çocuk ihmali ve istismarı farkındalıklarını arttırmada etkili bir yaklaşım olduğu söylenebilir.

- *Ebeveynlerin çocuk istismarına ilişkin bilişsel hatalarını azaltılmasını test etmeye ilişkin yapılan ön test-son test analizleri ve psikoeğitim uygulamasının değerlendirilmesine ilişkin yapılan görüşmelerden elde edilen bulgular doğrultusunda, BDT odaklı psikoeğitim uygulamasının ebeveynlerin çocuk istismarına ilişkin bilişsel hataları azaltmada etkili bir yaklaşım olduğu söylenebilir.*

#### **4.SONUÇ VE ÖNERİLER**

Bu araştırma Türk ebeveyn örnekleminde çocuk istismarı farkındalığını arttırmaya yönelik BDT odaklı psikoeğitim programı geliştirmeyi ve karma araştırma yöntemiyle etkililiği test etmeyi amaçlamıştır. Nicel bulgular genel olarak değerlendirildiğinde, BDT odaklı psikoeğitim programının ebeveynlerin çocuk ihmali farkındalıklarının arttırılmasında, çocuk istismarı farkındalıklarının arttırılmasında ve çocuk istismarına ilişkin bilişsel hatalarının azaltılmasında etkili bir yaklaşım olduğu ifade edilebilir. Nitel bulgular genel olarak değerlendirildiğinde; çocuk istismarı farkındalığı programının ebeveynlerin aile içi iletişimlerine önemli katkılarının olduğu ve istismar farkındalığıyla ilgili bilişsel farkındalıklarının arttığı sonucuna ulaşılmaktadır. Ebeveynlerin eğitim sonrasında çocuk istismarına farkındalığına ilişkin hatalı düşüncelerini işlevsel bir şekilde değiştirdikleri ve yapıcı düşünceler geliştirdikleri görülmüştür. Karma bulgular genel olarak değerlendirildiğinde, nitel bulguların nicel sonuçları desteklediği ve yeterince açıkladığı görülmüştür. BDT odaklı psikoeğitim uygulamasının ebeveynlerin çocuk istismarına farkındalıklarını arttırmada etkili bir yaklaşım olduğu karma araştırma yöntemiyle ortaya konulmuştur.

Bu karma yönelimli çalışmanın güçlü yönlerinin yanı sıra bazı sınırlılıkları da bulunmaktadır. Araştırmanın verilerinin bir ildeki iki farklı mahallede ikamet eden ebeveynlerden elde edilmiş olması bir sınırlılıktır. İleride farklı örneklem gruplarıyla eş zamanlı olarak veriler toplanabilirse daha genellenebilir sonuçlar elde edilebilir. Bu araştırmaya sadece ebeveynler dâhil edilmesi bir diğer sınırlılık olarak değerlendirilebilir. Çocukların da müdahale programının bir parçası haline getirilmesi veri üçgenlemesi ve genellenebilirlik açısından iyi bir değerlendirme fırsatı verebilir. Çalışmanın bir başka sınırlılığı ise, Türk ebeveyn örnekleminin olmasıdır. Farklı ülkelerde bu programının uygulanmasıyla kültürel/kültürlerarası psikoloji ve programının etkililiğinin genellenebilirliği açısından alanyazına katkı sunabilir.

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## **YAŞAR KEMAL'İN ROMANLARINDA MASAL**

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### **ÖZET**

Yaşar Kemal, halk kültürü ve folklordan etkilenmiş, halk kültürüne ait unsurları eserlerinde sık sık kullanmıştır. Halk kültürünün unsurlarını modern romanın imkânları ile aktararak evrenselleştirmek istemiştir. Bu bağlamda destanları, masal, efsane ve halk hikâyeleri romanların olay örgüsüne içkinleştirerek günümüze taşımıştır. Söz konusu unsurları yeniden yorumlayarak yerel ile evrenseli ve kadim ile modern bir araya getirmiştir. Böylece insanlığın ortak kültür kodlarına ve kolektif bilince varmak istemiştir. Yaşar Kemal, kurmaca eserlerinde destansı ve masalımsı atmosferi hakim kılarak mistik ve gizemli bir şekle sokmuştur. Okuyucuyu masal atmosferine sokarak onu kurgu ile gerçek hayat arasındaki ince çizgide bırakmaktadır. Bu üslup onun kurmaca eserlerinin ana iskeletini oluşturmaktadır. Sözlü edebiyatın hikâyelerini, söylencelerini günümüze taşıyarak buradaki kahramanları destanlaştırmış, masal dilini günümüz Türkçenin içine yerleştirerek dilin zenginleşmesini sağlamıştır. *Bir Ada Hikâye* dörtlemesinin ikinci kitabı olan *Karınca'nın Su İçtiği* bu anlamda önem arz etmektedir. Çalışmada, *Karınca'nın Su İçtiği* romanı baz alınarak Yaşar Kemal'in masaldan yararlanma biçimi ele alınmıştır.

**Anahtar Kelimeler:** Yaşar Kemal, *Bir Ada Hikâyesi*, *Karınca'nın Su İçtiği*, Folklor, Masal.

**TALE IN YAŞAR KEMAL'S NOVELS****ABSTRACT**

Yaşar Kemal was influenced by folk culture and folklore, he frequently used elements of folk culture in his works. He wanted to universalize the elements of folk culture by transferring them with the possibilities of the modern novel. In this context, epics, fairy tales, legends and folk tales have been brought to the present day by incorporating them into the plot of the novels. By reinterpreting these elements, he brought together the local and the universal, the old and the modern. Thus, he wanted to reach the common cultural codes of humanity and collective consciousness. Yaşar Kemal has made the epic and fairy-tale atmosphere dominant in his fictional works and put it into a mystical and mysterious form. It puts the reader in the atmosphere of a fairy tale, leaving him on the fine line between fiction and real life. This style forms the main skeleton of his fictional works. He brought the stories and myths of oral literature to the present day, making the heroes here epic, and enriching the language by placing the fairy tale language into today's Turkish. *Karınca'nın Su İçtiği*, which is the second book of an *Bir Ada Hikâye* quartet, is important in this sense. In the study, Yaşar Kemal's use of the fairy tale is discussed based on the novel *Karınca'nın Su İçtiği*.

**Keywords:** Yaşar Kemal, *Bir Ada Hikayesi*, *Karınca'nın Su İçtiği*, Folklore, Fairy Tale.

## GİRİŞ

Halk kültüründeki anlatı serüveni mitoloji, destan, masal, efsane ve halk hikâyesi gibi aşamaları geçirmiştir. Bu çerçevede, masal, Halk Edebiyatının önemli üçüncü anlatı türüdür. “19. yüzyılın sonlarında Avrupa’da ortaya çıkan folklor, ilgiyle karşılanmış, ülkemizde Tanzimat’la birlikte halka dönüş hareketiyle, halk ve millet kavramları benimsenip yayılmıştır. Düşünürlerimiz, edebiyatımızın asıl kaynağının halk olduğu görüşünü savunarak, halk dili ve halk kültürüne” (Topçu, 2008: 28) ilgi duymuşlardır. Bu ilginin sonucu olarak, halk kültürüne iki farklı yöneliş olmuştur. Birincisi Şinasi ile başlayıp Ziya Gökalp ile zirveye ulaşan yöneliştir. Bu ideolojik temelli olup Türk kültürünün temellerini Orta Asya’ya dayandığı düşüncesinin sonucudur. Şinasi’nin arzuladığı halk kültürü, Orta Asya’ya işaret etmese de seküler temeldedir ve burada Ziya Gökalp ile düşünceleri kesişmektedir. İkincisi ise ideolojik kaygıdan uzak halk kültürünü romanın imkânlarıyla yaşatmaya yöneliktir. İkinci kategoride yer alanlar, Akdeniz, Ege, Anadolu ve Mezopotamya merkezli anlatılara yönelmişlerdir. Bu bağlamda, yukarıda adı geçen anlatı türleri, çağdaş romanı da etkilemiştir.

Türk Edebiyatında, Cumhuriyet sonrası dönemin romancısı olan Yaşar Kemal’i, ikinci kategoride değerlendirmek gerekir. Masalları ideolojik temelde kullanmaz. Romanlarında genişçe yer verdiği halk unsurları, Akdeniz, Ege, Anadolu ve Mezopotamya halk kültürleri kaynaklıdır. Yaşar Kemal, bu dört medeniyete ait halk edebiyatı unsurlarıyla büyümüştür. Beslendiği Akdeniz, Anadolu ve Mezopotamya kültürüne ait unsurlar, masallar dinsel kaynaklı olsa da İslamiyet öncesidir: “Benim yazdıklarım gelenekler, Müslümanlığa sığınmış eski mitler olacak.” (Bosquet, 1993: 91). Yaşar Kemal, bu ifadeyi, “romanlarınızda neden namaz kılan insan yok” şeklinde soruyu yanıtlarken kullanır.

Halk kültürünün en etkin bir şekilde var olduğu bir ailede ve çevrede doğup büyüdüğünden mitoloji, destan, masal, efsane ve halk hikâyelerini sıklıkla kullanmıştır. Hayal gücü zengin olan romancı küçüklüğünden beri hayal gücünü zenginleştiren masallarla büyüdüğünü ifade eder: “Çok da masal dinlerdim, dinlerken hep kendimden geçerek.... Ben de yaşlı kadınlardan öğrendiğim masalları köyün çocuklarına bire bin katarak, yeniden yaratarak anlatırdım. Her yetenekli masalcının, bilinen masalı hep yeniden yarattığını, üstelik de gücüne her anlayışta yeniden yarattığını çok sonraları öğrendim.” (Bosquet, 1993: 89). Çalışmada Yaşar Kemal’in romanlarını kurgularken masal kültüründen beslendiği vurgulanmaktadır. Masal beslenme yazarda iki şekilde tezahür etmektedir. Birincisi masal dili diğeri de kahramanın ağzından veya anlatıcı tarafından masalın aktarılmasıdır. Bu bakımdan okuyucu kendini düş ile gerçek arasında

bir dünyada hissetmektedir. Eserlerinde masal dilini kullanmasında, dinlediği masalların dışında, köyünde konuşulan zengin Türkmencenin etkisi olduğu muhakkaktır. Bu bağlamda bir konuşmasında kullandığı şu ifadeler bu tespitimizi doğrulamaktadır: “Benim doğduğum köy bir Türkmen köyüydü. Belki de Türkçenin en zengin konuşulduğu yeri benim bölgem. Her kadın bir şairdi. Ağıt yakmasını bilmeyen bir kadın ya deliydi, ya da aptal. Başka türlü düşünülemezdi.” (Bosquet, 1993: 45). Fransız edebiyatçı Alain Bosquet’ye verdiği röportajda buna ek olarak masal ve destan bağlamında Çukurova’nın zengin bir kaynak olduğunu söylemektedir.

### **Dünyayı Değiştirmeye Muktedir: Büyülü Masal Dili**

Yaşar Kemal, destan ve masal anlatıcılarının çok olduğu bir ailede ve çevrede yetişmiştir. Çocukluğu, düş ile gerçek arasında ince çizgede geçen Yaşar Kemal, yeni dünyaların ve umutların yaratıcısıdır. Bunu da romanlarına yerleştirdiği, masallarla yapar. Masallar ona düşünüyü kurduğu dünyayı kurgulama fırsatını verir. Zira dil, ona sonsuz bir güç ve büyü ortam yaratmıştır: “Dilin gücünü, onun gücünün sonsuz olduğunu denemelerimle o yaşlarımda bile kavramıştım. Dilin büyüüne, sonsuz gücüne öylesine inandırmıştım ki kendimi, şimdi bile bütün insanlığı dilin kurtaracağına inanıyorum” (Bosquet, 1993: 91). Bu bakımdan dil onun için sonsuz bir güç ve büyük bir evrendir. Bilhassa bu dil masal dili olunca bir başka önem arz etmektedir. Dile olağanüstü vasıflar yükleyen, Yaşar Kemal, gelişmiş bir dil sayesinde, evrenin yenileneceğini, gelişip güzelleşeceğini aktarır.

Yaşar Kemal, belli ki dünyayı yenileyecek ve güzelleştirecek dilin ‘masal dil’inin olacağına kani olmuştur. Bu bakımdan, dil sayesinde masal atmosferini kurgularken aslında gerçekte yaşamak istediği dünyayı yansıtmaktadır. Bunu da okuyucuyu büyü bir atmosfere sokarak yapar.

Yaşar Kemal’in romanlarında masal dili iki şekilde bulunmaktadır. Birincisi paragraflarda kullanılan fiiller ve sıfatlarda açıkça görülmektedir. Fiil ve sıfatlara mecazi, anlamlar, somut nesnelere, coğrafi unsurlara insani vasıflar ustaca yükleyerek yapmaktadır. Akıcı ve sade dil anlayışı okuyucuyu büyülemektedir. Mezopotamya’nın uçsuz bucaksız ovalarından Karınca Adasına gelen Dengbej Uso’nun kavalını çalması ile oluşan atmosfer, bu ifadeleri doğrulamaktadır:

“Göge baktı, gök ışıklıydı. Yıldızlar durmadan arka arkaya akıyordu. Döndü geldi yerine oturdu. Kavalını aldı, uzunca sıvazladı, dudaklarına götürdü. Kavalın inceden duyulur duyulmaz sesler geldi. İnce uzun sesler, biteviye böyle sürdü. Ses öteki seslere hiç

benzemiyordu. Şaşkınlık, acı, dehşet, korku yüreklere işliyordu. Sonra ses birden kanatlandı, öfkeye kesti, hırçınlaştı. Dinleyenler bir hoş oldular. Ardından da indi, yağmur çiseliyor, ılık bir yel esiyordu, gökler uzaklardaydı başını almış gidiyordu. Çöl uçsuz bucaksızdı, ceren sürüleri Abdülaziz dağlarından kırmızı sel olmuşlar çöle akıyorlardı.” (Yaşar Kemal, 2022: 327-328).

Söylem analizinde, ‘sesin diğer seslere benzememesi’, “sesin kanatlanması”, “sesin öfkelenmesi, hırçınlaşması, cerenlerin çöle akması” gibi söz grupları, gerçek üstü masal atmosferini yakalamak için kullanılmıştır.

*Karınca'nın Su İçtiği* romanının bir başka kahramanı Baytar Cemil'dir. Sarıkamış Savaşından sağ kurtulan Baytar Cemil'in doğduğu şehir olan Van'a at üstünde dönünce aktarılan sahnenin dili, yukarıda ifade edilen dili çağrıştırmaktadır. Dili sayesinde Baytar Cemil büyülü ve masalımsı bir an yaşamaktadır:

“Kıpkırmızı top gülleleri yolunu kesmiş, hışılıyarak, karanlıkta kırmızı, yeşil, mavi, turuncu, uzun çizgiler çizerek geçiyordu. Top sesleri kesilince de karanlığın üstünde asılı kalıyorlardı. Baytar dalıyor, başı heybenin üstüne düşüyor, top gürültüleri karşı dağı sallıyor. Baytar birden ayağa fırlıyor, karanlığın üstünde savrulan renk çizgileri karanlık gölün üstüne sağlıyor, Süphan dağı geliyor, kurşun geçirmez bir karanlık duvarı oluşturuyor, üstüne abanıyor, soluk aldırıyor. Derin bir uykuya dalıyor. Ortalıkta çıt yok. Baytar Cemil büzüldükçe büzülüyor. Dizleri karnında, çenesi dizine dayalı bir topak oluyor. Bir şehir yanıyor, taa kalenin burçlarına kadar yalımlar uzuyor, uçları kopup gölün üstüne uçuyor, mavi, turuncu, yeşil dökülüyor. Buradan, som kırmızı bir ışık çizgisi karanlığı yararak, yalp yalp uçarak gidiyor. Süphan dağına saplanıyor. Baytar, daha büyük bir gürültü, bir patlamayla uyanıyor, karşısındaki ateş almış, tepeden tırnağa yalıma kesmiş yer yer kırmızı çizgileri koparak uçan turunculamış dağa bakıyor.” (Yaşar Kemal, 2022: 143).

İkinci yöntem ise karşılıklı konuşmalarda ortaya çıkan, mani ve tekerlemelerde var olan üslubu çağrıştırmaktadır. *Karınca'nın Su İçtiği* romanında masal dilinde rastlanabilen, tekerlemeleri çağrıştıran tekrarlar vardır. Bilginin kalıcı ve hafızada iyice yerleşmesi için başvuru tekrarlar, Yaşar Kemal de sık sık kullanılan bir tekniktir. Adaya yeni gelen Baytar'ın evindeki eşyalar yerleştirilince şöyle bir konuşma geçer:

“Sonra oda oda dolaşp yerleştirdiklerini seyrettiler, beğendiler.

“Güzel dedi Lena, “her şey yerli yerince”

“Güzel dedi Baytar.

“Güzel” dedi Poyraz.

Orada bulunan herkes, güzel” dedi.

Nişancı Veli ile evlenmek için takip edip köyüne gittiği kızın babası ile konuşma sahneleri kısa cümleli diyaloglardan oluşur. Tekrar ve cümlelerin kısa oluşu masal dilini çağrıştırmaktadır:

"Sen ne iş görürsün."

"Balıkçıyım."

"O balıkçılık da askerlik gibiymiş, betermiş, denize giden dönmüyormuş."

"Azıcık tevatür bu. Denize çıkanlardan binde biri denizde kalır."

"Balıklara yem olur."

"Balıklara yem olur."

"Kızımı nerde gördün?"

"Pazar yerinde gördüm..."

(...)

"Demek nişancılığı bırakacaksın?"

"Bırakırım."

"Demek gelip bu kayalıkların ortasında oturacaksın?"

"Oturacağım."

"Burada deniz yok."

"Yok biliyorum."

"Burada toprak da, tarla da yok."

"Siz nasıl yaşıyorsunuz..."

"Razı mısın?"

"Razıyım."

"Keçi çobanı olacaksın."

"Olurum. Keçileri çok severim."

"Peki kız ne diyecek buna?"

"İşte onu bilemem. Dün bir bugün iki. Allah yüzümü kara çıkarmasın."

"Kızla konuştun mu?"

"Nasıl konuşalım, dün bir bugün iki."

"Çağırıp sorayım mı?"

"Sen bilirsin" (Yaşar Kemal, 2022: 116-117).

*Karınca'nın Su İçtiği* romanında bir Bey'in kızına tutulan Çoban Uso için kızı istemek için Bey'in sarayına giden ricacılar ile Bey arasındaki konuşma da, masal dilini, masallardaki kısa ve tekerlemeye dönüşen sözün tekrarı şeklindeki diyaloglara benzemektedir:

"Ricacılar, öfkeyle gürpedek ayağa kalkıp kapıya yöneldiler. Çoban, boynu bükük dikildiği yerde öyle dimdik kalakaldı.

Beydir, kalkanların öfkesinden ürktü:

"Durun, ağalar, hatunlar, size bir teklifim var."

"Nedir o?" sordu dengbej.

"Nedir o?" sordu Şeyh.

"Nedir o?" sordu demirci.

"Nedir, nedir, nedir o?" diye sordu oradakilerin hepsi.

"Demek bu çoban böyle bir kavalcı!"

"Böyle bir kavalcı."

"Şimdi beni dinleyin. Onun güttüğü sürü büyük bir koyun sürüsüdür."

"Büyük," dediler. (Yaşar Kemal, 2022: 329).

### **Roman İçinde Masal**

Yaşar Kemal, romanlarında halk biliminin unsurlarından masaldan çokça beslenmiştir. *Bir Ada Hikâyesi* dörtlemesinin dört romanında da masal modern bir anlatımla mevcuttur. Bilhassa *Karınca'nın Su İçtiği* romanı bu anlamda zengindir. Romanın geçtiği, Karınca Adası Rumların mübadele sonucu henüz terk ettiği bir adadır. Rum ve Türk kültürünün bir başka ifadeyle Hristiyanlık ve Müslümanlığın keşiştiği ideal bir mekândır. Bu bakımdan adaya yeni gelenlerin ile eski sakinlerinin masal ve efsaneleri bir arada anlatılır. Romanda yer alan ve adayı terk etmeyen Lena Ana ile Melek Hatun'un anlatılarıyla dağ masalımsı ve büyülü bir atmosfere bürünür. Lena Ana, mübadele sonucu apar topar Yunanistan'a götürülen ancak adanın hasretinden dayanamayıp geri dönen yaşlı bir kadındır. Melek Hatun da adanın karşı kıyısında bulunan kasabada yaşayan, tekneçilik yapan oğlu ile adaya taşınan bir kadındır.

Olay örgüsünde aktarılan ilk masal, adanın karşısında bulunan Rumların İda dağı, Türklerin ise Kaz Dağı dediği dağa ait masaldır. Romancı, ilk önce Lena'nın İda Dağı'na dair bildiği anlatıya yer verir: "Melek Hatunun kocası savaşta toz oldu. Babası anası, familyası o dağdadır daha. Türkler ona diyorlar Kazdağı, sarı bir kız orada kaz güdermiş. Biz diyoruz ona İda. Eskiden Meryem Ana yaşarmış orada. Sen hiç duydun mu "binbir pınarlı İda"yı?"



"Duydum," dedi Hüsmen. "Maşallah, maşallah, Yunanistanda İdayı duymayan hiç, hiçbir kişi olur mu...". Meryem Ananın yurdu orasıdır. Oğlunu orada doğurmuş. Oğlu oradan göğe çekilmiş gitmiş." (Yaşar Kemal, 1993: 47). Adayı terk etmeyip adada kalan ikinci Rum ise Vasili'dir. Vasili de İda Dağının hikayesini bilir. Ona göre İda Dağı, Tanrıların oturduğu bir dağdır. Bu bilgileri ilk defa duyan Melek Hatun, Meryem Ana'nın, çevrede hikayesi anlatılan Sarı Kız olacağını düşünerek Kaz Dağı dediği İda Dağı'na dair "Sarı Kız" masalını anlatır:

"Sen hiç Kazdağını gördün mü kardeş? O dağda bir kız varmış. Öyle güzel, öyle güzelmiş ki dünya alem ona aşık olurmuş. Hiçbirisine kız yüz vermemiş. Saçları ipek, gözleri ceylan, boyu fidanmış, ona kara çalmışlar, kardeşleri onu öldürecek olmuşlar. Babası kızını almış bir gece Kazdağma götürmüş, dağın tepesine bırakmış, ölümünü gözüm görmesin, diye oraya atmış. Kız ölmemiş. Ona geyikler süt, turnalar, kazlar yumurta, keklikler et vermiş. Dağda kurdun kuşun, akar suyun, esen yelin, biten çiçeğin ermiş olduğu olmuş. Elmalar, armutlar, kirazlar, cevizler, bütün ağaçlar meyvelerini, arılar ak petekli ballarını ona sunarlarmış."

"Sarı Kızı kurtların kuşların, çangal boynuzlu geyiklerin, ayıların arasında görenler, eyvah, biz ne yaptık da dünya güzeli bir ermişe kara çaldık, eyvah eyvah, demişler. Bizim bu dünyada da yerimiz yok, öbür dünyada da..." (Yaşar Kemal, 1993: 47-48). Anlatıcı, İda Dağındaki masal ile adeta Melek hatun'un hayatı arasında bir bağlantı kurar ve okuyucunun zihninde "sarı kız"ın Melek Hatun olabileceği izlenimini uyandırır. Melek Hatun'un sürekli "Ben o dağlardan olurum. Oraya binbir parmlı, bin çiçekli bin çeşit kuşlu Kazdağı derler." tekrarlama bu kanıtlamaktadır. Anlatıcı bu şekilde Melek hatun'a masalımsı ve destansı bir kişilik kazandırmak istemektedir.

## **SONUÇ**

Masal, insanoğlunun doğa karşısında yaşadığı korkuları sevinçleri ve umutların dile dökülmüş halidir. Yüzyıllardan beri oluşan sözlü kültürün en önemli türü olan masal, modern çağda roman aracılığıyla okuyucuya aktarılmaktadır. Epik romanın en büyük ustası olan Yaşar Kemal, romanlarında Ege, Akdeniz, Mezopotamya halk kültürünü destansı bir üslupla yaşatmaktadır. Yaşar Kemal'de masal iki şekilde ortaya çıkmaktadır. Birincisi anlatıcının yarattığı atmosferdir. Gerçek alemde yaratılan 'masalımsı' atmosfer ile okuyucu büyüdü bir dünya yaşamaktadır. Kullanılan fiiller, sıfatlar ile tabiat varlıklarına doğaüstü özellikler yakıştırılarak modern anlatıda gerçek üstü bir ortam yaratılmaktadır. Bu gerçek üstü ortam yazarın, yücelttiği, bir takım ulvi anlamlar yüklediği durumlarda meydana gelmektedir. Yazarın, mitolojik bir

üstünlük ve ulviyet atf ettiği Mezopotamya coğrafyası ve onunla özdeşleşen dengbêjlik kültürünü söz konusu olduğunda tılsımın, gizemin bol olduğu masalımsı bir anlatıma başvurmaktadır. İncelenen romanda, kahraman zor durumda olduğu zamanda da masalımsı üslubla yazmaktadır. Yaşar Kemal’de masal dil aracılığıyla da tezahür etmektedir. Kısa cümleler diyaloglar halinde beliren tekrarlar masal dilini çağrıştırmaktadır. Yazarın röportajları, deneme yazıları incelendiğinde, bir edebi tür olan masal ile içli dışlı bir ailede yaşadığı, söylenen destan ve masalların küçük dimağında yer edindiği açıkça ortaya çıkmaktadır. Çocukluğunda, gazeteciliği ve gezileri sırasında öğrendiği halk kültürünü ve masalları yeniden yorumlayarak romanın içine serpiştirmiştir.

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## **YAŞAR KEMAL'İN ROMANLARINDA İNSANLIK İDEALİ**

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### **ÖZET**

Yazar ve toplum ilişkisi, her dönemde tartışılan ve güncelliğini koruyan bir olgudur. Topluma kayıtsız kalmayan edebiyatçılar, kendi toplumlarının ve insanlığın karşı karşıya oldukları sorunları irdelemeye çalışmışlardır. Eserlerinde, mevcut sorunlardan sıyrılmış muhayyilelerinde yaşanabilir bir insanlığı ve toplumu kurgularlar. Yaşar Kemal, Bir *Ada Hikayesi* adlı seri romanlarında alternatif yeni bir toplumun ve ideal insanlığın çerçevesini çizer. Bu çerçevenin merkezinde, insan vardır. Bu insan tipolojisi, her türlü bağınazlıktan sıyrılmıştır. Anlaşmazlığa, eşitsizliğe ve savaşa sebebiyet veren dinsel, ideolojik ve etnik tutuculuğa son verme arzusundadır. Kimliklere ait değerler çatışmacı olmaktan ziyade birleştirici unsurlar olarak sunulmuş insanlık potasında eritilmiştir. Söz konusu nehir romanlarda Kemal, yeni bir mekanda Anadolu'nun farklı yerlerinden, farklı din, mezhep ve etnik kimlikteki insanları bir arada getirir. Yeni bir toplum ve insanlık ideali kurgulanırken temelinde sevgi, hoşgörü ve karşılıksız paylaşmak vardır. Savaşların sürükleyip bir adada bir araya getirdiği bu insanlar, savaşı ve çatışmasız bir toplumun ve insanlığın idealini gerçekleştirme çabasındadırlar. Bu araştırmada, *Karınca'nın Su İçtiği* romanında adaya gelmek zorunda kalan farklı şahsiyetlerin oluşturduğu insanlık modeli incelenmiştir.

**Anahtar Kelimeler:** Yaşar Kemal, Bir Ada Hikâyesi, *Karınca'nın Su İçtiği*, İdeal İnsanlık.

**THE IDEAL HUMANITY IN YAŞAR KEMAL'S NOVELS****ABSTRACT**

The relationship between the author and society is a phenomenon that has been discussed and kept up to date in every period. Literary writers, who were not indifferent to society, tried to examine the problems faced by their own society and humanity. In their works, they construct a livable humanity and society in their imaginations stripped of existing problems. Yaşar Kemal draws the framework of an alternative new society and ideal humanity in his serial novels called *Bir Ada Hikayesi*. At the center of this framework is the human being. This human typology has been stripped of any bigotry. It desires to put an end to religious, ideological and ethnic conservatism that causes conflict, inequality and wars. Values belonging to identities, while being confrontational, were presented as unifying elements and melted in the pot of humanity. In these river novels, Kemal brings together people of different religions, sects and ethnic identities from different parts of Anatolia in a new place. While the ideal of a new society and humanity is being constructed, it is based on love, tolerance and free sharing. These people, dragged by wars and brought together on an island, are trying to realize the ideal of a war and conflict-free society and humanity. In this research, the model of humanity created by different personalities who had to come to the island in the novel *Karınca'nın Su İçtiği* was examined.

**Keywords:** Yaşar Kemal, *Bir Ada Hikayesi*, *Karınca'nın Su İçtiği*, Ideal Humanity.

## GİRİŞ

### Kurmaca Bir İnsanlık Hayali

Hümanizm, Fransızca “humain” sözcüğünden gelmektedir. Humain insan demektir. Dolayısıyla Hümanizm, insanı merkeze alan bir felsefe ve dünya görüşüdür. İnsanı merkeze alarak antik Yunan ve Roma dönemlerine özlem duymaktadır: “Tanrı inancını ve doğüstünü reddeden bir çeşit insanperestlik düşüncesi veya bir başka deyişle insanlık dinidir. Kültürel ve entelektüel bir hareket olarak referansını daha çok eski Yunan ve Roma’ya veren hümanizm düşüncesi, bu dönemlerin sanat ve edebiyatlarını yeniden keşfetmeyi amaçlamış ve bu çizgiyi takip etmiştir” (Maraş, 2005: 1). Kelimenin ilk kullanımının M.Ö. 80’li yıllarda Çiçero tarafından “Humanitas” şeklinde ifade edilmesine kadar götürülen Çağdaş bir düşünce olarak da, Hümanizm, Avrupa’da Rönesans ile yaygınlık kazandığı bilinmektedir.

Hümanizm, Türk Edebiyatındaki ilk izleri Yunus Emre ve Mevlana’nın şiirlerinde aranılır. Yunus Emre’nin hümanist anlayışı, insan sevgisini, kalp kırmamayı, insanlar ile iyi geçinmeyi öncelemektedir. İbadetlerin muteberliği dahi alçak gönüllü olmaya, hoşgörülü olmaya ve insan olmaya bağlanmıştır:

Bir kez gönül yıktın ise/Bu kıldığın namaz değil

Yetmiş iki millet dahi/Elin yüzün yumaz değil

Kanı erenler geldi geçti/Bunlar yurdu kaldı göçtü

Bu anlamda, günümüz edebiyat araştırmacıları Yunus Emre’nin şiirlerine hümanizm anlamında çok mana yüklemektedirler. Bilhassa Talat Sait Halman, Yunus Emre’yi Türk hümanizmasını oluşturan kişi olarak niteler: “Eski Yunan’dan ve Roma’dan, Doğu dinlerinden, eski, Türklerin insancı düşüncesinden, İslamiyet’in öz değerlerinden, içinde yaşadığı bölgedeki sufilerden aldığı hümanist kavramları birleştirerek bir Türk hümanizması yaratmış” (Akt. Maraş, 2005: 34) demektedir. Maraş, Talat Sait Halman’ın Yunus Emre’nin hümanistliği meselesini abarttığını, onun üzerinden dinleri birleştirerek yeni bir Tanrı anlayışı ortaya koymaya çalıştığını iddia etmektedir.

Yunus Emre ile aynı dönemlerde yaşamış Mevlana Celaleddin-i Rumi de şiirlerinde insana büyük değer vermektedir. Çağdaş yorumcular, ‘insana değer verme’ üzerinden Mevlana’yı önemli bir hümanist olarak değerlendirirler. Tıpkı Yunus Emre gibi Mevlana da insanlığa hoşgörü, erdem, iyilik, karşılıksız yardım, menfaatsiz kardeşliğe ve sevgiye çağrıda bulunmaktadır.

Aşağıdaki mısralarda, Mevlana, insanı dünyanın temeli sayar:

Sen cihanın hazinesisin, cihan ise yarım arpaya değmez.

Sen cihanın temelisin, cihan senin yüzünden taptazedir.

Diyelim ki, âlemi meşale ve ışık kaplamış,

Çakmaksız ve taşsız olduktan sonra o, iğreti bir rüzgârdan başka nedir?

Yazıoğlu, Mevlana'nın birkaç beytinden hareketle “Mevlânâ insanı fizikî âlemle metafizik âlem arasına yerleştirmekte ve insanda her iki yönün bulunduğunu belirtmektedir. İnsanın fizikî âlemle ilgili yönü, onun maddî yönüdür. İnsanın gerçek yönü, özü veya insanlık cephesi ise, onun manevî yönünü oluşturmakta ve onu metafizik âlemle ilişki kurmaya sevk etmektedir.” (Yazıoğlu, 2017: 4) ifadesinde bulunmaktadır.

Yunus Emre ve Mevlana'da dini, yerel ve Doğu kaynaklı olan Hümanist anlayış, Tanzimat ile beraber çehre değiştirir. Tıpkı diğer bütün anlayışlar gibi hümanizm de batı tandanslı olmaya başlamıştır. Batı düşüncesi, felsefesi ve edebiyatı ile tanışma fırsatı bulan Osmanlı aydın ve edebiyatçıları, hümanist anlayışın kökeni Batı'da aramaya başlarlar. Bunlardan biri de İbrahim Şinasi'dir. (1826-1871). Şinasi, Sultan Abdülmecit döneminde Avrupa'ya Maliye alanında eğitim almak için gönderilen bir gençtir. Sadrazam Mustafa Reşit Paşa, tarafından istidadı keşf edilen hep onun tarafından himaye edilen Şinasi, Paris'e üç defa gitmiş ve toplam sekiz sene kalmıştır. Burada “Société asiatique” ve “Société orientale” gibi şarkiyatçı derneklere gidip gelmiştir. Bu derneklerde ve Paris'in farklı yerlerinde bir çok ünlü Fransız düşünür ve edebiyatçı ile tanışma fırsatını yakalamıştır. Maliye alanından ziyade edebiyat ile ilgilenerek Fransız şairlerden ve düşünürlerden çok etkilenmiştir. Şinasi, bilhassa tanıştığı düşünürlerin hümanist anlayışlarının derin tesirinde kalmıştır. Bu tesir, ona şu çarpıcı ifadeyi yazdırtmıştır:

“Milletim nev'-i beşerdir, vatanım rûy-i zemin.”

*Müntehabât-ı Eş'ar* da söylediği bu ifade onun hümanist düşüncesinin bir sonucudur. Şinasi, kuvvetle muhtemeldir ki bu ifadeyi kullanırken Victor Hugo'dan (1802-1885) etkilenmiştir. Zira Hugo'nun *Les Burgraves* adlı tarihi dram tiyatrosunun önsözünde buna benzer bir cümle yer almaktadır:

“Avoir pour patrie le monde et pour nation l'humanité” (Hugo, 1843: 25) “Vatan için dünya, millet için insanlık” yeter şeklinde çevrilebilecek bu ifade, adı geçen kitabın önsözünün son cümlesidir. İbareyi, evvela Şinasi kullanmıştır. Şinasi'den sonra Tevfik Fikret, bir cümle ekleyerek yeniden yazmıştır. “Halûk'un Âmentüsü” şiirinde yeni neslin prototipi olan oğlu

Haluk'un amentüsünü yazarken bu ifadeye yer vermiştir:

“Toprak vatanım, nev’-i beşer milletim... İnsan

İnsân olur ancak bunu iz’anla inandım”

Fikret, muhtemelen Şinasi'nin Hugo'dan aldığı ibareyi kendine göre formüle ederek, geliştirmiş ve 'insan' vurgusunu öne çıkarmıştır. Yahya Kemal ve Yakup Kadri'de “*Bahr-i Sefid Havza-i Medeniyeti*”, sonra “*Mavi Anadoluculuk*” gibi akımlarla tezahür eden hümanist anlayış Cumhuriyet dönemi romancılarından Yaşar Kemal'de de geniş bir yelpazede işlenmektedir. Yaşar Kemal, zorunlu göç ve savaşlara karşı hümanist anlayışı öne sürmekte ve yaşanabilir bir dünyayı bu çerçevede temellendirmektedir. Aslında yaşar Kemal'in birlikte yaşama temelinde gelişen hümanizmasının temellerini çocukluğuna ve köyündeki insanların insani tutumlarında aramak gerekir. Belli ki yazar her türlü bağınazlıktan uzak bir çevrede büyümüştür. Bunu bir röportajında şöyle dile getirmektedir: “Doğduğum bu Türkmen köyünde bizi Kürt diye hiç ayrı saymıyorlardı. Biz de kendimizi onlardan hiç ayırmıyorduk. Bütün köylüyle akraba gibiydik. Daha da köylümle benim yakın akrabalığım sürüyor. Şunu da ekleyeyim de bir yanlışlık olmasın, Türkiye haritasına bakılırsa görülür ki, benim doğduğum güneyle babamın geldiği doğu, yani Van Gölü kıyıları birbirlerine yüzlerce kilometre uzaklıkta.” (Bosquet, 1993: 46).

### **Yaşar Kemal'de İnsanlık**

*Bir Ada Hikayesi* bu esas üzerine kurgulanmıştır. Dörtlemenin ikinci kitabı olan *Karınca'nın Su İçtiği* romanı Yaşar Kemal'in insanlık idealini açıkça ortaya konulmaktadır. Romanda gerçek mekân Karınca Adasıdır. Asıl adı Mirmingi Adası olan Karınca Adası, yerli Rumların mübadele sonucu zorunlu olarak gitmesiyle, kısa süreliğine ıssız bir mekân hâlini alır. Adanın boşalmasıyla adaya yakın kıyı kasabasındaki resmi makamlarca adaya insanlar gönderilir. Böylece adanın insan profilinde kökten bir değişim yaşanır. Değişim, Yaşar Kemal'in romanlarında sıklıkla karşılaşılan bir olgudur. Ramazan Çiftlikçi, söz konusu yazarı kastederek: “Onun en önemli bir farklılığı da değişmeyi anlatmasıdır. Yazarın ben değişmenin romancısıyım” (Çiftlikçi, 1997: 39) ifadesi dikkat çekicidir. Tarımdaki makineleşmenin yol açtığı değişim, toplumun sınıfsal yapısının değişimi gibi değişimler zamanın ve şartların doğurduğu değişimlerdir. Ancak bu romanda karşılaşılan değişim, savaşın sebebiyet verdiği ve siyasal erkin tepeden inme politikaları sonucu gerçekleşen değişimdir. Yaşanan siyasal ve sosyal değişim dörtlemenin ikinci romanı *Karınca'nın Su İçtiği* eserinde açıkça yansıtılmıştır.



Romanda Yaşar Kemal, mitolojik bir insanlık ideali söz konusudur. Yazar, roman anlatısını mitolojik ve masalsi imgelerle zenginleştirmiştir. Bu bakımdan ada kısa sürede bir “rapsodi” halini almaktadır. Kısa sürede adaya mübadele ve savaşın yerlerinden, ailelerinden kopardığı insanların sığınağı olur. Gelişi güzel insanların aktarıldığı bu adaya gelen herkesin “insanlık” anlayışı benzeşmektedir. Bu insanlığın temelinde “hümanist” felsefe ve dünya görüşü mevcuttur. Adaya gelmek zorunda kalan farklı şahsiyetlerin oluşturduğu birliktelik “örnek bir dünya” olarak sunulmuştur.

Romanda adaya gelen kişiler arttıkça olay örgüsü derinleşir. Bu bağlamda romanın kurgusu kişilere bağlı olarak gelişir ve genişler. Dünya cenneti olarak sunulan adaya gelen her yeni kişi romanda oluşturulmak istenen ‘ütopik dünyanın’ bir parçası olur. Anlatıcı, bu dünyaya katılan yeni kişinin yaşadıklarını okuyucuya bütün ayrıntılarıyla aktarır. Bunu da “bütüncül geriye dönüş” tekniğini kullanarak yapar. Destansı anlatımın hâkim olduğu olay örgüsünde, bütün kahramanların adaya geldikten belli bir süre geçtikten sonra geçmiş hayatları aktarılır. Yazar, muhtemelen kahramanını daha ‘gerçekçi kılmak’ için ve ona bütüncül bir kimlik kazandırmak için bu yola başvurur. Uzun bir süreç içerisinde kahramanın geçmişini tanıtan anlatıcı, böylece hem romana hem de kahramana derinlik ve çok boyutluluk kazandırmak ister. Bu teknik sayesinde, sonuçtan nedene gidilerek, geçmiş bütün ayrıntılarıyla aktarılır.

Olay örgüsünde yer alan her kişi travmatik vakalar yaşamıştır. Bu durum sürekli gündemde tutulmuştur. Devlet tarafından Osmanlı topraklarının her tarafından insanlar, adaya gönderilmektedir. Gönderilme işlemi Karınca Adası’na yakın adı zikredilmeyen kıyı kasabesindeki devlet görevlileri, mal müdür, nüfus müdürü ve kaymakam tarafından yapılmaktadır. Bu görevlilerin tavırları, klasik devlet memuru biçiminde yansıtılmıştır. Adaya mübadele sonucu Yunanistan’dan gönderilenler olduğu gibi savaş cephelerinde yerini yurdunu, ailesini kaybetmiş insanlar akın akın gelmektedir. Yurtsuzlara yurt hâline gelen Karınca Adası, kısa sürede farklı insan tipleriyle dolarak bir “rapsodi” hâlini alır. Rapsodi, farklı ezgilerin bir araya getirilmesiyle oluşan müzik parçasıdır. Farklı etnik yapıdan, mesleklerden, düşüncelerden insanların toplandığı ada, bu yönüyle Babil Kulesi’ni andırmaktadır.

### **Acıların Birleştirici Gücü: Savaşsız İnsanlık Özlemi**

Karınca Adası, insanlığın yeni umudu olur. Bu ütopik mekana yerleşmeyi kabul edenlerin ortak noktası, savaşın ve yoksulluğun onları buraya sürüklemiş olmasıdır. Bu bilinçte olan bu insanlar insani değerleri özümsemişlerdir. Acıların ortak olması, onları birbirine kenetlemiştir: “Oradaki her insan büyük acılardan geliyordu. Kimi yoksulluktan, açlıklardan, kimi savaşlardan, kimi

kan seli içinden, kimi ovalarca serilmiş yatan ölümlerin üstünden geçerek, kimi asker ölüsü kokularından burunlarının direği kırılarak, kokulara dayanamayarak ölenleri görerek, yaşayarak, kokulardan bayılarak, ölümlerden ölüm beğenlerden buraya gelmişlerdi.” (Yaşar Kemal: 486). Yaşar Kemal’in ütöpik mekân ve dünya özlemine yansıtan romanda, yıkıcı savaşlardan sonra sevgi ve insanlık temelinde yeni bir dünyanın kurulması fikri olay örgüsünün tamamına yedirilmiştir. Savaşın dışlandığı olay örgüsü boyunca yer yer insanlık vurgusu yapılmıştır. Bunlardan birkaç ifade aşağıya aktarılmıştır:

“Başkalarının acısını, acıyı çeken bilir, bu üç savaş belimizi kırdı. Bu üç savaştan sonra yer yerinden oynadı. Bu üç savaş insanlığımızı elimizden aldı. Gene de içimizde azıcık insanlık kalmış ki...’ diyor” (Yaşar Kemal: 37).

“‘Hepimizin,’ dedi Hüsmen. ‘Bu savaş bize neler etti, bizi insanlığımızdan çıkarttı. İnsanlığımızı, onurumuzu, neyimiz varsa hepsini elimizden... Yüreğimizi de kopararak aldı götürdü. Yürek koymadı insanlıkta.’” (Yaşar Kemal: 37).

İnsanlık, Yaşar Kemal için bir mihenk taşıdır. O, yaşanan olumlu ve olumsuz tutumları insanlık terazisinde tartar. Temel ölçü, hümanizmadır. Hayalini kurduğu ütopya, ancak hümanizm yani insanlık terazisinde gerçekleşebilir. “Olumlu özelliklere sahip, yaşanılabilir hayali mekânlar anlamında kullanılan ütopya, bireyin ruhsal kaçış ülkesidir.” (Yaşar Kemal: 285). Romanda evrensel insanlık değerleri, her türlü tutucu etnik ve dinsel inanışların üstünde tutulmuştur. Bu çerçevede, anlatıcı “dinden çıktı”, “milletinden çıktı”, “ırkını terk etti” sözcükleri yerine “insanlıktan çıktı”, “insanlığımızdan çıkardı” sözü leitmotif olarak tekrarlar.

Yukarıda da zikredildiği gibi romanın kurgusu, kişilerin adaya gelmesiyle genişler. Adaya gelenler, olay örgüsünün sağlam ve inandırıcı bir zeminde gelişmesini sağlamıştır. Yeni gelen kişiler, yeni kurulan topluluğa yaşadıklarıyla, kültürel geçmişiyle, becerileriyle bir değer katmaktadır. Kişiler sıradan kişilerdir. Bu üslup üzerinden yazar, yaşanabilir bir dünyayı önelemektedir. Aslında yazar, muhayyilesindeki dünyayı bu ada ve adaya gelen kişiler üzerinden kurgulamaktadır. Bu bakımdan söz konusu roman kişilerini tahlil etmek eserin anlaşılmasına yardımcı olacaktır. Serinin ilk romanı olan *Fırat Suyu Kan Akıyor Baksana*’da adada Lena, Vasili, Poyraz Musa, Baytar Cemil, Kadri ve annesi yer alır. *Karınca'nın Su İçtiği* romanında bunlara birçok kişi eklenir. Mübadele ile gelen Hüsmen ile eşi Sabiha ve altı kızı, Giritli Musa Kazım ile iki kızı, dışında savaşın kırıp geçtiği Anadolu’nun farklı yerlerinden gelen Nişancı Veli ile isimleri zikredilmeyen üç torunu, Dengbej Uso ile karısı Hacı, Şeyhmus ile kilim ustası eşi Şerife Hatun, emekli olmuş öğretmenlik yapmak için adaya gelen biri topal

ve kulaksız, diğeri çolak zabit iki doktor, Doktor Salman Sami ve Doktor Halit Rıfat Bey'dir. Her birinin olay örgüsünde yer alması yaşamsal değerdedir. Bu bakımdan dörtlemenin en önemli romanı bu eserdir. Dörtlemenin zirve eseri ve dönüm noktasıdır. Romanın sonuna doğru Karadeniz aksanlı iki kadın ve iki çocuğun gelmesiyle olay örgüsü sona erer.

Yaşar Kemal'in bu romandaki insanları, sıradan ve doğal insanlardır. Ancak okuyucuya bazen bunlar olağan üstü kişiler olarak yansıtılabilir. Yaşar Kemal, bir röportajında bu saptamayı yapmaktadır: "Benim yazdığım insanların hiçbiri olağanüstü kişilerden değildir. Hepsi doğal insanlardı. Benim yazdıklarım size olağan üstü geliyorsa suç bende değil" (Bosquet, 1993: 89). Yazarın coşkulu ruhu, düş dolu bir dünyayı yaratmayı sağlamıştır. *Karınca'nın Su İçtiği*'nde bu insanların adadaki ortak yaşamları aktarılır. Farklı kimlik, dil, din ve inanışların sığınağı hâline gelen Karınca Adası, yazarın hayalindeki 'ütöpic mekân'ın tasarımıdır. Adada kalmaya karar verenlerin iki vazgeçilmez ortak değeri vardır: Birinci insanlık ikincisi de adadaki iş bölümüdür. Adada, hiç kimse etnik, ideolojik ve dinsel eğilimlerini öne çıkarmak. Farklılıklar zenginlik olarak tasarlanmış ve birleştirici bir güç olarak gündemde tutulmuştur. Bu nedenle Nişancı Veli'nin balıkçılıktaki "nişancılığı", dengbej Uso'nun dengbejliği insanlığa katkı sunacak birleşirci bir güç olarak ele alınmıştır. Yeni kurulacak hayat bu iki düzlemde gelişir.

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**MECMÛA GELENEĞİNİN BİR PARÇASI: KANTO MECMÛALARI VE  
HASAN TAHSİN'İN NEŞ'E-İ DİL-YENİ ŞARKI VE KANTO MECMÛASI ADLI ESERİ**

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**ÖZET**

Kanto, İtalyanca “canto” sözcüğünden dilimize geçmiştir ve şarkı söyleme sanatı anlamına gelmektedir. Kanto kültürü, 1800'lü yılların sonundan itibaren İstanbul'da, Tuluat tiyatrolarında, oyundan önce izleyicinin dikkatini canlı tutmak ve çeşitlilik sağlamak amacıyla genelde kadın sanatçıların şarkı söyleyip dans ederek yaptığı gösteri ve bu gösteri esnasında söylenen şarkılar şeklinde ortaya çıkmıştır. Bu gösterilerde söylenen şarkılar klasik Türk edebiyatı geleneğinin kırkambarı olarak anılan mecmûalarda derlenerek bir araya getirilmiştir. Güfte mecmûaları kapsamında değerlendirebileceğimiz; ilgisine şarkı makam, usul, bestekâr gibi pek çok malzeme sunan bu eserler genellikle kanto ya da şarkı mecmûası olarak adlandırılmışlardır. Çalışmamıza konu olan eser de bir Kanto Mecmûası'dır. Hasan Tahsin tarafından derlenmiş *Neş'e-i Dil Yeni Şarkı ve Kanto Mecmûası* adlı eserin basım tarihi 1323/1905'tir. Derleniş hususiyetleri bakımından şiir mecmûaları ile benzer birtakım özelliklere sahip bu eserler ihtiva ettikleri kanto, şarkı, gazel ve kıtalarla klasik Türk şiiri ve Türk mûsikîsinin şekil, söyleyiş ve duyuş bakımından da iç içe olduğunu göstermesi bakımından önemlidirler. Bu çalışma ile amacımız *Neş'e-i Dil Yeni Şarkı ve Kanto Mecmûası* adlı eseri bilim alemine tanıtmak; Türk edebiyatının ve Türk mûsikîsinin disiplinler arası çalışmalara dair ortak veriler sunduğunu ortaya koymaktır.

**Anahtar kelimeler:** Kanto mecmûası, klasik Türk şiiri, şarkı, mecmûa, Hasan Tahsin.

**A PART OF THE MECMUA TRADITION: CANTO MECMUAS AND HASAN  
TAHSİN'S NEŞ'E-İ DİL-YENİ ŞARKI VE KANTO MECMUASI**

**ABSTRACT**

Kanto has been translated into our language from the Italian word “canto” and means the art of singing. Kanto culture emerged in Tuluat theaters in Istanbul from the end of the 1800s, in order to keep the audience's attention alive and to provide diversity before the play. It has emerged in the form of the performances of female artists by singing and dancing and the songs they sang during this show. The songs sung in these shows were compiled and brought together in mecmuas known as the kırkambar of the classical Turkish literature tradition. We can evaluate within the scope of lyrics mecmuas; These works, which offer many materials such as songs, maqam, tempo, composer, etc., are generally called canto or song mecmuas. The work that is the subject of our study is also a Kanto Mecmua. The publication date of Neş'e-i Dil Yeni Şarkı ve Kanto Mecmûası, compiled by Hasan Tahsin, is 1323/1905. These works, which have some features similar to poetry mecmuas in terms of compilation characteristics, are important in terms of showing that classical Turkish poetry and Turkish music are intertwined in terms of form, utterance and sound with the cantos, songs, ghazals and stanzas they contain. Our aim with this study is to introduce Neş'e-i Dil Yeni Şarkı ve Kanto Mecmûası to the scientific world; It is to reveal that Turkish literature and Turkish music offer common data on interdisciplinary studies.

**Keywords:** Canto mecmuas, classical Turkish poetry, song, mecmua, Hasan Tahsin.

## **GİRİŞ**

Mecmûanın kelime anlamı sözlüklerde “Toplanılıp biriktirilmiş ve tanzim ve tertip edilmiş şeylerin hepsi (Sami, 2005)”, “Seçilmiş yazılardan meydana getirilen yazma kitap, dergi (Devellioğlu, 2010)” olarak geçmektedir.

Klasik Türk Edebiyatı dairesi içerisinde ilk örneklerini 15. yüzyıldan itibaren görmeye başladığımız mecmûaların tarihi, esasında Hz. Peygamber dönemine kadar dayanmaktadır. İslâmî kültürde hadis yazımının başlamasıyla, aktarılan ve kayıt altına alınmak istenen bilgiler mecmûalarda bir araya getirilmiştir. Arap edebiyatında, Cahiliye devrine ait kasidelerin toplandığı, seçme şiirlerin bir araya getirildiği eserler yine mecmûalardır ve bunlar seçme şiir mecmûalarının<sup>3</sup> en eski tarihlieleri olarak bilinmektedirler. Arap edebiyatındaki ilk örneklerinden sonra mecmûa geleneği, Fars ve Türk edebiyatlarında da kendine has özelliklerle oluşmuş ve Türk edebiyatında varlığını 19. yüzyıla kadar devam ettirmiştir.

İçerdikleri metinler bağlamında edebiyat tarihine kaynaklık eden mecmûalar her ne kadar sıklıkla edebiyat alanı içerisinde ele alınıyor olsalar da sadece edebiyat alanını ilgilendirmezler. Kütüphane kataloglarında kayıtlı tarih, sosyoloji, ziraat, tıp, ecza, müzik gibi farklı alanlara ait içerikteki mecmûalar bunun ispatıdır.

Bu çalışmanın konusu olan eser de bir kanto mecmûasıdır. Kanto, İtalyanca “canto” sözcüğünden dilimize geçmiştir ve şarkı söyleme sanatı anlamına gelmektedir. Kanto kültürü, 1800’lü yılların sonundan itibaren İstanbul’da, Tuluat tiyatrolarında, oyundan önce izleyicinin dikkatini canlı tutmak ve çeşitlilik sağlamak amacıyla genelde kadın sanatçıların şarkı söyleyip dans ederek yaptığı gösteri ve bu gösteri esnasında söylenen şarkılar şeklinde ortaya çıkmıştır. Bu gösterilerde söylenen şarkılar klasik Türk edebiyatı geleneğinin kırkambarı olarak anılan mecmûalarda derlenerek bir araya getirilmiştir. “Güfte mecmûaları geleneğinin devamı olan şarkı ve kanto mecmûaları, Osmanlı edebiyat ve mûsikîsine dair şarkı, türkü, kanto, marş, gazel, kıta gibi birçok unsuru ihtiva etmektedir. Bir yanıyla geleneğe bağlanan bu eserler, diğer yanıyla imparatorluktan devlete geçiş dönemine ait yeniliklerin izlerini de taşımaktadır (Koç Keskin&Yoloğlu, 2018: 28).”

Kanto, menşei itibariyle batılıdır. Fakat Osmanlı toplumlarında bu tarz, halk öğeleri ile harmanlanarak sahnelenmiş ve bu haliyle de muhatap bulmuş, varlık göstermiştir. Örneğin *Neş’e-i Dil*’de bir “Çiftetelli Kantosu” yer almaktadır. Hiçyılmaz’ın, *İstabil Geceleri ve Kantolar* adlı çalışmasındaki şu ifadesi vurgulamaya çalıştığımız şeyi destekler niteliktedir:

<sup>3</sup> Örneğin; Mufaddal ed-Dabbî, el-Mufaddaliyyât.

“Bizim çiftetelli dediğimiz kırık oyun tarzı ile karıştırılarak, kanto adı ile bir tip sahne dansı halinde Tuluat tiyatrolarımıza da geçmiştir.” (Hiçyılmaz, 1999:8). Yine Ziya Gökalp *Türkçülüğün Esasları* adlı kitabının “Ulusal Müzik” başlıklı bölümünde ulusal müziğimizin doğu, batı ve halk müziği olmak üzere üç müzikle karşı karşıya olduğunu vurgulamış ve akabinde görüşünü şu cümlelerle ifade etmiştir: “Ulusal müziğimiz, ülkemizdeki halk müziğiyle batı müziğinin kaynaşmasından doğacaktır. Halk müziğimiz, bize birçok ezgi vermiştir. Bunları toplar ve batı müziği yöntemlerine göre armonize edersek hem ulusal hem de Avrupalı bir müziğe kavuşuruz” (Gökalp, 2006: 192). Kantonun 1800’lü yılların sonunda Osmanlı toplumuna girişini, kabul görmesini, varlığını beğeni ile devam ettirebilmesini anlamlandırmamız için bu görüşler oldukça önemlidir.

Kültürümüzde kanto ile alakalı en detaylı çalışmalar And<sup>4</sup>, Belge<sup>5</sup> ve Hiçyılmaz<sup>6</sup> tarafından yapılmıştır. Bu çalışmanın amacı kantoların mûsikî ve tiyatral özelliklerinden söz etmekten ziyade kanto mecmûalarının derleniş şekillerinin geleneğin uzantısı olduklarını ortaya koymaktır.

Bir şarkı ve kanto mecmûası olan *Neş’e-i Dil*, güfte mecmûaları kapsamında geleneğin çağa uydurulmuş bir formu olarak değerlendirilebilir. Türk mûsikî tarihi için önemli olan bu eserler adlandırılma, düzenlenme ve ihtiyaca cevap verme bakımından klasik dönem mecmûalarının pek çok özelliklerini yansıtmaktadırlar: Şarkı, kanto, gazel, kıta, besteci, makam, usul gibi pek çok unsurun bir araya getirildiği derleme eserler olmaları; Şiir mecmûalarında kullanılan “eyzan, bu dahı” gibi bazı tabirlerin ortaklığı (bestecisi verilmiş bir şarkıdan hemen sonra “eyzan” tabiri ile nakaratların, “bu dahı” tabiri ile de aynı besteciye ait farklı makam ve usullerde şarkıların yazılması); ilgisine, devrin sevilen, en çok dinlenen, en meşhur örneklerini sunmaları; belki sadece derleyicisinin şahsi zevklerini barındırıyor olmaları bu eserleri mecmûa geleneğinin devamı olarak saymamız için yeterli sebeplerdir.

### **HASAN TAHSİN ve NEŞ’E-İ DİL-YENİ ŞARKI VE KANTO MECMÛASI**

Eserin derleyicisi Hasan Tahsin hakkında bildiklerimiz sınırlıdır. Günümüze ulaşan eserleri dışında hakkında pek fazla bilgi bulunmamaktadır. Gülçin Yahya Kaçar, Hasan Tahsin’in *Gülzâr-ı Mûsikî* adlı bir eseri üzerine yaptığı çalışmasında bizlere, mürettibin devlet memuriyetlerinin yanı sıra Türk Mûsikîsi ile yakından ilgilendiğini ve bu yönde bazı hizmet ve

<sup>4</sup> And, M. (1976). *Osmanlı Tiyatrosu, Kuruluşu, Gelişimi, Katkısı*. Ankara: Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Yayınları.

<sup>5</sup> Belge, M. (1998). “*Kantolar*”, *Kantolar Albümü: 1905-1945*. CD-Kitapçık. İstanbul.

<sup>6</sup> Hiçyılmaz, E. (1999). *İstanbul Geceleri ve Kantolar*. İstanbul: Sabah Kitapları.



çalışmalarının olduğunu aktarmıştır (Yahya Kaçar, 2017: XI). Çalışmamıza konu olan *Neş'e-i Dil*'in mukaddimesinin sonunda yer alan “*Maârif Nezâret-i Celîlesi Evrak Kalemi Mümeyyiz-i Sânisî Hasan Tahsin*” notundan onun Eğitim Bakanlığında, evrak kalemi ikinci kâtibi olduğunu anlıyoruz.

*Neş'e-i Dil*-Yeni Şarkı ve Kanto Mecmûası adlı eserin basım tarihi 1323/1905'tir. Eserin cilt kapağında matbaa olarak Kütüphâne-i Cihân yazıyorken cüz başlangıç sayfalarında Saryan matbaası yazmaktadır. 160 sayfa ve 10 bölümden oluşan mecmûanın ilk üç bölümü cüz, diğer bölümleri ise forma olarak adlandırılmıştır. Derleniş hususiyetleri pek çok mecmûa gibi kendine has olan eserin belki de örnekleri arasındaki en önemli özelliklerinden biri kısa da olsa bir mukaddimesinin bulunmasıdır. Hasan Tahsin, eserin mukaddimesine Sultan Abdülhamîd Hân'ın saltanatının devamı için dua ederek başlamış ve *Neş'e-i Dil*'den önce neşrettiği şarkı mecmûalarının muhterem okurlarından gördüğü rağbete karşılık bir teşekkür babında bu eserin neşrine cüret edebildiğini aktarmıştır:

*“Cenâb-ı Hak velî ni'met-i bî-minnetimiz padişâh-ı maârif-perver ve şehensâh-ı mâdelet-güster efendimiz hazretlerini ilâ âhirü'z-zamân evreng-i hilâfat ü saltanatlarında ebed mekîn buyursun âmîn.*

*Bundan akdem neşr itdigim Safâ-yı Dil, Güldeste-i Mûsikî, Gülzâr-ı Mûsikî, nâm şarkı mecmûalarının kârîûn-i kirâmdan gördüğü rağbete müteşekkiren “Neş'e-i Dil” nâmı altında işbu mecmûanın da neşrine cüret kılınmıştır. Esâtize-i kirâmın en güzîde ve rağbet-i âmmeye mazhâr olmuş âsâr-ı bergüzîdelerini câmi' olduğu hasebiyle bunun da hüsn-i kabûl göreceğine ümitvârim.”* (Hasan Tahsin, 1323: 2)

Eserin mukaddimesinden hemen sonra “*Medhiye-i Hazret-i Hilâfet-Penâhî*” başlığı ile bestecisi Mustafa Nûrî Efendi, usulü Marş ve makamı Neveser olan bir dörtlük yer almaktadır. Aruzun “Fâilâtün Fâilâtün Fâilâtün Fâilün” kalıbıyla yazılan marş klasik dönem şairlerinin kasidelerindeki methiyelerden farksızdır:

*Medhiye-i Hazret-i Hilâfet-penâhî*

*Pâdişâh-ı Âlî Osmân Hazret-i Abdülhamîd*

*Devlete viridi vücûd âkidesin ömr-i cedîd*

*Lutf-ı şahânenden oldu mülk ü millet müstefîd*

*Eyleriz sâyende her gün îd-ber-bâlâ-yı îd* (Hasan Tahsin, 1323: 3)

Yukarıdaki dörtlükte yer alan “*îd-ber-bâlâ-yı îd*” klasik şiirde sık kullanılan bir tamlamadır. *Neş’e-i Dil*’in kısacık methiyesinde kendine yer bulan tamlama, 18. yüzyıl şairi Haşmet’in bir kasidesinde ve 19. yüzyıl şairi Yûsuf Râif Bey’in Saîd Paşa’nın bir gazelini tahmininde de benzer kullanımlarla geçmektedir:

*İltifatınla idersem ‘îd-ber-bâlâ-yı ‘îd*

*Neşve-i lutfunla def eyleyse dil derd-i seri.* Haşmet K.11/39 (Aslan, 1995: 207)

*Gönlümi her dil-rübâ almak ba ‘îd-ender-ba ‘îd*

*Vuslatıyla Râ ‘îf eyleyler ‘îd-ber-bâlâ-yı ‘îd*

*Zâtına virmiş necâbet Hazret-i Rabb-i Mecîd*

*Lutf ile almış Nebî pendin o âfet ey Sa ‘îd*

*Yohsa ben her bî-vefâyı kendime yâr eylemem* Râif T.23/5 (Sarıççek, 2014?: 255)

Mecmûalar içerik bakımından çok çeşitlidirler. “Çeşitli hastalıkların tedavisi için reçeteler, toplumsal olayları düzenleyen kural ve kanunları içeren fetvalar, devrin ileri gelenleri arasındaki siyasi/toplumsal içerikli mektuplar, güfteler gibi tüm farklı içerikler mecmûa metinlerinde yer alabilir (Batğı, 2019: 7)”. Tüm bu derlemeler, şair, müzisyen, din adamı, hekim, tarihçi gibi farklı meslek kollarından entelektüel kimseler tarafından bazen estetik bir kaygıyla bazense bir amaca hizmet etmek maksadıyla oluşturulmuştur.

Mecmûalar, tıpkı içerikleri gibi derleniş özellikleri bakımından da değişiklik arz ederler. Belirli düzenleme biçimlerine sahip mecmular olduğu gibi, dağınık-gelişigüzel düzenlenmiş olanları da hayli fazladır. Hasan Tahsin *Neş’e-i Dil*’i, derlediği diğer eserlerinde olduğu gibi (*Güldeste-i Mûsikî, Gülzâr-ı Mûsikî, Hadîka-i Mûsikî, Safa-yı Dil yâhud Yeni Şarkı ve Kanto Mecmûası*) cüz/forma adı verilen her bir bölümde, şarkı veya kantodan hemen önce usul-makam-besteci bilgisi vererek düzenlenmiştir. Bestecisi bilinmeyen/belli olmayan kantolar “kanto” başlığı altında verilmiştir. Eserde Acem, Çoban, Köçek, Piyano, Çiftetelli, Tâife, Düetto, Hovardo olmak üzere farklı kantolar yer almaktadır. Bölümlerde yer alan besteci ve şarkı/kanto sayıları değişkenlik göstermektedir, standart bir sayı yoktur. Mecmûada beste sayısı fazla olan besteciler şunlardır: Abdülkâdir Bey, Ahmed Râsim Bey, Ali Salâhî Bey, Edhem Efendi, Çulhayan Kirkor Efendi, Karnik Garmiryân Efendi, Mustafa Nûrî Efendi, Piyanist Ahmed Bey, Üdî Hafız Mehmed Efendi. Eserde Lâ-edri olarak üç ve tek kadın besteci Hikmet Hanım’dan da bir şarkı yer almaktadır. Hikmet Hanım’ın Hüseyinî makamında ve Sofyan usulündeki şarkısı şöyledir:

*Ağlıyorum derdin ile rûz u şeb*

*Bilmez misin hâlimi ey gonçe-leb*

*Âhımla feryâdına sensin sebep*

*Nakarat*

*Merhamet et bana âmân merhamet*

*Eyle beni vaslın ile bahtiyâr*

*Sensiz olur mu bu dil gam-güsâr*

*Eyliyorum merhametin intizâr* (Hasan Tahsin, 1323: 149)

*Neş'e-i Dil'* de gazel ve kıtalar yer almaktadır. Mecmûada yer alan aşağıdaki gazelin kime ait olduğu bilinmemektedir, mahlas bilgisi bulunmamaktadır. Fakat gazelde klasik şiirin yankıları sezilmektedir. 19. yüzyıla gelindiğinde değişen sevgili tipi pek çok şairin şiirlerinde kendine yer bulmuştur. Dördüncü beyitte aşığın arzusunu anlayan, gönül okşayan sevgili, güzel bakışları ile aşığa hoş cevaplar vermiştir:

*Fâilâtün Fâilâtün Fâilâtün Fâilün*

*Cilve-peydâdır cemâl-i yâr her sözden yine*

*İhtirâz eyler gönül ol kadd-i dil-cûdan yine*

*Nûr-ı dîdem zülf-i müşgînin olunca mevc-hîz*

*Tab'im istignâ ider ezhâr-ı hoşbûdan yine*

*Korkarım cemiyet-i eskâre virmez ihtimâl*

*Bir perîşânlık nümâyan oldu gîsûdan yine*

*İştîyâkım anlamış zannım o şûh-ı dil-nüvâz*

*Hoş cevâb aldım güzel gözlerle ebrûdan yine*

*Reng reng eyler tecelli veçhe dildârım edîb*

*Yüz çevirdim sünbül ü gül-zâr u şeb-bûdan yine* (Hasan Tahsin, 1323: 21-22)

Aşağıdaki kıtada ise merhamet etmeyen sevgili ve gözyaşını dahi silmeye gücü kalmamış aşığın vurgusu yapılmaktadır:

*Feilâtün Feilâtün Feilâtün Feilün*

*Ne zaman rahm idecek hâlîme bilmem o melek*

*Beni mahv eyleyecek kadrîmi sonra bilecek*

*Öyle bir hâle getirmiş ki beni kahr-ı felek*

*Kudretim kalmadı billâh dîde-i eşkim silecek*<sup>7</sup> (Hasan Tahsin, 1323: 10)

Eserde yer alan bir gazelin “Cûdî” mahlası ile 19. yüzyıl şairlerden Merzifonlu İbrahim Cûdî’ye ait olduğu tespit edilmiştir. Hasan Tahsin’in bu gazeli eserine seçme sebebi üzerine yorum yapabilmek için şairin Divan’ı incelenmiştir. Cûdî Divanı’nda güfte, şarkı, ilahi formunda şiirlerin olması onun mûsikî ile ilgilendiğini gösterir niteliktedir. Klasik şiir geleneğini sürdüren Cûdî’nin devrinde okunan, şiirleri sevilen bir şair olması kuvvetle muhtemeldir. Esere yer alan aşağıdaki gazel kullanılan terkipler, Arapça-Farsça kelimelerin çokluğu bakımından tam bir klasik dönem gazeli gibidir:

*Fâilâtün Fâilâtün Fâilâtün Fâilün*

*Gûr-ı tab’a düşdüm envârım güzâr itmez bana*

*Bahtı seyr et yâr-ı cânım yâr-ı gâr itmez bana*

*Tab-ı târîkimden olmaz nûr-ı cânım müncelî*

*Hey ne muzlim şeb ki yâ Rabb inficâr itmez bana*

*Cûy-bâr olsam revân olsam ayagın öpmege*

*Serv-i nâzım sâyesin zîb-i kenâr itmez bana*

*Kâtib-i kâtîm degildir yoksa eşk-i gam-nüvîs*

*Bir muhâsib derdimi öyle şümâr itmez bana*

*Bilmese cânân cemâlinden ebed kesmem nigâh*

*Pây-i rahşî böyle teheyüç gubâr itmez bana*

*Ey semend-i yâr gül sînemde cevlân eylesen*

*Hâk-sârım gök yere inse hasâr itmez bana*

<sup>7</sup> Mısrada vezin aksamaktadır.

*Cûdiya cânânımın hayrân-ı istiğnasıyım*

*Arş u ferş olsam da itmez itibâr itmez bana* (Hasan Tahsin, 1323: 16)

Eserde yer alan Kantoların eserdeki diğer şarkı ve formların beşte biri kadar olduğu söylenebilir. Aşağıda yer alan örnek bizlere adeta 15. yüzyıldan bir gazelin çağrışımını yapmaktadır:

*Hasretinle nazlı cânân kalb-i mahzun inliyor*

*Gözlerimden kanlı yaşlar durmayup âh çağlıyor*

*Hâlîme âgâh olanlar hep benimle ağlıyor*

*Gel yetiş imdadıma âh merhamet feryâdına*

*Terahhüm kıl bu âşık kurbânına*<sup>8</sup> (Hasan Tahsin, 1323: 36-37)

*Neş'e-i Dil*'de yer alan şarkı, kanto ve diğer tüm formları konu bakımından kategorize etmek oldukça güçtür. Genel olarak aşık-sevgili eksenli konuların çokluğundan, Osmanlı toplumunun eğlence anlayışına hitap eden unsurların varlığından söz etmek yanlış olmayacaktır.

## **SONUÇ VE DEĞERLENDİRME**

Bu çalışma ile vurgulamak istenen temel konu; varlığını çeşitli alanlarda 20. yüzyıla kadar sürdüren mecmûa geleneğinin ve ortaya çıkan eser neşirlerinin Türk kültür tarihine yaptığı katkılardır. Bu katkılar sadece edebiyat alanı için değil tarih, felsefe, müzik ve daha pek çok alan için belge niteliğindedir. Bu çalışmaya konu olan *Neş'e-i Dil* içerik bakımından çoğunlukla şarkı ve kantoları ihtiva etmektedir ve tüm bunlarda klasik şiirin üslup ve imajları kendini göstermektedir. Derleniş sebebi, düzeni, içeriği gibi pek çok husus bu eseri klasik geleneğin devamı olarak görmemiz gerektiğini ortaya koymaktadır.

Şiir ve mûsikîyi ayrı düşünmek mümkün değildir. Klasik şiirin terkipleri, anlam ve imajlar dünyası, sevgili ve aşık rolleri Türk mûsikîsinin güftesi olmuştur. Edebiyat ve mûsikî birbirini besleyerek ilerlemiştir. TRT nota arşivlerinde henüz Latinize edilmemiş eserlerin varlığı, kütüphane kataloglarında yer alan ve neşredilmemiş pek çok şarkı ve kanto mecmûası Türkoloji alanının bu eserlerle de ilgilenmesi gerektiğini; üniversite ve konservatuarların Çalgı ve Ses Eğitimi, Müzikoloji bölümlerinde Osmanlı Türkçesi ve Güfte İncelemeleri derslerinin zaruretinin hâsıl olduğunu göstermektedir.

<sup>8</sup> Makam-Usul-Besteci bilgisi bulunmamaktadır.

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**BAZI TİYADIAZOL TAÇ ETERLERİN KOMPLEKSLEŞME DAVRANIŞLARININ  
İNCELENMESİ**

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**ÖZET**

Bu inceleme kapsamında tarafımızca sentezlenmiş farklı tiyadiazol taç eter türevlerinin metal kompleksleşme özellikleri fiziksel organik kimya penceresinden değerlendirilmiştir. Bu amaçla 2,5-dimerkapto-1,3,4-tiyadiazol bileşiğinden sentezlenen Z1-Z4 taç eterlerin ve 2-amino-5-merkapt-1,3,4-tiyadiazol bileşiğinden sentezlenen M1-M4 taç eterlerinin metal kompleksleşme özellikleri karşılaştırılmıştır. Tiyadiazol halkası üzerine bağlı atomların bir ya da birkaçının değişmesi ile kompleksleşme özelliklerinin değişimi incelenmiştir.

**Anahtar kelimeler:** Fiziksel Organik Kimya, tiyadiazol taç eter, metal kompleksleşmesi.

**INVESTIGATION OF THE COMPLEXATION BEHAVIOR OF SOME  
THIADIAZOL CROWN ETHERS**

**ABSTRACT**

In this study, the metal complexation properties of different thiadiazole crown ether derivatives synthesized by us were evaluated from the perspective of physical organic chemistry. For this purpose, metal complexing properties of Z1-Z4 crown ethers synthesized from 2,5-dimercapto-1,3,4-thiadiazole and M1-M4 crown ethers synthesized from 2-amino-5-mercapto-1,3,4-thiadiazole were compared. The change of complexation properties with the change of one or more of the atoms attached to the thiadiazole ring was investigated.

**Keywords:** Physical Organic Chemistry, thiadiazole crown ether, metal complexation.



## 1. Giriş

Taç eterler, etilen köprülerinin, kükürt ve azot gibi donör atomlar yardımıyla bağlanmasıyla elde edilen halkalı yapılardır. Ayrıca etilen köprülerinin aromatik bileşikler, alkil grupları ve heteroatomlu bileşikler ile yer değiştirmesi ile farklı özellikte taç eterler sentezlenmektedir. Taç eterlerin oldukça popüler olmasındaki başlıca sebep ise metallerle oluşturdukları güçlü kompleksleşmelerdir. Taç eterin içerdiği gruplara ya da atomlara bağlı olarak farklı karakterdeki metal iyonlarıyla kompleksleşmeler oluşturması sağlanmaktadır (Abdurrahmanoglu et al., 2005; Çiçek & Onbaşıoğlu, 2016; Çiçek et al., 2011; Pedersen, 1978). 1967 yılında ilk olarak Pedersen tarafından sunulan taç eter bileşikleri iki ya da daha fazla etilen glikol zincirlerinin oluşturduğu halkalı yapılardır (Pedersen, 1967, 1972, 1978, 1991). Bu bileşikler içerdikleri hidrojen ve karbon atomlarının oluşturduğu hidrofobik apolar bir dış kavite ile heteroatomların (oksijen, kükürt, azot) oluşturduğu polar hidrofilik bir iç kaviteye sahiptirler (Çalışır et al., 2019; Çiçek, Çakir, et al., 2012; Çiçek & Çalışır, 2016; Erk et al., 1999; Tu et al., 2007). Literatürde yer alan çalışmalarda taç eterlerin pozitif yüklü metal katyonlarıyla doğrudan ve bu katyonların counter anyonlarıyla da dolaylı yoldan kompleksleşmektedir (Çakir et al., 1998, 2004; Çalışır et al., 2019; Çiçek, Çakir, et al., 2012). Pedersen' e göre oksijen ve benzen içeren taç eterler alkali ve toprak alkali metal katyonlarına yüksek ilgi göstermektedir (Pedersen, 1967). Bununla beraber, taç eter halkasının doğrudan katılan veya yan kollardan katılan kükürt, azot, elementleri ile tiyofen, pirol, tiyadizaol, triazol, disülfid, amit, ester, tiyoester, vb. grupları metal iyonlarına olan seçiciliklerini etkilemektedir (Calisir et al., 2017; Cicek et al., 2016; Baki Çiçek et al., 2011). Taç eter üzerindeki azot atomu sayısı arttıkça geçiş metallerine olan ilgi attığı tespit edilmiştir (Canbolat et al., 2022; Çiçek, 2002). Ayrıca halka üzerindeki kükürt donör atomlarının sayısının artması bu ilgiyi cıva, kadmiyum, bakır, demir gibi ağır metallere ve değerli metaller olan altın, gümüş, platine kaydırmaktadır (Çiçek, Ergun, et al., 2012; Çiçek et al., 2011; Sapmaz, 2019). Bununla beraber, sentezlenecek taç eter bileşiği heteroatomların, yan kolların farklı kombinasyonlarla dizilmesi ile metal iyonlarına olan seçicilik de değiştirilebilmektedir (Albayrak, 2020; Canbolat et al., 2022; Çiçek & Onbaşıoğlu, 2016).

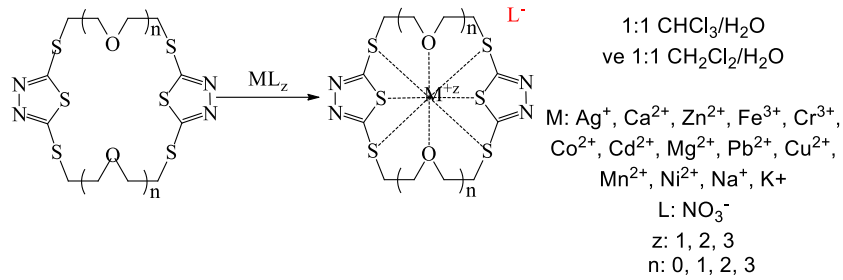
Bu inceleme kapsamında Çiçek araştırma grubu tarafından sentezlenmiş oksa, tiyo, aza, benzo taç eter türevlerinin değişik yöntemler kullanılarak fiziksel organik kimya açısından metal kompleksleşme özellikleri incelenmiştir. Bu sonuçların fiziksel organik kimyada açmış olduğu pencereler bilim insanlarına ilham kaynağı olacaktır.

## 2. ARAŞTIRMA VE BULGULAR

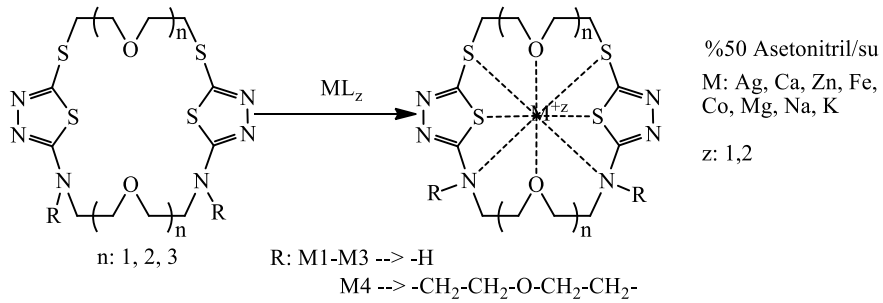
### Yöntem

Z1 ((1,4,10,13)-tetratiya[4.4](2,5)-1,3,4-tiyadiazolo-fan), Z2 ((4,16)-diokso-(1,7,13,19)-tetratiya[7.7](2,5)-1,3,4-tiyadiazolofan), Z3 ((4,7, 19,22)-tetraokso-(1,10,16,25)-tetratiya[10.10](2,5)-1,3,4-tiyadiazolofan), Z4 ((4,7, 10,22,25,28)-hekzaokso-(1,13,19,31)-tetratiya[13.13](2,5)-1,3,4-tiyadiazolofan) tiyadiazol taç eterleri ile M1 (5,13-dioksa-10,16-ditiya-2,8-diaza-1,9(2,5)-ditiadiazolasikloheksadekapan), M2 (5,8,16,19-tetraokso-13,22-dithia-2,11-diaza-1,12(2,5)-dithia-diazolacyclodocosaphane), M3 (5,8,11,19,22,25-hekzaoksa-16,28-ditiya-2,14-diaza-1,15(2,5)-ditiadiazolasiklootakosa-fan) ve M4 (24,210,7-trioksa-4,10-ditiya-21,27-diaza-1,3(2,5)-ditiyadiazola-2(1,7)-siklododekanasiklodekapan) taç eterlerinin  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Fe}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ag}^+$ ,  $\text{Fe}^{3+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Mn}^{2+}$  iyonlarıyla kompleksleşmeleri karşılaştırılmıştır (Canbolat et al., 2022; Çiçek & Onbaşıoğlu, 2016).

Gerçekleştirilen kompleksleşmeler Şekil 1 ve Şekil 2’de şematize edilmiştir.



Şekil 1. Z1-Z4 tiyadiazol taç eterlerin metal kompleksleşmeleri (Çiçek & Onbaşıoğlu, 2016).



Şekil 2. M1-M4 tiyadiazol eterlerin metal kompleksleşmeleri(Canbolat et al., 2022)

### Bulgular

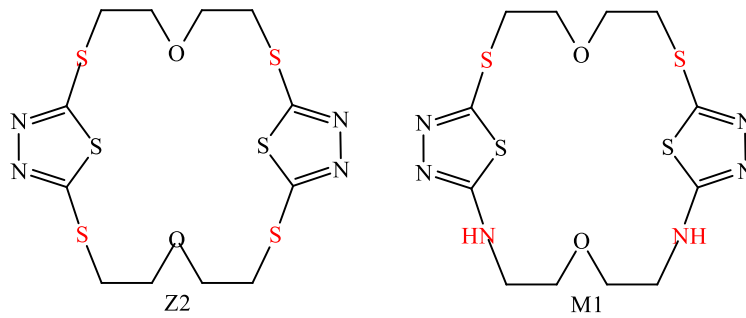
Bu çalışmalarda elde edilen bulgular aşağıda özetlenmiştir.

**Tablo 1.** Taç eterlerin metal kompleksleşme oranlarının kıyaslanması

Taç Eter	Kompleksleşme oranı, K <sub>e</sub>
M1	Ca <sup>2+</sup> > Na <sup>+</sup> > Ag <sup>+</sup> = Co <sup>2+</sup> > Mg <sup>2+</sup> > K <sup>+</sup> > Fe <sup>2+</sup> > Zn <sup>2+</sup>
M2	Co <sup>2+</sup> > Ag <sup>+</sup> > Ca <sup>2+</sup> > Na <sup>+</sup> > K <sup>+</sup> > Zn <sup>2+</sup> > Fe <sup>2+</sup> > Mg <sup>2+</sup>
M3	Fe <sup>2+</sup> > Co <sup>2+</sup> = Na <sup>+</sup> > Mg <sup>2+</sup> > Ag <sup>+</sup> > Zn <sup>2+</sup> > K <sup>+</sup> > Ca <sup>2+</sup>
M4	Ca <sup>2+</sup> > Co <sup>2+</sup> > Fe <sup>2+</sup> > Na <sup>+</sup> > Mg <sup>2+</sup> > Ag <sup>+</sup> > Zn <sup>2+</sup> > K <sup>+</sup>
Z1	Pb <sup>2+</sup> > Cu <sup>2+</sup> > Cd <sup>2+</sup> > Ag <sup>+</sup> > Mn <sup>2+</sup> > Cr <sup>3+</sup> > Zn <sup>2+</sup> > Ni <sup>2+</sup> > K <sup>+</sup> > Na <sup>+</sup> > Ca <sup>2+</sup> > Co <sup>2+</sup> > Mg <sup>2+</sup> > Fe <sup>3+</sup>
Z2	Pb <sup>2+</sup> > Cu <sup>2+</sup> > Cd <sup>2+</sup> > Ag <sup>+</sup> > Fe <sup>3+</sup> > Mg <sup>2+</sup> > Cr <sup>3+</sup> > Ni <sup>2+</sup> > Ca <sup>2+</sup> > Zn <sup>2+</sup> > K <sup>+</sup> > Na <sup>+</sup> > Co <sup>2+</sup> > Mn <sup>2+</sup>
Z3	Pb <sup>2+</sup> > Cu <sup>2+</sup> > Cd <sup>2+</sup> > Fe <sup>3+</sup> > Ag <sup>+</sup> > K <sup>+</sup> > Ca <sup>2+</sup> > Mg <sup>2+</sup> > Ni <sup>2+</sup> > Cr <sup>3+</sup> > Co <sup>2+</sup> > Na <sup>+</sup> > Mn <sup>2+</sup> > Zn <sup>2+</sup>
Z4	Pb <sup>2+</sup> > Cu <sup>2+</sup> > Cd <sup>2+</sup> > Ag <sup>+</sup> > Fe <sup>3+</sup> > K <sup>+</sup> > Ca <sup>2+</sup> > Mg <sup>2+</sup> > Cr <sup>3+</sup> > Ni <sup>2+</sup> > Na <sup>+</sup> > Co <sup>2+</sup> > Zn <sup>2+</sup> > Mn <sup>2+</sup>

### 3. SONUÇ

Bu inceleme kapsamında tarafımızca sentezlenmiş, Z1-Z4 ve M1-M4 taç eterler serilerinin Na<sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, Zn<sup>2+</sup>, Fe<sup>2+</sup>, Co<sup>2+</sup>, Ag<sup>+</sup>, Fe<sup>3+</sup>, Cr<sup>3+</sup>, Cd<sup>2+</sup>, Pb<sup>2+</sup>, Ni<sup>2+</sup>, Cu<sup>2+</sup>, Mn<sup>2+</sup> iyonlarıyla kompleksleşmeleri karşılaştırılmıştır (Canbolat et al., 2022; Çiçek & Onbaşıoğlu, 2016). Taç eterler içerdikleri atomlar sebebiyle hidrofobik bir dış iskelete ve hidrofilik bir iç kaviteye sahiptirler. Bu hidrofilik iç kavite oksijen, azot, kükürt gibi elementlerden kaynaklanmaktadır. Bu incelemede değerlendirme alınan Z1-Z4 ve M1-M4 tiyadiazol taç eter bileşikler sadece tek bir heteroatom farklılık göstermektedir (Şekil 3). Bu sebeple farklı hidrofilik iç kaviteye sahiptirler. Bu iç kavitelere uygun olan metal iyonları daha yüksek kompleksleşme yapmaktadır.



**Şekil 3.** Z2 ve M1 tiyadiazol taç eterleri

Tablo 1’de yer alan sonuçlara göre hem M1 hem de M4 taç eterlerin aynı kimyasal bileşenlerle, ancak farklı kondenzasyon prosedürleriyle (M1; 2:2 ve M4 2:3) sentezlenerek  $Ca^{2+}$ ,  $Co^{2+}$ ,  $Fe^{2+}$  ve  $Na^+$  tuzları ile kompleksler oluşturması, sentezde halka boşluğunun önemini göstermektedir. Çift köprülü bir yapıya sahip olmayan M1 de benzer şekilde  $Ag^+$ ,  $Zn^{2+}$  ve  $K^+$  tuzları ile kompleksleşme yapmıştır. Bunun sebebi halka boşluğunun iyonların daha net hareket etmesine izin vermesi ve içerdiği –NH- grubu metal iyonlarını daha etkin bir şekilde bağlamasıdır. Halka boşluğundaki glikol gruplarının artması, kompleksleşmenin geçiş metallerine doğru kaymasına yol açmıştır (Tablo 1). Glikol gruplarının eklenmesiyle halka üzerindeki donör oksijen atomlarının miktarını artmaktadır, bu da kobalt (II) ve demir (II) iyonlarının yüksek kompleksleşme oranlarıyla bağlamasını sağlamaktadır.

Z1-Z4 bileşiklerinin her biri  $Pb^{2+}$ ,  $Cu^{2+}$ ,  $Cd^{2+}$ ,  $Ag^+$  iyonlarıyla yüksek kompleksleşmelere sahiptir (Tablo 1). Bu iyonlardan  $Pb^{2+}$ ,  $Cu^{2+}$  iyonları Tablo 2’ye göre orta-sert Lewis asitleri iken  $Cd^{2+}$ ,  $Ag^+$  iyonları yumuşak Lewis asitleridir. Z1-Z4 bileşikleri tiyadiazol halkası üzerinde sabit 2’şer adet kükürt ve azot atomları içermektedir. Z1-Z4 taç eterlerinde değişen ise iç kaviteye etki eden oksijen donör atom sayısıdır. Z1-Z4 taç eterlerinde, sertliğin, artan oksijen sayısının molekülün iç kavitesine bağlı olarak değişmesine rağmen tiyadiazol halkası içerdiği kükürt donör atomları sebebiyle oldukça yumuşak karakter sergilemiştir. Bu sebeple  $Pb^{2+}$ ,  $Cu^{2+}$ ,  $Cd^{2+}$ ,  $Ag^+$  iyonlarıyla yüksek oranda kompleksleşme göstermiştir.

**Tablo 2.** Lewis asitleri ile seçilen metal iyonlarının yarıçapları

	<b>Lewis Asitleri</b> (Leach, 1999; Vignerresse, 2009)	<b>Metal İyonu Yarıçapı (pm)</b> (Colton et al., 1995)
<b>Sert Lewis Asitleri</b>	$Cr^{3+}$ $Mg^{2+}$ $Fe^{2+}$ $Fe^{3+}$ $Mn^{2+}$ $Ca^{2+}$ $Na^+$ $K^+$	$Cr^{3+}$ (61.5 pm) $Mg^{2+}$ (72 pm) $Fe^{2+}$ (76 pm) $Fe^{3+}$ (78 pm) $Mn^{2+}$ (83 pm) $Ca^{2+}$ (100 pm) $Na^+$ (102 pm) $K^+$ (138 pm)
<b>Orta-Sert (Ara/Sınır) Lewis Asitleri</b>	$Ni^{2+}$ $Cu^{2+}$ $Zn^{2+}$ $Co^{2+}$ $Fe^{2+}$ $Pb^{2+}$	$Ni^{2+}$ (69 pm) $Cu^{2+}$ (73 pm) $Zn^{2+}$ (74 pm) $Co^{2+}$ (74.5 pm) $Fe^{2+}$ (76 pm) $Pb^{2+}$ (119 pm)
<b>Yumuşak Lewis Asitleri</b>	$Cd^{2+}$ $Ag^+$	$Cd^{2+}$ (95 pm) $Ag^+$ (115 pm)

Tablo 2’de verilen metal yarıçapları ve Lewis asitlerinin sınıflandırması göz önüne alınarak sonuçlar yeniden değerlendirilmiştir. M1-M4 bileşikleri sert karakterde atomlar olan azot ve oksijen atonlarını ve bir adet yumuşak Lewis bazı olan kükürt atomunu içermektedir. Bununla beraber Z1-Z4 bileşikleri ise yumuşak karakterde Lewis bazları olan kükürt atomlarıyla, sert karakterdeki oksijen atomlarını içermektedir. Bunun sonucu olarak M1-M4 bileşikleri daha sert Lewis asitleri olan  $\text{Ca}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Fe}^{2+}$ ,  $\text{Na}^+$  iyonlarına ilgi gösterirken, Z1-Z4 taç eterleri  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Ag}^+$  gibi daha yumuşak Lewis asitleri olan iyonlara ilgi göstermiştir.

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**ETİL 2-((4,6-DİMETİL-2-İRİMİDİNİL)AMİNO)ASETAT BİLEŞİĞİNİN SENTEZİ,  
KARAKTERİZASYONU VE HYPERCHEM İLE BAZI HESAPSAL  
ÖZELLİKLERİNİN BELİRLENMESİ**

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**ÖZET**

N-sübstitüe amino asit esterleriyle enzimatik çalışmalarda substrat olarak ve peptit sentezinde sık sık karşılaşılmaktadır. N-süsbtitüe poliglisinler, canlılar için öneme sahip sentetik polimerlerdir. N-sübstitüe amino asit esterlerinin farmasötik ajanlar olarak en önemli avantajları arasında sentez kolaylığı ve ekonomik oluşu, iskeletin oldukça modifiye edilebilmesi ve yan zincir üzerinden sübtitüe olabilme imkanıdır. Bu sebeple oligomerlerin eldesi ve ilaç tasarımına yönelik uygulamalarda kullanılmaktadır. Aynı zamanda, peptoidlerin biyolojik sistemlerde oldukça aktif oldukları ve proteolitik bozunmaya karşı dirençli oldukları tespit edilmiştir. Bu oligomerik moleküllerin başlıca avantajları arasında, modüler yapılarının bir sonucu olarak neredeyse sınırsız çeşitlilik, sentezlenebilme ve dizilenebilme kolaylıkları ve doğal biyolojik uygunlukları yer almaktadır. Bu çalışma kapsamında N-(4,6-dimetil-2-pirimidinil) glisin ester bileşiği sentezlenerek karakterize edilmiştir. Ayrıca bazı teorik (hesapsal) özellikleri incelenmiştir. Bu amaçla, HyperChem programı kullanılarak sentezlenen bileşiğin bağ uzunlukları, elektrostatik potansiyelleri, toplam yük yoğunluğu ve yük dağılımı, bazı enerji parametreleri, HOMO, LUMO ve LUMO-HOMO boşluğu ( $\Delta E$ ) hesaplanmıştır.

**Anahtar kelimeler:** N-sübstitüe glisin ester, karakterizasyon, sentez, Hyperchem, hesapsal kimya.

**SYNTHESIS, CHARACTERIZATION AND DETERMINATION OF SOME  
THEORETICAL PROPERTIES OF ETHYL 2-((4,6-DIMETHYLPYRIMIDIN-2-  
YL)AMINO)ACETATE**

**ABSTRACT**

N-substituted amino acid esters are frequently encountered as substrates in enzymatic studies and peptide synthesis. N-substituted polyglycines are synthetic polymers that are important for living things. Among the most critical advantages of N-substituted amino acid esters as pharmaceutical agents are ease of synthesis and economy, the possibility of highly modifying the skeleton, and substitution via the side chain. For this reason, it is used in applications for the production of oligomers and drug design. At the same time, peptoids are highly active in biological systems and resistant to proteolytic degradation. The main advantages of these oligomeric molecules include almost unlimited diversity, ease of synthesis and sequencing, and natural physical compatibility due to their modular structure. Within the scope of this study, N-(4,6-dimethyl-2-pyrimidinyl) glycine ester compound was synthesized and characterized. In addition, some theoretical (computational) properties are examined. For this purpose, bond lengths, electrostatic potentials, total charge density, charge distribution, and some energy parameters, HOMO, LUMO, and LUMO-HOMO gap ( $\Delta E$ ) of the compound synthesized using the HyperChem program were calculated.

**Keywords:** N-substituted glycine ester, characterization, synthesis, Hyperchem, computational theoretical chemistry.

## 1. GİRİŞ

Kimya biliminin temel dallarından olan teorik kimya, bilgisayar sistemlerinin gelişmesiyle organik kimya ve ilaç kimyası başta olmak üzere birçok bilim alanında kullanılmaktadır. Teorik kimya ile hedeflenen bileşiklerin modellenmesi, deneysel olarak gerçekleştirme olasılığının belirlenmesi ve elde edilen sonuçların canlı yaşamını olumsuz etkilemeyecek şekilde değerlendirilmesinde ön çalışma olarak kullanılmasının başlıca sebepleridir (1).

Pirimidin ve aminopirimidin türevleri, doğada bileşen olarak buldukları için biyolojik olarak önemli bileşiklerdir. Bazı aminopirimidin türevleri antifolat ilaçlar olarak kullanılmaktadır (2,3). Daha önceki çalışmalarda, aminopirimidin türevleri (4), aminopirimidin karboksilatları (5) ve ko-kristal yapıları (6) bildirilmiştir. 2-amino-4,6-dimetil pirimidin bileşiği biyoaktif bir bileşiktir (7). 2-amino-4,6-dimetil pirimidinin farklı aromatik ve alifatik dikarboksilik asitler ile reaksiyonu sonucu elde edilen bileşikler, floresans spektroskopisinde içerdikleri kromofor gruplar sebebiyle mavi emisyon göstermiştir (8). 2-aminopirimidin molekülleri N-HN hidrojen bağları ile N-H<sub>2</sub>O aracılığıyla bağlanan benzoik asit molekülleri içeren bileşikler karakterize edilmiştir (9). p-ksilen-bis(tiyooasetik) asit ve 2-amino-4,6-dimetilpirimidin bileşiklerinin ko-kristalleri sentezlenerek tek kristal X-ışını kırınımı, kızılötesi spektroskopi ve termal analiz yöntemleri ile karakterize edilmiştir (10). Au(III), Pt (II) ve Pt (IV) metallerinin 2-amino-4,6-dimetil pirimidin ile reaksiyonları K.D. Dimitra tarafından rapor edilmiştir (11,12). 2-amino-4,6-dimetil pirimidin bileşiğinin bazı hesapsal özellikleri HyperChem ile hesaplanmıştır (13). Etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiği ticari olarak temin edilebilen bir bileşik olup bu çalışma kapsamında ise 1,3-dipolar siklokatılma reaksiyonuyla MWCNT bileşiklerinin siklokatılma ürünlerinin sentezinde öncü bileşikler olarak sentezlenmiştir.

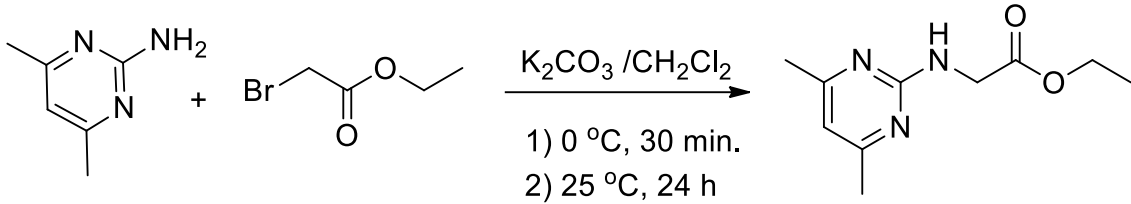
Bu çalışma kapsamında, 2-amino-4,6-dimetil pirimidin ve etil bromoasetat moleküllerinden sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin karakterizasyonu FT-IR, <sup>1</sup>H-NMR ve <sup>13</sup>C-NMR teknikleri ile gerçekleştirilmiştir. HyperChem ile sentezlenen bileşiğin bazı teorik parametreleri belirlenmiştir. Bileşiğin reaktivitesi ve nükleofilliği karşılaştırılmıştır.

## 2. MATERYAL VE METOT

### *Etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin sentezi*

1.798 g (14.6 mmol) 2-amino-4,6-dimetilpirimidin ve potasyum karbonat (0.71 g, 5.14 mmol) 50 mL iki boyunlu reaksiyon balonuna alındı. Üzerine 20 mL susuz diklorometan (DCM) eklendi. Buz banyosuna alınarak 0°C'ye ulaşması için beklendi. 10 ml susuz DCM içerisinde

çözünmüş 1.62 mL (14.6 mmol) etilbromoasetat basınç kontrollü damlatma hunisine alındı. Reaksiyon balonuna üstten bağlanarak damla damla 45 dakikalık bir sürede 0°C’de ilave edildi. Ekleme işlemi tamamlandığında 10 dakika daha beklendi. Sonra reaksiyon karışımı buz banyosundan ayrılarak sıcaklığının oda sıcaklığına ulaşması sağlandı. 24 saat oda sıcaklığında karıştırıldı. Reaksiyon ince tabaka kromatografisi (TLC) ile kontrol edilerek (TLC görüntüleme için iyot ile yakma yöntemi kullanıldı) sonlandırıldı. 3 kere 10 ml doymuş tuzlu su çözeltisi ile (3x10 ml) ekstrakte edildi. Organik faz ayrılarak kalsiyum klorür ile kurutuldu. İçerdiği DCM çözücüsü döner evaporatörde uzaklaştırıldı. FT-IR ile ürün kontrol edildi. (TLC çözücü sistemi: %50/50 etil asetat/hegzan, R<sub>f</sub>, Amino: 0.42 ve R<sub>f</sub>, Ürün:0.48 Verim: 2.78 g, %91.15).



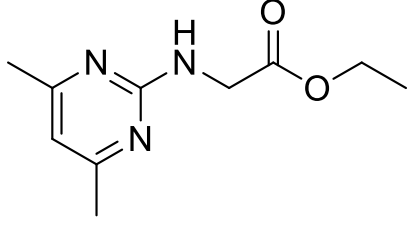
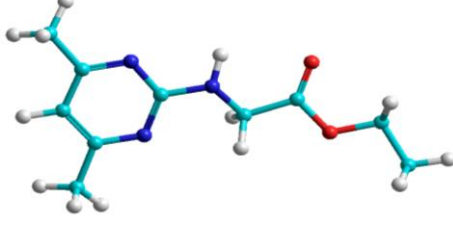
### ***Hesapsal Çalışmalar***

Sentezlenen bileşiğin bazı teorik verileri HyperChem Professional 8.0.1 yazılımı ile hesaplanmıştır. Hesaplamalar Intel (R) Core (TM) i3 CPU M380 @ 2.53 GHz işletim sistemi içeren bilgisayarda gerçekleştirilmiştir. Bileşiklerin açık yapıları çizildikten sonra geometrik optimizasyonu, sırasıyla moleküler mekanik (MM+) tekniği ve yarı-deneysel (semi-empirical, PM3) tekniği kullanılarak gerçekleştirilmiştir. Bileşiğin en düşük enerjili konformasyonu belirlenmiştir. Geometri optimizasyonları Polak-Ribiere algoritması kullanılarak vakum ve sonlanma koşulu olan RMS gradient 0.01 kcal Å<sup>-1</sup> mol<sup>-1</sup> veya 1000 maksimum döngü üzerinden gerçekleştirilmiştir (14).

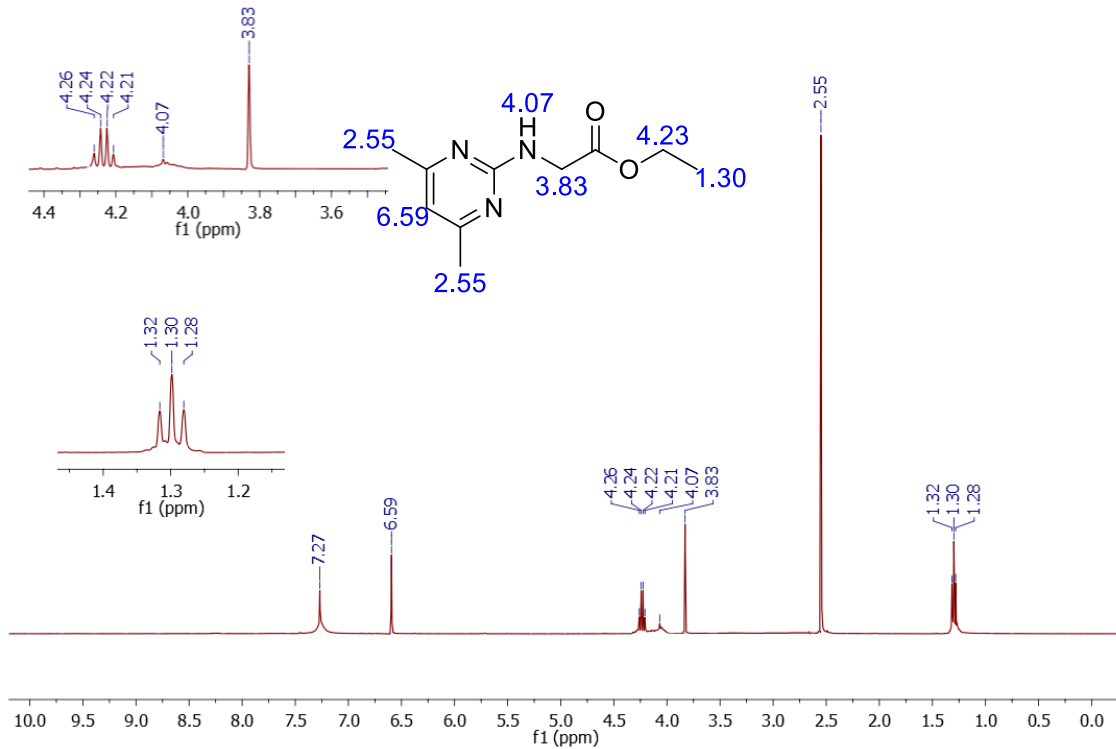
### **3. BULGULAR VE TARTIŞMA**

Tablo 1’de sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin açık yapısı ChemBioDraw Ultra 12.0 programıyla, 3D gösterimleri ise HyperChem programıyla çizilmiştir.

**Tablo 2.** Sentezlenen bileşiğin açık yapısı ve 3D gösterimi

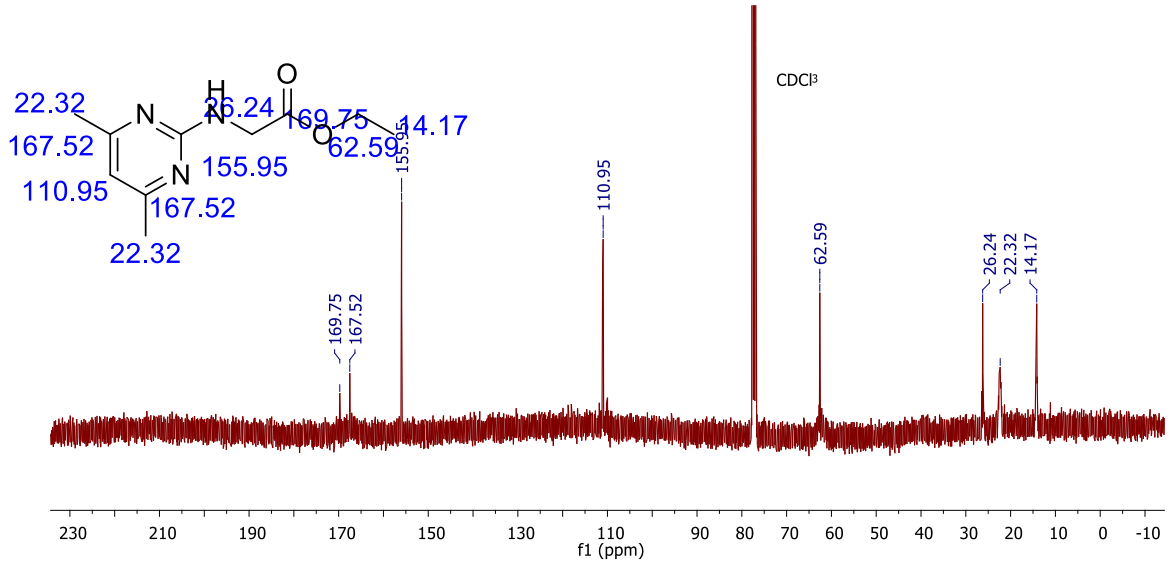
Açık yapısı	3D gösterimi
	

2-amino-4,6-dimetil pirimidin ve etil bromoasetat bileşiklerinin bazik ortamda, diklorometan içerisinde, düşük sıcaklıkta ve  $S_N2$  mekanizması üzerinden reaksiyonu ile hedeflenen bileşik elde edilmiştir. Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin karakterizasyonu FTIR,  $^1H$ NMR ve  $^{13}C$ NMR teknikleri ile gerçekleştirilmiştir.



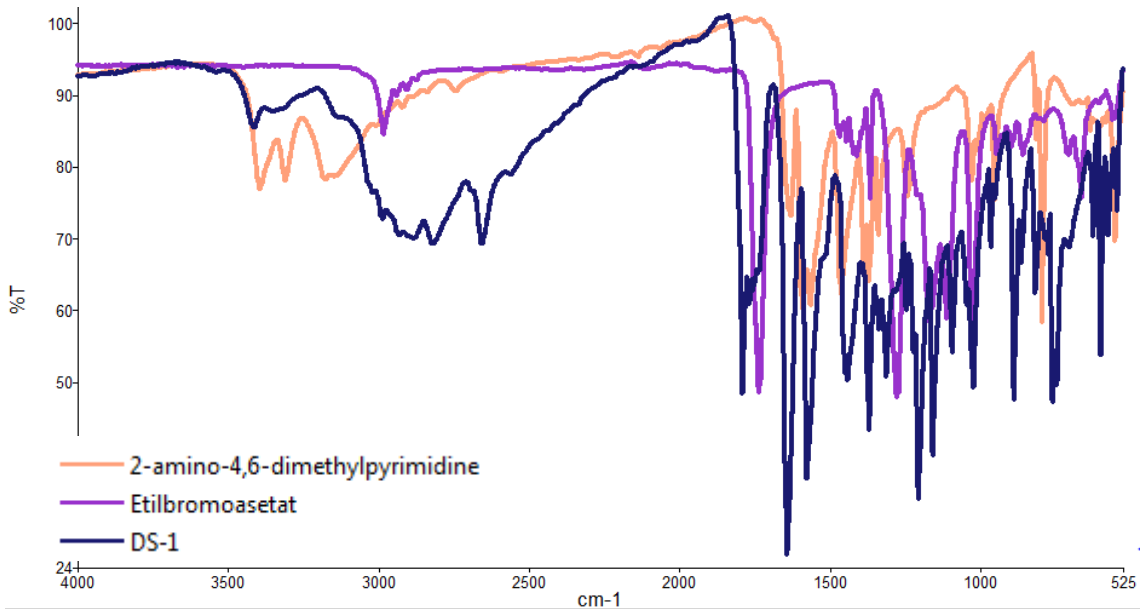
**Şekil 1:** Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin proton NMR spektrumu

Sentezlenen bileşiğin proton NMR spektrumu (Şekil 1) incelendiğinde 1.30 ile 4.23 ppm arasında alifatik proton kimyasal kaymaları ve 6.59 ppm'de aromatik –C-H kimyasal kayması gözlenmiştir.



Şekil 2. Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin karbon NMR spektrumu

Sentezlenen bileşiğin karbon NMR spektrumu (Şekil 2) incelendiğinde 14.17-62.59 ppm arasında alifatik karbon kimyasal kaymaları gözlenmiştir. Bununla beraber aromatik karbonların kimyasal kaymaları 110.95-167.52 ppm arasında, karbonil kimyasal kayması da 169.75 ppm’de gözlenmiştir.



Şekil 3. Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin FT-IR spektrumu

Sentezlenen bileşiğin FT-IR spektrumu (Şekil 3) incelendiğinde, 2-amino-4,6-dimetil pirimidin bileşiğine ait -NH<sub>2</sub> asimetrik ve simetrik gerilmeleri 3393 ve 3309 cm<sup>-1</sup>’de gözlenmektedir.

Sentezlenen bileşiğin FT-IR spektrumu incelendiğinde  $3415\text{ cm}^{-1}$ 'de  $-\text{NH}$  (sekonder amin) gerilmesi gözlenmektedir. Ayrıca etil bromoasetat bileşiğinin FT-IR spektrumunda  $1733\text{ cm}^{-1}$ 'de gözlenen karbonil gerilmesinin, sentezlenen bileşiğin spektrumunda  $1790\text{ cm}^{-1}$ 'ye kaydığı gözlenmiştir.

Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin HyperChem programıyla moleküler mekanik yöntemleriyle geometrik optimizasyonu sonucu elde edilen veriler Tablo 2'de verilmiştir.

**Tablo 3.** Sentezlenen bileşiğin geometrik optimizasyon (moleküler mekanik) verileri

Enerji (kcal/mol)	Gradient
50.956695	32.148039

Moleküler mekanik yöntemleri, sistemin elektronlarını hesaplama esnasında göz ardı etmektedir. Bu durum nükleofilik bileşikler içeren moleküllerde hata oluşturduğundan nükleofilik bağ oluşumu ve bağ kırılmaları moleküler mekanik yöntemleriyle açıklanamamaktadır (15). Bu sebeple yarı-deneysel (semi-empirical) yöntemler kullanılmaktadır. Yarı-deneysel yöntemde PM3 fonksiyonları kullanılarak hidrojen bağı benzeri moleküller arası etkileşimler de hesaplanmaktadır (16). PM3 kullanılarak Tablo 3'de verilen sistemin toplam enerjisi, bağlanma enerjisi, izole atomik enerjisi, elektronik enerjisi, çekirdek-çekirdek etkileşimi, konfigürasyon etkileşimi (CI), oluşum ısısı, referans konfigürasyon gradienti ve simetrisi (Sym.) belirlenmiştir. Sentezlenen bileşikte net yük sıfır olup CI enerji hesaplanmasında 19 konfigürasyon üzerinde bir etkileşim tespit edilmemiştir. Sentezlenen bileşik düzlemsel olduğundan C1 simetriye sahiptir.

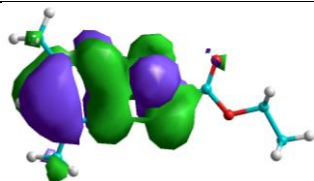
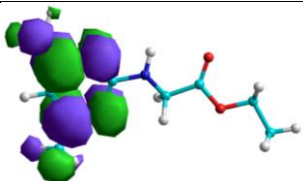
HOMO ve LUMO) enerji düzeyleri olası elektronik geçişler hakkında bilgi vermektedir. Ayrıca HOMO ve LUMO bileşiğin elektrophilik veya nükleofilik özelliği hakkında bilgi elde edilebilir. Kimyasal reaktivite için ise LUMO-HOMO aralığı ( $\Delta E$ ) oldukça önemlidir. Yüksek  $\Delta E$  değeri, düşük reaktivite anlamına gelmektedir. Tablo 4'de HOMO-LUMO orbitalleri ve  $\Delta E$  değerleri verilmiştir. Burada yeşil renk pozitif değer ve mor renk negatif değeri göstermektedir (17–19).

**Tablo 4.** Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiğinin geometrik optimizasyonunda (yarı-deneysel) elde edilen veriler

Parametre	Sonuç
Elektron Sayısı	82
Çift Eşleşmiş Seviye Sayısı	41
Sistemin Yüğü	0
Toplam Orbital Sayısı	75
Toplam Enerji (kcal/mol)	-57442.56
Toplam Enerji (a.u.)	-91.5405
Bağlanma Enerjisi (kcal/mol)	-3020.42
İzole Atomik Enerji (kcal/mol)	-54422.14
Elektronik Enerji (kcal/mol)	339657.39
Çekirdek-Çekirdek Etkileşimi (kcal/mol)	282214.83
CI'da kullanılan Eşleşmiş/Eşleşmemiş Orbital Sayısı	3 / 3
CI Enerji (kcal/mol)	0.0000000
CI'da Kullanılan Konfigürasyon Sayısı	19
Oluşum Isısı (kcal/mol)	-71.8761
Referans Konfigürasyon Gradienti (kcal/mol/Ang)	0.0064320
Simetri	C1

Tablo 4 incelendiğinde sentezlenen bileşiğın LUMO-HOMO boşluğu ( $\Delta E$ ) 8.79 eV olarak hesaplanmıştır. Tablo 4'de yer alan HOMO ve LUMO gösterimleri incelendiğinde yüksek negatif yük sebebiyle bileşiğın daha çok nükleofil olarak ataklara yatkın olduğu söylenebilir.

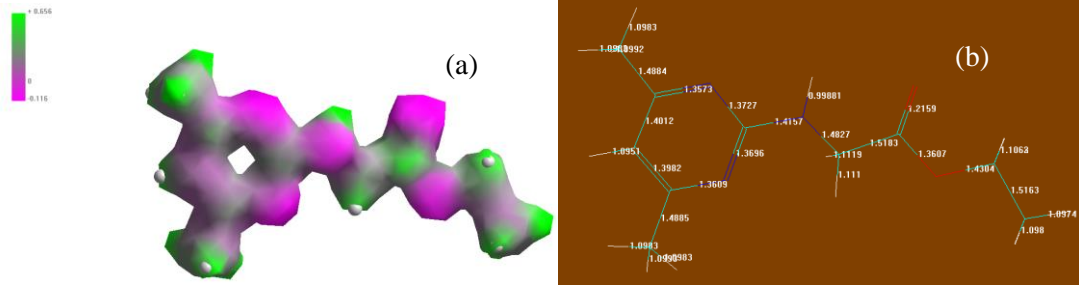
**Tablo 5.** Sentezlenen bileşiğın HOMO / LUMO Orbitaleri ile HOMO, LUMO,  $\Delta E$  değerleri

HOMO, eV	LUMO, eV	$\Delta E$ , (LUMO-HOMO aralığı), eV
-9.05	-0.26	8.79
		

Bağ uzunluklarının artması bileşiğın reaktivitesini azaltmaktadır (13). Sentezlenen bileşikte en yüksek bağ uzunluğunun  $C(sp^3)$ - $C(sp^2)$  arasında olduğu ve en kısa bağ uzunluğunun ise yüksek enerjili N-H bağına ait olduğu belirlenmiştir (Şekil 4-a).

Bileşik üzerinde pozitif ve negatif yüklerin toplandığı bölgelerin belirlenmesi ile bileşiğın nükleofilik atak yönü ve elektrofilik grupları belirlenebilir (13). Sentezlenen bileşikte negatif yüklerin aromatik halka üzerindeki azot atomları üzerinde toplandığı, pozitif yüklerin aromatik halka üzerindeki karbon atomlarına bağlı hidrojen atomu üzerinde toplandığı tespit edilmiştir (Şekil 4-b).





**Şekil 4.** Sentezlenen bileşiğin (a) elektrostatik potansiyeli (b) bağ uzunlukları

#### 4. SONUÇLAR

Bu çalışma kapsamında etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiği, 2-amino-4,6-dimetil pirimidin ve etil bromoasetat bileşiklerinden sentezlenmiştir. Sentezlenen etil 2-((4,6-dimetil-2-pirimidinil)amino)asetat bileşiği, FT-IR, <sup>1</sup>H-NMR ve <sup>13</sup>C-NMR teknikleri ile başarılı bir şekilde karakterize edilmiştir. Bileşiğin en düşük enerjili konformasyonu, HyperChem programı kullanılarak MM+ ve PM3 yöntemleriyle belirlenmiştir. Ayrıca HOMO ve LUMO moleküler orbital seviyeleri hesaplanmıştır. Sentezlenen bileşiğin bağ uzunlukları ve elektrostatik potansiyeli hesaplanmıştır. Negatif yükün azot atomları üzerinde toplandığı gözlenmiştir.

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## **BİTKİ EKSTRAKTI VE YAĞLARIN YENİLEBİLİR FİLMDE KULLANIMI**

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### **ÖZET**

Günümüzde giderek artan bir farkındalıkla çevremizi, doğamızı akabinde de yeryüzünde yaşayan tüm canlıları korumamız gerektiği bilinci oluşmuştur. Bu nedenle toplumun her kesiminden insan sorumlulukları gereği kendi üzerine düşeni yerine getirerek ekosisteme yardımcı olmaktadır. Bilim insanları birçok şeye çare bulmayı böylece topluma hizmet etmeyi amaç haline getirmişlerdir. Öncelikle artan nüfusa bağlı olarak ortaya çıkan kıtlığa çare bulmak için gıdaların raf ömrünü uzatmayı hedeflemişlerdir. Bu amaçla uzun bir kullanım potansiyeli olan plastik ambalajlar geliştirilmiştir. Ancak bu ambalajların doğa üzerinde oluşturdukları olumsuz etki göz önüne alındığında bilim insanları yenilebilir ambalajlar/filmler üzerinde çalışmaya başlamışlardır. Söz konusu filmlerin geliştirilmesiyle hem raf ömrünün uzatılması hem de doğa dostu ürünler geliştirilmesi istenilmiştir. Ancak karşımıza çok sayıda yenilebilir filmle ilgili çalışma çıkmıştır. Dolayısıyla hangi filmin daha iyi olduğu, farklı çalışmalara ihtiyaç olup olmadığı soruları ortaya çıkmıştır. Yaptığımız bu çalışma ile literatürde bitki ekstraktı ve yağlar ile yapılan yenilebilir filmlerin yer aldığı çalışmalar bir araya getirilerek karşılaştırılmaya çalışılmıştır. Sonuç olarak yenilebilir filmlerin hayatımıza tahmin ettiğimizden de daha önce girdiği anlaşılmaktadır. Dahası filmlerin sentezi, ürün kaplama yöntemi ve film oluşumunda kullanılacak ham maddenin seçiminde, belirleyici en önemli faktörün uygulama ürünü olduğunu söyleyebiliriz.

**Anahtar kelimeler:** Ambalaj, bitki ekstraktı, yağ, yenilebilir film,

**USE OF PLANT EXTRACT AND OILS IN EDIBLE FILMS****ABSTRACT**

With an ever-increasing awareness today, we have become conscious of the need to protect our environment, our nature, and then all living things on earth. For this reason, people from all parts of the society help the ecosystem by fulfilling their responsibilities as required. Scientists have made it their goal to find solutions to many things and thus serve the society. First of all, they aimed to extend the shelf life of foods in order to find a solution to the famine caused by the increasing population. For this purpose, plastic packages with a long usage potential have been developed. However, considering the negative effects of these packaging on nature, scientists have started to work on edible packaging/films. However, we have come across many studies on edible films. For this reason, questions such as which movie is better and whether there is a need for different studies arose. With this study, we tried to compare the studies in the literature that include edible films made with plant extracts and oils. As a result, it is understood that edible films entered our lives earlier than we expected. Moreover, we can say that the most important factor determining the synthesis of the films, the product coating method and the selection of the raw material to be used in the film formation is the application product.

**Keywords:** Packaging, plant extract, oil, edible film

## 1. GİRİŞ

İnsan beslenmesinde sağlıklı gıda üretimi ve tüketimi büyük önem taşımaktadır. Ancak gıda maddeleri, üretilmelerinin ardından hemen tüketilemediklerinden dolayı, gıdanın kalite ve güvenliğinin sağlanması, özelliklerinin korunması açısından; raf ömrü süresince korunabilmeleri amacıyla ambalajlanmaları gerekmektedir (Delikanlı ve Özcan, 2014). Bu nedenle cam, metal, kâğıt, plastik gibi malzemelerden yapılan çeşitli ambalajlar kullanılmaktadır (Çelik ve Tümer, 2016). Cam, metal ve tahtaya göre plastiklerin daha ucuz ve kolay elde edilebilir olmasından dolayı 20. yüzyıldan itibaren birçok alanda (tıp, eğitim, ev gereçleri, sanayi) kullanılmaktadır. Ancak plastiklerin kanserojenik etkilerinin olmasının yanında sıklıkla kullanılan naylon poşetlerin sıcaklıkla tepkimeleri sonucu zehirli özellikleri de oluşabilmektedir (Kayan ve Küçük, 2020).

Yenilebilir karbon kaynaklarından veya biyolojik kökenli polimerlerden elde edilen biyoplastikler ise; uygun koşullar altında tekrar CO<sub>2</sub>, su ve biyokütleyle indirgenebilmektedir (Çelik ve Tümer, 2016). Kolay bozunmalarının yanısıra toksik olmaması, geri dönüşümünün kolay, yenilebilir ve ekolojik olması da biyoplastikleri geleneksel plastiklerden üstün kılmaktadır (Özdemir ve Erkmen, 2013). Biyolojik olarak parçalanamayan plastik ambalajların neden olduğu ekolojik problemlerden dolayı protein (hayvan ve bitki bazlı), yağ ve polisakkarit gibi yenilebilir, biyolojik kaynaklı gıda ambalaj malzemelerine olan ilgi de giderek artmaktadır (Shahbazi, 2018). Özellikle çevre kirliliğine yönelik kaygılar nedeniyle yenilebilir film ve/veya biyolojik ambalajlar hakkında birçok çalışma gerçekleştirilmektedir (Moradi ve ark. 2012). Her ne kadar yeni bir teknik gibi görünse de yenilebilir filmlerin kullanımı çok eskiye dayanmaktadır. Çin’de 12. ve 13. yüzyıllarda turunçgillerin mum ile kaplanması gerçekleştirildiği bilinmekle birlikte, gıda sanayinde kaşar peynirinin mumla kaplanması, çikolatanın veya elmanın şekerle kaplanması ya da sosisin yenilebilir kollojen kılıfla kaplanması şeklinde çeşitli uygulamalar da ilkleri temsil etmektedir (Hardenberg, 1967; Kaya ve ark., 1998; Polat 2007; Dursun ve Erkan 2009; Çağrı-Mehmetoğlu 2010; Sarıoğlu 2005).

Günümüzde yenilebilir film ve kaplamalarının uygulanmasında birçok farklı teknikten yararlanılmaktadır. Bunlar; daldırma, dökme, püskürtme, fırça ile boyama ve ekstrüzyon yöntemleridir. Daldırma yönteminde gıdaların film çözeltisine daldırılması ile kaplanması gerçekleşirken, dökme yönteminde uygun bir yüzeye dökülerek kurutulmuş film ile gıdanın kaplanması gerçekleştirilmektedir. Hazırlanan film solüsyonunun kurutulmadan fırça yardımıyla direkt ürünün üzerine sürülerek kaplanması ise boyama yöntemi olarak ifade

edilmektedir. Bununla birlikte ince, homojen bir film oluşumu tercih edildiğinde ya da kaplanmış bir gıda yüzeyinin ikinci bir film tabakası ile kaplanması istenildiği durumda püskürtme yöntemi tercih edilmektedir. Çözücü ilavesine ve kurutma işlemine ihtiyaç duymayan ekstrüzyon yöntemi ise nişasta bazlı filmlerin yapımında kullanılmaktadır (Yıldız Oğuzhan ve Yangılar, 2016; Tural ve ark. 2017).

Yenilebilir film ve kaplamaların yapımında kullanılan hammaddeler güvenilir (GRAS), kontrollü ürün solunumuna izin veren, tekstürü koruyan, gıda katkı maddelerinin etkisi üzerinde olumsuz bir etki yaratmayan hatta etkisini destekleyen ve mikrobiyal bozulmayı kısıtlayan özellikte olmalıdır (Delikanlı ve Özcan, 2014).

Yenilebilir film ve kaplamaların üretiminde tek başına veya kombinasyon halinde kullanılan bitkisel ve hayvansal kaynaklı birçok polisakkarit, lipit ve proteinlere ilaveten çözücü, plastikleştirici, emülsüfyer, antoksidan ve antimikrobiyal maddelerden de yararlanılmaktadır (Tural ve ark. 2017). Bu nedenle yenilebilir filmler ve kaplamaların özelliği, üretimi esnasında kullanılan materyale göre değişkenlik göstermektedir (Ertugay ve Tomar, 2004). Özellikle filmin; kaplanabilme özelliği, suda çözünürlüğü, hidrofilik-hidrofobik oluşu ve duyuşal özellikleri kaplama malzemesi seçiminde göz önünde bulundurulmaktadır (Yüksel ve ark. 2020). Genellikle polisakkaritlerle oksijen ve diğer gazların geçişi kontrol edilirken, lipitlerle su transferi azaltılmakta, proteinlerle ise filmlere mekaniksel dayanıklılık kazandırılmaktadır (Tural ve ark. 2017). Hidrofilik özellik taşıyan polisakkarit (nişasta, kitin, kitosan, selüloz, gamlar, pektinler) veya protein (mısır zeini, buğday gluteni, kolajen, jelatin, soya proteini, peynir altı suyu proteini) yapılı yenilebilir film ve kaplamaların nem bariyerleri düşük, gaz bariyerleri yüksekken, hidrofobik özellik gösteren lipit yapılı (balmumu, çeşitli hayvansal ve bitkisel yağlar, serbest yağ asitleri, lesitin, çeşitli ağaç reçineleri) yenilebilir film ve kaplamaların nem bariyerleri yüksek gaz bariyerleri ise düşüktür (Debeaufort ve ark., 1998; Candan ve Bağdatlı, 2018; Yüksel ve ark., 2020). Yapılan çeşitli çalışmalarla da farklı kaplama materyallerinden yararlanılarak; çilek, yenedünya, elma, armut, mandalina, nektarin, nar tanesi, yeşil kahve çekirdeği , peynir, kaşar peyniri, sucuk, sosis, salam, pastırma, kıyma, pırzola (domuz), gökkuşuğı alabalığı, karides, kulfı (pasta) (Polat; 2007; Öztürk, 2009; Kalkan, 2014; Işık Çiçek, 2011; Shin ve ark., 2012; Özmert Ergin, 2015; Özdemir ve Gökmen, 2019; Yaman, 2013; Yuan ve ark., 2016; Hassanzadeh ve ark. 2018; Ferreira ve ark., 2018; Zhang ve ark. 2018; Kozlu, 2020; Thi Tran ve ark. 2021; Mahajan ve ark. 2021) gibi birçok farklı gıdanın kaplanması sağlanmıştır.

Çalışmamız kapsamında ise bitki ekstraktı ve yağların yenilebilir filmlerde kullanımına yönelik kaynak oluşturmak üzere gerçekleştirilen çeşitli çalışmalar derlenmiştir (Tablo 1). Bu çalışmalarda kullanılan ham maddeler ve bu hammaddelerin kullanılmasıyla elde edilen filmlerde gerçekleştirilen analizler ile birlikte; filmlerin uygulama alanı ve/veya üründe yapılan analizler ayrıntılı olarak belirtilmiştir. Bu doğrultuda yapılacak olan diğer çalışmalarda; yararlanılacak olan materyal, yöntem ve tekniğin seçimi hususunda araştırmacılara; kaynak sağlayacağı düşünülmektedir.

## **2. YENİLEBİLİR FİLM YAPIMINDA BİTKİ EKSTRELERİNİN KULLANILDIĞI ÇALIŞMALAR**

Hammadde olarak dikenli akasya çekirdek ekstresinin kullanıldığı çalışmada ilk olarak hazırlanan ekstrede toplam fenolik madde analizi ve DPPH radikal giderme aktivitesi yapıldığı görülmektedir. Söz konusu ekstraktın tercih edilme nedeni antioksidan özelliği olduğu için özellikle bu kısım vurgulanmak istenmiş olabilir. Hazırlanan film formülasyonunda ise polimer olarak galaktomannan (%0,5-1,5) kullanılmıştır. Ayrıca hazırlanan filmin içeriğinde %0,5 oranında gliserol ve dikenli akasya çekirdek ekstresinin sırasıyla %0, 0,5, ve 1 oranlarında ilave edilerek optimizasyon çalışmalarının gerçekleştirildiği ifade edilmiştir. Optimizasyon çalışmaları kapsamında film kalınlığı, su buharı geçirgenliği, renk analizi ve SEM analizleri yapıldığı belirtilmiştir. Ancak söz konusu çalışmada sadece karakterizasyon çalışmaları yapıldığı görülmektedir. Herhangi bir gıda maddesine uygulama yapılmamıştır (Cerqueira ve ark. 2010).

Greyfüt çekirdek özü ve kırmızı yosun ekstresinin bir arada kullanıldığı sorbitol bazlı yenilebilir filmde film kalınlığı, film gerilme direnci ve uzaması, su buharı geçirgenliği, nem içeriği, antimikrobiyal ve antioksidan çalışmaların ardından duyu analizler (renk, koku, sarılma ve sıklık) gerçekleştirilmiştir. Özellikle antimikrobiyal çalışmanın sonuçları filminin peynir ve pastırmanın raf ömrünü uzatmak için yararlı bir sarma malzemesi olduğunu göstermektedir (Shin ve ark. 2012).

Diğer bir çalışmada ise ayva çekirdeği müsilağı, kitosan ve guar gam kullanılarak farklı içeriklerde ve kombinasyonlarda üç adet film formülasyonu kullanılmıştır. Birinci formülasyonda %1'lik kitosan, %0,5 (v/v) gliserol, ikinci formülasyonda %1'lik (w/v) guar gam+%35 (w/w) gliserol, üçüncü formülasyonda ise 1'lik (w/v) ayva çekirdeği müsilağı, %1'lik (w/v) kitosan ve %1'lik (w/v) guar gam kullanılmıştır. Filmlerin kalınlıkları, nem, suda



çözünürlük, yoğunluk, su buharı geçirgenliği, renk, opaklık, tekstür, DSC, FTIR ve SEM analizleri yapılmıştır. Başarılı bir şekilde üretildiği belirtilen filmlerin karakterizasyon sonuçlarına göre yenilebilir film üretiminde kullanılabileceği belirtilmiştir (Erdoğan, 2020).

Antep fıstığının (*Pistacia terebinthus*) farklı bölgelerinden (tohumu, yaprağı, gövdesi) elde edilen ekstraların HPLC ile fenolik bileşik analizi yapıldıktan sonra ekstralar ile hazırlanan kitosan bazlı filmlerde FT-IR, SEM, mekanik özellikler, TGA, DSC, UV-Vis, Temas açısı ölçümleri, filmin sudaki çözünürlüğü, biyolojik parçalanabilirliği, biyobozunma, antioksidan (DPPH), antimikrobiyal ve anti-quorum analizler yapılmıştır (Kaya ve ark. 2018a). Kitosan-meyve ekstralı filmin, diğer filmlere kıyasla daha yüksek antioksidan, antimikrobiyal aktivite gösterdiği belirtilmiştir. Antep fıstığının tohumu, yaprağı, gövdesinden yenilebilir film yapılmasının faydalı olacağı sonucuna varılmıştır (Kaya ve ark. 2018a).

Karamuk meyvesi (*Berberis crataegina* DC) ve çekirdek yağ ekstraktı ile kitosan bazlı filmler oluşturularak elde edilen filmlerde FT-IR, SEM, mekanik özellikler, DSC, UV-Vis, Temas açısı ölçümleri, filmin sudaki çözünürlüğü, yağ asidi kompozisyonu analizi, antioksidan (DPPH, Fenolik madde), antimikrobiyal ve anti-quorum analizler yapılmıştır (Kaya ve ark. 2018b). Kitosan-meyve ekstralı filmin, diğer filmlere kıyasla daha yüksek termal kararlılık, antioksidan, antimikrobiyal ve anti-quorum aktivite gösterdiği belirtilmiştir. Karamuk meyvesi (*Berberis crataegina* DC) ve çekirdek yağ ekstraktı filmin dayanıklılığını arttırırken, geçirgenliği azaltmıştır. Yazarlar karamuk meyvesi (*Berberis crataegina* DC) ekstralı filmin yüksek termal kararlılık, antioksidan ve antimikrobiyal özellik göstermesi nedeniyle karamuk meyvesinin yenilebilir filmlerde kullanılabileceği ifade etmişlerdir (Kaya ve ark. 2018b).

Kekik ekstraktı, Psyllium-tohum müsülaj ve gliserol bazlı filmler oluşturularak elde edilen filmlerde FT-IR, SEM, mekanik özellikler, renk, nem içeriği, Temas açısı ölçümleri, filmin sudaki çözünürlüğü, su buharı geçirgenliği, film kalınlığı ve antimikrobiyal analizler yapılmıştır (Hajivand ve ark. 2020). Bu analizler neticesinde kekik özütü ve gliserol içeriğine bağlı olarak filmlerin kalınlığı, uzayabilirliği ve sudaki çözünürlüğünde iyileşme olduğu ifade edilmiştir. *Staphylococcus aureus* ve *Escherichia coli*'ye karşıda antimikrobiyal etki sergilediği belirtilmiştir. Daha sonra çileğe uygulayıp çürümesini analiz ederek raf ömrünü uzattığı yazarlar tarafından tespit edilmiştir (Hajivand ve ark. 2020).

Karvakrol ve üzüm çekirdeğinin bir arada kitosan bazlı filmlere uygulandığı çalışmada elde edilen filmlerde film kalınlığı, suda çözünürlük, nem içeriği, renk, su buharı geçirgenliği, FT-IR, oksijen ve karbondioksit geçirgenliği, X ışını difraksiyonu, mekanik ve yapısal özelliklerin

belirlenmesi ve SEM analizleri yapılarak karakterize edilmiştir (Rubilar ve ark. 2013). Yapılan çalışmada hidrofilik (GSE) ve hidrofobik (karvakrol) bileşiklerin oranlarının filmin karakteristik özelliklerini etkilediği sonucuna varıldığı belirtilmiştir (Rubilar ve ark. 2013).

Ejderha gözü bitki ekstraktı ve BHT ile jelatin bazlı filmlerin yapıldığı çalışmada, filmlerin kalınlığı, mekaniksel özellikleri, rengi, şeffaflığı, su buharı geçirgenliği, elektrofoetik (SDS-PAGE) özellikleri, FT-IR, SEM, DSC ve lipid oksidasyonu analizleri yapılmıştır (Vichasilp ve ark. 2014). Çalışma neticesinde ejderha gözü bitki ekstraktı veya BHT ile birleştirilen jelatin filmlerin mekanik özelliklerinin, kontrol jelatin filminin özelliklerine benzer olduğu belirtilmiştir. Aynı zamanda lipid oksidasyonundaki analiz sonuçlarına göre ejderha gözü bitki ekstraktının antioksidan özelliğine ilave olarak film özelliklerinde kabul edilebilir değişiklikler sağlması nedeniyle yenilebilir film teknolojisinde kullanılabileceği belirtilmektedir (Vichasilp ve ark. 2014).

Sumak (*Rhus microphylla*) bitki ekstraktının siyah çiya musilajına ilave edilerek oluşturulan yenilebilir filmlerde yüzey gerilimi, zeta potansiyeli, film kalınlığı, su buharı geçirgenliği, nem içeriği, suda çözünürlüğü, optik özellikleri, mekanik özellikleri ve reolojik davranışları incelenerek analiz edilmiştir (Charles-Rodríguez ve ark. 2020). Çalışma neticesinde sumağın yenilebilir film yapımında kullanılabileceği sonucuna varılmıştır (Charles-Rodríguez ve ark. 2020).

Demirhindi çekirdek ekstraktında polifenol, falvanoid içeriğine ve antioksidan (DPPH ve ABTS) özelliklerine bakıldıktan sonra peynir altı suyu protein izolatı, doğal patates nişastası ve gliserol ile kombine bir şekilde yenilebilir bir film oluşturulmuştur. Daha sonra elde edilen filmlerde mekanik özellikler (uzama yüzdesi, kopmadan önceki çekme mukavemeti, Young modülü), yüzey tepkisi ile film optimizasyonu metodolojisi, yenilebilir film detaylandırma ve depolama esnasında film karakterizasyonu ve stabilitesi analizleri yapılmıştır (López-Hernández ve ark. 2018). Demir hindi ekstraktının yenilbilir filmlere eklenmesinin filmlerin antioksidan özelliklerini arttırmakla birlikte, filmin mekanik özelliklerini de geliştirdiği ifade edilmiştir. Ayrıca filmin ışığa karşı duyarlılığını da azalttığı ifade edilmiştir (López-Hernández ve ark. 2018).

Aljinik asit sodyum tuzu, sürfaktanlar, lipidler ve ekstraktlara dayalı altı farklı yenilebilir film hazırlanarak karakterize edilmiştir. Ekstrakt olarak üzüm çekirdek ekstresi ve yeşil çay ekstresi kullanılmıştır. Elde edilen filmlerde; film mekanik özellikleri, SEM, FT-IR, renk, su buharı

geçirgenliği, antioksidan ve anti viral özellikler analiz edilmiştir. Kullanılan bu ekstraların antioksidan özelliği ve antiviral özelliği arttırdığı ifade edilmektedir (Fabra ve ark. 2018).

İki farklı yöntem ile ışık ekstresi ilaveli yenilebilir on iki adet filmin üretimi ve karakterizasyonun yapıldığı çalışmada film kalınlığı, su buharı geçirgenliği, çekme dayanımı ve uzama katsayısı, filmin renk özellikleri, antioksidan aktivite (FRAP, DPPH ve ABTS), FT-IR, SEM, termal gravimetrik analiz (TGA), biyobozunurluk, suda çözünürlük, absorbans, transmittans değeri ve antimikrobiyal aktivite analizleri yapılmıştır. Her iki yöntemle elde edilen filmlerin sarı-yeşil tona sahip olduğu, ışık ile film iskeletlerinin herhangi bir kimyasal etkileşime girmediği, dahası ışık ilavesinin antioksidan özelliğini arttırdığı belirtilmiştir. Ancak film örneklerinde antimikrobiyal etki tespit edilememiştir (Pekdoğan, 2021).

### **3. YENİLEBİLİR FİLM YAPIMINDA BİTKİ YAĞ EKSTRELERİNİN KULLANILDIĞI ÇALIŞMALAR**

Peynir altı suyu proteini izolat ortamına üç farklı oranda (%0,05, %0,10 ve %0,15) ayçiçek yağı dağıtılarak emülsiyon tekniği ile biyokompozit filmler oluşturulmuştur. Oluşturulan yenilebilir filmlerde kalınlık, nem içeriği, sudaki çözünürlük, nem absorpsiyon kinetiği, şişme indeksi, temas açısı, renk analizi, termal özellikler, partikül boyut dağılım analizi, su buharı ve oksijen geçirgenliği, tekstür analizi ve atomik direnç mikroskopisi analizleri yapılmıştır (Erdem Gökkaya ve ark. 2019). Düşük konsantrasyondaki ayçiçeği yağı ilavesinin filmlerin su buharı ve oksijen bariyeri özellikleri üzerinde olumlu bir etkiye sahip olduğu, filmlerin bariyer ve optik karakterlerinde herhangi bir olumsuz değişiklik yapmadığı, filmlerin hidrofobik özelliğini arttırdığı belirlenmiştir (Erdem Gökkaya ve ark. 2019).

Çay tohumu yağında pH ve vizkozite analizleri yapıldıktan sonra kitosan, tween 80 ve gliserol içeren karışıma %0,5'lik bir oranda ilave edilmiştir. Akabinde elde edilen filmlerde SEM, nem içeriği, film kalınlığı, su buharı geçirgenliği, antifungal özelliklerini tespit etmeye yönelik analizler yapılmıştır. Ayrıca bu çalışmada elde edilen filmler Japon armuduna kaplanarak gıda üzerindeki etkilerini ve raf ömrünü tespit etmeye yönelik olarak nem, brix, pH, renk, sertlik, duyu analizler, meyve çürümesi ve solunum miktarı tespit edilmiştir (Thi Tran ve ark, 2021). Bu yenilebilir kaplamalar, depolama sırasında armutların fizikokimyasal kalitesinde önemli bir değişiklik sağlamazken, pH, ve renk gibi bazı biyokimyasal özelliklerde hafif farklılıklara yol açmıştır. Çay tohumu yağının ilavesi ve konsantrasyona bağlı olarak filmlerdeki antifungal özelliği artırmıştır. Ve Japon armudunun raf ömründe önemli bir etkiye sahip olduğu

belirtilmiştir. Ancak yazarlar tarafından maliyeti düşürmek ve kullanımı artırmak için optimum konsantrasyonun belirlenmesi gerektiği ifade edilmiştir (ThiTran ve ark, 2021).

Çiya çekirdek yağından arındırılmış, kuru çiya müsilağı kullanılarak oluşturulan filmlerde nem içeriği, suda çözünürlük, su buharı geçirgenliği, renk, opaklık, ışık geçirgenliği, kalınlık ve mekanik dayanıklılık analizleri yapılmıştır (Muñoz-Tebar ve ark. 2021). Genel olarak, yağı alınmış undan yapılan filmlerin bütün tohumlardan yapılan filmlere göre daha elastik, daha iyi görünür ışık bariyeri, suda daha az çözünür, daha kalın ve daha az kırmızımsı olduğu belirtilmektedir (Muñoz-Tebar ve ark. 2021). Bu çalışmada elde edilen sonuçlar, tohum yağı ekstraksiyonundan elde edilen yağı alınmış unun, yenilebilir kaplamalar ve filmler geliştirmek için yararlı bir yan ürün ve gıdaların korunmasında uygun bir seçenek olabileceğini, böylece döngüsel ekonomiyi teşvik ettiğini ve atık miktarını azalttığını göstermiştir (Muñoz-Tebar ve ark. 2021).

Uçucu yağların biyopolimer bazlı ambalaj malzemelerine doğrudan dahil edilmesinin, çözünmezlik ve aktivite kaybı gibi çeşitli zorluklarla yol açabileceğini düşünen yazarlar, ilk olarak *Zataria multiflora* esansiyel yağının biyoaktivitesini, önce bir nanoemülsiyon yapıp, ardından fesleğen tohumu gamı bazlı film ağı içinde immobilize ederek film üretmeyi amaçlamışlardır. Bunun için birinci aşamada fesleğen tohumu gamında FT-IR analizi yapılmışlardır. İkinci aşamada *Zataria multiflora* esansiyel yağının GC-FID ile yağ analizi, damlacık boyu ve antimikrobiyal özellikleri tespit edilmiştir. Üçüncü aşamada özellikleri tespit edilen fesleğen tohumu gamı ve *Zataria multiflora* esansiyel yağı değişik oranlarda kombine edilerek yenilebilir filmler oluşturulmuştur. Son aşamada ise elde edilen filmlerde film kalınlığı, sudaki çözünürlük, mekanik özellikler, antimikrobiyal özellikleri, film bakteriyel kinetiği, filmin depolama sırasındaki *Zataria multiflora* stabiletisine bakılmıştır (Gahruie ve ark. 2017). Yazarları uçucu yağların biyopolimer bazlı filmlere yenilikçi bir şekilde dahil edilmesi, uçucu bileşenlerin salınmasını geciktirerek gıda ürünlerinin raf ömrünü uzatmada etkilere sahip olabileceğini düşünmektedir (Gahruie ve ark. 2017).

Değişik konsantrasyonlarda hodan çekirdek yağı, darı nişastası, sorbitol ve tween 80'nin kombine edilerek geliştirildiği yenilebilir filmlerde nem miktarı, filmlerin kopma uzama, gerilme kuvveti, suda çözünürlük, su buharı geçirgenliği, renk, antioksidan aktivite (FRAP, ABTS), SEM ve DSC analizleri yapılmıştır (Cao ve ark. 2017). Hodan çekirdek yağının filme dahil edilmesi, gerilme kuvvetini azaltırken, kopma uzama kuvvetini çıkarmıştır. Su buharı geçirgenliği, suda çözünürlük, nem içeriği artan hodan çekirdek yağı konsantrasyonu ile

azalırken, antioksidan aktivite artmıştır. Ayrıca hoda çekirdek yağlı filmler iyi bir ışık bariyeri özelliği göstermiştir (Cao ve ark. 2017).

Kekik esansiyel yağı (%1-6) içeren fesleğen tohumu sakızı ile yenilebilir filmler üretilerek antibakteriyel, antioksidan aktivite (DPPH, ABTS, FRAP), film kalınlığı, nem içeriği, şeffaflık, şişme indeksi, temas açısı ve su buharı geçirgenliği analizleri yapılmıştır. Özellikle belirtmelidir ki çalışmaya başlamadan önce kekik yağı GC-MS ile analiz edilerek yağ analizi yapılmıştır. Kekik yağına bağlı olarak film kalınlığı değişmediği, su buharı geçirgenliğinin azaldığı, nem içeriği, temas açısı, şeffaflık ve şişme indeksinin arttığı ifade edilmiştir. Filmlerin önemli bir antibakteriyel ve antioksidan özellik gösterdiği belirtilmiştir (Hashemi ve Khaneghah, 2017).

Ayva çekirdek müsilağı ve kekik esansiyel yağı ile oluşturulan yenilebilir filmlerde, film kalınlığı, nem içeriği, renk, suda çözünürlük, su buharı geçirgenliği, oksijen geçirgenliği, germe-çekme özellikleri, SEM, DSC, toplam fenolik madde analizi, antioksidan ve antimikrobiyal aktivite analizleri yapılmıştır. Kekik yağı içeren filmlerin önemli bir antimikrobiyal ve antioksidan aktivite gösterdiği belirtilmiştir. Camsı geçiş sıcaklığında bir azalma gözlemlenirken, oksijen ve su buharı geçirgenliğini etkilememiştir. Filmlerin uzama yüzdesi artarken, çekme mukavemeti önemli ölçüde azalmıştır (Jouki ve ark. 2014).

Kuşburnu çekirdek yağı, kitosan/tween 80/montmorillonite nanokil kompozitlerinin karışımı ile kombine edilerek biyokompozit filmler üretilmiştir. Oluşturulan filmlerin damlacık boyutu ölçümü, zeta potansiyeli analizi, FT-IR, SEM, mekanik ve bariyer testleri, gaz geçirgenlik testleri ve dinamik nem emme, antimikrobiyal ve antioksidan özellikler analiz edilmiştir. Kuşburnu tohumu yağının kitosan filmlerdeki varlığı, geliştirilmiş mekanik, gaz, su buharı bariyer özellikleri ile esnek filmlerin oluşumuna yol açmıştır. Ayrıca kuşburnu yağı filmlere artan bir antioksidan ve antibakteriyel özellik kazandırmıştır (Butnaru ve ark. 2019).

Başka bir çalışmada, nar çekirdeği yağı içeren peynir altı suyu proteini izolatu, κ-karagenan ve her ikisinin karışımı geliştirilerek biyokompozit film üretilmiştir. Daha sonra FT-IR, SEM, su buharı geçirgenliği, çözünürlük, mekanik, optik özellikler, salım testleri ve antimikrobiyal aktivite analizleri ile karakterize edilmiştir. Nar çekirdek yağı içeren film numuneleri daha yüksek uzama kapasitesi ve daha düşük su buharı geçirgenliği, çözünürlük ve şeffaflık değerleri göstermiştir. Nar çekirdek yağı içeren filmlerin anti-mikrobiyal aktivite sergilediği ifade edilmiştir (Sogut ve ark. 2019).

Hidroksipropil metilselüloz ve üzüm çekirdeği yağından yeni biyobazlı çok bileşenli yenilebilir filmler geliştirilmiştir. Su buharı geçirgenliği, nem analizi, renk, mekaniksel penetrasyon testi, ve antioksidan analizler yapılmıştır. Üzüm çekirdeği yağı ilavesiyle iyileştirilmiş su buharı geçirgenliği ve azaltılmış nem emilimi ile ifade edilen filmlerin hidrofobikliğinin arttığı belirtilmiştir. Filmlerin renk ve penetrasyon özellikleri de incelenmiştir. Saf selüloz film neredeyse renksizdir, ancak üzüm çekirdeği yağından soluk yeşilimsi sarı renk alarak daha koyu hale geldiği ifade edilmektedir. Filmlerin kırılma kuvvetinin üzüm çekirdeği yağı konsantrasyonundan bağımsız olduğu ancak filmler daha elastik bir yapı kazandığı belirtilmektedir. Son olarak, elde edilen filmlerin güçlü antioksidan aktivite gösterdiği bu nedenle gıda aktif ambalaj olarak kullanılabileceği yazarlar tarafından düşünülmektedir (Marudova ve ark. 2021).

Nişasta-kitosan harman filmlerine limon esansiyel yağı ve greyfurt çekirdeği ekstraktı ilavesinin fonksiyonel özellikleri ve ilgili yapısal değişiklikleri; filmlerin etkili esansiyel yağ içeriği, optik özellikleri, sudaki çözünürlüğü, çekme özellikleri, bariyer özellikleri, TGA, DSC, SEM, FT-IR, antibakteriyel ve antioksidan özellikler analiz edilerek belirlenmiştir. Limon esansiyel yağının eklenmesi ile filmlerde sarımsı bir renk oluştuğu, greyfurt çekirdeği ekstraktının film matriksine iyi bir şekilde dahil olduğu, limon esansiyel yağının ise polimer karışımı içinde dağıldığı ifade edilmiştir. Ekstrelerinin ilavesinin oksijen ve su buharı bariyeri özellikleri üzerinde bir değişikliğe yol açmadığı, ancak daha sert ve dayanıklı bir özellik kazandığı ifade edilmiştir. Antimikrobiyal etkinin gözlenmediği antioksidan aktivitenin ise troloxdan daha düşük olduğu belirtilmiştir (Bof ve ark. 2016).

Antioksidan kitosan bazlı yenilebilir filmler, tek başına ve kombinasyon halinde *Zataria multiflora* Boiss esansiyel yağı ve üzüm çekirdeği ekstresi ile birleştirilmiş olarak geliştirilmiştir. Filmlerin fiziko-mekanik, kalınlık, su buharı geçirgenliği, ıslanabilirlik, şişme indeksi, renk, toplam fenol ve antioksidan özellikleri incelenmiştir. İncelenen birçok parametrenin kombinasyon ve konsantrasyona bağlı olduğu belirtilirken, üzüm çekirdeği ekstresi ve *Zataria multiflora* Boiss esansiyel yağı'nın kitosan filme dahil edilmesinin, yüzeyin ıslanabilirliğini, toplam fenol ve antioksidan aktiviteyi artırdığı ve rengi koyulaştırdığı ifade edilmektedir (Moradi ve ark. 2012).

İncir çekirdeği yağı, erik çekirdeği yağı, kayısı çekirdeği yağı farklı koşullarda uygulandığında kitosan polimerinin antimikrobiyal kapasitesinin sinerjistik olarak artırılıp artırılamayacağını test etmek için yapılan çalışmada antimikrobiyal, antiviral, MD simülasyonu analiz edilmiştir.

Kullanılan yağlar içerisinde incir yağının etkili olduğu ve bozulmayı önemli ölçüde engellediği belirtilmiştir (Baykara ve ark. 2021).

Kitosan-nanomontmorillonite ve karboksimetil selülozın antioksidan, antimikrobiyal ve bazı fizikokimyasal özelliklerini geliştirmek için *Ziziphora clinopodioides* esansiyel yağı ve metanolik incir (*Ficus carica*) ekstraktının kombinasyon halinde kullanılmıştır. Çalışmanın ilk kısmında *Ziziphora clinopodioides* esansiyel yağının GC-MS ile analizi yapılmıştır. Bu analiz neticesinde ana bileşiklerin sırasıyla karvakrol (%65.22) ve timoldü (%19.51) olduğu ifade edilmiştir. *Ziziphora clinopodioides* esansiyel yağı ve incir (*Ficus carica*) ekstraktınınlı filmler ayrı ayrı ve kombine halinde hazırlanan filmlerin su emme özelliğini, çekme mukavemetini, kopma uzamasını, delinme kuvvetini ve delinme deformasyonunu azaltmıştır. Antioksidan ve antimikrobiyal aktivite kombinasyon ve konsantrasyona bağlı olarak değişmektedir. Ekstreler filmleri ışık intoleransına karşı daha dayanıklı hale getirmiştir (Shahbazi, 2018).

#### **4. SONUÇ**

Bitki ve yağ ekstraktlarının film oluşumlarında kullanılması filmin antioksidan, antimikrobiyal, antiviral, antifungal, antikanser yani biyolojik aktivitelerini arttırdığını söyleyebiliriz. Ancak oluşan filmlerin hangisinin daha iyi olduğunu kesin olarak söylemek mümkün değildir. Kullanıldığı gıdaya göre etki ve koruyuculuğu değişmektedir. Genel olarak incelediğimiz çalışmalarda daha çok karakterizasyon çalışmalarına yer verildiğini görmekteyiz. Elde edilen filmlerin gıda maddesi üzerine uygulama yapılmasının faydalı olduğunu düşünmekteyiz.

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**SİRKE ile TUZUN FARKLI KOMBİNASYONLARININ *S. aureus* ve *E. coli* O157:H7'YE KARŞI ANTİBAKTERİYEL ETKİSİNİN İNCELENMESİ**

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## **ÖZET**

Gıdaların muhafazasında veya üretiminde sirke ile tuzun koruyucu etkisi çok eski zamanlardan beri bilinmektedir. Sirke iki aşamalı fermente bir ürün olmakla birlikte, ilk aşamada mayalar şekerleri anaerob koşullarda etil alkole, ikinci aşamada ise aerob koşullarda etil alkolün asetik asit bakterileri tarafından asetik aside dönüştürülmesiyle elde edilmektedir. Tuz ise gıdalara tad verme veya raf ömrünün uzatılması amacıyla kullanılmakta, doğada tuzlu yüzey suları, kaya tuzları ve yeraltındaki tuz kaynaklarından temin edilmektedir. Yapılan bu çalışma, tuz ve meyve sirkeleri arasında en çok tüketilenlerden biri olan elma sirkesinin farklı kombinasyonlarındaki çözeltilerinin önemli gıda patojenlerine (*S. aureus* ve *E. coli* O157:H7) karşı antibakteriyel etkisinin belirlenmesi amacıyla yapılmıştır. Bu çalışmada sirke ve tuz kombinasyonlarının bakterilere karşı antibakteriyel etkisi, pH, briks, renk (*L*, *a*, *b*) değerleri ve ticari antibiyotiklerin bakterilere karşı etkisi incelenmiştir. Sonuç olarak bu çalışmada sirkenin tuza göre daha yüksek antibakteriyel etki gösterdiği, kullanılan ticari antibiyotiklerin çoğuna göre daha yüksek düzeyde etkili olduğu anlaşılmıştır. Böylece bu ürünlerin kullanımına yönelik tüketici tercihlerinde etkili olabileceği düşünülmektedir.

**Anahtar kelimeler:** Antibakteriyel, elma sirkesi, tuz.

**INVESTIGATION of THE ANTIBACTERIAL EFFECT of DIFFERENT COMBINATIONS of VINEGAR and SALT AGAINST *S. aureus* and *E. coli* O157:H7****ABSTRACT**

The protective effect of vinegar and salt in food preservation or production has been known since ancient times. Although vinegar is a two-stage fermented product, yeasts convert sugars to ethyl alcohol under anaerobic conditions in the first stage, and in the second stage, by converting ethyl alcohol to acetic acid under aerobic conditions by acetic acid bacteria. Salt, on the other hand, is used to add flavor to foods or to extend their shelf life, and is obtained from salty surface waters, rock salts and underground salt sources in nature. This study was carried out to determine the antibacterial effect of apple cider vinegar, which is one of the most consumed salt and fruit vinegars, in different combinations of solutions against important food pathogens (*S. aureus* and *E. coli* O157:H7). In this study, the antibacterial effect of vinegar and salt combinations against bacteria, pH, brix, color (*L, a, b*) values and the effect of commercial antibiotics against bacteria were investigated. As a result, in this study, it was understood that vinegar showed a higher antibacterial effect than salt and was more effective than most of the commercial antibiotics used. Thus, it is thought that it may be effective in consumer preferences for the use of these products.

**Key words:** Antibacterial, apple cider vinegar, salt.

## **GİRİŞ**

Dünya genelinde en çok tüketilen ve ticareti yapılan yumuşak çekirdekli meyvelerden biri olan elma ülkemizin neredeyse her bölgesinde yetiştirilmekte olan besleyici niteliği yüksek olan bir meyvedir (Tangüler vd., 2021). Dünya genelinde üretim alanı ve miktarı (4.833.841 ha/83.139.326 ton) bakımından değerlendirildiğinde; yaprağını döken meyve türleri içerisinde ilk sırada bulunan elmanın (Mertoğlu ve Evrenosoğlu, 2019), en yüksek üretim miktarı Çin, Amerika Birleşik Devletleri (ABD) ve ülkemizde gerçekleştirilmektedir (Sülük vd., 2018; Tangüler vd., 2021). Yaygın bir kullanım alanına sahip olan elma meyve olarak taze tüketilmesinin yanında reçel, marmelat, meyve suyu, çay ve sirke gibi ürünlere işlenerek de sofralarımızı zenginleştirmektedir (Sülük vd., 2018). Ancak ham ve ekşi elma türleri sirke üretimi için uygun bulunmamakta, şeker oranı yüksek olan kış elmaları önerilmektedir (Öztürk vd. 2009).

Bununla birlikte Fransızca Vin aigre “Ekşi şarap” kelimesinden türetilen sirke antimikrobiyal, antioksidan, antikarsinojenik özellik taşıyan; alkol ve asit fermantasyonları sonucu elde edilen bir üründür (Öztürk vd. 2009; Konuş vd. 2020). Bu nedenle fermantasyon esnasında ilk aşamada anaerobik koşullarda mayalar, fermente olabilir şekerleri etil alkole dönüştürmekte, ikinci aşamada ise aerobik koşullarda sirke bakterileri (Acetobacter ve Gluconobacter) etil alkolü asetik asite (sirke asidi) yani sirkeye dönüştürmektedir ve bu dönüşüm sonucu elde edilen sirkenin, standartlar (Tük Gıda Kodeksi ve ABD) gereği en az %4 oranında asetik asit içermesi gerekmektedir (Altunbağ ve Zencir, 2018). Üretiminde hammadde olarak birçok madde kullanılmakla birlikte (meyve, malt, tahıl, bal, peynir altı suyu vb.) meyve sirkesi üretiminde başta üzüm ve elmadan yararlanılmaktadır (Ünal ve Canbaş, 2008; Yücel Şengül ve Kılıç, 2019). Keşfi çok eskiye dayanan sirkenin kullanımı Hipokrat’a kadar gitmektedir. Lezzet vermesinin yanı sıra gıda koruyucu özelliği ve tıbbi amaçlarla da sirkeden çok eskiden beri faydalandığı bilinmektedir (Öztürk vd. 2009). Ancak bu denli faydalı etkilere sahip olan sirkenin, Türk yemeklerinde kullanımının yapılan bazı araştırmalarla birlikte tahmin edilen kadar yaygın olmadığı görülmektedir (Altunbağ ve Zencir, 2018).

Önemli bir kimya sanayi hammaddesi olan tuz ise gıdaya lezzet vermesinin yanı sıra gıda güvenliği açısından patojen ve bozulma yapan mikroorganizmalara karşı koruyucu olarak yararlandığımız önemli bir besin maddesidir (Alp vd., 1995; Akgün vd., 2018). Tuz kullanımı ile istenilmeyen tatlar (acı, metalik, kimyasal) maskelenebilirken, istenilen bazı tatların (tatlılık gibi) yoğunluğu da arttırılabilmektedir (Akgün vd., 2018). Taşıdığı bu özellikler nedeniyle tuz

ve sirke kombinasyonlarından marinat üretiminde de yararlanılmaktadır (Çetinkaya, 2017). Tuz materyale sertlik verirken, sirke yumuşaklık vermektedir. Ancak her ne kadar sirke/tuz kombinasyonunun konserve edici etkisi olsa da esas koruyucu etki asitten kaynaklanmaktadır (Varlık vd. 1993). Asetik asitin bu koruyucu etkisi ise ortamın pH ve sıcaklığına, iyonlaşma sabiti ( $K_a$ ) derecesine, hedef mikroorganizmanın türüne ve kullanılan diğer antimikrobiyal maddelere bağlı olarak değişebilmektedir (Ayhan ve Bilici, 2015). Erzurum'da piyasadan temin edilen salata malzemelerinden biri olan havuç, hıyar ve marulun *Escherichia coli* ve *Staphylococcus aureus* ile kontamine edildikten sonra %3 sirke çözeltisinde belirli süre (0, 5, 15 ve 30 dakika) tutulması sonucu her mikroorganizma sayısında bir miktar düşüş tespit edilmiş ve %3 gibi düşük konsantrasyonda sirkenin salata dezenfeksiyonunda kullanılabileceği kanısına varılmıştır (Elhan, 2014). Başka bir çalışmada sirkenin *Escherichia coli* O157:H7 dahil birçok gıda kaynaklı patojenlere karşı antibakteriyel özelliğinin olduğunu ve sirkede bulunan asetik asidin %0.1 oranında tüm mikroorganizmaların gelişimini engellediğini bildirmişlerdir (Entani vd., 1998).

Üretici ve tüketicileri bilinçlendirmeye yönelik olarak gerçekleştirilen bu çalışmada ise farklı konsantrasyonlardaki elma sirkesi ve tuz kombinasyonlarından hazırlanan çözeltilerin fizikokimyasal (pH, briks, renk) özellikleri ile önemli gıda patojenlerine (*S. aureus* ATCC 29213 ve *E. coli* O157:H7 ATCC 43888) karşı antibakteriyel etkisi belirlenmeye çalışılmıştır.

## **MATERYAL VE METOD**

Bu çalışmada iki farklı markaya ait ticari elma sirkeleri kullanılmıştır. Çalışma kapsamında öncelikle farklı konsantrasyonlarda (%0, 25, 50, 100) sirke ve tuz (%0, 2.5, 5, 10) çözeltileri hazırlanmıştır. Daha sonra hazırlanan bu çözeltiler sırasıyla birbiri ile kombine edilerek toplamda 16 farklı kombinasyon halindeki solüsyonların analizleri gerçekleştirilmiştir.

**pH değerinin belirlenmesi:** Cemeroğlu (2013) tarafından önerilen metoda göre pH metre (Mettler Toledo, S220 Seven Compact™, Çin) kullanılarak ölçümler gerçekleştirilmiştir.

**Briks Analizi:** Rekraktometre (Hanna® HI 96801, Romanya) kullanılarak Cemeroğlu (2013) tarafından önerilen metoda göre yapılmıştır.

**Renk Analizi:** Örnekler için Renk değerlerinin belirlenmesi: Pen Color Art 1 L model, Artoksi MSM, İstanbul, Turkey markalı cihaz kullanılmıştır. Her örnek için üç tekrarlı ölçümlerle ortalamalar alınarak ( $L$  (koyuluk/açıklık),  $a$  (+kırmızılık/-yeşillik),  $b$  (+sarıklık/-mavilik)) değerlendirilmiştir (Hunter ve Pointer, 2011).



**Standart bakteri suşlarının standart antibiyotiklere karşı duyarlılığı:** Bu kapsamda test edilen bakteri suşları (*S. aureus* ATCC 29213, *E. coli* O157:H7 ATCC 43888) Giresun Üniversitesi'nden temin edilmiştir. Bakterilerin antibiyotiklere karşı direncini belirlemede disk diffüzyon yöntemi kullanılmıştır (Temiz, 2010). Buna göre; öncelikle bakteri suşları Tryptic Soy Agar (TSA, Merck) besiyerinde tekrar aktif hale getirilerek, içinde serum fizyolojik tuzlu su bulunan deney tüplerinde yoğunluğu 0.5 McFarland standardına göre ayarlanmıştır. Mueller-Hinton (Mueller-Hinton Agar, Merck) besiyerine steril eküvyon çubukları ile yayma yöntemi kullanılarak her bir bakteri suşu inoküle edilmiş, sonrasında standart antibiyotikler (Streptomycin 10 µg (Oxoid, S10), Penicilin 10 µg (Oxoid, P10), Amoxycillin/Clavulanic asit 30 µg (2:1; Oxoid, AMC 30) ve Cephalexin 30 µg (Oxoid, CL 30) disk diffüzyon yöntemine göre steril pens ile aralarındaki mesafe en az 2 cm olacak şekilde besiyeri üzerine yerleştirilmiştir. Bu işlemde sonra petri ters çevrilerek 37 °C'de 18-24 saat aerob koşullarda inkübasyona bırakılmıştır. İnkübasyon sonunda oluşan şeffaf zon çapları dijital kumpasla ölçülerek değerlendirilmiştir.

**Sirke ve tuz kombinasyonlarının antibakteriyel etkisinin belirlenmesi:** Sirke ve tuzun farklı kombinasyonlarının antibakteriyel etkinin belirlenmesinde delik agar diffüzyon yöntemi kullanılmıştır (Temiz, 2010). Bu yöntemde; Mueller-Hinton besiyerine her bakteri suşu ayrı ayrı inoküle edilmiş, bakteri solusyonunun besiyerine emilmesinden sonra, besiyeri üzerine 0.5 cm çaplarında her bir kuyucuk arasında en az 2 cm olacak şekilde kuyucuklar açılmıştır. Önceden hazırlanan kombinasyonların herbirinden ayrı ayrı 20µL olacak şekilde kuyucuklara aktarılmış, yaklaşık 20 dakika boyunca besiyerine emilmesi sağlanmıştır. Sonra petri ters çevrilerek 37 °C'de 18-24 saat aerob koşullarda inkübasyona bırakılmıştır. İnkübasyon sonunda oluşan şeffaf zon çapları dijital kumpasla ölçülerek değerlendirme yapılmıştır. Tablo 1'de ise zon çapına bağlı olarak antimikrobiyal şiddetin yorumlanması için kullanılan değerler gösterilmiştir.

**Minimum inhibisyon konsantrasyon (MİK) Değerinin belirlenmesi:** Temiz (2010)'un önerdiği yöntem modifiye edilerek gerçekleştirilmiştir. Sirke (%100) ile tuzun (%10) çözeltilerinin birlikte iki kat seyreltileri hazırlanmış, ardından bu çözeltilere her bakteri suşu ayrı ayrı inoküle edilerek 37°C'de 18-24 saat inkübe edilmiştir. Sonra bakteri içeren bu tüplerden bir öze dolusu kültür alınıp, *S. aureus* için Baird Parker agara, *E. coli* için Eosin Methylene Blue (EMB) Agara tek koloni düşürme tekniğiyle çizimler yapılmıştır. Daha sonra petri ters çevrilerek tekrar 37 °C'de 18-24 saat inkübe edilmiştir. İnkübasyon sonunda üreme

gösteren tipik koloniler pozitif (+), üreme olmayan kısımlar ise negatif (-) olarak değerlendirilmiştir.

**Tablo 1.** Zon çapına bağlı olarak antimikrobiyal etki şiddetleri (Ponce vd. 2003 )

Zon çapı (mm)	Antimikrobiyal şiddet	Tespit
Çap<8.00	Etkisiz	-
9.00<Çap<14.00	Düşük etkili	+
15.00<Çap<19.00	Etkili	++
Çap>20.00	Aşırı etkili	+++

**İstatistiksel analiz:** Çalışmada elde edilen bulguların değerlendirilmesinde SPSS 22.0 istatistik paket programı kullanılmış, ölçümlerin ortalaması alınarak varyans analizine tabi tutulmuş, önemlilik seviyesinin belirlenmesinde de korelasyon analizi uygulanmıştır.

## BULGULAR VE TARTIŞMA

Yapılan bu çalışmada tuz ve sirke kombinasyonlarından elde edilen çözeltilerinin fizikokimyasal özellikleri Tablo 2'de sunulmuştur.

**Tablo 2:** Tuz ve sirke kombinasyonlarının fizikokimyasal özellikleri

Tuz/Sirke	pH	°Briks	Renk <i>L</i>	Renk <i>a</i>	Renk <i>b</i>
0/0	6.38±0.02	0	27.62±0.24	0.29±0,18	-0.72±0,28
0/25	2.93±0.09	0.2±0.14	27.44±0.78	-0.15±0,29	0.74±1,07
0/50	2.85±0.03	0.4±0.14	26.07±0.4	-0.79±0,75	2.51±2.35
0/100	2.7±0.11	1±0.28	26.29±2.09	-1.22±1.41	4.21±4.0
2.5/0	4.48±0.24	1.6±0.56	26.06±0.40	0.24±0.23	-0.24±0.59
2.5/25	2.75±0.04	1.95±0.49	26.96±2.10	-0.07±0.59	0.59±0.90
2.5/50	2.62±0.09	2.25±0.49	25.60±0.96	-0.52±0,76	1.84±2.24
2.5/100	2.48±0.04	2.85±0.35	26.41±0.84	-1.41±0.93	4.68±3.21
5/0	4.23±0.40	2.95±0.35	28.76±0.02	0.17±0.78	-1.01±0,89
5/25	2.67±0.14	3.25±0.21	27.57±0.97	0.02±0.42	0.59±0.97
5/50	2.59±0.04	3.4±0.14	26.8±0.71	-0.66±0.95	2.18±2.60
5/100	2.44±0.07	3.95±0.07	25.85±0.29	-1.14±0.92	4.37±3.80
10/0	4.05±0.07	5.6±0	30.43±0.26	0.50±0.11	-0.76±0.04
10/25	2.57±0.03	5.85±0.21	26.90±0.82	-0.18±0.23	0.55±0.94
10/50	2.54±0.02	6.05±0.35	26.75±0.89	-0.79±0.52	2.57±1.74
10/100	2.40±0.01	7.05±0.07	24.05±2.82	-2.52±0.62	8.64±2.75

Gıdaların pH değerleri; gıdanın asidik bazik oluşu, işlem süreçleri, depolaması ve kalitesi hakkında bilgilendiren ve mikroorganizmaların gelişimleri üzerine etkili olan iç faktörlerden biridir (Temiz, 2015). Çalışmada kullanılan elma sirkesinin pH değeri  $2.47 \pm 0.03$  olarak tespit edilmiştir. Belirlenen pH değerinin Hill vd (2005), Budak (2010), Ozturk vd. (2015), Bayram vd. (2018), Bozdemir vd. (2021), Kahraman vd. (2022)'nin gerçekleştirmiş olduğu çalışmalarda elma sirkesinde tespit etmiş olduğu pH değerlerinden daha düşük olduğu görülmüştür. Sirkenin saf suyla seyreltilmesiyle birlikte pH değerinin yükseldiği görülmüştür. Bununla birlikte tuzlu su ilavesiyle birlikte pH'nın bir miktar azaldığı belirlenmiştir. Yapar ve Atay (2005), farklı oranlarda tuz (%0-1-2) ve fosfat çözeltilerinin Turna balığının bazı emülsiyon özelliklerine olan etkisini incelediği çalışmada tuzun pH değerleri azaltıcı etki gösterdiğini ancak bu etkinin istatistiki açıdan önemli olmadığını belirtmiştir. Yine Yıldız Turp ve Atalı (2021) tuz ilavesinin, etin su aktivitesi ve pH değerini düşürdüğünü ve mikrobiyel açıdan koruma sağladığını söylemiştir. Akgün vd. (2018) ise her tuzun kendine özgü bir pH değerine sahip olduğunu ve saf suyun pH değerinin NaCl eklenmeye başladıkça arttığının belirtildiğine değinmiştir. Lu vd. (2013) sirke ilavesinin salamuranın pH değerini düşürdüğünü belirtmiştir. Chancellor ve Elsharafi (2016) farklı konsantrasyonlarda sodyum klorür içeren salamuranın pH değerlerini incelediğinde %1 konsantrasyonda pH 6.2 iken %2 ve %5 konsantrasyonda 5.8, %10 da 5.9, %12.5 ta 6.6 %15 te 6.4 %17.5-%20 de 6.6 olarak belirlemiştir. Bahsedilen çalışmalar değerlendirildiğinde, sirkelerde belirlenen farklı pH değerlerinin, kullanılan sirke materyaline ve sirkeye uygulanan işlemlere bağlı olarak değiştiği düşünülmektedir. İstatistiksel olarak değerlendirildiğinde ise pH üzerinde kuru madde, renk değerleri ( $L$ ,  $a$ ,  $b$ ), sirke tuz kombinasyon oranlarının etkili olduğu görülmüştür ( $p < 0.01$ ).

Gıdalarda kuru madde denilince suyun dışında kalan tüm organik ve inorganik maddeler ifade edilmektedir. Suda çözünen kuru madde miktarı ise briks olarak ifade edilmektedir (Cemeroğlu, 2013). Çalışmada kullanılan sirkenin briks değeri ise  $2.2 \pm 0.14$  olarak belirlenmiştir. Çalışmamızda tespit ettiğimiz bu değer Ozturk vd. (2015)'nin geleneksel elma sirkelerinde (1.02-12.90) tespit ettiği briks değeri aralığındayken, Budak (2010)'ın, yüzey kültür ve derin kültür yöntemi ile üretilen elma sirkesi (%5.5-6) çeşitlerinde tespit ettiği suda çözünür kuru madde değerlerinden daha düşük olduğu görülmüştür. Bu farklılıkların ortaya çıkması sirke materyalinin ve değişik üretim tekniklerinin etkili olabileceğini düşündürmektedir. İstatistiki olarak briks değerinin, sirke-tuz konsantrasyonu ve renk ( $a$  ve  $b$ ) değerleri arasında önemli bir korelasyon gösterdiği anlaşılmıştır ( $p < 0.05$ ).

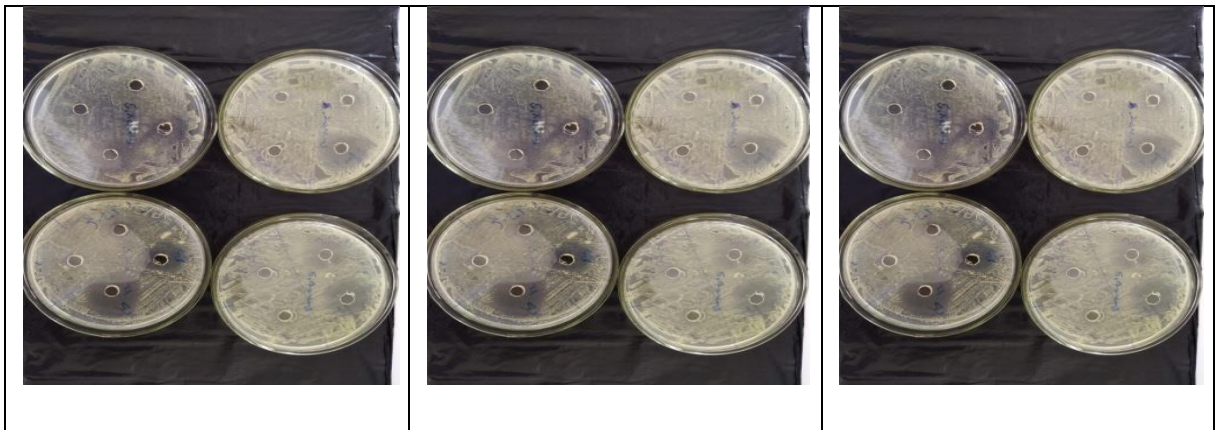
Renk, gıdaların tüketiciler tarafından tercih edilmesinde, genel olarak gıdanın kalitesi hakkında bilgi vermesi yönüyle önemli parametrelerden biridir. Yapılan bu çalışmada kullanılan sirkelerin  $L$ ,  $a$  ve  $b$  değerleri sırasıyla  $19.11 \pm 0.99$ ;  $-1.04 \pm 0.47$ ;  $4.04 \pm 1.95$  olarak belirlenmiştir. Yapılan başka bir çalışmada ise piyasadan temin edilen elma sirkelerinin  $L$ ,  $a$ ,  $b$  değerinin sırasıyla  $9.16-14.31$ ;  $0.50-9.28$ ;  $15.71-24.02$  arasında değişim gösterdiği gözlenmiştir (Bayram vd. 2018). Başka bir çalışmada ise geleneksel el yapımı elma sirkelerinde  $L$ ,  $a$ ,  $b$  değerleri sırasıyla  $4.48-20.15$ ;  $0.09-6.66$ ;  $3.71-11.98$  arasında değişim gösterirken, ticari elma sirkesinde  $12.03$ ;  $0.32$ ;  $4.91$  olarak belirlenmiştir (Ozturk vd. 2015). Renk değerlerinde görülen bu farklılıkların analiz edilen sirkelerin üretim teknikleri veya markalarıyla ilişkili olabileceği düşünülmektedir. Çalışmamızda kullanılan kombinasyonlar değerlendirildiğinde ise renk değerlerinin konsantrasyonlara bağlı olarak değiştiği;  $L$ ,  $a$  ve  $b$  değerlerinin ise sırasıyla  $24.05-30.43$ ,  $-2.52-0.50$  ve  $-1.01-8.64$  olduğu tespit edilmiştir. Yapılan istatistiki değerlendirmeler sonucunda  $L$  değerinin kuru madde, pH, renk ( $a$  ve  $b$ ) değerlerine bağlı olarak önemli değişiklik gösterdiği görülmüştür ( $p < 0.01$ ). Ayrıca  $a$  değerlerinde artışa bağlı olarak  $b$  değerlerinde azalma olduğu görülmüştür ( $p < 0.01$ ).

Sirke ve tuz kombinasyonlarının *E. coli* O157:H7 ve *S. aureus* bakterilerine karşı antibakteriyel etkileri (Şekil 1) ve etki şiddetleri Tablo 3'te belirtilmiştir. Mikrobiyolojik açıdan incelendiğinde sadece farklı tuz konsantrasyonlarının kullanılmasının *E. coli* O157-H7 ve *S. aureus*'a karşı inhibisyon etki oluşturmadığı ancak sirke konsantrasyonunda artışa paralel olarak inhibisyon etkinin giderek yükseldiği görülmüştür. Ancak %50 ve üzerinde sirke kullanılan örneklere eklenen tuzun, %5 düzeyinde ilavesi durumunda *S. aureus*'a karşı inhibisyon etkiyi arttırdığı belirlenmiştir. Genel itibariyle tüm örneklerde konsantrasyon artışına bağlı olarak antimikrobiyal etkide artış gözlenmiştir. Benzer şekilde Yeniçeri ve Hallaç (2021) sumak konsantresi düzeyinin artışına bağlı olarak, çeşitli patojenler üzerinde inhibisyon etkinin arttığını ve iki kat seyreltilen sumak konsantresinin *S. aureus*'a karşı inhibisyon etkisinin (23.20 mm) 64 kat seyreltilene (9.80 mm) göre daha yüksek olduğunu gözlemlemiştir. Yine Kelebek vd. (2017) *S. aureus* ATCC 29213'e karşı elma sirkesinin inhibisyon zon çapını 9.00-13.33 mm olarak belirlerken, Budak vd. (2022) *S. aureus* ATCC 25923'e karşı herhangi bir etki göstermediğini tespit etmişlerdir. Yapılan başka bir çalışmada ise bazı geleneksel el yapımı elma sirkelerinin *S. aureus* ve *E. coli* O157:H7 üzerinde inhibisyon etkisi yokken, bazı geleneksel elma sirkelerinin ve ticari sirkelerin *S. aureus*'a (geleneksel olanın 7.64-20.12 mm, ticari sirke 9.34 mm) ve *E. coli* O157:H7'e karşı (geleneksel olanın 10.40-15.16 mm, ticari

olanın ise 8.42 mm) inhibisyon etkisi olduğu görülmüştür (Ozturk vd. 2015). Çalışmalarda gözlemlenen bu farklılıkların sirke üretim tekniği, sirkenin antioksidan, fenolik ve organik asit içeriği, sirkeye uygulanan muameleler gibi birçok sebepten kaynaklanabileceği düşünülmektedir.

**Tablo 3:** Sirke ve tuz kombinasyonlarının *E. coli* ve *S. aureus* bakterilerine karşı antibakteriyel etkisi ve şiddetleri

Tuz/Sirke	<i>E. coli</i> O157:H7	<i>S. aureus</i>	<i>E. coli</i> O157:H7	<i>S. aureus</i>
0/0	-	-	-	-
0/25	10.33±0.57	9.33±0.57	+	+
0/50	19.66±0.57	12.33±0.57	++	+
0/100	30.00±1.00	18.66±0.57	+++	++
2,5/0	-	-	-	-
2,5/25	10.50±0.50	9.33±0.57	+	+
2,5/50	20.33±0.57	12.66±0.57	+++	+
2,5/100	30.66±1.15	20.66±0.57	+++	+++
5/0	-	-	-	-
5/25	11.00±1.00	9.33±0.57	+	+
5/50	21.33±0.57	17.66±0.57	+++	++
5/100	31.33±1.52	28.33±0.57	+++	+++
10/0	-	-	-	-
10/25	11.66±0.57	10.00±1.00	+	+
10/50	21.33±0.57	18.33±0.57	+++	++
10/100	31.66±0.57	30.00±1.00	+++	+++



**Şekil 1:** Bazı tuz ve sirke kombinasyonlarının bakterilere karşı antibakteriyel etkileri (delik agar diffüzyon yöntemi)

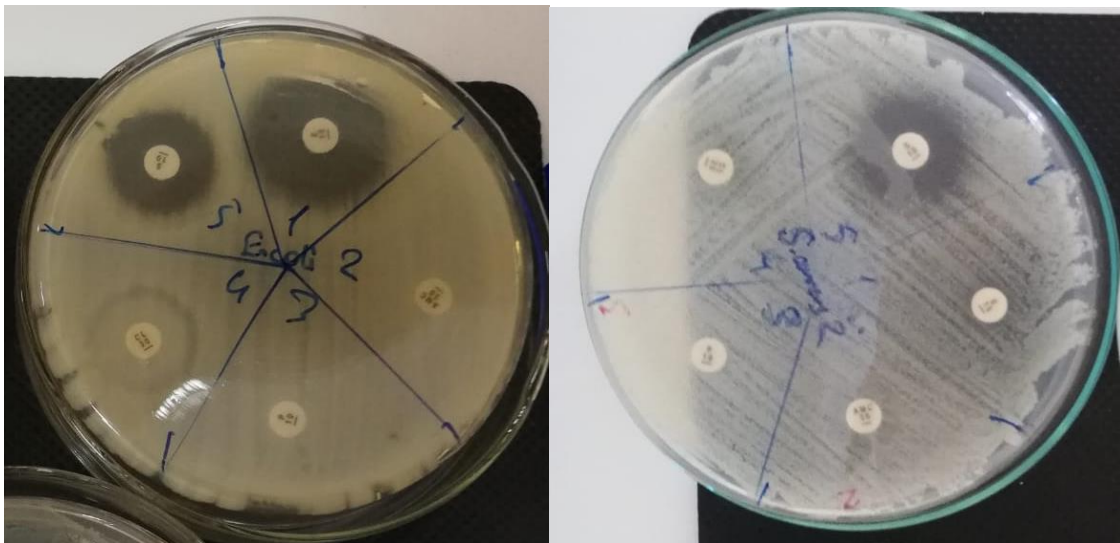
Gıda kaynaklı patojenlerden olan *E. coli* O157:H7 ve *S. aureus* bakterilerinin standart antibiyotiklere karşı duyarlılığı Tablo 4’te belirtilmiştir (Şekil 2). *S. aureus* ATCC 29213

suşunun çalışmada kullanılan S10, P10, AMC30 ve CL30 antibiyotiklerine karşı sırasıyla 18.66, 26.00, 27.33 ve 28.00 mm zon oluştururken, *E. coli* O157:H7 ATCC 43888 suşunun aynı antibiyotiklere karşı sırasıyla 28.33, 0, 26.33, 7.66 mm zon oluşturduğu görülmüştür. Hallaç vd. (2022) ise yaptıkları çalışmada aynı antibiyotiklere (S10, P10, AMC30 ve CL30) karşı *S. aureus* ATCC 29213 suşunun sırasıyla 16.33, 33.83, 31.50 ve 26.83 mm, *E. coli* O157:H7 ATCC 43888 suşunun ise 19, 0, 18 ve 20.33 mm zon oluşturduğunu belirlemişlerdir.

Sirke/tuz kombinasyonları antibakteriyel etki şiddetleri yönünden incelendiğinde; *E. coli* O157:H7 üzerine S10 ile 0-50 oranında tuz-sirke kombinasyonunun ve yine *S. aureus* üzerine S10 ile tuz-sirke kombinasyonlarının (0-10, 5-50, 10-50) benzer etki (++) gösterdiği anlaşılmaktadır. *E. coli* O157:H7 üzerine sirkenin ilave edildiği tüm konsantrasyonlarının P10 ve CL30'dan daha etkili olduğu gözlenmiştir.

**Tablo 4:** Gıda patojenlerinin standart antibiyotiklere karşı dirençliliği/duyarlılığı (mm)

Bakteri türü	Ticari antibiyotikler			
	S10	P10	AMC30	CL30
<i>S. aureus</i> ATCC 29213	18.66±0.57	26.00±1.00	27.33±0.57	28.00±0.00
<i>E. coli</i> O157:H7 ATCC 43888	28.33±0.57	0	26.33±0.57	7.66±0.57



**Şekil 2.** Ticari antibiyotiklerin bakterilere karşı etkinliği (disk diffüzyon yöntemi)

Minimum inhibisyon konsantrasyon (MİK) değeri, üreme olmayan en düşük antimikrobiyal madde konsantrasyonu olarak kabul edilmektedir (Temiz, 2010). Yapılan bu çalışmada tespit edilen MİK değerleri Tablo 5’te sunulmuştur. MİK değerleri yönünden sadece sirkenin *E. coli* O157:H7 için 1/128, *S. aureus* için 1/512 olması nedeniyle *S. aureus*'a karşı daha etkili olduğu belirlenmiştir. Diğer taraftan sirke (%100) ve tuz (%10) kombinasyonunda *E. coli* O157:H7 için 1/128, *S. aureus* için ise 1/16 seviyesinde MİK değerleri saptanmıştır. Böylece *S. aureus*'a nazaran *E. coli*'ye karşı daha fazla etki gösterdiği belirlenmiştir. Yapılan başka bir çalışmada elma sirkesinin önemli patojen mikroorganizmalardan olan hem *S. aureus* ATCC 43300 hem de *E. coli* O157:H7 ATCC 35150’ye karşı MİK değeri %12.5, MBK değeri ise %25 olarak belirlenmiş ve sirkenin sahip olduğu antibakteriyel aktivitesinin, toplam fenolik ve organik asit içerikleri ile ilişkili olduğu ifade edilmiştir (Kahraman vd. 2022). Yine Baldas ve Altuner (2018) elma sirkesinin *S. aureus*’a karşı MİK değerini 25 µg/mL olarak belirlemişlerdir. MİK değerlerinin kullanılan bakteri türüne, sirkenin kalitesine ve kullanılan metoda göre değişiklik gösterebileceği düşünülmektedir.

**Tablo 5:** Sirke ve tuz kombinasyonlarının patojen bakterilere karşı MİK değerleri

Minimal İnhibisyon Konsantrasyon (MİK) Değerleri										
Çözeltiler	½	1/4	1/8	1/16	1/32	1/64	1/128	1/256	1/512	Bakteriler
Sirke	-	-	-	-	-	-	+	+	+	<i>E. coli</i> O157:H7
	-	-	-	-	-	-	-	-	+	<i>S. aureus</i>
Sirke+Tuz	-	-	-	-	-	-	+	+	+	<i>E. coli</i> O157:H7
	-	-	-	+	+	+	+	+	+	<i>S. aureus</i>

## SONUÇ ve ÖNERİLER

Bu çalışma sonucunda pH ‘nın sirke kullanım seviyesi arttıkça düştüğü, kurumadde miktarının da tuz kullanım seviyesi arttıkça yükseldiği gözlenmiştir. Genel olarak renk değerleri yönünden değerlendirildiğinde sirke miktarı arttıkça parlaklığın (*L*) azaldığı, tuz miktarının artışında ise parlaklığın arttığı; sirkenin ve tuzun kullanım seviyesi arttıkça *a* değerinde bir azalma meydana geldiği; *b* değerinin ise sirke miktarı arttıkça yükselme, tuz miktarı arttıkça azalmanın olduğu gözlemlenmiştir. Yapılan bu çalışmada antimikrobiyal özellikleri yönünden sirkenin tuza göre daha etkili olduğu ancak birlikte kullanılmaları durumunda tuzun kısmi olarak antimikrobiyal etki gösterdiği anlaşılmıştır. Sirkenin bakteri türüne farklı seviyelerde etki ettiği, MİK değerleri

yönünden incelendiğinde sirke kullanılması durumunda *S. aureus*'a karşı *E. coli* O157:H7'den daha etkili olduğu belirlenmiştir. Diğer taraftan sirke (%100) ve tuz (%10) kombinasyonunun kullanılması durumunda *E. coli* O157:H7' ye karşı *S. aureus*'tan daha fazla etkili olduğu saptanmıştır. Sonuçta gıda güvenliği açısından değerlendirildiğinde bu patojenlere karşı en az %5 tuz ve %50 sirke kombinasyonunun kullanılması durumunda etkili olduğu görülmüştür. Tüketicilerin temizlik-dezenfeksiyonda, gıda muhafazası ve gıda üretiminde (turşu, mayonez gibi) bu değerleri gözönünde bulundurmaları gerekliliği ortaya konulmuştur. Böylece sirke veya sirke-tuz kombinasyonunun sentetik antibiyotiklere ve çeşitli kimyasal dezenfektanlara alternatif olabileceği belirlenmiştir.



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**GENCE’NİN FETHİNE MÜTEAKİP BÖLGEDE BULUNAN OSMANLI ASKERİ  
SINIFLARI (1723- 1730)**

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**ÖZET**

Safevi Devleti Şah İsmail tarafından 1501 tarihinde Tebriz de kurulmuştu. Devlet Şii Mezhebini benimsemişti. Şah İsmail Şii mezhebini İran’a ve ardından diğer civar bölgelere yaymayı hedeflemişti. Anadolu da baş gösteren Şii tehlikesi ve Şah Kulu isyanın bastırılmasından sonra Yavuz Sultan Selim Safevi Devleti üzerine sefere çıktı. Şah İsmail ile Osmanlı Hükümdarı Yavuz Sultan Selim arasında 1514 yılında Çaldıran Savaşı yapıldı. Anadolu, Safevi tehlikesinden kurtuldu. Ancak Osmanlı Devleti ile Safevi Devleti arasında 250 yıl sürecek uzun soluklu bir mücadele yaşanmaya başlandı. Bu mücadele bilhassa 18. yüzyılın 2. çeyreğinde yoğunluk kazandı. Safevi Devleti doğuda Afganlı Mir Mahmud’un saldırısına, kuzeyde ise Rusların istilasına maruz kaldı. Osmanlılar bölgenin Rus istilasına uğramaması için İran’ın batı topraklarına ve Kafkasya’ya yönelik 1723 tarihinde başarılı seferler düzenledi ve önemli şehirler alındı. Bu şehirler içerisinde tarihi İpek yolu üzerinde bulunan Gence’ de vardı. Bölge zapt edildikten sonra çeşitli sınıflara mensup askeri birlikler kaydırıldı. Bu çalışmada; Osmanlı arşiv kayıtları incelenerek bölgeye intikal ettirilen Osmanlı askeri sınıfları ve bu sınıfların ifa ettikleri görevler irdelenmiştir. Gence de bulunan askeri sınıfların nefer sayısı, yevmiye ve mevacicileri ortaya konulmuştur. Konunun daha iyi anlaşılması maksadıyla bazı askeri birliklerin sayısı ve elde ettikleri gelirler tablolar halinde gösterilmiştir.

**Anahtar kelimeler:** Gence, Safevi, Osmanlı Devlet, Askeri Sınıf

**OTTOMAN MILITARY CLASSES IN THE REGION AFTER THE CONQUEST OF  
GANJA (1723- 1730)****ABSTRACT**

The Safavid Empire was founded by Shah Ismail in 1501 in Tabriz. The state had adopted the Shiite Sect. Shah Ismail aimed to spread the Shiite sect to Iran and then to other surrounding regions. After the Shiite threat emerged in Anatolia and the suppression of the Shah Kulu rebellion, Yavuz Sultan Selim went on a campaign against the Safavid State. The Battle of Çaldıran was fought between Shah İsmail and the Ottoman ruler Yavuz Sultan Selim in 1514. Anatolia was saved from the Safavid danger. However, a long-term struggle began to take place between the Ottoman Empire and the Safavid Empire, which would last for 250 years. This struggle intensified especially in the second quarter of the 18th century. The Safavid Empire was attacked by the Afghan Mir Mahmud in the east and by the Russians in the north. The Ottomans organized successful expeditions to the western lands of Iran and the Caucasus in 1723 to prevent the region from being invaded by the Russians, and important cities were taken. Among these cities, there was also Ganja on the historical Silk Road. After the region was captured, military units belonging to various classes were shifted. In this study; By examining the Ottoman archive records, the Ottoman military classes transferred to the region and the tasks performed by these classes were examined. The number of soldiers, wages and wages of the military classes in Ganja are revealed. In order to better understand the subject, the number of some military units and their earnings are shown in tables.

**Keywords:** Ganja, Safavid, Ottoman State, Military Class

## GİRİŞ

Gence; küçük Kafkasya dağ gurubunun kuzey doğu eteğinde, Kura Irmağı'nın sağ kollarından Genceçay'ın her iki sahilinde bulunmakta olup deniz seviyesinden 445 m. yüksekliğe sahiptir. Bakü ile Batum arasındaki işlek demir yolu üzerinde bulunan şehir günümüzde nüfus bakımından Bakü'den sonra Azerbaycan'ın en kalabalık şehridir. Kuzeyinde Kura Irmağı kollarının suladığı verimli ovalar yer almışken, güneyinde ise zengin yaylaları olan sığ ormanlarla kaplı dağlık bir bölgedir. Şehir adını nereden geldiği ve ne zaman kurulduğu ile ilgili değişik görüşler bulunmaktadır. Bir görüşe göre şehrin adının İslamiyet'ten önceki Maraga civarında bulunan bugünkü Taht-ı Süleyman denilen yerde Süryani ve Ermeni kaynaklarında Ganzaka, İranlıların Gazna ve Arapların Carza dedikleri hükümet merkezinden aldığı tahmin edilmektedir.<sup>9</sup> Gence isminin Azerbaycan Türkçesinde açık geniş yer anlamına gelen “gen yer” anlamına bağlanılabildiği gibi Pehlevi dilinde hazine, mahsul deposu anlamına geldiği yönünde görüşlerde bulunmaktadır.<sup>10</sup>

Hız. Ömer döneminde İslam orduları İran ve Kafkasya üzerinde hızlı fetihler gerçekleştirmişti. Osman b. Affan zamanında Muğire b. Şu'be Sakafi tarafından 642-643 yıllarında Azerbaycan'ın çeşitli şehir ve kasabaları ele geçirilerek bölgeye Araplar yerleştirildi.<sup>11</sup> Kafkasya üzerinde Hazarlar ile Emevi orduları arasında sürekli mücadeleler yaşandı. Bu mücadele Abbasiler döneminde de devam etmiştir.<sup>12</sup> Oğuz Türkmenlerinin bölgeye ilk taarruzları Çağrı Bey döneminde gerçekleşmiştir. Çağrı Bey, 1018 yılında Anadolu'ya akınlar gerçekleştirmiş Van Gölü havzasında önemli başarılar elde ettikten sonra Azerbaycan'a yönelmiştir.<sup>13</sup> Bizans İmparatoru Konstantin Oğuz akınlarına karşı 1045 tarihinde Gürcü Laparit komutasında bir orduyu Selçuklular üzerine göndermişti. Tuğrul Bey ise Gürcü, Ermeni ve Rumlardan oluşan Bizans ordusuna karşı amcasının oğlu Kutalmış'ı görevlendirdi ve 1045 güzünde Gence de yapılan savaşı Selçuklu ordusu kazandı.<sup>14</sup> Ruslar 993-994 yıllarında Hazar Denizi ve Kura Irmağı yoluyla Gence'ye gelerek bölgeyi yağma ve tahrip bulundular. Arran bölgesinin merkezi haline gelen Gence de Türk asıllı Sacoğulları ve ardından Selçukluların müttefiki olan Şeddadoğullarının hâkimiyeti başladı. Sultan Alpaslan 1071 Malazgirt zaferinden kısa bir süre önce Gürcistan'ı fethetmiş ve dönüşte Gence'ye uğramıştı. Sultan

<sup>9</sup> Mirza Bala, “Gence”, *İslam Ansiklopedisi*, C. IV, Milli Eğitim Basımevi, İstanbul, 1979, s.762.

<sup>10</sup> Oktay Efendizade, “Gence”, *TDV İslam Ansiklopedisi*, C.14, Diyanet İslam Vakfı Yayınları, İstanbul, 1996, s. 17.

<sup>11</sup> Ya'kubî, *Ülkeler Kitabı*, Çev. Murat Ağarı, İstanbul, 2002, s. 54.

<sup>12</sup> Ahmet Taşağıl, “Hazarlar”, *TDV İslam Ansiklopedisi*, C. 17, Diyanet İslam Vakfı Yayınları, İstanbul, 1998, s. 117, 118.

<sup>13</sup> Osman Turan, *Selçuklular Tarihi ve Türk İslam Medeniyeti*, İstanbul, 1969, s.131.

<sup>14</sup> Turan, s. 119, 121.

Melik Şah Gence'yi oğlu Mehmed'e tımar olarak vermişti. Ardından komutanlarından Sav Tegin'i Gence'ye göndererek Oğuz Türklerinin bölgeye yerleştirdi. Bölgenin bir Türkmen şehri haline gelmesi sağlandı.<sup>15</sup> 1139 yılında Gence 'de büyük bir deprem meydana gelmişti. Bu durumdan faydalanan Gürcü Kralı I. Dimitrius, depremden yıkılmış Gence 'ye baskın yaparak şehri yağmalamıştır.<sup>16</sup> Bölge 1212-1223 yılları arasında Gürcistan'da hüküm süren Tamar'ın oğlu ve ardından gelen halefi II. Giorgi Laşa'nın hâkimiyetine girdi.<sup>17</sup> Ardından Moğollar orduları Kafkasya'ya doğru ilerleyerek Gence'yi istila ettiler.<sup>18</sup> Gence, Moğollardan sonra İlhanlı ve Timur hâkimiyeti altına girdi.<sup>19</sup> XIV. yüzyılın ortalarında Gence ve Karabağ'a Celayirliler hâkim oldu. XV. yüzyılın başlarında Karakoyunluların eline geçti. Timur'un oğlu Şah Ruh Azerbaycan ve Karabağ'a 1420-21 yılları arasında iki sefer düzenledi. 1461- 1501 yılları arasında Akkoyunlu Devletinin hâkimiyet kurduğu dönemde muhtemelen Kaçar emirinin idaresi altında kaldı. Ardından Safevi Devletinin 13 vilayetinden biri haline geldi.<sup>20</sup> Safevi hükümdarı II. Şah İsmail'in yüksek dozda kullandığı afyonun etkisiyle hayatını kaybetmiş devlet adamları 1578 yılında Mehmed Hüdabende'yi hükümdar ilan edildi. Hüdabende'nin aciz yönetimi tahtan uzaklaşmasına sebep oldu ve yerine Hamza Mirza geçti. İran da karışıklık gittikçe artmaya başladı. Bunu durumu değerlendiren Osmanlı Devleti Sokullu Mehmed Paşa'nın muhalefetine rağmen İran'a savaş ilan etti. Böylece 12 yıl sürecek Osmanlı-İran savaşları başlamış oldu. Lala Mustafa Paşa 1578 yılında Gürcistan topraklarına girdi. Ferhad Paşa Tebriz'i kurtardıktan sonra 3 gün süren muharebeden sonra Gence ve Karabağ'a girmeye muvaffak oldu.<sup>21</sup> Gence Hakimi Ziyad oğlu Mehmed Osmanlı kuvvetlerinin Gence'ye doğru ilerlediğini öğrenince tüm köy ve nahiyelerde bulunan halkı göçürmüş bölgede kimseyi bırakmamıştı. Osmanlı kuvvetleri terkedilmiş şehre girdi. Selaniki şehirde iki köprü'nün bulunduğunu, bağ ve bahçeleriyle oldukça güzel bir şehir olduğunu 40 gün süren bir tamirattan sonra kale burçlarının tamir ve hendeklerinin kazıldığını gerekli istihkâmların gerçekleştirildiğini ifade etmektedir.<sup>22</sup> Safevi Devletinin başına Şah Abbas geçti. Doğuda Özbeklerle batıda Osmanlılara karşı başarılı olamayınca barış talebinde bulundu. 12 yıl süren

<sup>15</sup> Bala, s. 762, 763.

<sup>16</sup> Efendizade, s. 17.

<sup>17</sup> Ayşe Beyza Büyükcınar, "Gürcü-Moğol İlişkilerinin İlk Evresi: 1220-1247", *Karadeniz Araştırmaları Enstitüsü Dergisi*, C. 4, Sayı: 6, 2018, s. 268.

<sup>18</sup> Rene Grousset, *Stepler İmparatorluğu Atilla, Cengiz Han, Timur*, Çev. Halil İnalçık, Yayına Haz. Ertuğrul Tokdemir-Mustafa Dönemez, Türk Tarih Kurumu Basımevi, Ankara, 2011, s. 272.

<sup>19</sup> İsmail Aka, *Timurlular*, Türkiye Diyanet Vakfı Yayınları, İstanbul, 1993, s.22-28.

<sup>20</sup> Efendizade, s. 18.

<sup>21</sup> İsmail Hakkı Uzunçarşılı, *Osmanlı Tarihi*, C. III/I, Türk Tarih Kurumu Basımevi, Ankara, 2011, s.56-62.

<sup>22</sup> Selaniki Mustafa Efendi, *Tarih-i Selaniki*, Türk Tarih Kurumu Basımevi, Ankara, 1999, s. 205, 206; Efendizade, s.18.



savaşın sonucunda Safevi Devleti ile Osmanlılar arasında Ferhat Paşa antlaşması imzalandı. Bu antlaşmaya göre Tebriz, Gence, Karabağ, Şirvan, Gürcistan, Nihâvend ve Lûristan bölgeleri Osmanlı Devleti'nde kaldı.<sup>23</sup> Ancak Şah Abbas Osmanlı Devletinin batı da Avusturya ile yapılan savaşları ve Anadolu da çıkan Celali isyanlarıyla meşgul olmasından istifade ederek 1606-1607 yıllarında Azerbaycan, Gence ve Şamahı'yı ele geçirmeye muvaffak oldu.<sup>24</sup>

İran ile 1639 yılında yapılan Kasr-ı Şirin Antlaşmasından sonra uzun bir süre Osmanlı- Safevi ilişkileri sükûnet dönemine girdi. Bu barış dönemi 1722 yılında bozuldu. Safevi Devletinin başında Şah Hüseyin bulunuyordu. Onun devleti idare etmede gösterdiği zafiyet Safevi Devletini zor durumu bıraktı. Doğuda Afganlı Mir Mahmud isyan ederek İsfahan'ı kuşattı. Erzurum Valisi Silahdar İbrahim Paşa İran'ın içinde bulunduğu karışıklığı İstanbul'a bildirmişti.<sup>25</sup> Rus Çarı Petro İran'ın içinde bulunduğu iç karışıklıktan istifade etmeyi düşünmüş Şirvan ve Bakü'yü istila etmeyi hedeflemiştir. Ayrıca Kafkasya'da Kabartay ve Lezgiler üzerinde hâkimiyet kurmayı istiyordu.<sup>26</sup> Erzurum Valisi İbrahim Paşa Erzurum'da gerekli hazırlıkları tamamladıktan sonra 17 Aralık 1722 tarihinde Kars'a doğru harekete geçmiş ve 11 gün süren yolculuğun ardından Kars'a varılmıştır. Osmanlı orduları 146 gün Kars'ta kaldıktan sonra 23 Mayıs 1723 tarihinde Tiflis'e doğru harekete geçmiştir. 28 gün süren yolculuğun ardından 19 Haziran 1723 tarihinde Tiflis'e varılmıştır. Tiflis'te 100 gün kalan Osmanlı orduları Gence' ye doğru hareket etmiş ve 28 Eylül 1723 tarihinde Gence' ye ulaşmışlardır.<sup>27</sup> 24 Haziran 1724 tarihinde Ruslarla yapılan antlaşmada Gence, Berda, Karabağ ve Nahcivan Osmanlı Devletinde kaldı.<sup>28</sup> Erzurum Valisi Vezir Hacı Mustafa Paşa Revan'dan hareket ederek Arapçayır'a geldi. Burada ordu için gerekli zahire ve mühimmatı temin ettikten sonra Lori Kalesi'ne ulaştı 4 Ağustos 725 tarihinde kale ele geçirildi. Ardından Gence Kalesi de 5 Eylül 1725 yılında iki gün süren kuşatmadan sonra fethedildi.<sup>29</sup>

Osmanlı Devleti 5 Eylül 1725 tarihinde Gence'nin fethi üzerine Dergâh-ı Âli yeniçerilerin bölgeye intikalini sağladı. Bölgenin Safevi ordularına karşı tahkimatı hedeflendi. Osmanlı arşiv kaynaklarında bilhassa mevacib defterlerinde bu askeri sınıfların mevcudu, elde ettikleri

<sup>23</sup> M. Fahrettin Kırzioğlu, *Osmanlılar'ın Kafkas Elleri'ni Fethi*, Türk Tarih Kurumu Basımevi, Ankara, 1998, s. 389.

<sup>24</sup> Özer Küpeli, *Osmanlı-Safevi Münasebetleri*, Yeditepe Yayınevi, İstanbul, 2014, s. 52-54.

<sup>25</sup> Çelebizâde İsmâil Âsım Efendi, *Tarih-i Çelebizâde*, C.III, Haz. Abdülkadir Özcan- Yunus Uğur- Baki Çakar- Ahmet Zeki İzgöer, Klasik Yayınlar, Mayıs, 2013, s. 1330- 1331; Uzunçarşılı, *Osmanlı Tarihi*, C. V, s. 173.

<sup>26</sup> M. Münir Aktepe, *1720-1724 Osmanlı- İran Münasebetleri ve Silahşör Kemani Mustafa Ağa'nın Revan Fetih-namesi*, İstanbul Üniversitesi Edebiyat Fakültesi Yayınları, İstanbul, 1970, s.11.

<sup>27</sup> BOA, *MAD.d. 1943*, s. 4.

<sup>28</sup> Çelebizade, s. 1382.

<sup>29</sup> Çelebizade, s. 1449, 1450.

yevmiye ve zabitleri ile ilgili bilgiler göze çarpmaktadır. Bu bilgilerin ışığında kalede görevli askeri personellerin durumu ortaya konulmaya çalışılacaktır.

### **1.Gence de Bulunan Dergâh-ı Âli Yeniçeriler**

Osmanlı Devleti'nin fethettiği bölgelerdeki Hıristiyan çocukları devşirerek asker elde etmesi yeniçeri ocağının esasını teşkil etmiş ve bu sistem ilk defa Osmanlı Devleti'nde görülmüştür.<sup>30</sup> 1362 tarihindeki Pencik Kanunu'na göre esir edilenlerin beşte biri ordu ve saray hizmetine alınmıştır. Başlangıçta bir akçe yevmiye ile Gelibolu ve Çardak arasında süvari askerlerinin nakliyesi için hizmet veren gemilerde görevlendirilmişlerdir. Sayıları artınca da askeri hizmetlerde kullanılmışlardır.<sup>31</sup> Osmanlı Devleti'nin askeri yapısı iki ana temelden oluşmuştur. Bunlardan birincisi; devletten sürekli maaş alan kapıkulu askerleri, diğeri ise eyalet askerlerinden müteşekkildi. Devletin sınırlarının genişlemesi ve harp teknolojisinde meydana gelen değişimlere paralel olarak bu iki ana yapıya değişik dönemlerde yeni yeni askeri birlikler eklenmiştir. Kapıkulu askerleri yaya ve süvari olmak üzere iki bölüme ayrılmıştı. Yaya kısmı; Acemi Ocağı, Yeniçeri Ocağı, Cebeci Ocağı, Topçu Ocağı, Top Arabacıları Ocağı ve birer bölük halinde Lağımçı ve Humbaracılarından oluşmuştu. Süvari kısmı ise; Sipahi, Silahdar, Sağ Ulûfeciler, Sol Ulûfeciler, Sağ ve Sol Gariplerden oluşmuştu.<sup>32</sup>

Yeniçeri askerleri teşkilatının kurulduğu ilk yıllarda iki bin kişilik bir askeri mevcudu bulunmaktaydı. Ancak sonraki dönemlerde sayısı gittikçe arttı. I. Bayezid döneminde 10.000 olan sayı II. Murad döneminde 5 bine düştü. Fatih Sultan Mehmed döneminde yapılan alımlarla yeniçeri askeri sayısı 12 bine ve Kanuni Sultan Süleyman döneminde 14 bine yükselmiştir. Bu sayı 16. yüzyılın sonunda 40 bini aşmıştı.<sup>33</sup>

Yeniçeri Ocağı; Cemaat, Sekban ve Ağa bölüklerinden oluşmakta idi. Yeniçeri Ocağı kurulduğu ilk dönemlerde 1.000 kadar yeniçeri alınmış ve her 100 askerin başına bir yayabaşı atanmıştır. Yeniçeri yaya bölükleri sonradan Cemaat adını alarak sayısı 10'dan 101'e kadar çıkarılmıştır. Sekbanlar 34 ortadan, ağa bölükleri ise 50 kişilik mevcutla 61 bölükten oluşmaktaydı. Böylece Yeniçeri Ocağı'nın Cemaat, Sekban ve Ağa bölüklerinin toplam orta ve bölük sayısı 196' ya ulaşmıştı.<sup>34</sup>

<sup>30</sup> Mücteba İlgürel, "Yeniçeriler", *İA*, C. XIII, Milli Eğitim Basım- Evi, İstanbul, 1986, s. 385.

<sup>31</sup> İsmail Hakkı Uzunçarşılı, "Acemi Oğlanlar", *İA*, C. I, Milli Eğitim Basımevi, 1978, İstanbul, s. 117

<sup>32</sup> İsmail Hakkı Uzunçarşılı, *Osmanlı Devleti Teşkilatından Kapıkulu Ocakları (Acemi Ocağı ve Yeniçeri Ocağı)*, C. I, Türk tarih Kurumu, Ankara, 1988, s. 3- 4

<sup>33</sup> İlgürel, "Yeniçeriler", s. 385.

<sup>34</sup> Kemal Beydilli, "Yeniçeri", *TDV İslam Ansiklopedisi*, C. 43, Diyanet Vakfı Yayınları, İstanbul, 2013, s. 457.

Mevacib defterlerinde kalelerde mevcut bulunan cemaat ortaları, Sekban ve ağa bölükleri ile yamak ve diğer askeri sınıflar kaydından sonra bu sınıfların mevcudu, yevmiyeleri ve ölüm, azil gibi nedenlerle askerlikle ilişkisi kesilenler ve nihayetinde tüm askeri personelin alçakları ücretler 88,5 ile çarpılarak Masar, Recec, Reşen ve Lezez dönemlerine ait ulûfeleri ortaya konulmuştur. Bu bilgiler mevacib defterlerinin son sayfasında belirtilmiştir. Kayıt işleminin kimin tarafından ve hangi tarihte yapıldığı kaydı da düşülmüştür.<sup>35</sup>

### 1.1. Cemaat Ortaları

Yeniçeri ocağı kurulduğunda öncelikle cemaat ortaları (yaya başı) kurulmuş, sekban ortaları ve ağa bölükleri daha sonradan yeniçeri ocağına katılmıştır. Yeniçeri Ocağı'nın kurulduğu ilk dönemlerde her 100 nefere bir yaya başı komutan tayin edilmiştir. Bundan sonraki dönemlerde ise yeniçeri mevcudu ve orta adedi artmış ve cemaat ortalarının sayısı yüz bire kadar yükselmiştir.<sup>36</sup> Cemaat ortaları da tıpkı ağa bölükleri gibi zabitlerinin sahip oldukları statüye göre belirli bir hiyerarşi içinde yer almaktaydı. Derecesine göre en küçük cemaat ortasından en büyüğüne doğru bir hiyerarşi yapıldığında Yaya Baş, Deveciler, Baş Deveci, Hasekiler, Baş Haseki, Turnacı, Seksoncu, Zağarcı ve Sekbanbaşları olduğunu görülmektedir.<sup>37</sup>

Gence Kalesi'nde görev yapan cemaat ortalarının bulunduğunu çeşitli arşiv vesikalarından özellikle de mevacib defterlerinden anlaşılmaktadır. Bu vesikalardan çeşitli cemaat ortalarının numarası, cemaat ağası, nefer sayısı, yevmiyesi, Masar, Recec, Reşen Lezez dönemleri ile bir yıllık ödenen toplam maaşlarıyla ilgili detaylı bilgileri tespit etmek mümkündür.<sup>38</sup>

1.1.1. Deveciler Ortası (Cemaât-ı Şütürban) Yeniçeri Ocağı kurulduğunda ocak geleneğine göre 1.000 nefer alınmış ve her 100 neferi bir orta teşkil edecek şekilde 10 ortadan yani bölükten meydana gelmişti. Sonraki tarihlerde ortanın sayısı gelen neferlerle birlikte artmıştı ve 101'e ulaşmıştı. Birinci cemaat ortasından beşinci cemaat ortasına kadar olan yaya ortalarına Cemaât-ı Şütürban yani deveciler ortası denilmiştir. Numarası hiç değişmeyen bu ilk 5 ortanın dışında 1623 tarihli ulûfe defterlerinde ilk 5 cemaatin dışında 8, 29, 33, 39, 40, 46, 55, 57 ve 95'inci

<sup>35</sup> Uğur Demlikoğlu, *Gürcistan Kaleleri: Savaş, Sefer ve Kale organizasyonu (Tiflis Gori, Tob-Karaağaç, Akçakale 1723-1735)*, Gece Akademi, 2019, Ankara, s. 69. Ulûfeli askerlerin mevacibleri üç ayda bir olmak üzere senede dört dönemde ödeniyordu. Hicri ayların üç isminin baş harfleri alınarak 4 dönem belirlenmiştir. Hicri aylardan Muharrem, Safer, Rebiü'l-evvel aylarının ilk harfleri olan M, S, R harflerinin birleşmesinden Masar dönemi oluşurken, Rebiü'l-ahir, Cemaziye'l-evvel, Cemaziye'l-ahir aylarının ilk üç harfinin alınmasıyla Recec dönemi oluşmuştur. Receb, Şaban aylarının ilk harfiyle Ramazan ayının N harfinin birleşmesinden Reşen Dönemi, Şevval ayının son harfiyle Zilkade ve Zilhicce aylarının ilk harflerinin birleşmesinden Lezez dönemi oluşmuştur. Masar ulûfesi Muharrem ayında, Recec ulûfesi Cemaziye'l-evvel ayında, Reşen ve Lezez Dönemine ait olan ulûfelerin ikisi de Şaban ayı içinde verilmekteydi. Son iki maaşın birleştirilerek bir arada verilmesine kisteyn mevâcibi denilmekteydi. Bkz: Uzunçarşılı, *Kapukulu Ocakları*, C. I, s. 411, 412.

<sup>36</sup> Uzunçarşılı, *Kapukulu Ocakları*, C. I, s. 156.

<sup>37</sup> Uzunçarşılı, *Kapukulu Ocakları* C. I, s. 173

<sup>38</sup> Bkz: BOA, *MAD. d. 6123*, s. 522-560; BOA, *MAD.d. 17016*, s. 1-29; BOA, *MAD.d. 6575*, s. 354-392.

cemaat ortalarının da deveci ortası olduğu anlaşılmaktadır. 1663-1664 yılındaki ulûfe defterinde ise 6, 8, 26, 29, 33, 39, 42, 43, 45, 46, 47, 48, 57, 75, 78, 86, 87, 91, 95, 98. ortaların deveciler yani Cemaat-ı Şütürban ortası olduğu görülmektedir.<sup>39</sup> Deveci ortası kumandanlığına yaya başlıktan geçilmekteydi. Baş deveci terfi ettiğinde Heseki ağa veya Acemi Ocağı'nın Rumeli ağası olurdu. Yeniçeri Ocağı'nın zabitlerinden olan başçavuş azledildiğinde ise deveci ortası kumandanlığına getirilirdi. Deveciler ortası muharebe esnasında siper kazmak, sefere giderken ve seferden döndüğünde Yeniçeri Ağasının ağırlıklarını taşımak gibi görevleri bulunmaktaydı. Deveciler ortası diğer yaya ortalarına göre oldukça hürmet edilen bir askeri sınıftı. Zabitleri sorguclarına balıkçıl tüy takarlardı ve divan elbiseleri kethüda beyinkine benzerdi.<sup>40</sup> İncelediğimiz döneme ait Gence Kalesi'nde muhtelif numaralar belirtilen deveciler ortasına tesadüf edilmiştir. Gence'nin fethine müteakip kalede görev yaptıkları mevacic defterlerinden anlaşılmaktadır. Bu defterlerde 25, 39, 42, 46 ve 75. cemaat ortalarının bulunduğu görülmektedir. Aşağıdaki tabloda deveciler ortasının bulunduğu cemaat ortası, nefer sayısı ve neferlerin elde ettikleri yevmiye ve mukarrer mevacicleri gösterilmiştir.

**Tablo 1:** Gence de Bulunan Deveci Ortaları (Cemaat-i Şütürban)<sup>41</sup>

Tarih	Cemaat Ortası	Nefer Sayısı	Yevmiyesi (akçe)	Mukarrer (akçe)
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	25. Cemaat Ortası	361	2.652	234.702
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	39. Cemaat Ortası	222	1.602	141.777
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	42. Cemaat Ortası	183	1.310	115.935
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	75. Cemaat Ortası	281	2.023	179.035,5
5 Mart- 1 Haziran 1726 (H. 1138 Reşen)	25. Cemaat Ortası	260	1.950	172.575
5 Mart- 1 Haziran 1726 (H. 1138 Reşen)	39. Cemaat Ortası	162	1.176	104.076
5 Mart- 1 Haziran 1726 (H. 1138 Reşen)	46.Cemaat Ortası	144	1.041	92.128,5
5 Mart- 1 Haziran 1726 (H. 1138 Reşen)	75. Cemaat Ortası	159	1.171	103.633,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	39. Cemaat Ortası	146	1.075	95.137,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	46. Cemaat Ortası	120	869	76.906,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	75. Cemaat Ortası	137	1.014	89.739

<sup>39</sup> Mehmet Zeki Pakalın, *Osmanlı Tarih Deyimleri ve terimleri Sözlüğü*, C.III, Milli Eğitim Basım Evi, İstanbul, 1972, s. 362.

<sup>40</sup> Uzunçarşılı, *Kapıkulu Ocakları*, C. I, s. 213.

<sup>41</sup> BOA, *MAD.d. 6123*, s. 522-536; BOA, *MAD.d. 17016*, s. 1- 12; BOA, *MAD.d. 6575*, s. 354-363.

Yukarıdaki tabloda nefer sayısı bakımından en kalabalık deveçiler ortasının 25. Cemaat ortası olduğu görülmektedir. Bu ortanın nefer sayısı 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihleri arasında 361 olduğu görülmektedir. Bu cemaat ortasında bulunan neferler 2.651 akçe yevmiye tasarrufunda bulunmaktaydı. En az neferin bulunduğu cemaat ortası ise 22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen) tarihleri arasında Gence de bulunan 46. cemaat ortasının olduğu görülmektedir. Gence'nin fethinden sonra kalede bulunan deveçiler ortalarına mensup nefer sayısında artışlar gözlenmektedir. Nitekim 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihleri arasında deveçiler ortasına mensup toplamda 1.057 nefer bulunmaktaydı. Fakat daha sonraki dönemde düşüşler gözlenmektedir. 5 Mart- 1 Haziran 1726 (H. 1138 Reşen) tarihlerinde 725'e, 22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen) tarihinde 403'e düştüğü görülmektedir.<sup>42</sup> Gence de kurulan Osmanlı hâkimiyeti ve Safevi tehlikesinin bertaraf edilmesi nefer sayında azalmalara sebep olmuştur.

#### 1.1.2. Zağarcılar

Yeniçeri cemaat ortalarından 64. ortaya zağarcılar ortası denilmektedir. Bu ortanın efradı yaya ve süvari birliklerinden oluşmaktaydı. Fakat süvari birlikleri yayalara nispetle daha azdı. Süvarilerin yevmiyeleri yayalardan daha yüksektir. Bu ortanın en büyük kumandanı zağarcıbaşıdır ve rütbesi Yeniçeri Ocağı'nda kethüdadan sonra gelmektedir.<sup>43</sup>

Sultana ait av köpeklerini muhafaza ederlerdi. Bu ortada bulunan 34 zabıt ellerinde bulunan köpeklerle sultanın avlandığı sırada kendisine refakat ederlerdi. Sultanın yanında bulunmaları nedeniyle itibarlı bir ortaydı. Zağarcıbaşı terfi ettiğinde Yeniçeri Ocağı kâtibi rütbesine yükselirdi.<sup>44</sup> Muharebede yararlılık gösterenler yüksek mevkilere terfi ederdi. Revan ve Tebriz'in fethinde Yeniçeri Ağası vekili olarak hizmet eden Zağarcıbaşı muhasara esnasında gösterdiği başarıdan dolayı 1726 yılında Rumeli beylerbeyi payesi ile İnebahtı sancağına atandı.<sup>45</sup>

Gence'nin fethinin ardından kalede 64. ortaya mensup zağarcılarda bulunmaktaydı. 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihlerinde bu ortaya mensup 629 nefer bulunmaktaydı. Bu neferlerin toplam yevmiyesi 4.579 akçedir. Masar dönemine ait mevaciclerinin 405.241,5 akçe olduğu görülmektedir. 5 Mart- 1 Haziran 1726 (H. 1138 Reşen) tarihleri arasında 64. zağarcı ortasının nefer sayısı 506'ya elde ettikleri toplam yevmiye 3.809 akçeye düşmüştür. 22 Şubat-

<sup>42</sup>BOA, MAD.d. 6123, s. 522-536; BOA, MAD.d. 17016, s. 1- 12; BOA, MAD.d. 6575, s. 354-363.

<sup>43</sup> Uzunçarşılı, *Kapukulu Ocakları*, C. I, s. 199.

<sup>44</sup> Graf Marsilli, *Osmanlı İmparatorluğunun Zuhur ve Terakkisinden İnhitattı Zamanına Kadar Askeri Vaziyeti*, Çev. M. Kaymakam Nazmi, Büyük Erkan-ı Harbiye, Ankara, 1934. s.79.

<sup>45</sup> Uzunçarşılı, *Kapukulu Ocakları*, C. I, s. 201.

21 Mayıs 1727 (H. 1139 Reşen) tarihinde zağarcı ortasındaki nefer sayında düşüşün devam ettiği görülmektedir. Bahsi geçen tarihte 445 nefer bulunmaktaydı. Elde ettikleri toplam yevmiye 3353 akçe olmuştur. Zağarcılar ortasının en büyük zabiti olan Zağarcıbaşının yevmiyesi ise 26 akçe olduğu görülmektedir.<sup>46</sup> Zağarcıların bulunduğu 64. Ortanın dışında Zağarcıbaşı Mustafa Ağa'nın hizmetinde bulunanların belirtildiği ayrı bir cemaat daha bulunmaktaydı. Bu cemaatte 40 nefer mevcuttu ve neferlerin elde ettikleri toplam yevmiye ise 280 akçeydi.<sup>47</sup>

#### 1.1.3. Mütekaitler

Mütekait kelimesi memuriyet ve hizmetten çekilip hizmet süresine göre maaş alan kimseler için kullanılan bir tabirdir.<sup>48</sup> Gence de bulunan cemaat ortalarından mütekaitlerin de görev aldığı görülmektedir. *An cemmati mütekaidin* şeklinde mevacib defterinde kayıtlı bulunan bu askeri sınıfın 5 Mart- 1 Haziran 1726 (H. 1138 Reşen) tarihlerinde 276 neferle görev aldığı görülmektedir. Neferlere toplamda 7.718 akçe yevmiye takdir edilmiştir. Bu meblağın diğer askeri zümrelerle mukayese edildiğinde oldukça yüksek olduğu anlaşılmaktadır. Mütekaitlerin yevmiyelerindeki bu artışın daha önceden harp görmüş tecrübeli olmaları sebebiyle verildiği düşünülmektedir. Emekliye ayrılan yeniçeriler muhtemelen İran savaşlarının başlamasından sonra kalelerde istihdam edilmeye başlamışlardır.<sup>49</sup>

#### 1.1.4. Tüfenkçiler

Cemaat ortalarına mensup olan fakat belirli bir numarası bulunmayan bu ortadır. En büyük zabiti de ser tüfenkçi olarak bilinmektedir. 1623- 1624 yılına ait ulûfe defterinde 92'inci 1663- 1664 yılına ait ulûfe defterinde ise 43'üncü ortası bu cemaatin kumandanının ismi verilmiştir. Osmanlı ordusunda tüfeğin yaygın bir şekilde kullanılması üzerine 16. yüzyılın ortalarında tüfenkçiler ortası kurulmuştur.<sup>50</sup> Gence Kalesi'nde 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihlerinde bulunan bu orta "an cemaat-i tüfenkçiyân hazreti Serasker Mustafa Paşa" şeklinde kayıtlıdır. Gence de bulunan Serasker Mustafa Paşa'nın emrinde 40 nefer tüfenkçi bulunmaktaydı. Tüfenkçilerin toplam yevmiyesi 280 akçeydi.<sup>51</sup>

<sup>46</sup> BOA, MAD.d. 6123, s. 524- 526; BOA, MAD.d. 17016, s. 1-4; BOA, MAD.d. 6575, s. 354-557

<sup>47</sup> BOA, MAD.d. 6575, s. 376.

<sup>48</sup> Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü*, C.III, s.638, 639.

<sup>49</sup> BOA, MAD.d. 17016, s.31-34.

<sup>50</sup> Uzunçarşılı, *Kapukulu Ocakları*, C. I, s. 230,231.

<sup>51</sup> BOA, MAD.d. 6123, s. 553.

#### 1.1.5. Yamaklar

Gence Kalesi'nde görev yapan diğer bir cemaat ortası ise yamaklar olmuştur. Yamak kelimesi yardımcı, çırak, çıraktan sonra gelen işçi anlamına gelmektedir. Osmanlı askeri teşkilatında askeri sınıfların yardımcısı olarak ifade edilmekteydiler. Yamaklar ilk Osmanlı askeri teşkilatını oluşturan yaya ve müsellemlerin yardımcı, ihtiyat gücü iken sonraları yeniçeri ordusunda asker adayı, savaşlara katılan gönüllüler olarak istihdam edilmişlerdir.<sup>52</sup>

Yeniçeri Ocağı ile Yeniçeri Ocağı'nda bulunan topçu, humbaracı gibi askeri birliklerde bulunanlara, kalelerde müstahfiz suretinde görev alan askerlere verilen isimdir.<sup>53</sup> Yamaklar 17. yüzyıldan sonra Osmanlı ordusunun piyade sınıfında istihdam edilmeye başlamıştır. Yeniçerilerin eski nizamı kalmayınca asker ihtiyacı taşradaki sivillerden temin edilmeye çalışılmış ve bir bakıma yeni bir askeri sınıf ortaya çıkmıştır. Osmanlı- Safevi savaşlarının sürdüğü 1630'lu yıllarda yeniçerilere olan talep dolayısıyla yeniçeriler arasında yamak tahriri gerçekleştirilmiştir. Bu durum 18.yüzyıldan sonra hız kazanmış yerel güçlerden farklı olarak sivillerden de yamak alınmaya devam etmiştir. Yamaklar, Yeniçeri Ocağı'na katılmaya aday olan guruplar haline gelmiş ve özellikle de sınır kalelerinde de istihdam edilmeye başlanmıştır.<sup>54</sup> Gence Kalesi'nde bulunan askeri sınıflar içerisinde yamaklarda mevcut olmuştur. Aşağıdaki tabloda Gence de bulunan yamakların sayısı ve yevmiyeleri verilmiştir.

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<sup>52</sup> Feridun Emecen, "Yamak", *TDV İslam Ansiklopedisi*, C. 43, İstanbul, 2013, s. 310.

<sup>53</sup> Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü*, C.III, s.604.

<sup>54</sup> Emecen, "Yamak", s. 310.

**Tablo 2.** Gence de Bulunan Yamaklar<sup>55</sup>

Tarih	Cemaat Ortası	Nefer Sayısı	Yevmiyesi (akçe)	Mukarrer (akçe)
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	Yamakan Katib	104	744	65.844
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	Yamakan Ağa	244	1.711	151.423,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	Yamakan-ı Gence	1.760	12.327	1.090.939,5
5 Mart- 1 Haziran 1726 (H. 1138 Reşen	Yamakan Katib	100	716	63.366
5 Mart- 1 Haziran 1726 (H. 1138 Reşen	Yamakan Ağa	100	700	61.950
5 Mart- 1 Haziran 1726 (H. 1138 Reşen	Yamakan-ı Gence	350	2.450	216.825
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	Yamakan Katib	90	646	57.171
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	Ordu Yamakları	85	596	52.746
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	Yamakan-ı Mütেকaidin	1.107	17.678	1.564.503
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	Yamak Ağa	767	4.141	366.478,5

Yukarıdaki tabloda yamak cemaatinin yamakan-ı katib, yamakan-ı ağa, yamakan-ı Gence, yamakan-ı mütেকaidin ve yamakan-ı ordu şeklinde farklı isimlerle zikredildiği görülmektedir. Bu yamaklar içerisinde en kalabalık gurubu 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihlerinde Gence yamaklarının olduğu görülmektedir. Bahsi geçen Gence yamaklarının mevcudu 1.760'dir. Bu neferlerin elde ettiği yevmiye toplamda 12.327 akçedir. Diğer bir kalabalık yamak grubu ise emekliye ayrılmış yamak mütেকaitleridir. Yamak mütেকaitlerinin mevcudu 1.107'dir. Elde ettiği yevmiye 17.678 akçedir. Sayıca Gence yamaklarından az olmalarına rağmen elde ettikleri yevmiye itibariyle daha fazla olduğu görülmektedir.<sup>56</sup> Emekliye ayrılmış yamakların kalede istihdam edildiği görülmektedir. Tecrübeli olmaları ve daha kıdemli olmaları nedeniyle yevmiyelerinin bu denli artış gösterdiği tahmin edilmektedir.

#### 1.1.6. Serdengeçti Bayraktarları

Düşman içine dalmak ya da kuşatma altındaki bir kaleye ölümünü göze alarak giren fedailer için kullanılan bir tabirdir. Bu askerlere dalkılıç denilmesinin sebebi ise kınlarından sıyrılmış kılıçlarıyla böylesine tehlikeli işlere giriştikleri içindir. Dalkılıçlar, düşmana sağdan, soldan ya da arkadan saldırır, kaleye karanlıkta merdiven kurarak aniden baskınlar düzenler, önlerine

<sup>55</sup> BOA, MAD.d. 6123, s. 536, 555; BOA, MAD. d. 17016, s. 12, 13, 14, 29, 30; BOA, MAD.d. 6575, s. 379-389.

<sup>56</sup> BOA, MAD.d. 6123, s. 536, 555; BOA, MAD. d. 17016, s. 12, 13, 14, 29, 30; BOA, MAD.d. 6575, s. 379-389.



çıkanları kılıçtan geçirir ve görevleri bitmeden asla dönmezlerdi. Bu zorlu görevlerden kurtulan serdengeçtilere üçer beşer akçe terakki verilirdi.<sup>57</sup>

Gence Kalesi'nde görev yapan serdengeçtilerin iki ayrı cemaat halinde teşkil edildiği görülmektedir. Bunlardan ilki emeklilerden yani mütekaide ayrılmış serdengeçtilerdir. Diğerleri ise serdengeçti ağasının emri altında toplanmış olan serdengeçti bayraktarlarıdır. 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihleri arasında Gence de bulunan mütekait serdengeçtilerin 194 neferle kalede vazifeli olduğu görülmektedir. Elde ettikleri yevmiye ise 5.274 akçedir. Serdengeçti Ağasının maiyetinde bulunan nefer sayısı da 315'dir ve neferlere verilen toplam yevmiyenin de 8.656 akçe olduğu belgeden anlaşılmaktadır.<sup>58</sup> 27 Aralık 1728 tarihinde Gence Kalesi'ne 22 bayraktan oluşan 1.657 Serdengeçti neferi görevlendirilmişti. Bu neferlerin toplam yevmiyesi 10.520 akçedir.<sup>59</sup>

#### 1.1.7. Terakkilûyân-ı Sipahi

Kapıkulu Süvari Ocağı, Rumeli Beylerbeyi Timurtaş Paşa'nın tavsiyesi üzerine I. Murad döneminde ilk defa kurulmuştur. İlk kurulan süvari birliği silahdar, ikincisi ise sipahi olmuştur. Ardından sağ ulûfeciler ile sol ulûfeciler, sağ garipler ile sol garipler bölüklerinin 15. Yüzyılın ortalarında kurulmasıyla Kapıkulu süvari bölümü toplam altı bölükten meydana gelmiştir. Kapıkulu süvarileri tıpkı yeniçeri askerlerinde olduğu gibi padişaha bağlı, atlı kuvvetli birlikler olup, derece ve itibar bakımından yeniçerilerden daha üstündüler.<sup>60</sup>

Fatih Sultan Mehmed döneminde kurulan sipahi bölümü savaşta merkezin sağında saltanat sancağının altında ve bazen de padişahın arkasında bulunurdu. Ordu sefere gittiğinde ordunun önünden giderek yolların kontrolünü sağlardı. Sipahi bölümü 20, 30 kişilik 300 bölükten oluşurdu. Her bölümün başında bulunan sipahi zabıtine "bölükbaşı", bütün bölümün başındakine de "sipahi ağası" denilmekte idi.<sup>61</sup> Gence Kalesi'nde 13 Haziran- 6 Aralık 1725 (H. Lezez 1137- Masar 1138) tarihleri arasında 499 nefer terakkilûyan-ı sipahi sınıfına mensup askeri birliğin kalede bulunması gerekmekteydi. Fakat bu askerlerden 199'u mahlûl, 10 neferi çalık<sup>62</sup>, 8 neferi yoklamada bulunmadığı ve 1 neferin de kaçak olması sebebiyle 281 nefer kalede bulunmaktaydı. 281 nefere 8.748 akçe yevmiye takdir edilmiştir. 13 Haziran- 6 Aralık 1725

<sup>57</sup> Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü*, C. III, s. 181.

<sup>58</sup> BOA, *MAD.d. 6123*, s. 556- 560.

<sup>59</sup> BOA, *MAD.d. 6205*, s. 14.

<sup>60</sup> Uzunçarşılı, *Kapıkulu Ocakları*, C. II, s. 137.

<sup>61</sup> Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü*, C. III, s. 230.

<sup>62</sup> Çalık: Yeniçeri Ocağı'ndan kaydı silinmiş olanlar için kullanılan bir tabirdir. İsmail Parlatur, *Osmanlı Türkçesi Sözlüğü*, Ankara, 2006, s. 274.

tarihleri arasında kalede görev yapan sipahilere (H. Lezez 1137, Masar 1138) 702.839 akçe ödeme yapılmıştır.<sup>63</sup>

## 1.2. Sekban Bölükleri

Yeniçeri Ocağı'nın 196 ortasından 34 ortasını sekban bölükleri oluşturmuştur.<sup>64</sup> Sekban ya da diğer adıyla Seymen bölükleri 14. Yüzyılın ortalarında I. Murad döneminde kurulmuş ve Yıldırım Bayezid zamanında geliştirilmiştir. Sekbanlar 1451 yılına kadar müstakil bir ocak halinde bulunmuş, ancak Fatih Sultan Mehmed'in Karamanoğlu İbrahim Bey üzerine sefere çıkarken Sekban Ocağı'nın göstermiş olduğu itaatsizlikler, sefer bahşişi istemeleri gibi nedenlerle yaklaşık 6- 7 bin Sekban Ocağı'nı Yeniçeri Ocağı'na katmıştır. Fatih av hizmetinde bulunmaları için de yaklaşık 500 sekbanı da yanında bulundurmıştır. Yeniçeri ağalarının da sekbanbaşılardan olması kanun haline getirilmiştir. Dolayısıyla 1451 yılından itibaren sekbanlarla yeniçeriler birleştirilmiş ve yeniçeri ortalarından 65. ortayı oluşturmuşlardır ancak sekbanların mevcut sayılarındaki kalabalıktan dolayı Süvari sekbanlarının dışında 34. bölüğe ayrılmışlardır. Böylece, Yeniçeri cemaat ortalarından 65. Cemaat Ortası'nı oluşturan sekban ortaları iki kısımdan meydana gelmiştir. Birinci kısım süvari, ikinci kısım ise 34 bölükten oluşan piyade birlikleri idi. Sekban bölüklerinden 18. bölüğe kâtib-i sekban, kethüdanın olduğu bölüğe ise kethüdây- 1 sekbanan denilmiştir. Sekban bölükleri içerisinde yer alan 33. bölüğe Avcı, komutanına ise serşikârî denilmiştir. Avcı bölüğü sekban bölükleri içerisinde en itibarlı bölük olmuş, devlet adamlarının ve ocak ağalarının çocukları bu bölükte yer almıştır.<sup>65</sup> Gence Kalesi'nde bulunan sekban bölükleri aşağıdaki tabloda gösterilmiştir.

**Tablo 3.** Gence de Bulunan Sekban Bölükleri<sup>66</sup>

Tarih	Sekban Bölükleri	Nefer Sayısı	Yevmiye	Mukarrer (Akçe)
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	26. Sekban Bölüğü	144	1.030	91.155
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	32. Sekban Bölüğü	173	1.223	108.235,5
5 Mart- 1 Haziran 1726 (H. 1138 Reşen)	26. Sekban Bölüğü	114	826	73.101
5 Mart- 1 Haziran 1726 (H. 1138 Reşen)	32. Sekban Bölüğü	104	735	65.047,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	26. Sekban Bölüğü	104	750	66.375
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	32. Sekban Bölüğü	102	726	64.251

<sup>63</sup> BOA, C.AS. 25901.

<sup>64</sup> Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü*, C. III, s. 148.

<sup>65</sup> Uzunçarşılı, *Kapukulu Ocakları*, C. I, s. 162- 164.

<sup>66</sup> BOA, MAD. d. 6123, s. 545-549; BOA, MAD.d. 17016, s. 24,25; BOA, MAD.d. 6575, s. 372-376.

9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihleri arasında Gence Kalesi'nde bulunan en kalabalık bölüğün 32. Sekban bölüğü olduğu görülmektedir. 32. sekban bölümünde bulunan nefer sayısı 173'dür. Fakat bu sekban bölümündeki nefer sayısının 22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen) tarihleri arasında 102'ye düştüğü görülmektedir. Bu düşüşte neferlerin ölüm, azil ya da başka bir sekban bölümüne geçiş yaptığı tahmin edilebilir.

### **1.3. Ağa Bölükleri**

Fatih Sultan Mehmed sekban bölüklerinin disiplinsizce davranmaları üzerine önceleri müstakil olan bu ocağı cemaat ortalarına katarak nüfuzunu kırmıştır. II. Bayezid döneminde Yeniçerilerin itaatsizliklerinin baş göstermesi ve sekban bölüklerinin disiplinsizce davranışlarından dolayı ağa bölükleri adında devşirmelerden oluşan 61 bölük meydana getirilmiştir. Kanuni döneminde de itibarları gittikçe artmıştır. Böylece yeniçeriler yaya veya cemaat ortalarından, sekban ve ağa bölükleri olmak üzere üç kısımdan meydana gelmiş oldu. Ağa bölüklerinin her birisine 50 nefer alınmış ve bölüklerine komutan olarak bölükbaşı, birer odabaşı, vekilharç, bayrakdar, müteferrika, aşçı tayin edilmiştir. 61 bölümün 1 ile 41. bölümüne kadar olanlar yeni odalarda tahsis edilmiş, 41'den 61'e kadarı da eski odalarda yer almıştır. Ağa Bölüklerinin en büyük zabitlerini aşağıdan yukarıya doğru bir hiyerarşi yaptığımızda bunların; baş bölükbaşı, kethüda yeri, muhızırbaşı, başçavuş, kethüda bey, kul kethüdası şeklinde bir hiyerarşi içinde yer almışlardır. Ağa bölükleri oluşuncaya kadar Yeniçeri Ocağı Kethüdası'nın ve başçavuşun belirli bir odası bulunmamakta idi. Ağa bölükleri oluştuktan sonra 1. Ağa bölümü yeniçeri kethüda odası olmuştur. 5. Ağa Bölümü'ne ise ser çavuş (başçavuş) denilen ocak komutanına oda olmuştur. Başçavuş, kethüda beyinden sonra Yeniçeri Ocağı'nın en nüfuzlu ağasıdır. Başçavuş ağa kapısında durarak davası ya da herhangi bir işi olanları kethüda beyine bildirirdi. Muhızır ağanın bölük numarası ise zaman zaman değişmiştir. Kethüda yeri ise bazen 7 ve 33 ve bazen de 31 ile 50. odada yer almıştır. 54. Bölük ise sermuâllim-i talimhâne denilen ocak talimci başının odası olmuştur. Gence de bulunan ağa bölükleri aşağıdaki tabloda gösterilmiştir.

**Tablo 4.** Gence de Bulunan Ağa Bölükleri<sup>67</sup>

Tarih	Ağa Bölükleri	Nefer Sayısı	Yevmiyesi (akçe)	Mukarrer (akçe)
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	3. Bölük	272	1967	174.079,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	10. Bölük	261	1890	167.265
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	21. Bölük	395	2809	248.598,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	Bölük-ü Baş Çavuş	15	105	9.292,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük ....Ahmed Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Malatyalı Osman Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük İbrahim Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Oltulu Ahmed Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Ahmed Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Erzurumlu Ali Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Hüseyin Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Eyüb Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Ahmed Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Yusuf Çavuş	5	35	3.097,5

<sup>67</sup> BOA, MAD. d. 6123, s. 527-553; BOA, MAD.d. 6575, s. 364-379.

9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5.Bölük Ahmed Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Ahmed Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Mustafa Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Süleyman Çavuş	5	35	3.097,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Süleyman Çavuş	15	105	9.292,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Mustafa Çavuş	15	105	9.292,5
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Süleyman çavuş	10	70	6.195
9 Eylül- 6 Aralık 1725 (H. 1138 Masar)	5. Bölük Ahmed Çavuş	15	105	9.292,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	3. Bölük	151	1120	99.120
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	10. Bölük	133	992	87.792
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	21. Bölük	212	1.529	135.316,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	Bölük-ü Baş Çavuş	15	105	9.292,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Belgradlı (?) Ahmed Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Malatyalı Osman çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük İbrahim Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Oltulu Ahmed Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Erzurumlu Ali Çavuş	5	35	3.097,5

22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Hasan çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Ahmed Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Ahmed Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Yusuf Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Ahmed Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Mustafa Çavuş	5	35	3.097,5
22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen)	5. Bölük Süleyman Çavuş	5	35	3.097,5

Yukarıdaki tabloda 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihleri arasında 3., 10. ve 21. bölüğün bulunduğu görülmektedir. Bu bölükler içinde 21. Bölüğün sayıca daha fazla olduğu görülmektedir. 21. Bölükte 395 nefer bulunmaktadır. 10. bölükte ise 261 nefer mevcuttu. Bölük ağalarına başçavuşun komuta ettiği ve 5. bölüğün kumandanı olduğu görülmektedir. 5. bölük kendi içinde alt bölüklere ayrılmış ve her bölükte 5 neferin bulunduğu görülmektedir. Bu bölüklere komuta edenlerin isimlerinin yanında memleketleri de yazılmıştır. 9 Eylül- 6 Aralık 1725 (H. 1138 Masar) tarihleri arasında Gence de ağa bölüklerinde istihdam edilen nefer sayısı toplamda 1.068'dir. 22 Şubat- 21 Mayıs 1727 (H. 1139 Reşen) tarihleri arasında ise ağa bölüklerde bulunan nefer sayısı 571'e düşmüştür.

## SONUÇ

Gence sahip olduğu jeopolitik konumu itibariyle tarihi ipek yolu üzerinde Bakü ile Batum arasında işlek bir yol güzergâhının kavşak noktasında bulunmaktadır. Bu özelliğinden dolayı bölge tarihi süreçte siyasi, ekonomik ve askeri anlamda egemen güçlerin sürekli hâkimiyet mücadelesine sahne olmuştur. Safevi Devletinde ortaya çıkan iç karışıklıklar ve Afganlı Mir Mahmud'un İsfahan'ı ele geçirmesi ve Rusların Kafkasya da ilerlemesi üzerine Osmanlı orduları Kafkasya, İran'ın batı ve güney topraklarında ilerledi ve önemli şehirleri zapt etti. Bu

şehirler arasında Gence de bulunmaktaydı. Gence'nin fethine müteakip pek çok askeri birlik kaydırılmıştı. Bu askeri birliklerin cemaat ortaları, sekban ve ağa bölüklerinden müteşekkil olduğu görülmektedir. Cemaat ortaları içerisinde 64. orta olan zağarcılar ortası ile muhtelif numaralara sahip deveçiler ortasının kalede vazifeli oldukları arşiv kayıtlarından anlaşılmaktadır. Zağarcılar ortası Osmanlı ordusu içinde oldukça itibarlı bir sınıftı. Zağarcıbaşının günlük yevmiyesi ise diğer zabıtlere göre oldukça yüksekti. Deveçiler ortası ordunun ağırlıklarını taşıma, siper kazmak gibi görevleri ifa etmekteydi. Gence Vali Mustafa Paşa'nın maiyetinde tüfenkçi birlikleri de bulunmaktaydı. Bu tüfenkçi ortası 40 neferden oluşmakta ve 280 yevmiye tasarruf etmekteydi. Emekliye ayrılmış mütekait sınıfına mensup olanlar da Gence Kalesi'nde istihdam edilmiştir. Elde ettikleri yevmiyeler ise deveçiler ortası ve tüfenkçilere göre oldukça yüksekti. Yamak cemaati içinde bulunan mütekaitler ile Gence yamaklarının gelirleri ise diğer ağa ve kâtibin bulunduğu yamaklara göre oldukça yüksek olduğu görülmektedir. Sekban bölüğünde bulunan nefer sayısının ise cemaat ortalarına ve ağa bölüklerine nispeten daha az olduğu anlaşılmaktadır.

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## **GÜVEN VE GÜVENİ KÖTÜYE KULLANMA SUÇU**

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### **ÖZET**

Sosyal ilişkilerin kurulması ve sürdürülmesinde güven önemli bir dayanak olmaktadır. Sağlıklı bir toplumun olması toplum içindeki güven duygusunun güçlü olmasına bağlıdır. Güven duygusunun ise suç ile yakın bir ilişkisi vardır. Güvenin kaybolduğu toplumlarda suç oranları yüksek olmaktadır. Bu bağlamda güvenin tahkim edilmesi, suçun azalmasında önemli bir faktör olduğu anlaşılmaktadır. Ayrıca suçluya yönelik uygulanacak yaptırımlar da adalet ve emniyet kurumlarına olan güvenin artmasına katkı sağlamaktadır. Güven, toplumsal hayat içerisinde olumlu işlevlere sahiptir. Bu işlevler sayesinde toplum bütüncü bir yapıya dönüşmekte ve toplumsal dayanışma sağlanmaktadır. Toplumsal hayat içerisinde güvenin inşasında bazı kişiler ve kurumlar referans olabilmekte, bu noktada söz konusu unsurların istismarı üzerinden mağduriyetler oluşabilmektedir. Bazı suçların temelinde, mağdurların söz konusu unsurlara bağlılıklarının istismar edildiği anlaşılmaktadır. Örneğin, din, aile, devlet, önemli şahsiyetler, milli ve manevi değerler kullanılmak suretiyle ayrı bir suç işlenmektedir. Suçluların bu unsurlara herhangi bir bağlılığı olmamasına rağmen, mağdurların duygularını istismar ettikleri ve söz konusu unsurları kullandıkları görülmektedir. Araştırmamız, literatür taramasından elde edilen verilere dayanmaktadır. Çalışmada, “güven” ve “güveni kötüye kullanma suçu” kavramsal ve kuramsal temelde ele alınmaktadır. Burada güveni kötüye kullanma suçu üzerinden güven ve suç ilişkisi üzerine durulmaktadır. Kurulan veya varolan güvenin istismarı sonucunda güveni kötüye kullanma suçu oluşmaktadır. Buradan hareketle güvenin kötüye kullanılması suçunun kanundaki tanım ve tasnifi irdelenmektedir. Ayrıca güveni kötüye kullanma, güven duygusunu zayıflatma ile ilgili alınması gereken önlemler hakkında öneriler sunulmakta ve güvenin oluşmasında istismar edilen unsurlar da tasnif edilmektedir.

**Anahtar Kelimeler:** Güven, Sosyal Güven, Güven İstismarı, Güveni Kötüye Kullanma Suçu

## **TRUST AND THE CRIME OF ABUSE OF TRUST**

### **ABSTRACT**

Trust is an important basis for establishing and maintaining social relations. The existence of a healthy society depends on the strong sense of trust in the society. Confidence has a close relationship with crime. In societies where trust is lost, crime rates are high. In this context, it is understood that strengthening trust is an important factor in reducing crime. In addition, the sanctions to be applied against the criminal also contribute to the increase of trust in the justice and security institutions. Trust has positive functions in social life. Thanks to these functions, the society turns into a holistic structure and social solidarity is ensured. Some individuals and institutions can be a reference in the construction of trust in social life, and at this point, grievances may occur through the abuse of these elements. At the base of some crimes, it is understood that the victims' commitment to these elements is abused. For example, a separate crime is committed by using religion, family, state, important personalities, national and moral values. Although the criminals do not have any attachment to these elements, it is seen that they abuse the feelings of the victims and use the mentioned elements. Our research is based on data obtained from literature review. In the study, "trust" and "crime of abuse of trust" are discussed on a conceptual and theoretical basis. Here, the relationship between trust and crime is emphasized through the crime of abuse of trust. As a result of the abuse of the established or existing trust, the crime of abuse of trust occurs. From this point of view, the definition and classification of the crime of abuse of trust in the law is examined. In addition, suggestions are made about the measures to be taken regarding abuse of trust and weakening the feeling of trust, and the elements that are abused in the formation of trust are also classified.

**Keywords:** Trust, Social Trust, Abuse of Trust, Crime of Abuse of Trust

## **GİRİŞ**

İnsanların birbirine güvendiği toplumsal hayat istenilir bir durumdur. Toplumsal hayat içerisinde güvenin azalması, güvenin kötüye kullanma ile yakın bir ilişkisi vardır. Dünya değerler anketinde insanların çoğuna güvenme durumu gittikçe olumsuz yönde değişime uğramaktadır. Artık insanların güven alanın yaşadıkları olumsuz tecrübe ve deneyimler kişilerarası ilişkilerde güvenin azalmasına neden olmaktadır.

Güveni kötüye kullanma suçu temelde güvenin istismarına dayanmaktadır. Aslında güven ilişkileri üstündür ve değerlidir. Ancak bazı suçlular dahi önce güven oluşturarak insanların güvenini kazanmakta ve daha sonra kişilerin sermayesini ve birikimini kendi zilyetine geçirmektedir. Ponzi oyunu, piramit satış, dolandırıcılık, saadet zinciri, titan gibi isimlerle ile işlenen dolandırıcılık suçlarının temelinde yine güven oluşturup istismar etmek vardır.

Çalışma güven ve suç ilişkisi irdelenmekte ve kavramsal bir analiz ile güven ihmalinin ve istismarının suça dönüşmesini ele almaktadır. Bu bağlamda güveni kötüye kullanma suçu açıklanmaktadır.

## **Güven ve Sosyal Güven**

Sosyal hayat içerisinde insanlar arasında ilişkileri oluşması ve sürdürülmesinde güven oldukça önemli bir işlev üstlenmektedir. Güven toplumsal birlikteliğinde esas olmakla birlikte güven olmadığı toplumsal çöküntüye de neden olabilmektedir. Tecim (2011), güvenin, sosyal sermayenin bir ögesi olarak görüldüğünü ve ağ ögesiyle sosyal sermaye daha anlaşılır hale geldiğini ifade etmektedir.

Sosyal sermaye, esasında toplumsal ilişkilerin gücüne dayanmaktadır. Bu çerçevedeki değerlendirmelere bakıldığında, insan ilişkilerini en geniş anlamıyla toplumsal gelişmenin ve dinamizmin kaynağı sosyal sermaye olarak görülmektedir. Başka bir ifade ile sosyal sermaye, topluma ya da topluluğa ortak bir benlik inşa eden, birey ve toplum/topluluk arasındaki bağı güçlendiren esaslı unsurun adıdır. (Aydemir ve Tecim, s. 2012: 45). Toplumsal hayatın varlığı, güvenin tesis edilmesi ile yakın bir ilişki içerisinde.

İnsanların amaç ve hedeflerine ulaşma noktasında sosyal ilişkiler önemli yer tutar. Sosyal ilişkiler toplumsal hayat için gerekli olmanın yanında hayatı kolaylaştırmada rol oynamaktadır. Sosyal hayat içerisinde gerçekleşen ilişkiler birer sosyal sermayeye dönüşürken, aynı zamanda gönüllü birliktelikler, sosyal ağlar, normlar ve güvenilirlik birer sosyal sermaye biçimi olarak karşımıza çıkmaktadır (Aydemir, 2011: s. 62). Sosyal sermaye insan birlikteliklerini temsil

etmekte ve bu temsiliyet içerisinde iletişim, etkileşim ve güven önemli unsurları oluşturmaktadır.

Sosyalleşme, insanların birbirileri ile ilişkilerinde norm ve kurallara bağlı kalırken gelişmektedir. Daha doğru bir ifade ile bireyler birbirilerinden norm ve kurallara uyması beklemektedir. Ayrıca sosyal sistem içerisinde norm ve kural dışı davranışların sergilenmesi için söz konusu davranışları gerçekleştirenlerin müeyyidelerle cezalandırılacağına yönelik kanaat oluştuğunda insanlar, daha çok güven duyma eğilimindedir. Bu ilişkisel davranış yüksek seviyede sosyal güveni sağlar (Aytaç, Çarkoğlu ve Ertan, s. 2017: 4). Sosyal güven, insanların nerede, ne zaman ve nasıl davranması konusunda ipucu vermektedir. İnsanların belli durumlarda nasıl davranışlar sergileyeceğinin bilinmesi sosyal güvenin varlığına işaret etmektedir.

Güven duygusu ile sosyal ilişkileri arasında doğrusal bir ilişki söz konusudur. Güven azaldıkça sosyal ilişkilerde bir gerileme ortaya çıkmaktadır. Fukuyama'nın sosyal sermayeyi güven üzerinden değerlendirmekte ve sosyal sermayeyi "bir toplumda ya da bir toplumun belli bölümlerinde güvenin hüküm sürmesinden doğan kapasite" olarak açıklamaktadır. Sosyal sermaye sadece benzer sosyal kesimlerin birbirine güvenmesi anlamını taşımamaktadır. Sosyal sermaye aynı zamanda yabancılara yönelik de bir güven duygusunun gerekliliğini ortaya koymaktadır (İlhan ve Fırat, 2019: 365).

İnsanlar, davranışlarını ortaya koyarken güven temelinde hareket edebilmektedir. Başka kişilerin sonraki söz, eylem ve pratiklerini göz önünde bulundurmamak suretiyle beklentiler içine girilebilmektedir. İnsan davranışlarının bazı temel nitelikleri güveni önemli hale getirmektedir. Aslında insanlar arasında kurulan ilişkiler başkasına güven temelinde ilerlediğini söylemek mümkündür. Çünkü onların davranacağını kestirmekteyiz ve bu kestirim güveni oluşturmaktadır (Turner, 2020: 391).

Sosyal ilişkilerin erozyona uğraması ve dejenere olması, ilişkilerin gerilemesine ya da bozulmasına neden olmaktadır. Bu durum, ilişkide güven yerine şüphe ve kuşkunun ağırlık kazanması ile ilintilidir. Bireyler, ilişkilere başlamak için aralarında güveni sağlaması gerekmektedir. Güvenin sağlanamaması ya da gerilemesi halinde sosyal ilişki bu durumdan olumsuz etkilenmesi kaçınılmazdır (Tan, 2021).

Sosyal ilişkilerinde güven bazen olumsuz kullanılmaktadır. Güven istismarı olarak karşımıza çıkan bu durum insanlar arasındaki güvenin azalmasına neden olmaktadır. Güven istismarı,

nihayetinde bir suça dönüşmektedir. Güvenin suça dönüşmesi güveni kötüye kullanma suçunun oluşmasına neden olmaktadır.

### **Güveni Kötüye Kullanma Suçu**

Güvenin kötüye kullanılması suça dönüşmektedir. Güveni kötüye kullanma suçu, 5237 sayılı Türk Ceza Kanununun ilgili maddelerinde açıklanmaktadır:

*“Başkasına ait olup da, muhafaza etmek veya belirli bir şekilde kullanmak üzere zilyedliği kendisine devredilmiş olan mal üzerinde, kendisinin veya başkasının yararına olarak, zilyedliğin devri amacı dışında tasarrufta bulunan veya bu devir olgusunu inkar eden kişi, şikayet üzerine, altı aydan iki yıla kadar hapis ve adli para cezası ile cezalandırılır.*

*Suçun, meslek ve sanat, ticaret veya hizmet ilişkisinin ya da hangi nedenden doğmuş olursa olsun, başkasının mallarını idare etmek yetkisinin gereği olarak tevdi ve teslim edilmiş eşya hakkında işlenmesi halinde, bir yıldan yedi yıla kadar hapis ve üçbin güne kadar adli para cezasına hükmolunur”.*

İlgili kanunun güveni kötüye kullanma suçu tanım ve açıklamasına bakıldığında maddi zarar üzerinden açıklandığı ve bu durum esas alınarak cezai yaptırımlar uygulandığı anlaşılmaktadır. Güvenin oluşumu kolay olmadığı gibi belli bir süre ve emek sonucunda oluşmaktadır. Bu sebeple güven istismarının ciddi yaptırımlar ile karşılık bulması gerektiği düşünülmektedir. Bu bağlamda söz konusu suçun mahiyeti ve kapsamı gözden geçirilerek ve yaptırımların daha işlevsel hale getirilerek güvenin tahkim edilmesi ile mümkün olabilir.

Güveni kötüye kullanma suçu ticaret, aile ve sosyal çevre ilişkilerinde karşılaşılmaktadır. Ticarete, kişiye ve nesneye duyulan güvenin boşa çıkması sonucu şikayetler oluşabilmektedir. Aile ilişkileri, güvene dayalı olması tabiidir. Burada malın birisine devredilmesi ve sonradan teslim edilmemesi ya da malın kullanımı konusunda hakların sahibine teslim edilmemesi sonucunda aile bireyleri arasında güveni kötüye kullanma suçu oluşabilmektedir. Bir diğer husus ise sosyal çevre ile kurulan güvenin istismar edilmesi sonucunda maddi zararlar oluşmakta ve kişilerarası ilişkilerin zarar görmesine neden olabilmektedir. Bu çerçevede sosyal sermayenin önemli bir unsuru olan güvenin, sosyal çevre içerisinde istismar edilmesi sosyal sermayenin zarar görmesine neden olmaktadır. Sosyal sermaye bağlarının güçlü ve sağlam olması sosyal güvenin tahkim edilmesi ile yakın bir ilişki içerisindedir. Hewitt ve Shulman' ın (2019: 278) ifadeleriyle sosyal düzen, insanların güveni ihlal edip zorunlulukları yerine getirmemesiyle tehdit altındadır. Biz istemsiz olarak koordine sosyal eylemlere girmek, sosyal

düzeni sağlamak ve devam ettirmek için başkalarıyla güven ilişkileri temelinde bağlı kalmaktayız.

## **SONUÇ**

Güven, toplumsal hayat içerisinde belirleyici bir unsur olarak karşımıza çıkmaktadır. İnsanların birbirine şüphe duymadan bağlanma duygusuna ve beklendi davranışların ortaya çıkması bağlamında güven kişilerarası ilişkilerin oluşması ve sürdürülmesinde etkin bir işleve sahiptir. Ancak güven, suçlular tarafından olumsuz yönde kullanarak insanların mağdur olmasına neden olmaktadır. Bu durum güven istismarı olarak açıklamak mümkündür. Güven istismarı, maddi zararı çıkarması sebebiyle güveni kötüye kullanma suçu ortaya çıkmaktadır. Ancak güveni kötüye kullanma sadece maddi boyut ile açıklamak yetersiz kalacağı düşüncesi önemlidir. Güvenin kötüye kullanma sonucunda toplumsal hayat içerisinde güven duygusu zarar görmekte ve insanların birbirine güveni azalmaktadır. Bu durum sosyal hayatı olumsuz etkilediği gibi bireylerde kimseye güvenmeme duygusunu ortaya çıkarmaktadır.

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## **ÖĞRETMEN ADAYLARININ EĞİTİMDE WEB 2.0 TEKNOLOJİLERİ KULLANIM PERFORMANSLARININ ARTIRILMASINA YÖNELİK BEKLENTİLERİNİN BELİRLENMESİ**

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### **ÖZET**

Öğretim ve öğrenme ortamlarında planlı ve disiplinli web teknolojilerinin kullanım sıklığı artmaktadır. Bunun yanında mevcut teknolojileri istendik seviyede kullanamayan, öğretimsel amaçları destekleyecek kapsamda bu teknolojilerden yararlanmayan öğreticiler de bulunmaktadır. Bu bağlamda öğreticilerin öğrenme ortamlarında web 2.0 teknolojilerinden yararlanması için asgari yeterlik ve motivasyon kaynaklarının belirlenmesi değerli görülmektedir. Bu araştırma konusu web 2.0 araçlarını mutlak yararlı ve zorunlu görüldüğü gerekçesiyle değil; kullanım durumlarının ortaya çıkmasını sağlayacak beklentilerin belirlenmesi üzerine ortaya çıkmıştır. Bu araştırmanın amacı öğretmen adaylarının web 2.0 teknolojileri kullanım performanslarının artırılmasına yönelik beklentilerinin belirlenmesidir. Nitel araştırma ile desenlenen bu çalışmada yarı yapılandırılmış görüşme formu veri toplama aracı olarak kullanılmıştır. Katılımcıların farklı web 2.0 teknolojilerine yönelik görüşleri istekli, ılımlı, mesafeli olarak belirlenmiştir. Kullanım performanslarının artırılmasına yönelik beklentileri ise teknoloji kabul kullanım, tekno-stress, teknik altyapı, uygulamalı kullanım deneyimi kategorilerinde izlenmiştir. Bu doğrultuda öğretmen adayları bilişim teknolojileri, öğretim teknolojileri gibi derslerde aldıkları teorik bilginin gerçek bir sınıf ortamında uygulanmasının önemine işaret etmiştir. Teknoloji kullanım deneyimlerinin sosyo ekonomik düzeyle ilişkilendirilerek düşük ve orta seviyede olanların teknoloji kabul ve kullanım seviyelerinde de düşüş görülmektedir. Okullarda gerçekleştirilen etkileşimli tahta uygulamalarının artmasıyla birlikte bilgisayar laboratuvarlarının azalması veya kapatılması ile teknik altyapı yeterliği konusunda endişeler beraberinde gelmektedir. Öğretmen adaylarının son olarak web 2.0 teknolojileri hakkında bilgi sahibi oldukları alanlarda ve uygulamalarda dahi kullanım yetersizlikleri ve düşük motivasyon durumları dikkat çekmiştir. Bu kapsamda web 2.0 teknoloji uygulamalarının öğretici ve öğrenen rollerinde uygulanarak deneyimin artırılması gerekliliğinin altı çizilmiştir. Sonuç olarak öğretmen adayları teorik bilginin gerçek yaşamla ilişkilendirilmesinde gerçek sınıf etkinlikleriyle desteklenmesi gerektiğini ve kullanım sırasında yaşanacak problemlerde teknik desteğin sağlanılmasının önemi açığa çıkmıştır.

**Anahtar Sözcükler:** Web 2.0, Öğretim, Teknolojik Yeterlik, Motivasyon

**DETERMINING THE EXPECTATIONS OF TEACHER CANDIDATES FOR  
INCREASING THE PERFORMANCE OF USING WEB 2.0 TECHNOLOGIES IN  
EDUCATION****ABSTRACT**

The frequency of use of planned and disciplined web technologies in teaching and learning environments is increasing. In addition, there are also instructors who cannot use existing technologies at the desired level and do not benefit from these technologies to support educational purposes. In this context, it is considered valuable to determine the minimum proficiency and motivation resources for instructors to benefit from web 2.0 technologies in learning environments. The subject of this research is not on the grounds that web 2.0 tools are considered absolutely useful and necessary; It emerged on the determination of the expectations that will lead to the emergence of use cases. The aim of this research is to determine the expectations of pre-service teachers to increase their performance in using web 2.0 technologies. In this research, which was designed with qualitative research, semi-structured interview form was used as a data collection tool. The opinions of the participants on different web 2.0 technologies were determined as willing, moderate and distant. Expectations for increasing usage performances were followed in the categories of technology acceptance, use, techno-stress, technical infrastructure and hands-on usage experience. In this respect, pre-service teachers pointed out the importance of applying the theoretical knowledge they received in courses such as information technologies and instructional technologies in a real classroom environment. By associating technology use experiences with socio-economic level, there is a decrease in the technology acceptance and use levels of those at low and medium levels. With the increase in interactive whiteboard applications in schools, the decrease or closure of computer laboratories and concerns about technical infrastructure adequacy. The inadequacies and low motivation of teacher candidates, even in the fields and applications where they have knowledge about web 2.0 technologies, attracted attention. In this context, the necessity of increasing the experience by applying web 2.0 technology applications in the roles of instructor and learner has been underlined. As a result, it was revealed that pre-service teachers should be supported with real classroom activities in associating theoretical knowledge with real life and the importance of providing technical support for problems that may arise during use.

**Keywords:** Web 2.0, Training, Technological Competence, Motivation

## 1. GİRİŞ

Öğretim teknolojileri zamanla öğrenme ortamlarının sıklıkla tercih edilen bir parçası olmuştur. Dijital teknolojilerin öğretim amaçlı kullanım hızı ikinci dünya savaşından bu yana ivmelenmektedir. Bu durumun temel gerekçesi öğretim teknolojilerinin öğrenme süreçlerine olan katkısıdır. Bu katkılar şu şekilde özet bir listede sunulabilir;

- Bireysel farklılıklara önem verilmesi (Arslan ve Bilgin, 2020)
- Kalıcı ve transfer edilebilir öğrenme çıktıları sunması (Uygun ve Kılıçkara, 2019)
- Farklı öğrenme stillerine uygun içerikler sunulabilmesi (Shemshack, 2021)
- Öğrenmede mekân ve zaman sınırlılığını esnetebilmesi (Fidalgo vd., 2020)
- Tekrar kullanılabilirlik (Dumford ve Miller, 2018)
- Kolay erişilebilirlik (Crompton ve Sykora, 2021)
- Uygulaması güç ve maliyetli uygulamaların simülasyon olarak hazırlanmasına aracılık etmesi (Barth vd., 2022; So vd., 2019)
- Öğrenen ilgi ve motivasyonunu kazanabilmesi (Saban ve Çelik, 2018)

Başlıca bu gerekçeler olmak üzere öğretim teknolojisi araçları öğrenmenin gerçekleşmesi sürecinde önemli bir araçtır. Bu teknolojiler zaman zaman öğrenmenin tek aracı olabilmektedir. Nitekim öğretmenin fiziki veya sanal olarak bulunmadığı ortamlarda da öğrenme gerçekleşebilmektedir. Bu durum iyi bir öğretim tasarımının öğrenme aracına entegrasyonu ile mümkün olabilmektedir (Yücel, Acun, Tarman, & Mete, 2010).

Öğrenen tarafında öğrenme sürecinin anlamlandırılması için temel bir takım ölçütlerin yerine getirilmesi kritik öneme sahiptir. Dikkat çekme ve ilgiyi sürdürebilme için öğrenme ortamının arayüzü, işlevselliği, etkililiği ve öğrenen şeması ile benzeşimi değerli görülmektedir (Saban ve Çelik, 2018). Öğrenen kendisi için basit, somut ve tanıdık bir ortamda harici bilişsel yüklenmeden muaf olmaktadır. Böylelikle öğrenme odağı öğrenene aktarılabilir. Bunun yanında öğrenen dijital teknolojilerle zengin bir çevrede bulunmasa dahi öğrenme ortamının olanakları ile yeterli dijital deneyime erişebilmekte ve sonraki öğrenme ortamlarında yaşayacağı yabancılik hissini en aza indirgeyebilmektedir. Bu araştırmada eğitsel dijital teknolojileri araçları arasında yer alan web 2.0 araçlarının öğretmen adayları tarafından kullanım durumlarının belirlenmesi ve kullanım performanslarının iyileştirilmesi için beklentilerinin analizi hedeflenmektedir. Bu durum analizi ile geleceğin öğretmenlerinin kendi sınıflarında etkili, işlevsel ve kalıcı öğrenmelere hizmet edebilecek web teknolojilerine yaklaşımlarının iyileştirilmesi için öneriler hazırlanması mümkün olabilecektir.

## 2. ARAŞTIRMA VE BULGULAR

Bu araştırmada nitel araştırma desenlerinden durum araştırmasından yararlanılmıştır. Durum araştırması ile alanı belirli bir konunun derinlemesine incelenmesi hedeflenmektedir (Creswell vd., 2007; Merriam, 2002). Araştırmanın çalışma grubunu 2021-2022 öğretim yılında Siirt Üniversitesi Eğitim Fakültesinde öğrenim görmekte olan 12 öğretmen adayı oluşturmaktadır. Çalışma grubunun belirlenmesinde amaçlı örneklem yöntemleri arasında yer alan tipik durum örnekleme kullanılmıştır. Patton (2014) tipik durum örnekleme farklılık içeren durumların ortalama ve benzeşik yapısının temsilinde önem taşıdığı ifade etmektedir. Çalışma grubu belirlenirken öğretmen adaylarının öğretim teknolojileri dersini almış olma koşulu aranmıştır. Böylelikle araştırma odağına hizmet edebilecek asgari bilgi ve beceri seviyesi katılımcılarda gözetilmiştir. Araştırmaya katılan öğretmen adaylarına ait bölüm ve sınıf düzeyi verileri tablo 1’de özetlenmiştir.

Bölüm	Sınıf düzeyi	Katılımcı sayısı
Fen Bilgisi Öğretmenliği	3	1
İlköğretim Matematik Öğretmenliği	4	4
Rehberlik ve Psikolojik Danışmanlık	4	2
Sınıf Öğretmenliği	3	4
Sosyal Bilgiler Öğretmenliği	4	1

**Tablo 1.** Çalışma grubuna ait bölüm ve sınıf seviyeleri verileri

Araştırmada veri toplama aracı olarak yarı yapılandırılmış görüşme formunda yararlanılmıştır. Görüşme formunda alanyazın taraması yapılmış sonrasında web 2.0 araçlarının işlevleri gözetilerek sorular hazırlanmıştır. Verilerin analizinde içerik analizinden yararlanılmıştır. Katılımcıların web 2.0 teknolojilerini meslek yaşantılarında kullanım durumlarına yönelik motivasyonel durumları istekli, ılımlı ve mesafeli temalarında izlenmiştir. Bu durum tablo 2’de özetlenmiştir.

**Tablo 2.** Öğretmen adaylarının web 2.0 teknolojilerini kullanma motivasyonlarına yönelik görüşleri

ISTEKLI	ILIMLI	MESAFELI
Niyet+Motivasyon	Kararsız/Farkında/ Değişken Bilgi Düzeyi	Direnç/Gerekçe/Kilif

Tablo 2’den anlaşılacağı üzere katılımcılar farklı kullanım motivasyonu seviyelerinde yer almaktadır. Bir katılımcının “*Şimdiki öğrenciler her şeyi biliyor hocam. Okulun imkanı olursa*

*onları teşvik etmek için bende öğrendiklerimi kullanırım.*” ifadesi kullanım niyetinin oluşunu ve deneyimin kullanma motivasyonunu tetiklediğine yönelik işaretçisi olmaktadır. Bu durum Usta ve Korkmaz (2010) çalışmaları ile tutarlılık göstermektedir. İlgili çalışmada öğretmen adaylarının teknoloji algı ve motivasyonlarının olumlu olduğu izlenmiştir. Farklı bir katılımcının *“Ben öğrenmeye çalışıyorum. Öğreniyorum da. Ama sanki biri buradan ders anlatacak veya uygulama yapacak, ben kullanıcı olacaktım gibi hep”* görüşü ise kullanımın etkisine yönelik mutlak bir görüşün olmadığı ancak öğrenme konusunda ılımlı bir etkinin varlığına inanç olarak nitelenebilir. Bununla birlikte bir katılımcının *“Öğretmen olunca bizim alanda çok kullanılmıyor hocam, kullanmadan da öğretebilirim.”* ifadesi, eğitsel web teknolojilerinin kullanımına yönelik güçlü bir gerekçe olmayışının ve kullanım konusunda dirençli bir yaklaşımın göstergesi niteliğindedir.

Meslek yaşantılarından etkili web 2.0 araçlarının kullanım performanslarının artırılmasına yönelik beklentileri noktasında ise katılımcılar belirli noktaların altını çizmiştir. Teknoloji kabul kullanım seviyelerinin iyileştirilmesi için etkinliklerin hazırlanması ve uygulanması, tekno-stress yükünün azaltılması, teknik altyapının yeterli ve sürekli etkin olması, uygulamalı kullanım olanaklarının sağlanması vurgulanan beklentiler arasında yer almıştır. Bir katılımcının *“Hocam ben bilgisayarımı açmamla stres altına girmem bir oluyor. Ben zaten kullanmaya yeni başladım bu nedenle açıkçası biraz isteksizim”* ifadesi teknolojik araçlara yönelik genellenmiş bir stres yükünün göstergesi olmuştur. Bir başka katılımcı *“Okulda biri sürekli hocam bu bu işe yarıyor, böyle kullanılıyor diye anlatacak, yanlış yapınca da hemen yardımcı olacak ki ben rahat edeyim”* görüşüyle sürekli bir uygulama desteğinin önemini ifade etmiştir. Bunun yanında etkileşimli tahtanın açılmaması, arıza yapması uygulamanın istenilen biçimde hizmet etmemesi durumunda yardımcı olacak teknik bir destek birimi katılımcı beklentileri arasında yerini almıştır.

### **3. SONUÇ**

Bu çalışmada öğretmen adaylarının web 2.0 teknolojilerini kullanım performanslarının artırılmasına yönelik beklenti ve önerileri derlenmiştir. Bu doğrultuda öğretmen adayları meslek yaşantılarında bu teknolojileri etkin, sürekli ve istekli kullanabilmek için bir dizi öneriler sunmuştur. Okulların teknolojik altyapısının güncel ve etkin olması bu beklentiler arasında yer almaktadır. Öğretmen adayları kullanım performanslarının artması için fiziki bir engelle karşılaşmak istemediklerini, sürekli bir teknik desteğinin de bulunması gerektiğini

belirtmektedir. Eğitsel uygulamaların kullanımında ise bilmedikleri uygulamaların hizmetiçi uygulamalı eğitimlerle öğretilmesi gerekliliğini ifade etmektedirler. Uygulamaların öğretici, yönetici ve öğrenci gibi tüm rollerinin kazandırılmasını değerli görmektedirler. Bu bağlamda meslek yaşantılarında öğretmene sürekli ve güçlü bir teknik altyapı desteğinin sunulması, web 2.0 araçlarının tanıtılması, kullanım durumlarının farklı rollerde (uygulayıcı-katılımcı) öğretilmesi ve deneyimletilmesi önem taşımaktadır. Tatlı ve Akbulut (2017) araştırmalarında öğretmen adaylarının lisans hayatından itibaren teknoloji tabanlı etkinlikler konusunda eğitim almalarını önemsemişlerdir. Benzer biçimde Kurtoğlu ve Seferoğlu (2013) çalışmalarında öğretmenlerin ham bir teknoloji bilgisinin ötesinde entegrasyon becerilerine sahip olması gerekliliğinin de altını çizmişlerdir. Öğretmen adaylarının güncel web araçlarında kendi alanlarına özgü tüm yeniliklerden haberdar edilmeleri de kritik öneme sahiptir. Böylelikle güncel uygulamaları ve gelişmeleri tanımaları, benimsemeleri ve kullanmaları mümkün olabilecektir. İlgili kurum ve kuruluşların, öğretmenlerin etkisi kanıtlanmış web araçlarını kullanım durumlarının takibini yapabilecek komisyon ve komitelerin kurulmasında sürece dahil olması, bu sürecin takibi açısından değerli görülmektedir.

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## **ORTA ÇAĞ RASATHANELERİNDE KULLANILAN SEKSTANT ALETİ**

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### **ÖZET**

Orta çağ İslam dünyasında rasathaneler ilk kez Abbasiler döneminde (750-1258) halife Me'mûn zamanında (813-833) kurulmuştur. X. yüzyıldan önce kurulan rasathaneler teknik bakımdan ve kapasite açısından yeterli değildi. Teknik açıdan yeterli olmayan bu rasathanelerde gözlem aletleriyle hassas ölçümler yapılamıyordu. Ancak X. yüzyıldan sonra inşa edilen rasathanelerde gelişmiş gözlem aletleri kullanılmaya başlanmıştır. Bu aletlerden en önemlisi ise genellikle rasathanelerin içine ve zeminine inşa edilen *sekstant* adıyla bilinen *es-südsü'l-fahrî* aletiydi. Rasathanenin tavanına açılan bir delikten içeri giren güneş ışınlarının günlük ve yıllık hareketleri bu alet ile ölçülmüştür. Bu aletin gelişim süreci aynı zamanda dakik ve hassas ölçümlerin ortaya çıkması süreciyle paralellik göstermektedir. Özellikle Rey (Fahrüddeve) Gözlemevi'nde inşa edilen sekstant rasat aletleri bakımından kıymete değerdir. İlhanlılar döneminde (1256-1335) Merâğa Gözlemevi'nin içine bu aletten büyük bir tane inşa edilmiştir. Rasathanenin tabanından tavanına kadar uzayan bu alet ile çok önemli verilere ulaşılmıştır. Uluğ Bey (1447-1449) tarafından inşa edilen ve günümüze kadar ulaşan Semerkant Rasathanesi'nde ise aynı aletin inşa edildiğine şahit olunmuştur. Bu çalışmada Orta çağ İslam dünyasında kurulan rasathanelerde inşa edilen sekstant aletinin kullanım ve gelişim süreci anlatılmaktadır.

**Anahtar kelimeler:** Sekstant, Rasathaneler, İlhanlılar, Astronomi, es-Südsü'l-Fahrî

## **SEXTANTE INSTRUMENT, WHICH IT WAS USED IN MEDIEVAL OBSERVATORIES**

### **ABSTRACT**

In the medieval Islamic world, observatories were first established during the Abbasid period (750-1258) during the reign of Caliph Me'mûn (813-833). The observatories established before the 10th century were not sufficient in terms of technical and capacity. Precise measurements could not be made with observation instruments in these observatories, which were not technically sufficient. However, advanced observation instruments began to be used in observatories built after the 10th century. The most important of these tools was the es-südsü'l-fahri, known as the sextant, which was usually built inside and on the ground of observatories. The daily and annual movements of the sun rays penetrating through a hole in the ceiling of the observatory were measured with this instrument. The development process of this instrument also parallels the emergence of precise and precise measurements. Especially the sextant built in the Rey (Fahrüddeve) Observatory are important in terms of observation instruments. During the Ilkhanate period (1256-1335), a large one of this instrument was built inside the Merağa Observatory. With this instrument, which extended from the floor of the observatory to the ceiling, very important data were obtained. In the Samarkand Observatory, which was built by Uluğ Bey (1447-1449) and survived until today, it was witnessed that the same instrument was built. In this study, the use and development process of the sextant instrument built, in the observatories established in the medieval Islamic world is explained.

**Key words:** Sextant, Observatories, Ilkhanate, Astronomy, es-Südsü'l-Fahri

## **GİRİŞ**

İlk çağ uygarlıklarında rasathanelerin varlığına dair kesin bir bulguya veya belgeye rastlandığını belirtmek pek olası görünmemektedir. Bu çağda gözlem faaliyetlerinin yürütüldüğü mekânlar ve rasat aletlerine rastlanmaktadır. Ancak bu mekânlar gözlem faaliyetlerinin yürütülmesi için inşa edilen alanlar değildi, daha ziyade dini ve ekonomik etkinliklerin sürdürülmesi için inşa edilen mekânlar olmuştur. Bir bakıma rasat faaliyetlerinin yürütüldüğü alanların varlığı bir amaç olarak değil, başka bir etkinliğin bir sonucu olarak ortaya çıkmıştır.

Orta çağ İslam dünyasında IX. yıldan itibaren rasathaneler inşa edilmeye başlanmıştır. Bir İslam kurumu olan rasathaneler, ilk defa Abbasi halifesi Me'mun döneminde (813-833) kurulmuştur. Ancak Abbasiler döneminde (750-1258) kurulan bu rasathanelerde inşa edilen gözlem aletleri nitelikleri açısından zayıf ve nicelikleri açısından ise azdı. İlk rasathanelerdeki gözlem aletleri ile dakik-hassas ölçümler yapılamıyor ve elde edilen sonuçlar tatmin edici gözüküyordu. Bu sorun rasat faaliyetleri sonucunda ortaya çıkan hata payını arttırıyordu.

X. yüzyıldan itibaren rasat faaliyetlerinde ortaya çıkan hata payları azaltılmak istenmiş ve bu amaçla gözlemevlerindeki rasat aletlerinde birtakım değişiklikler yapılmıştır. Önceki yüzyılda inşa edilen küçük rasat aletleri büyütülmüş, sayıca az olan rasat aletleri çeşitlendirilmiş ve gözlem aletlerinin sayısı arttırılmıştır. Bu suretle rasat aletlerinin nitelikleri ve nicelikleri önemli ölçüde ıslah edilmiştir. Rasat aletlerinin ıslah edilmesi olumlu sonuçlar vermiş ve hassas-dakik değerler elde edilmeye başlanmıştır.

X. yüzyılda inşa edilen rasathanelerde rasat aletleri önceki yüzyıldan farklı olarak taşınabilir aletlerin yanında, gözlemevinin temeline inşa edilen kalıcı ve taşınamayan rasat aletleri ile donatılmıştır. Büyük ebatlarda inşa edilen bu rasat aletleri rasathanelerin ana omurgasını oluşturmuştur. Bu aletlerden en önemlisi gözlemevinin içine inşa edilen, genellikle rasathanenin tabanından tavanına kadar uzanan çukur şeklindeki seksant (es-Südüsü'l-fahrî) aleti olmuştur.

Seksant'ın (es-Südüsü'l-fahrî) X. Yüzyıldan önce inşa edilen rasathanelerde kullanılıp kullanılmadığı kesin bir şekilde bilinmemektedir. Ancak X. yüzyıldan sonra inşa edilen rasathanelerde önemli bir yer tuttuğu kesindir. Bu aletin gelişim serüveni uzun bir zaman almıştır. XV. yüzyıla kadar seksant'ın (es-Südüsü'l-fahrî) gelişme gösterdiği ve ebatının giderek büyütüldüğü görülmüştür.

Bu çalışmada Orta çağ İslam dünyasında rasat aletleri içinde kullanılan ve en büyük rasat aleti olan seksant'ın (es-Südüsü'l-fahrî) gelişim süreci ele alınmıştır.

### **Rey Gözlemevi'nde Kullanılan Seksant (es-Südüsü'l-fahrî)**

Bir rasat alet olan sekstant'ın (es-Südüsü'l-fahrî) ilk kez nerede icat edildiğini veya ilk kez hangi gözlemevinde kullanıldığını kesin bir biçimde ifade etmek zordur. Ancak bu alete Rey Rasathanesi'nde rastlandığını belirtmek gerekir. Bu durum sekstant (es-Südüsü'l-fahrî) aletinin ilk kez Rey'de keşfedildiği olasılığını ortaya çıkarsa da bu iddiayı kesin bir şekilde dile getirmek pek doğru görünmemektedir. Güneş'in yüksekliğini -hareketini- ölçmek için Rey Gözlemevi'nde kullanılan seksanttan önce bu aletin görevini ifa eden herhangi bir alet var mı? Yoksa yok mu? Sorusu ister istemez akıllara gelmektedir. Yıldızların yüksekliğini veya gök cisimlerinin konumlarını belirlemek amacıyla kullanılan benzer aletlere bir İslam kurumu olan rasathanelerde rastlanmaktadır. Ancak bunların bir sekstant olmadığını da açık bir şekilde belirtmek doğru bir yaklaşım olmalıdır. Bu yönüyle sekstant aletinin ilk kullanıldığı yerlerden birinin Rey Rasathanesi olduğu savı gerçeğe yakın görünmektedir<sup>68</sup>.

Rey Gözlemevi'nde yapılan çalışmalar sırasında Batlamyus ve Hint kaynakları incelenmiştir. Bu inceleme sırasında döneminin en meşhur astronomu ve matematikçisi olarak bilinen el-Hucendî tarafından ekliptik eğimi değerinin zaman içinde küçüldüğü iddiası ileri sürülmüştür. Bu iddianın doğruluğunu ispatlamak için günümüzde Tahran'ın güneyinde olduğu tahmin edilen Rey'de Şii-Büveyhi hükümdarı Fahrüddeve'nin (976-997) desteği ile bir gözlemevi inşa edilmiştir. Gündönümlerinde (21 Haziran- 21 Aralık) Güneş'in yüksekliğini rasat etmek için dairenin  $\frac{1}{6}$ 'den ibaret olan bir yay şeklinde sekstant adı verilen bir gözlem aleti inşa edilmiştir. Bu alete Şii-Büveyhi hükümdarı Fahrüddeve'ye nispetle es-Südüsü'l-fahrî (Fahredden Sekstantı) adı verilmiştir<sup>69</sup>.

Gözlem faaliyetlerini da yakından takip eden Fahrüddeve, Rey kentinin meridyenin girişini rasat etmekte kullanılması için "*Hikâyetü'l-âleti'l-müsemmât bi's-südsi'l-Fahrî*" adıyla da bilinen sekstantın yapılmasını emretmiştir<sup>70</sup>. Bu vesileyle Rey Rasathanesi'nde kullanılması ve

<sup>68</sup> Sekstant (es-Südüsü'l-fahrî) aletinin kullanımı hakkında bilgi almak için bkz. Seyfettin Kaya, *Ortaçağ İslam Dünyası'nda Rasathaneler*, Libra Kitapevi, İstanbul 2020, s. 89-90.

<sup>69</sup> Fuat Sezgin, *İslam'da Bilim ve Teknik*, c. II, İstanbul Büyükşehir Belediyesi Kültür A.Ş. Yayınları, İstanbul 2008, s. 25.

<sup>70</sup> Abdülkerim Özyayın, "Fahrüddeve", *DİA*, c. XII, TDV Yayınları, İstanbul 1995, s. 99.

gözlem faaliyetleri yürütülmesi için sekstant (es-Südüsü'l-fahrî) aleti imal edildi. Bu konuya değinen Birunî şu bilgileri vermektedir.

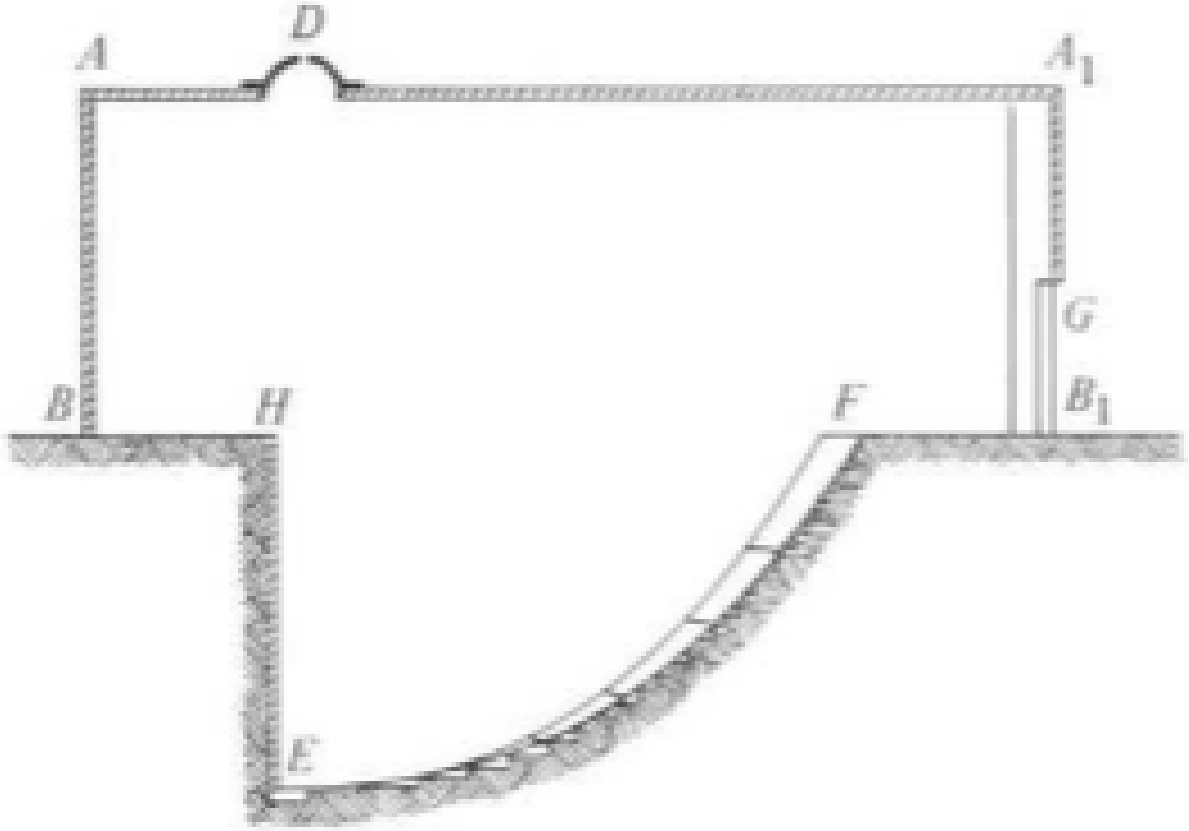
*“Fahrüddevlâ'nin isteği üzerine el-Hucendî, Rey şehri yakınlarında Tabarak Dağı'nda birbirine paralel iki duvar inşa etti. Duvarların arası 7 arşın idi ve bunların arasına tak (yarım daire) yaptı ve tepesine delik açtı. O deliğin kutru bir karış idi. O deliğin merkezinde, iki duvar beyninde nısf-ı nehâr hattı üzerindeki kutru seksen zirâ' olan südüs daireyi merkez kıldı. Ve onu tahtalarla döşeyerek muhtelif renklere boyadı. Ve devr-i cüz'lerinin her birini 369 müsâvî kısma taksim etti. O kısımlardan her biri 10 sâniye idi. Güneş ziyâsı mezkûr delikten nısf-ı nehâr hattı üzerine düşerdi. Ebû Mahmûd, yere düşen ziyâ mikdârında bir tanbur yaptı. O tanburun mütekâtî' iki kutru zâhir idi. Tanburun muhitini ziyân muhiti üzerine vaz' ederek, onun merkezi vasıtasıyla, Güneş ile semtürre's beynindeki mikdârı öğreniyordu.”<sup>71</sup>*

Bu alet hakkında bilim tarihinin önde gelen tetkikçileri önemli yorumlar yapmışlardır. Bu tetkikçilerden bir Fuat Sezgin'dir. Fuat Sezgin Rey Gözlemevi'nde kullanılan sekstant (es-Südüsü'l-fahrî) hakkında şu bilgileri vermektedir;

*“Bizim sekstantımız meridyen eparalel ve birbirlerinden boyunca 7 zira (3,5 m.) aralıkla kurulan iki dikey duvardan oluşmaktadır. Yerden 20 zira (10 m.) yükseklikteki tavanda bir kubbe ve bu kubbenin ortasında, içerisinde 1/ 6 ziralık (1/ 12 m.) çapında bir delik bulunmaktadır. Bu delik üzerine duvarlara paralel demir bir çubuk sabitlenmiş ve bu çubuk üzerine, bir ucunda iki halka olan tabanı kare şeklinde yirmi metre kadar uzunlukta bir demir çubuk asılır. Bu çubuğun ucuna bir demir halka sabitlenir. Bununla (duvara paralel aşağı yukarı hareket ettirmek suretiyle), bir dairenin altıda birinden ibaret bir yay tanımlanır. Bu yay, açıklığın altında dikey olarak 10 metre derinlikte başlamakta ve yer seviyesine kadar ulaşmalıdır. Bu yay özenle pürüzsüz hale getirilir ve tahtalarla kaplanır. Derecelere ve her derece 360 bölüme, yani dakikalara ve her birisi de onar saniyeye bölümlenir. Güneş'in şeklini sekstant yayı üzerinde tam ayarlayabilmek için, iki çapının birbirini 90 derece ile kestiğini gösteren çizgileri taşıyan (madeni) bir disk sağlanır. Bunun çapı (ki sekstant yayının genişliğine eşittir) kubbenin deliğinden 20 metre aşağıya gelen Güneş'in görünüş çapı büyüklüğünde olacak kadar hesaplanır.”<sup>72</sup>*

<sup>71</sup> Birunî, *Tahdîdü Nihâyâtî'l-Emâkin*, Tercüme: Kivâmeddin Burslan, Transliterasyonu Hazırlayan: Melek Dosay Gökdoğan-Tuba Uymaz, TTK, Ankara 2013, s. 54-55.

<sup>72</sup> Sezgin, *İslam'da Bilim ve Teknik*, s. 25.



*Sekstant'ın (es-Südü'sü'l-fahrî)<sup>73</sup>*

Rey'de kullanılan sekstant (es-Südü'sü'l-fahrî) hakkında bilgi veren bir diğer tetkikçi Aydın Sayılı'dır. Aydın Sayılı, Fuat Sezgin'in verdiği bilgilere paralel olarak şunları ifade etmiştir; *“es-südü'sü'l-Fahrî” aleti iki duvar arasına yerleştirilen ahşap bir yaydan inşa edilmişti ve bu ahşap yüzeye bakır levhalar yerleştirilmişti. Bu tür ayrıntılar, XIII. ve sonraki yüzyılların gözlemvleri için yapılan araçlar için de bulunurdu. Aletin kemerli tavanının üstündeki deliğin çapı yaklaşık 2 cm idi. Bu alet Şam'da (muhtemelen Kasîyûn Gözlemevi'nde) kullanılan kadrana oldukça benzer bir yayın üzerinde kayan hareketli bir parçaya sahipti.*<sup>74</sup>

Netice itibarıyla önceki rasat aletlerinden farklı olarak Rey Rasathanesi'nde sekstant (es-Südü'sü'l-fahrî) kullanılmış ve rasathanenin zeminine kalıcı bir şekilde inşa edilen bu alet ile gözlem faaliyetleri yürütülmüştür.

<sup>73</sup> Sevim Tekeli, “Al-Khujandi” *Dictionary of Scientific Biography*, Vol. VII, Charles Coulston Gillispie: Editor, Newyork-1981, s. 353.

<sup>74</sup> Aydın Sayılı, *The Observatory in Islam*, TTK, Ankara 1960, s. 119.

### **Serefüddeve Gözlemevi'nde Kullanılan Sekstant**

Rey Rasathanesi'nden sonra sekstant aletinin kullanıldığı yerlerden ikincisi Serefüddeve Gözlemevi olmuştur. Serefüddeve Gözlemevi'nde kullanılan birkaç rasat aletinden biri de sekstant aletiydi. Bu sekstant sayesinde Haziran 988 yılında ilk rasat faaliyetleri yapılmıştır. Bu alet Bağdat'ta bulunan rasathane binasına yapısal olarak inşa edilmişti<sup>75</sup>. Tarihi kaynaklar bu konuda önemli bilgiler vermektedir. Bu konuya değinen Birünî, dönemin ünlü astronomu olan el-Kûhî'nin öncülüğünde Şii-Büveyhi hanedanlığının merkezi olan Bağdat'ta bir gözlemevi inşa edildiğini ve bu rasathanenin tavanında bir delik olduğunu, Güneş ışınlarının tavanda bulunan bu delikten içeri süzüldüğünü ve bu vaziyetin ortaya çıkması sonucunda Güneş'in hareketinin izlendiğini ifade etmiştir<sup>76</sup>. Bu konuda bilgi veren bir diğer kişi Gıyâsüddîn Cemşîd bin Mes'ûd el-Kâşî olmuştur. El-Kâşî, Şii-Büveyhi hükümdarı Adûdüddeve için on gez çapında bir halka inşa edildiğinden bahsetmektedir<sup>77</sup>. Ancak bir rasat aleti olan bu halka hakkında fazlaca detay vermekten kaçınmıştır.

### **Merâga Gözlemevi'nde Kullanılan Sekstant**

Sekstant aletinin kullanıldığı yerlerden üçüncüsü Merâga Gözlemevi olmuştur. Merâga Gözlemevi'nde sekstant aletinin kullanıldığına dair önemli veriler bulunmaktadır. Bu konuda hem tarihi kaynaklarda hem de tetkik eserlerde önemli bilgilere rastlanmaktadır. Nitekim Gıyâsüddîn Cemşîd bin Mes'ûd el-Kâşî Merâga Gözlemevi'nde kullanılan sekstant hakkında önemli bilgiler vermektedir. El-Kâşî, Merâga Rasathanesi'nde yarıçapı 6 gez olan bir alet kullanıldığını, bu aletin "*hendesi minber*" olarak inşa edildiğini ve imal edilen bu aletin *süds-i fahrî* adı ile bilindiğini dile getirmiştir<sup>78</sup>. Bilim tarihinin ünlü tetkikçilerinden Aydın Sayılı ise gözlemevinin merkezinde yani tam da ortasında Rey Gözlemevi'ndekine benzer bir şekilde es-südsü'l-Fahrî aletine benzer bir rasat aleti imal edildiğini ifade etmiştir<sup>79</sup>.

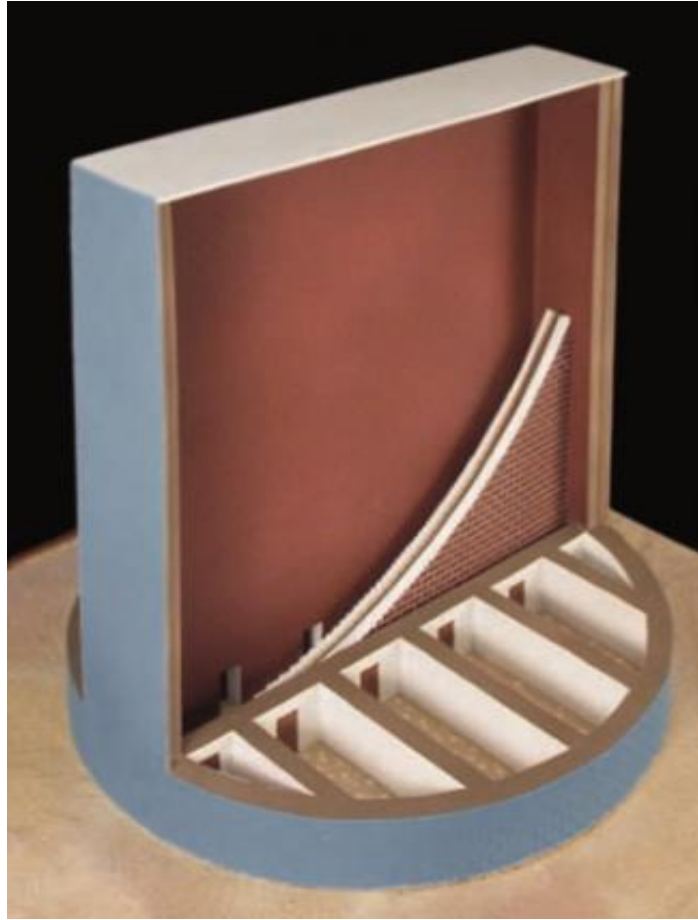
<sup>75</sup> Kaya, *a.g.e.*, s. 76-77.

<sup>76</sup> Birünî, *Tahdîdü Nihâyâti'l-Emâkin*, s. 53-54.

<sup>77</sup> Gıyâseddîn el-Kâşî, *el-Kâşî'nin Babasına Mektubu*, Haz. ve yay. Aydın Sayılı, *Uluğ Bey ve Semerkanddeki ilim faaliyeti hakkında Gıyâsüddîn-i Kaşî'nin mektubu*, TTK, Ankara 1985, s. 81.

<sup>78</sup> Gıyâseddîn el-Kâşî, *el-Kâşî'nin Babasına mektubu*, s. 81.

<sup>79</sup> Sayılı, *The Observatory in Islam*, s. 198-199.



*Merâğa Gözlemevi'nde yer alan es-süds-i fahrî<sup>80</sup>*

### **Semerkant Gözlemevi'nde Kullanılan Sekstant**

Orta çağ İslam dünyasında sekstant aletinin kullanıldığı dördüncü ve son rasathane Semerkant Rasathanesi olmuştur. Bu gözlemevinin bulunduğu bölgede yapılan incelemelerde Giyâsüddin Cemşîd bin Mes'ûd el-Kâşî yönetiminde inşa edildiği tahmin edilen devasa bir *es-süds-i fahrî* sekstantı bulunmuştur<sup>81</sup>. Rasathanenin zeminine inşa edilmiş veya zemine gömülü bir şekilde imal edilmiş görkemli bir taş kadrân buranın en önemli gözlem aletiydi. Çeyrek daire şeklinde inşa edilen bu kadrana gök cisimlerinin görüntüleri veya ışığı bir kamera gibi yansıtılarak rasat çalışmalarının yapıldığı tahmin edilmektedir<sup>82</sup>. 60 derecelik bir paralel (meridyen) yayı biçiminde inşa edilmiştir. Mermerle kaplı iki paralel duvardan meydana gelen *es-süds fahrî*

<sup>80</sup> Sezgin, *İslam'da Bilim ve Teknik*, s. 32.

<sup>81</sup> E. S. Kennedy, "A Letter of Jamshid al-Kâshî to His Father: Scientific Research and Personalities at a Fifteenth Century Court", *Orientalia*, Nova Series, Vol. 29, No. 2 (1960), s. 209.

<sup>82</sup> Geert Somsen and Jeroen Werner, "How to Succeed in Art and Science: The Observatory Observed", *Contemporary Culture*, Editors: Judith Thissen, Robert Zwijnenberg, Kitty Zijlmans, Amsterdam University Press, Amsterdam 2013, s. 215, 218.



sekstantı 51 cm genişliğindeydi. Bu alet ile Güneş, Ay ve gezegenlerin hareketleri rasat edilmeye çalışılmıştır. Ayrıca bu rasat aletiyle ekliptik eğimi, senenin uzunluğunu, ekinoks ve Güneş'in hareketlerinden etkilenen diğer gök cisimleri rasat edilmiştir<sup>83</sup>. Modern rasathanelerin bile aletlerini gölgede bırakacak kadar görkemli olan Semerkant Rasathanesi'nin kadranı oldukça etkileyici görünmektedir<sup>84</sup>.



*Semerkant Gözlemevi'nin içine oyulmuş el-Fahri sekstant aleti<sup>85</sup>*

## SONUÇ

Orta çağ İslam dünyasında kullanılan sekstant (es-Südüsü'l-fahrî) aletinin X. yüzyıldan önce kullanılmadığını ve bu aletin X. yüzyıldan sonra işlev hale gelmeye başladığını eldeki mevcut bilgilere göre söylemek gerekir. Ancak bu aletin kesin bir şekilde kim tarafından veya hangi rasathanede kullanıldığını söylemek zordur. Buna rağmen Rey Rasathanesi'nde kullanılmaya başlanan bu aletin Fahrüddeve'ye nispetle *es-Südüsü'l-fahrî* adını aldığını söylemek mümkündür.

Sekstant aletinin gelişim sürecinde Rey Rasathanesi'nde kullanılan rasat aletiyle Semerkant Rasathanesi'nde kullanılan alet arasında önemli farklar bulunmaktadır. X. yüzyılda imal edilen

<sup>83</sup> T. N. Kari-Niazov, "Ulugh Beg", *DSB*, Vol. XIII, Charles Coulston Gillispie: Editor, New York 1981, s. 536; Kaya, *a.g.e.*, s. 191.

<sup>84</sup> Sayılı, *The Observatory in Islam*, s. 271.

<sup>85</sup> Necmi Dayday & Vural Altın, *Gök Biliminde Türk-İslâm Bilginleri*, Erkam Matbaası, İstanbul 2010, s. 167.

sekstant aleti genellikle iki duvar arasında inşa edilen çeyrek daire şeklinde ve zemine yapılan kazılar sonucunda elde edilmiştir. Ancak XV. yüzyılın ortalarına kadar gelişim gösteren sekstant aleti zemine kazılan çukurdan çıkıp zeminin üzerine taş veya mermer yapılara oyulmak suretiyle inşa edilen yapılara dönüşmüştür.

Sekstant aletinin yapımında ortaya çıkan ikinci değişiklik ise bu aletin rasathane inşasının dışından içine alınması olmuştur. Rey Rasathanesi belki de sekstant aleti şeklinde inşa edilmişti. Ancak Merâğa ve Semerkant rasathaneleri sekstant aletlerini içine alan ve bu aletin dışında başka aletlerin de kullanıldığı yapılar topluluğuna dönüşmüştür.

Sekstant aletinin gelişimindeki bir diğer değişiklik ise bu aletin zamanla daha büyük yapılar hale gelmesi olmuştur. Bu açıdan Semerkant Rasathanesi'nde kullanılan sekstant Orta çağ rasathaneleri içinde kullanılan en büyük sekstant olarak ifade edilebilir.

Netice itibarıyla Orta çağ İslam dünyasında önemli bir medeniyet ve uygarlık kurumu olan rasathanelerde sekstant aleti kullanılmış ve bu çağın sonralarına kadar yapı, imal ve işlevsellik anlamında gelişme göstermiştir.

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## **GÖSTERGEBİLİMSEL BİR REKLAM ANALİZİ: “DOMESTOS”**

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### **ÖZET**

Göstergeler, insanlar ile doğal yaşam arasında ilgi ve iletişimi sağlayan, konumlandırmayı sağlamaştıran unsurlardır. Bu unsurların en fazla ifade alanı bulunduğu, taşıyıcılar ve aktarıcılarla dikkat algısını en üst düzeye geldiği yer, hiç şüphesizdir ki reklam metinleridir. Reklamlar içerisinde yer alan kodlar sesletim esnasında bireylerin ne olduğu veya ne olmaları gerektiğine dair ipuçları vererek esas iletinin anlamlandırılması sağlanmaktadır. Ayrıca reklamcı iletinin konusu olan ürün ve hizmet ile ilgili tüketicide veya izleyici kitlesi ile bağ kurmayı hedeflemektedir. Böylece reklamı yapılan hizmette veya üründe hedef kitleyi belirli bir düşünceye yönlterek dikkat çekmek, bilgi vermek belirli bir görüşün benimsenmesini ve satın alınmayı sağlamak esastır. Reklam metinlerinde yer alan sembollerin her ürün için ayrı ayrı tasarlandığı ve bu tasarlanan her sembolün zihinde çağrışım yoluyla ne anlama geldiği kodlarla sunulmaktadır. Bu kodlar mitler ile anlam zeminine oturtulmaktadır. Bu çalışmada içerik açısından çok sayıda kültürel ve yaşama dair kod bulunduran *Domestos* çamaşır suyu markasının pandemi öncesinde ve pandemi sonrasında yayınlamış olduğu birer reklamı göstergebilim yöntemi ile analiz edilmiştir. Analiz esnasında görsel materyaller aracılığıyla kodların düz ve yan anlam boyutları ele alınmış ve reklam metinlerinde yer alan mitlerden de yararlanarak reklam metinleri değerlendirilmiştir. Elde edilen bulgular ile reklamların kültürümüze ve yaşantımıza olan etkileri, bu etkilerin anlam dünyaları tespit edilmiştir. Esas noktası aynı olan bu reklam metinlerinin anlatım dili ve yöntemindeki farklılıklar, mitsel kodlarla sunulmuştur. Ayrıca ikili karşıtlık sistemi kullanılarak pandemi öncesi ve pandemi sonrası göstergesel farklılıklar gözler önüne serilmiştir.

**Anahtar Kelimeler:** Göstergebilim, Reklam, Mit, Domestos.

**SEMIOTIC ANALYSIS OF AN ADVERTISEMENT: “DOMESTOS”****ABSTRACT**

Indicators are elements that provide interest and communication between people and natural life, and reinforce positioning. There is no doubt that advertising texts are the place where these elements find the most expression and where the perception of attention is maximized with carriers and transmitters. The codes in the advertisements are aimed at the main message by giving clues about what individuals are or what they should be. In addition, the advertiser aims to establish a connection with the consumer or the audience regarding the product and service that is the subject of the message. Thus, it is essential to attract attention by directing a certain thought in the advertised service or product, to provide information, to ensure the adoption of a certain view and to ensure purchase. The symbols in the advertisement texts are designed separately for each product and the meaning of each designed symbol through association in the mind is presented with codes. In this study, some advertisements published by the Domestos bleach brand, which contains many cultural and life codes in terms of advertisement content, before and after the pandemic were analyzed within the framework of semiotics. During the analysis, literal and connotative dimensions of the codes were also evaluated by using visual materials. With the findings obtained, the effects of advertisements on our culture and our lives have been determined. The differences in the expression language and method of these advertisements, which have the same main point, and mythical codes are presented. In addition, pre-pandemic and post-pandemic indicative differences were revealed using the binary opposition system.

**Keywords:** Semiotics, Advertising, Myth, Domestos.

## **GİRİŞ**

Göstergebilim (semiologie) terimi ilk olarak göstergeleri inceleyen bilim dalı veya göstergelerin bilimsel incelemesi olarak tanımlanmaktadır. Günümüzdeki etkinlik alanı genişleyen göstergelerin, kendisini oluşturan *gösterge* ve *bilim* sözcüklerinin anlamsal toplamından fazla ve değişik bir boyut kazanmıştır (Rıfat, 1996: 9). İnsanlar, yaşamını sürdürmek, toplumsal anlaşmayı sağlamak için yarattıkları ve aynı zamanda kullandıkları doğal diller, jestler, trafik işaretleri, bazı meslek gruplarında yer alan flamalar, reklam afişleri, moda, mimarlık düzenlemelerinin hepsi birer dizge olup bu dizgeler belirli kurallar ile birer anlamlı bütün oluşturmaktadır. Anlamlı bütünlerin hepsi birer gösterge olduğu için yazınsal yapıdaki bir kahramanın davranışı, moda dergilerinde görülen bir etek, kazak vb. tüm birimlerle bağlantısı olan her şey gösterge olarak ele alınabilir (Rıfat, 1996: 10). Nitekim gösterge, kendisinden başka bir şeye gönderme yapan, duyular ile kavranabilen, varlığı tüketici veya kullanıcılar tarafından algıya ihtiyaç duyan bir unsurdur (Fiske, 2003: 63).

Dilbilimde, gösterilenin öz niteliğinin gerçeklik derecesi çokça tartışılmıştır. Tartışmalarda gösterilenin bir nesne değil de nesnenin zihinsel tasarımı olduğu vurgulanmıştır. Saussure, gösterilenin zihinsel özniteliğini, kavram terimini kullanarak *öküz* sözcüğünün gösterileni, hayvanın kendisi değil de onun zihinsel imgesi olduğunu savunmuştur. Gösterilen, göstergenin iki bağlantılı ögelerinden biridir. Göstereni karşıt yapan tek fark gösterenin bir aracı niteliği taşımış olmasıdır (Barthes, 2005: 44). Gösterge, bir başka şeyin yerini alabilmesini sağlayan özellikler taşıdığından kendi dışında bir nesne, olgu, varlık belirten ögedir ve bu öge algılanabilir düzeydedir (Vardar, 2001: 72).

Göstergelerde anlamlandırma düzeyi çok önemlidir. Bu düzey, gösterenin göstereni ve gösterileni arasındaki ilişkiyi ve gösterenin dışsal gerçeklikteki göndergesiyle ilişkisini betimlemektedir. Barthes bu düzeyi düz anlam olarak nitelendirir. Gösterenin ortak duyusal veya açık anlamına yapılan gönderme çeşididir. Bir sokak manzarasının fotoğrafı belirli bir sokağı işaret eder, *sokak* sözcüğü binalar arasında uzanan bir şehir yolunu anlatmaktadır. Renkli bir film kullanılabilir, yumuşak bir odak ayarı yapılabilir veya tam tersi şeklinde düzenlenebilir. Bu iki ayrı resmin düz anlamsal anlamı aynı olsa da farklılık yaratan yan anlamları olacaktır (Fiske, 2003: 115). Barthes'e göre yan anlamdaki en önemli husus ilk düzeydeki gösterendir. İlk düzey göstereni yan anlamın göstergesidir. Fotoğrafçılıkta düz anlam, fotoğraf makinasındaki nesnenin film üzerinde mekanik bir yeniden üretimi iken yan anlam bu sürecin insani boyutudur. Çerçevenin içine neyin dâhil edileceğinin, odağın, ışığın, kamera açısının,

filmin kalitesinin ve benzerlerinin seçimi yan anlamı işaret etmektedir. Düz anlam neyin fotoğraflandığı iken yan anlam ise nasıl fotoğraflandığıdır (Fiske, 2003: 117).

İletişimde belirli kişi ve gruplarda, belli bir bilgi, tutum ve düşünce değişikliği yaratmaya yönelik sözel ve görsel ileti alışverişine dayalı bir süreç vardır (Küçükdoğan, 2005: 11). İletişim sürecinin en önemli ögesi iletidir. Bu iletide alıcı veya hedef kitle en önemli unsurdur. İletişim sürecinde bu yüzden alıcı veya reklamda hedef kitlenin iyi belirlenmesi gerekir (Küçükdoğan, 2005: 12). Tüketicinin algılamasını kolaylaştıran, dikkatini çeken, alımlama aşamasında etkin biçimde işlev gören ileteler düzenlenir. Bu düzenleme için de reklamlardan çokça yararlanır. Reklam iletişimde ileti hazırlanması sürecinde hem hedef kitle üzerine bilgi edinilmesi hem de iletinin hedef kitlenin ilgisini çekebilecek, satın almayı kolaylaştıracak, yaratıcı, özgün ve etkin göstergeler ile düzenlenmesi gerekir (Küçükdoğan, 2005: 19).

Teknolojinin gelişmesi ile beraber tüketim artmıştır. Bu tüketim medya araçları ve yoğun reklam faaliyetleri ile gerçekleştirilmektedir. Reklam sadece bir kitle iletişim, ikna edici iletişim değil, bir ürün ya da hizmet için düşünce iletişim kanalı ve gösterimi olmanın ötesine geçmiştir (Işıktaş, 2018: 56).

Williamson'a göre reklamın insan yaşamında önemli bir yeri vardır. Eleştirel görüşle beraber reklamın yıkıcı etkisi göz ardı edilmemesi gereken bir durum söz konusudur. Çünkü eleştirel görüşte tüketici davranışının, tüketici zihniyetine ve tüketici toplumuna göre şekillenmesine sebep olmaktadır. Öyle ki reklam hayatın her noktasında yoğun olarak yer almaktadır. Medya araçlarında sınırsız şekilde bulunan reklam, özerk bir var oluş biçimi ile çok geniş çaplı etkileme gücüne sahip bir üstyapı oluşturmaktadır (Williamson, 2001: 11). Reklamlar, üretilmiş olduğu kültürün izini taşıırken mitsel doğmalara da seslenerek hedef kitlesini daha hızlı ve doğru biçimde ikna eder. Böylece var olan inanışlar, dünya görüşleri ve algılama şekilleri ile kodlanır. Her ürün için ayrı ayrı tasarlanmış olan sembolik anlamlar vardır. Bu anlamlar ihtiyaçlar, istekler ve değerler ile harmanlanır (Odabaşı, 2017: 87; Wernick, 1996: 57). Hedef kitlenin tutum değiştirme ve karar verme sürecini etkileyen ölçütlerin başında iletiye katılım gelir. Birey eğer satın alma sürecinde ürünle ilgili bilgiye ulaşabiliyor ve etkin biçimde ürünü izleyebiliyor, diğer markalar ile karşılaştırmaya gidiyor ve ürünü kullanarak en iyi sonucu elde etmek istiyorsa reklamı yapılan ürün veya hizmete dâhil olup benimseme sürecine girer (Göksel, 1997: 105).

Reklam metninde, reklam iletisinin çözümü aşamasında göstergebilimden her noktada yararlanılabilir. Çünkü insanlar ürüne reklam dili aracılığıyla anlam verir ve bu ürünün basit

kullanımı zihin deneyimine dönüşür. Reklam iletisinin çözümünde anlatımın ve anlamın üretiliş serüveni, koşulları ve sürecinde göstergebilim bir yöntem olarak devreye girer (Barthes, 2014: 166).

### **Mit Kavramı ve Reklam**

Mitler, kültürel unsurlarla harmanlanmış, insanın ölümü, cinsiyeti, toplumsal örgütlenişi için olması gereken tüm kuralların bir varlık durumuna gelmesini sağlamaktadır. Mitler, sadece masal veya efsane ile sınırlı değildir. Bu kavramda yaşayan *mit değişimi* ortaya çıkarak insan davranışı ile bağlantılı, toplumun her kademesini içinde barındıran ve yaşama anlam / değer katan bir olgu yer almaktadır (Eliade, 2001: 9-16). Kültürler ile şekillenen mitler, dil / inanç / sanat gibi kültürel değerlerle sürekli etkileşim içerisinde olduğu için reklamlar ile mitler sürekli bir ilişki içerisinde. Çünkü reklamlar toplumların kültürel unsurlarını ve değerlerini yansıtır bu yüzden reklamların mitlerle birlikte anılması kaçınılmaz olur (Dağtaş, 2003: 90-91). Mitleri bilmek nesnelere kökenindeki sırrı bilmek olduğu için reklamlar aracılığıyla mitlerin kökenine inilir ve mitin reklamı yapılan ürün ile reklam metnindeki esas ileti veya anlam dünyası anlaşılmasına çalışılır. Simgesel anlatımlar ile reklam metinlerindeki ürünlerin tanımları sağlanır. Böylece ürünün tüketici tarafından satın alınması sağlanır. Yaratılan simgesel anlatımlar ve anlamlar gösterge değeri taşır (Cengiz, 2005: 17). Mitler sayesinde ürünün değer ve bilgi noktası kolay aktarılır ve anlaşılır. Mitlerin göstergebilimsel yöntemle incelenmesi için reklamlardaki mitlerin çözümünde gösteren, gösterge ve gösterilenden yararlanır. Mit, semiyotik sistemin ikinci düzeni olup, ilk sistemde yer alan gösterge (sign), ikinci sistemin yani mitin göstereni (signifier) hâline dönüşmektedir. Bu noktada yan anlam gizli anlatım iken, düz anlam dilsel anlatımdır. Reklam metinleri çözümlenirken de mitlerde yer alan yan ve düz anlam düzlemi kullanılır (Barthes, 2014: 123). Reklam bir gösterge sistemidir, bu gösterge sistemi de mitlerin anlamlandırma sistemi tarafından yönlendirilir (Barthes, 2014: 124). Reklamlardaki mitsel kullanım sayesinde toplum ideolojileri ve değer yargıları anlamlandırılır.

### **Pandemi Döneminin Reklamlara Etkisi**

Covid 19, Çin'in Wuhan Eyaletinde Aralık ayının sonunda başlayıp doğrudan solunum yolu ile insandan insana bulaşarak Wuhan başta olmak üzere tüm dünyaya yayıldığı gözlemlenmiştir. Bu hastalık son yılların en önemli küresel salgını olup gün geçtikçe vaka sayılarının artması ile oldukça dikkat çekmiş ve tüm dünya pandemi çemberine girmiştir. Halkın sağlığını korumak amacıyla devletin almış olduğu bazı tedbirler ile salgının yayılım hızı yavaşlansa da ekonomi piyasası krizden oldukça etkilenmiş ve tüm pazarlama ürünleri neredeyse salgın merkezli



üretime geçmiştir. Özellikle markalar bu küresel salgında yaptıkları iletişim çalışmalarını ile tüketicinin dikkatini güven noktasında güçlendirme eğilimine yönelmiştir. Markalar güven eğilimini reklamlar aracılığıyla sağlama yolunu daha çok tercih ettikleri için reklam, bir ürünü veya hizmeti, tüketicinin faydasına sunarak ikna-istek-tutum- ilgi dörtlemesinde tüketicinin dikkatini markaya çekip yazılı, görsel ve işitsel bir çalışma sürdürmektedir.

Tüm reklamların ortak bir amacı vardır. Tüketicinin fiziksel, psikolojik, duygusal hatta toplumsal gereksinimlerine seslenen ürün üzerinden ilgi uyandırarak tüketicinin isteklerine etki edip tüketiciye yön vermektir (Elden; Bakır: 2010). Reklamda en önemli husus reklamın çekiciliği olduğu için ürün özelliğine yapılan vurguda rasyonel çekicilik, tüketicilerin duygularına yapılan vurguda duygusal çekicilik kullanılmaktadır (Drewniany; Jewler 2008 akt: Eşiyok, 2017). Duygusal çekicilikte sevgi, şefkat, korku gibi olumlu veya olumsuz duygu / düşünceleri gündeme alarak tüketicinin zihninde algı oluşturulurken, rasyonel çekicilikte tüketicilerin zihnine hitap vardır ve ürünün veya hizmetin hangi sebeple daha iyi olduğu ile ilgili argümanlar sunulmaktadır (Cılızoğlu, Dondurucu ve Çetinkaya, 2020: 282-283).

Pandemi sürecinde tüm sektörlerin Covid-19 ve varyantlarından etkilenmesi gibi medya ve reklam sektörü de aynı ölçüde etkilenmiştir. Reklam veren markalarda kısıtlamaya gidildiği görülmektedir. Bunun en önemli nedeni salgın sürecinin yavaşlaması veya bitmesi için evde geçirilen zamanın oldukça fazla olmasından kaynaklanmaktadır. Bu süreçte pandemi etkisi ile birçok marka logosunda değişiklik yapmış ve farkındalık oluşturmak istemiştir: McDonald's logosunda yer alan *M* harfini ikiye ayırıp *hep beraber olmak için bir süre ayrı* iletisini sunmuş (Marketing Birds, 2020), *Dominos*'un temassız teslimat ile halkın ve çalışanın sağlığını güvence altına alması, *Turkcell*, *Vodafone* ve *Türk Telekom*'un uzaktan eğitime destek sağlaması, *Arçelik*'in sağlık çalışanlarının yanında olduğunu hissettirmek amacıyla 170 adet hastaneye beyaz eşya ve küçük ev aleti bağışlayacağını duyurması tüketicinin yanında bulunduğu iletisini taşımıştır (Pazarlamasyon Prime, 2020). Reklamlarla beraber verilmek istenen iletiler daha kolay ve hızlıdır. Pandemi sürecinde toplumsal ve bireysel farkındalık sağlanması için görsel ve işitsel yönü çok ağır olan reklamlar önemli birer araç olmuştur.

#### **Çalışmanın Amacı ve Sınırlılıkları**

Pandemi sürecinde insanların evde daha çok zaman geçirmesi sağlanmaya çalışılmıştır. Ama dışarı ile bağlantının tam anlamıyla kopmaması sebebiyle hijyen unsuru çok önemli bir hâl almıştır. Sağlık bakanlığı tarafından da salgın seyrinin olumlu yönde ilerlemesi için hijyene çokça önem verilmesi gerektiğinin sürekli vurgulanması temizlik, hijyen konusunun

reklamlarda zirvede kalmasını sağlamıştır. Reklamlar, toplum bilincinin oluşmasında bir iletişim aracıdır bu yüzden toplumların hafızasında semboller / imgeler aracılığıyla farkındalık oluşturmada önemli bir yerdedir. Bu çalışmada pandemi sürecinde hijyen aracılığıyla insanları derinden etkilemeye çalışan temizlik markası olan *Domestos*'un pandemi öncesi ve pandemi esnasındaki birer reklamı ele alınacaktır. Böylece bu temizlik markasının tüketicinin dikkatini çekmek için nasıl iletiler taşıdığı, bu iletiler için nasıl bir dil kullandığı, hem duygusal hem de rasyonel çekicilik için nasıl bir yol izlediği incelenecek ve gösteren / gösterilen / düz anlam / yan anlam değerlendirmesi yapılarak sosyolojik, psikolojik ve dilsel bir çerçeve çizilecektir. Reklamların analizi sadece göstergebilimsel analizle sınırlandırılmıştır. Kültürel kodların çözümlenmesi için reklamların sunumlarından yararlanılmıştır.

### **Çalışmada Kullanılan Yöntem**

Pandemi sürecinden önce ve pandemi sürecinde yayınlamış olan *Domestos*'un reklamları Youtube kanalından elde edilerek göstergebilim analizi yöntemi ile çözümlenmiştir. Göstergebilim analizi yapabilmek için anlam taşıyan göstergelerin kültürel norm veya normlar içerisindeki temel dizgeyi bilmek ve bu bağlamda göstergelerin anlam boyutunun yorumlanması gerekir (Culler, 1985: 98). Ele alınan reklamlar göstergebilim analizi ile çözümlenirken Barthes'in mitsel çözümleme yöntemi de bu reklamlara uygulanmıştır. Ayrıca ikili karşıtlık (binary opposition) yöntemi de kullanılarak kavramların yer aldıkları dizgelerdeki içeriklerinde karşıtlıkları tespit edilmiştir. Bu yöntemle metinde gizlenmiş olan ve anlamı oluşturan gizli karşıtlıklar modeli aranmıştır. Çünkü ikili ya da kutupsal karşıtlıklar anlam ve ilişki kurmaya dayalı olup dildeki anlamın üretimindeki en önemli ilişkidir (Berger, 1993: 26).

### **BULGULAR VE YORUM**

#### **Pandemi Öncesinde Çekilen Domestos “Mikroplar Ağlarmış Şarkısı” [Mikropların Yeni Şarkısı Çıktı], Reklamı 1**

Reklam önce beyaz bir tuvalet görseli ile belirip sonra mikrop şeklini almış yeşil yaratıklar ve kahverengi kirli bir görsele geçişle devam etmektedir. Yeşil renginde mikrop elinde kimi zaman gitarla ciddiyetsiz, itici ve ilginç bir tavırla şu şarkıyı söylemektedir:

Bir yerim olsun isterdim, beyazdan uzak

Bir evim olsun isterdim, her yanı sarı

Onu pisletmek isterdim, leş gibi etmek

Hastalıktan bütün evi, kırıp geçirmek

Ben pislik, pislik isterdim  
Nerden bilirdim?  
Mikroplar ağlarmış!  
Bembeyaz dert oldu derzler  
Nerden bilirdim?  
Mikroplar ağlarmış?



**Reklam 1. Görsel 1**

Reklamın hemen başında olan bu görsel doğrudan lavaboda kullanılan deterjanın etkin alanını temsil etmektedir. Tüketici “evet, domestos burada kullanılır, çünkü temizliğe daima ihtiyacı olan bir yer” şeklinde düşünür ve esas iletide burada saklıdır: Temizlik ve hijyen lavabolarda çok elzemdir. Büyük harflerle yazılı olan TUVALETTE SIRADAN BİR GÜN... ifadesi tüketicinin ilgisini çekmek için önemli bir kodlama biçimidir. Gözle görülmeyen bazı mikropları içerisinde barındıran bu tuvalet görselinden hemen sonra sırada Görsel 2 vardır.



**Reklam 1. Görsel 2**

Görsel 1’den hemen sonra esasen reklam boyunca birden çok görsel bulunur. Ama çalışma boyunca tüm görselleri sunmak mümkün değildir. Reklamın başından sonuna kadar hep aynı tarz, yeşil / sarı renkte sevimsiz, ciddiyetsiz varlıklar mikrop olarak adlandırılmakta ve tüketici bu anlamlandırmayı işitsel olarak da onaylamaktadır. Görsel 2 oldukça karmaşık, kirli, düzensiz bir ortamdır. Buradaki esas ileti şudur: Domestos ile temizlenmeyen tuvaletin esasen dış yüzeyinde gözle görülmeyen mikroplar vardır.



**Reklam 3. Görsel 3**

Reklam metninin en sonunda domestos tuvalette kullanılır, bu kullanım sonucunda gözle görülmeyen tüm mikroplar zarar görür ve ağlar. Bu ağlama bir yok oluştur. Dış rengi beyaz olan domestos beyaz tuvaletle paralel anlam taşır. Domestos’un doğrudan kendisi, varlığı, kullanımı elinde gitar olup eğlenen, şarkı söyleyen, mutlu olan mikropları ağlatır. Son görselde yer alan mikroplar ağlarmış yazısının *i* ve *o* harfinde yer alan göz işareti mikropların gözlerini *a*, *r*, *m*, *p*, *ş* harflerinde yer alan biçimsizlik mikropların sevimsiz hallerini, bu yazının etrafında yer alan damlalar da mikropların gözyaşlarını temsil etmektedir. Domestos beyazlığı ile söz grubundaki netlik ise domestos’un net, kararlı, hijyende ileri düzeyde olduğunu temsil eden kodlardır.

### **Reklam 1’in Söylensel Analizi**

**Gösterenler:** Tam bir dakika süren reklamda görsel ve işitsel unsurlardan yararlanılmıştır. Önce beyaz bir tuvalet görüntüsü, daha sonra ortaya çıkan mikroplar ve sonra yine beyaz bir tuvalet görüntüsü ve en sonunda reklam ürünü olan domestos görülmektedir. Görseldeki mikropların elinde gitar vardır ve bunlar kirli bir bataklıkta, mutlu yaşamaktadırlar. Uzaktan dev bir domestos görüntüsü belirir. Domestos, mikropların üzerine dökülür ve banyo fayansı görünür. Fayansın üzerindeki lekeler geçer. Domestos vurucu bir sesle beyaz zeminin üzerinde durur. *Tuvalette sıradan bir gün* sloganıyla başlayan reklam ayrı ayrı ve vurucu bir müzik

tonuyla önce *domestos*, sonra *beyazlığı* ile daha sonra *mikroplar ağlarmış* sözcük grubu ortaya çıkar.

**Gönderge Sistemleri:** Domestos ve mikroplar, hijyen ve kir.

**Mitler:** Temiz miti.

**Çözümleme Sonucu:** Reklam, görsel metin, yazılı metin ve slogandan oluşmaktadır. Reklamda “temiz bir banyo / tuvalet için domestos kullanmanız gerekiyor” mesajı verilmektedir. Reklamın görsel kısmında temiz bir lavabonun ancak domestos ile mümkün olabileceği olağanüstü varlık gibi gösterilen, konuşan, şarkı söyleyen, duyguları olan mikroplar aracılığıyla sunulmuştur. Yaşantımızın her alanında mikroplar vardır. Bu mikroplar canlı birer organizmadır. Görsel metinde dikkat çekici olması açısından itici, sevimsiz ama ilginç gösterilen bu mikroplar ile esas ileti olan hijyen unsuru domestos’un karşılaşmasından doğan duyu durumu reklamın rasyonel çekicilik boyutundan duygusal çekicilik boyutuna geçmesini sağlamıştır. Mikroplar her ne kadar sevimsiz olsalar da domestos onları ağlatarak reklama bir sempatiklik de katmıştır. Reklamda domestos da tıpkı bir canlı gibi mikropların pis mekânında belirir ve onların üzerlerine dökülür. Reklamdaki ayrıntıda herhangi bir bireyin yüzünün görünmemesi dikkat çekicidir. Domestos’un dökülmesi anında bu işlemi yapan bireyin görünmemesi bireyi kimliksizleştirmektedir. Buradaki amaç reklamı izleyen bireylerin bu kimliksiz kişi ile kendisini özdeşleştirmesidir. Böylelikle, sadece reklamdaki kişi değil izleyiciler de bu ürünü kullanırlarsa başarılı olabileceği anlamını çıkartmak mümkündür. Temizlik mitinin uzantısında hijyen başarısının esasen domestos’a has olduğu, ancak domestos ile mikroplardan kurtulup hijyenin sağlanabileceği, domestos’un gücü sayesinde mikroplar dışında herkesin mutlu olabileceği anlamının bu reklamla üretildiği söylenebilir.

### **Pandemi Esnasında Çekilen Domestos “Domestos Virüslerle Son Damlasına Kadar Savaşır!” Reklamı 2**

Reklamın hemen başında beliren domestos ürününün tanıtıldığı sürede tok ve vurucu bir sese sahip olan aktarıcı şunları söyler:

Domestos’u bu kadar güçlü yapan nedir? Sürekli gelişen mikroplara karşı son damlasına kadar savaşması, son damlasına kadar ailenizi koruması, son damlasına kadar yanınızda savaşması. Domestos son damlasına kadar savaşır, yoğun kıvamlı formülüyle virüs ve bakterileri öldürür, maksimum hijyen sağlar. Evde de okulda da Domestos DURDURULAMAZ.



**Reklam 2. Görsel 1**

Reklamın hemen başında ortaya çıkan bu görselde domestos'un çerçevesinin olması ama iinin yani kendisinin vurucu bir sesle ortaya çıkıp tekrar kaybolduėu grlmektedir. Vurucu ve dikkat ekici bu ses ile byk harflerle ortaya ıkan *domestos'u bu kadar gçl yapan nedir?* sorusu doėrudan izleyiciye yneltilen aynı zamanda cevabı reklamın devamında olan bir slogandır. Siyah ve beyaz rengin kullanımı tezatdan doėan ekiciliėi st dzeye getirirken rnn erevesinin maviliėi ile hemen ardından ortaya ıkan grseldeki laboratuvarın rengi aynıdır. Buradaki ileti rnn retildiėi ortama iřaret ile tketicinin gvenini kazanma duygusu ile harmanlanmıřtır.



**Reklam 2. Görsel 2**

Bu grselde laboratuvar ortamında retilen domestosun kendisi ile bu rn zerinde inceleme ve arařtırma yapan bilim insanları bulunmaktadır. Mavi, loř ortam ile hijyen ve gven rnde vcut bulmaktadır. Reklamdaki rnn hedef kitlenin ihtiyaları doėrultusunda teknoloji-ustalık-bilim leminde retildiėi grlmektedir. Pandemi esnasında ekilmiř olan bu reklam tıpkı Covid-19 ařılarının retildiėi bilimsel bir ortam gibi hijyenin de ok nemli olduėu ve bu nemin domestos ile saėlandığı iletisi iin meknın laboratuvar olması dikkat ekicidir.



**Reklam 2. Görsel 3**

Reklamın üçüncü görselinde hedef kitle için güven arz eden bilim insanının deneyi sunulmuştur. Reklam boyunca *son damlasına kadar* ifadesinin vücut bulmuş hâli bilim insanının damlaların gerisinde fotoğraflanmış olması ile sunulmuştur. Reklamın rasyonel söylemi görsel olarak da hedef kitleye arz edilerek dikkatlerin tek bir noktada toplanmasını sağlamıştır. Teknolojiden de yararlanarak üretilen bu ürün, emin ellerden çıkmış hijyenik bir ürün olarak güven arz ettiği iletisi reklamın diğer görsellerinde de devam etmektedir.



**Reklam 2. Görsel 4**

*Son damlasına kadar* hijyen sağlayan bu ürün, artık üretilmiş ve ilk görseldeki gibi içi boş bir çerçeveden çıkarak vücut bulmuştur. Reklamın tüm görselleri çalışmada sunulmadığı için bu görselden sonra gelenler de birbirine bağlı devam eden bir zincir gibidir. Ürünü üreten bilim insanı kendi elleri ile ürünü anne ve babaya teslim eder. Ev ortamında (mutfak-lavabo) kullanılan ürünün kullanılma sırası okuldur. Okulda temizlik işleri ile uğraşan çalışana *baba* ürünü verir ve çalışan ürünü alırken elinde temizlik eldiveni yoktur ama lavaboda bu ürünü kullanırken elinde eldiven ile ürünü lavaboda kullanır. Temizlik yapılan bölgenin arka

görselinde buranın bir okul olduğu hem işitsel hem de görsel çok kısa belli-belirsiz bir akış ile sunulmuştur. Anne-baba-okul çalışanı-öğrenciler mutludur.



**Reklam 2.** Görsel 5

Reklamın son görselinde yer alan *durdurulamaz* sloganı vurucudur. Hedef kitle için esas iletiyi taşıyan sözcüklerden biridir. Pandemi esnasında çeşitli mutasyona uğrayan Covid-19 bile domestosu durduramaz, her türlü virüs, bakteriyi domestos yenebilir iletisi yine arka fon güven teşkil eden mavi renk ile sunulmuş, üretilen yeşil renkli ürün dikkat çekici bir hâl almış ve büyük harflerle yazılı olan slogan hedef kitleyi etkileyici bir ses ile ortaya çıkmıştır.

### **Reklam 2'nin Söylensel Analizi**

**Gösterenler:** Reklam metni on beş saniye sürmüştür. Başlangıçta belli-belirsiz vurucu bir ses ve yanında slogan ile ortaya çıkan ürün, daha sonra laboratuvar ortamında üretilmiştir. Ürün, bilim insanları tarafından incelenmiş, test edilmiş ve insanlara sunulmuştur. Ev ve okul ortamında kullanılan ürünün reklam metninin sonunda yine virüsleri öldürdüğü vurgulanarak reklam metni sona ermiştir. Mavi rengin laboratuvarı işaret etmesi, yoğun kıvamının görülmesi için ağır çekimde ürünün gerekli yerlere dökülmesi, ev ve okul ortamlarında ürünün kullanılması ve sloganların büyük harflerle yazılmış olması reklam metnindeki gösteren unsurlarıdır.

**Gönderge Sistemleri:** İleri teknoloji, üst düzey hijyen, güven, virüslere karşı savaş.

**Mitler:** Teknoloji, hijyen, virüs mitleri.

**Çözümleme Sonucu:** Modern yaşamın bir getirisi olan reklamlar daima mutlu, başarılı, sorunlardan uzak hayali bir dünya sunar (Batı, 2005: 181). Nitekim bu yaşamın sonucu olarak başarı miti merkez kabul edilir ve odak noktası olur (Fiske, 2003: 118). Ele alınan pandemi esnasında çekilmiş olan bu reklam metninde yer alan tüm insanlar güler yüzlü, hayatlarından



memnun ve güven içerisindedir. Domestos, güvenli ve mutlu bilim adamları tarafından test edilip üretilmiş, bunu kullanan anne-baba-okul çalışanları mutlu, memnun ve virüsten kendilerini koruyan pozisyonudur. Reklamda yer alan yazılı metinlerin hepsi büyük harflerle ve vurucu bir ses tonuyla sunulurken ev ve iş yaşantısında rahatlıkla kullanılabilen ürünü kullanacak olan hedef kitleye güven aşılanmıştır. Reklam tüketicie doğrudan pandemi veya Covid-19 salgını hakkında bilgiyi barındırmamaktadır. Barthes'in bu durumu basit olarak bir *eğretileme* adını vermesi, yani 'anlam aktarımı' olgusu olarak örneklendirmesi ürünün üretildiği zamana bir açıklama getirilmemesi ile ilgilidir (Batı, 2005: 183). Doğrudan pandemi denmese de önceki reklamlarda yer alan mikrop olgusu yerini virüs ve bakteriye bırakıp, bilim insanları, laboratuvar, ev ve okul ortamı yaşanan salgına bir işaretir. İleri teknoloji ve görseldeki satılması için reklamı yapılan ürün teknoloji ve hijyen miti olarak vurgulanmaktadır. Reklam bu bağlamda, bu ürünün tüketimiyle çevrenin her türlü şeyden korunduğunu izlenimi yaratmıştır. Çünkü egemen düşünce tüketici yani tüm insanlar bir virüs veya virüslerle mücadele etmektedir. Bu ürün bu mücadelede önemli bir silahtır. Değişen toplum gereksinimleri ve dinamikleri ile de kendini her daim yenilemektedir.

### **Pandemi Öncesi ve Pandemi Esnasında Reklamı Yapılmış Ürünün İkili Karşıtlık (Binary Opposition) Kodları:**

<b>Reklam 1</b>	<b>Reklam 2</b>
Mikrop	Virüs ve bakteri
Mikropların yaşamı / ölümü (görsel)	Virüs ve bakterilerin yaşamı / ölümü (dilsel)
Temiz / kirli tuvalet (ürünün kullanım alanı)	Temiz / kirli lavabo, tuvalet, mutfak (ürünün kullanım alanı)
Yaratık şeklinde mikroplar	Gerçek insanlar (bilim adamı, anne-baba, okul çalışanı, kısmen okuldaki çocuklar)
Beyaz renk / sarı renk (ortam)	Beyaz renk /mavi renk (ortam)
Şarkılı version	Vurgulu, düz, soru, ünlem cümlesi
Beyaz renkli domestos	Yeşil renkli domestos
Şarkı söyleyen mutlu mikroplar / ağlayan mikroplar	Ürünü inceleyen, kullanan daima mutlu insanlar
Mekân olarak sadece tuvalet ve mikropların bilinmeyen / hayal ürünü dünyası	Mekân olarak laboratuvar, ev, okul
Esas tema: Mikroplar ağlarmış!	Esas tema: Son Damla / Durdurulamaz!
Gitarla şarkı söyleyen, gayriciddi yaratıklar	Laboratuvarda bilimsel inceleme yapan ciddi bilim insanı
Metinde yer alan sözcükler: ev, derz, hastalık, leş, pislik	Metinde yer alan sözcükler: sürekli değişen mikroplar, korumak, savaşmak, güçlü, ev, okul, hijyen

## SONUÇ

Göstergebilim yöntemi ile domestos temizlik ürünü markası hedef kitle üzerindeki etkileri incelenmiş olan bu çalışmada, pandemi döneminde Covid-19 salgınının toplum üzerinde yarattığı belirsiz gelecek kaygısı ve bu kaygıyla gelen önlem mekanizmaları reklamlar aracılığıyla farklı bir kombinasyonda çözümlenmiştir. Çözümleme sonucunda şunlar tespit edilmiştir:

1. Tüm dünyayı etkisi altına alan Covid-19 ve varyantları küresel bir sağlık sorunu hâline geldiği için salgının etkisinin azalması açısından çeşitli önlemler alınmıştır. Bu süreçte Sağlık Bakanlığı tarafından da *maske, mesafe, hijyen* kuralı sık sık dile getirilmiştir ve reklam ürünleri de bu yönde dikkatleri çekmeye çalışmıştır. İncelenen ürün, bir temizlik markası olarak maske / mesafe / hijyen üçlemesinin önemli ayağı olan *hijyende* odaklanmıştır.

2. Pandemi öncesinde reklamı yapılan temizlik markası domestos doğrudan ve sadece mikroplar üzerinde yoğunlaşırken, pandemi esnasında yapılan ürün reklamının salgını etkileyen her noktaya değindiği görülmektedir. Covid-19 aşısı süreci, zorunlu ev hayatı, kısıtlı eğitim süreci ve bu çemberin zirvesinde oturan *hijyen* savunma mekanizması ürünün reklam sunumunda hem rasyonel hem de duygusal reklam çekiciliği ile sunulmuştur. Amaç hedef kitle ile duygusal bağ kurarak reklam çekiciliğini artırıp rasyonel yani mantık çerçevesine oturtulmuş bir düzenek ile satın almayı kolaylaştırmaktır.

3. Her iki reklamda da dikkat çekicilik toplumun veya hedef kitlenin ihtiyaçları doğrultusunda yoğrulduğu tespit edilmektedir. Pandemi öncesi reklamda da, pandemi esnasındaki çekilen reklamda da hedef kitlenin hijyene olan ihtiyacının altı çizilmiştir. Birinde sempatik bir sunum varken diğesinde ciddi ve koşullara göre şekillenmiş bir sunum yer almaktadır.

4. Duygusal ve rasyonel çekicilikte bilgi verme, korunma temaları ile geliştirilmiş bir strateji söz konusudur. Reklamlarda yer alan görüntüler, müzikler, sloganların tümünün amacı tüketiciyle doğru iletişim kurup tüketiciden pozitif bir geri dönüş alabilmektir. Pandemi dönemindeki marka çalışmalarıyla topluma hijyen sağlama, güven aşılama aynı zamanda birlik ve beraberlik ile sorunların üstesinden gelme iletileri yer almıştır.

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## **TÜRKİYE’DE ÇALIŞAN YOKSULLARA SAĞLANAN SOSYAL YARDIMLARIN DEĞERLENDİRİLMESİ**

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### **ÖZET**

Yoksulluk evrensel bir sosyal sorunken literatürde birden fazla yoksulluk türü tanımlaması yapılmıştır. Günümüzde mutlak yoksulluk tanımlamasının dışında yeni yoksulluk türlerinin tanımlamalarıyla karşılaşmak mümkündür. Bu çalışmada yoksulluğun değişen yüzü olan çalışan yoksullar üzerinde durulmuştur. Birçok ülkenin henüz çalışan yoksul tanımlamasını yasal olarak yapmadığı bilinmektedir. Dünya’da ve Türkiye’de çalışan yoksullara yönelik gerçekleştirilen sosyal politikalara değinilmiştir. Türkiye özelinde çalışan yoksullara yönelik sunulan gelir artıcı politikalar (asgari ücret, vergi indirimleri ve sosyal transferler/yardımlar) incelenmiştir. Çalışan yoksul olan bireylere yönelik vergi indirimlerinin ve sosyal yardımların geliştirilmesi; bu bireylerin çalıştıkları halde yoksulluk içinde bulunmalarını önleyici politika uygulamalarıdır. Türkiye’de sosyal güvenceli çalışan yoksullara yönelik sağlanan sosyal yardımların sayısı yeterli değildir. Bu minvalde Türkiye’deki sosyal yardımlara dair mevcut sosyal politikaların gözden geçirilerek yeniden tasarlanması gerekmektedir.

**Anahtar Kelimeler:** Yoksulluk, Çalışan Yoksul, Sosyal Yardım.

**EVALUATION OF SOCIAL ASSISTANCE PROVIDED TO WORKING POORS IN  
TURKEY****ABSTRACT**

While poverty is a universal social problem, more than one type of poverty has been defined in the literature. Today, it is possible to encounter definitions of new types of poverty apart from the definition of absolute poverty. In this study, the working poor, who are the changing face of poverty, are emphasized. It is known that many countries have not yet defined the working poor legally. Social policies for the working poor in the world and in Turkey are mentioned. Income increasing policies (minimum wage, tax reductions and social transfers/assistances) for the working poor in Turkey have been examined. Developing tax breaks and social benefits for individuals who are working poor; These are policy practices that prevent individuals from being in poverty even though they are working. The number of social assistance provided for the poor working with social security is not sufficient in Turkey. In this context, the existing social policies regarding social assistance in Turkey should be reviewed and redesigned.

**Keywords:** Poverty, Working Poor, Social Assistance.

## **1. GİRİŞ**

Yoksulluk kavramı; geçmişten günümüze gelen, global anlamda halen çözüm ve önleme stratejileri oluşturulmaya çalışılan sosyal sorunlardan bir tanesidir. Yoksulluğun bireyi etkileyen problem olarak ortaya çıkışı eski olmasına rağmen sosyal sorun olarak tanımlanması sanayi toplumuna dayandırılabilir. Toplumsal yaşamda bireyi güçsüzlüğe iten, toplumsal katılımı önleyici bir bariyer olan yoksulluk; başlarda hayırseverlik ve aile, akrabalık bağları ile turnike edilmiş fakat sanayi devrimi ile beraber değişen aile kurumunun işlevselliğinin sendelemesiyle toplulukları aşan, toplumu etkileyen ve devlet odaklı bir sosyal soruna evrilmiştir. Sanayi devrimi sürecinde köylerden şehirlere doğru yaşanan göç dalgaları; çok daha sonraları “*sosyal parazitler, tehlikeli sınıf, lümpenproleter, lanetli sınıf, kenardakiler, sınıf-altı kesim*” (Keyder ve Buğra, 2003: 20) gibi dışlayıcı bir terminolojinin ürünü olarak kimsesiz çocuk, engelli, çocuk işçiliği, kronik hastalıklar ve bakıma ihtiyaçlık hali, gelir adaletsizliği vb. problemleri ortaya çıkarmıştır. Bahse konu olan toplumun dezavantajlı kesimleri yoksulluk şemsiyesi altında toplayabileceğimiz aksiyonlardan bir kaçıdır. Devletlerin ve küresel boyutta tanınan ekonomi ve insani organizasyonların (DB, BM, ILO vb.) yoksulluk yaklaşımları; çoğu zaman sayılar üzerinden maddi verilerle ölçülebilen, göstergelere tabi tutulan yaklaşımlardır. Küreselleşme bahse konu yaklaşımların temel düzeyde yetersiz kaldığı, yeni tanımlamalara muhtaç yoksulluk kavramını karşımıza çıkarıvermiştir. Bundandır ki yıllarca mutlak yoksulluk olarak tanımlanan yoksulluk kavram ailesine insani yoksulluk, göreceli yoksulluk, kent yoksulluğu, nöbetleşe yoksulluk vb. tanımlamalar eklene gelmiştir. Bu çalışmada nasıldır ki çalışma ve yoksulluk gibi birbirine zıt kelimelerden “çalışan yoksulluğu” türetildiğine değinilmiş ve mücadele boyutu olarak sosyal transferler, yani sosyal yardım uygulamalarına bakılmıştır. Türkiye özelinde çalışan yoksullara sunulan sosyal transferlere atıfta bulunulmuştur.

## **2. YOKSULLUK KAVRAMI**

Yoksulluk kavramı evrensel bir sosyal sorun olarak varlık göstermiştir. Literatürde yoksulluk kavramının tanımına yönelik birden fazla tanımlama yapılmıştır. Bu tanımlamalar arasında yaygın olarak kullanılan tanım mutlak yoksulluk tanımıdır. Fakat daha evvel bahsedildiği üzere yoksulluk kavramı, içine hapsedilen mutlak yoksulluk kabuğuna sığamamış ve yeni tanımlamalar geliştirilerek karşımıza çıkagelmiştir. Yoksulluk üzerine yapılan mutlak, göreceli ve insani yoksulluk tanımlamalarına bakılması, kavramı zihnimize somutlaştıracaktır.

Dünya Bankası (1990) tarafından, “*asgari yaşam standardına erişememe durumu*” yoksulluk olarak ifade edilmektedir. Diğer bir söyleyişle bir doların altında günlük kazanç sağlayan bireyler mutlak yoksul şeklinde ifade edilmiştir (World Bank, 2000). Bahse konu olan günlük 1 dolarlık gelir düzeyi, ülkelerin gelişmişlik durumuna göre değişebilmektedir. Az gelişmiş devletlerde birey başına günlük 1 dolar kabul edilmekteyken Latin Amerika ülkeleri ve Karayipler’de günlük 2 dolar, Doğu Avrupa ülkeleri (Türkiye’nin de içinde yer aldığı) için günlük 4 dolar, sanayileşmiş ülkelerde günlük 14,40 dolar mutlak yoksulluk kıstası olarak belirlenmiştir (DPT, 2001).

Bir bireyin günlük hayat aktivitelerini yerine getirmesi için ihtiyacı olan 2480 k/cal (mutlak yoksulluk ölçütü) kıstasını temin etmesinin yanı sıra bireyin temel ihtiyaçları olan sağlık, eğitim ve barınma benzeri sosyal ve kültürel isteklerinin gerektirdiği ek kazanç gereksinimin de mutlak yoksulluk sınırına eklenmesi ile görelî yoksulluk ortaya çıkmaktadır (DPT, 2001, s. 104). Başka bir tanımlamada vurgu yapılan husus ise; görelî yoksulluğun diğeri ile karşılaştırmaya dayanmasıdır. Bu karşılaştırma bireysel, grup ve ülke bağlamında yapılabilmektedir. Medya araçlarının gelişmesi ve yaygınlaşmasıyla da evrensel olabilmektedir. Görelî yoksulluk, bireyin ya da hane üyelerinin, tabi olduğu grubun ya da hayat alanının dâhilindeki bireyin/grubun ve ya habitatın başka grup ve zümrelerle karşılaştırılması ile meydana gelir (Akder, 2006).

UNDP, Adam Smith’in yoksulluk üzerine görüşleri temel alınarak geliştirilen insani yoksulluk tanımlaması geliştirmiştir. “İnsani yoksulluk”, bireylerin yaşanılabilir bir hayat sürdürebilmesi adına gerekli seçenek ve fırsatlardan mahrum kalma durumu olarak tanımlanmıştır. Bu tanımlama yoksulluğun sadece ekonomik göstergeler üzerinden tanımlanmasına karşı görüşlerden beslenmektedir (DPT, 2001). Yoksulluğu temel ekonomik göstergeler dışında tanımlayan insani yoksulluk; insan onuruna yakışmayan önlenebilir hastalıklara yakalanmak, kısa yaşam süresi, ana-çocuk sağlığının yetersizliği, yetersiz beslenme, okur-yazarlık ve benzeri temel insani imkânlardan mahrum kalma durumudur. Bahse konu olan içme suyu, iletişim, eğitim, sağlık hizmetlerine ulaşılamaması, temel insan yeteneklerini sürdürebilecek yoksulluğun insani boyutudur (DPT, 2007).

### **3. ÇALIŞAN YOKSULLUĞU**

Birbirine karşıt olması beklenen bu iki kelimenin bir araya gelişinin akılda soru işaretleri oluşturması normal bir durumdur. Herkes için hem ödev hem de hak olan çalışma hakkı, nasıl olur da bireyi yoksulluğa itebilir (Kaboğlu, 1999, s. 288)? Küreselleşme ve sermaye ilişkileri bu



kavramları birleştiren temel etkidir. Gelir dağılımının dengesiz dağılımı, bireyleri çalıştıkları halde yoksulluğa sürükleyebilmektedir. Çalışan yoksulluğunun ilk görünüşleri, kapitalizmin 19. yüzyılda yoksulluğun çalışan bir kesim olan işçi sınıfında etki etmesi ile ortaya çıkmış ve dönemin klasik iktisatçıları tarafından analiz edilmeye başlanmıştır. Dönemin klasik ekonomistleri, çalışan yoksulluğunu demografi (Malthus), eğitim yetersizliği (Mill), ekonomik büyüme ve sosyal adaletsizlik (Adam Smith) gibi faktörlerle ilişkilendirirken Marx, kapitalist pazarın devamlılığında mihenk taşı olarak ifade etmiştir (Rauhutt vd., 2005). Günümüzde bireyler çalıştıkları halde temel insani ihtiyaçlarını karşılamakta sıkıntılar yaşayabilmektedir. Bu bakımdan çalışan yoksulluğu, çalışanların tüketilebilir net kazançları bakımından yoksul olarak tanımlanmasıdır (Eurofound, 2013). Eurostat'a (2021) göre yılın yarısından fazla süre çalıştıkları halde ulusal hane medyan gelir seviyesinin %60'ının altında gelir seviyesine sahip olan çalışanlar, yoksulluk riski altındadır.

Kapar (2010) çalışan yoksulluğunun artışıdaki sebepleri makro ve mikro ölçeklerde değerlendirdiğinde ekonomik işleyiş ve yapısının uygun yapıda olamayışı, işletmelerin çalışanlara insana yakışır istihdam sahaları oluşturulamaması, çalışanların hayat ve çalışma şartlarını geliştirme gayesi taşınmaması, hane halkında çalışanların azlığı ve işsizlerin fazlalığı olarak ifade etmektedir. Çalışan yoksulluğu sadece bireyi etkileyen bir sorun değildir. Birey ile beraber çevresini, özellikle ailesini de etkileyen bir sosyal sorundur. ILO (2011) yoksullukla mücadele eden bir ailede çalışan tüm aile üyelerini çalışan yoksul sınıflamasına dâhil etmektedir. ILO çalışan yoksul bireyleri tanımlarken yoksul bir hanede hayatına devam eden çalışan aile üyelerinin tümü, yoksul bir hanede hayatına devam eden tam zamanlı çalışanların tümü, en az bir aile üyesinin çalışma hayatına devam ettiği yoksul bir hanede hayatına devam eden tüm aile üyeleri, asgari bir tam zamanlı çalışanın yaşadığı yoksul bir hanede hayatına devam eden bütün bireyler çalışan yoksul şeklinde sınıflandırılmıştır (Strengmann-Kuhn, 2002).

Çalışan yoksul tanımlamalarına ülkesel açıdan bakıldığında; evvelki senede asgari 27 hafta aktif olarak iş gücüne katılan, yani çalışma hayatında bulunan veya meslek arayan ve ekonomik kazancı, ilgili kurumlarca belirlenen yoksulluk sınırından düşük olan bireylerin ABD Çalışma İstatistikleri Bürosu (BLS) tarafından çalışan yoksul sınıflamasına dâhil edildiği görülmektedir. Avrupa'da çalışan yoksul sınıflamasına öncülük eden Fransız İstatistik ve Ekonomi Enstitüsü (INSEE) ise BLS örneğinde olduğu gibi çalışma hayatına dâhil olma hususunda çaba gösterme yaklaşımını temel almakta, fakat aynı yıl içinde en az bir ay çalışmış olma kıstasını uzun süredir

istihdam sisteminin dışında olanları bu tanıma dâhil etmemek için çalışan yoksulluğu sınıfına eklemektedir (Eurofound, 2010). Yoksulluğun sadece az gelişmiş ülkelerin bir sosyal sorunu olmaması gibi çalışan yoksulluğu da az gelişmiş ülkelere özgü bir toplumsal sorun değildir. Konuyla ilgili Gündoğan (2007, s. 18), günümüzde çalışan yoksulluğunun dünyada yalnız az gelişmiş ülkelerde beliren bir sosyal sorun olmadığını belirtmiştir. Bu açıdan çalışan yoksulluğunun geniş bir yelpazede ele alınması elzem olan bir sosyal sorun olduğunu ifade etmiştir. 2001 yılı itibarıyla Amerika Birleşik Devletleri'nde nüfusun %11,7'si- bir başka ifadeyle 32,9 milyon kişi, ilgili kurumlarca belirlenen yoksulluk ölçütünden daha düşük gelirle hayatlarına devam ettiği, bu yoksulluk sınırının altında olan yoksullardan tahmini 6,8 milyon bireyin, 27 hafta ya da daha çok çalışma hayatında bulunan bireylerden oluştuğu bilinmektedir. Yine bir başka sanayileşmiş hayat alanlarından biri olan Avrupa'da da durum çok da iyi değildir. 1999 yılından beri Avrupa sınırları içinde aktif iş gücüne katılım sağlayan bireylerden yaklaşık 7,8 milyonu yani %6'sı, bilakis yoksulluğa maruz kalmaktadır (Gündoğan, 2007).

Türkiye özelinde nicel verilere dayanarak çalışan yoksulluğu profiline bakmak gerekirse Gündoğan (2007, ss. 70-83) TÜİK'in çalışması çerçevesinde; işsizlerin (%27,37), kendi hesabına çalışanların (%30,48), yevmiyeli çalışanların (%37,52) ve ücretsiz aile işçilerinin (%38,73) yoksulluk düzeyi yüksek gruplar olduğunu belirtmiştir. Ücretsiz aile işçilerinin kentsel alanlarda oldukça yüksek (%27,94) olduğunu ifade etmiştir. Türkiye'de gündelik şeklinde ödeme alarak çalışanların %37,52'sinin yoksul olduğunu belirtmiştir. Yevmiyeli çalışanların çoğunluğunun kırsal alanlarda tarımsal, kentlerde ise inşaat ve bayındırlık faaliyetlerde toplanmalarının ve eğitim seviyelerinin düşük olmasının, bu kesimin yoksulluğa maruz kalmalarının temel nedeni olarak görüldüğünü ifade etmiştir. TÜİK verileri kapsamında Türkiye'de çalışan yoksulluğu profilini; yoksullukla sıklıkla karşılaşılan inşaat ve tarım sektöründe çalışanlar, ücretsiz aile işçileri, yevmiyeli kendi hesabına çalışanlar, kadın çalışanlar, nitelik ve eğitim düzeyi düşük çalışanlar, yabancı kaçak çalışanlar, geniş ailelerde yaşayanlar, çalışan sayısının düşük olduğu işletmelerde çalışanlar, sosyal güvencesi bulunmayan kayıt dışı sektörde çalışanlar oluşturmaktadır (Gündoğan, 2007, s. 99). Öte yandan, Türkiye'de net asgari ücretli çalışanlar, TÜİK'in belirlediği "yoksulluk ücreti" (bir işçinin aylık geçim ücretinin altında) seviyesinde kalmaktadır (Erdoğan ve Kutlu, 2014, s. 96). Bu hesaplama göre emekli aylığı asgari ücretin düzeyinde olan emekliler de "yoksulluk ücreti" düzeyinde kalmaktadır. Yukarıda yer verilen yoksul profillerinin yanında Türkiye'de asgari ücretli çalışanlar ve emekliler de çalışan yoksulluğu profiline girmektedir.

#### **4. ÇALIŞAN YOKSULLARA YÖNELİK GELİŞTİRİLEN SOSYAL POLİTİKALAR**

Çalışan yoksulluğunu önlemeye yönelik geliştirilen sosyal politikaları ayırt etmek çoğu zaman pek mümkün değildir. Bu durumun temelinde yatan nedenlerden biri hâlihazırda çoğu ülkenin çalışan yoksulluğunu tanımıyor oluşu bulunmaktadır. Bir başka neden ise sosyal transfer uygulamalarının çoğu ülkede salt iş gücü piyasasının dışında kalmış, çalışmayan kişilere odaklanmasıdır. Buna sebep olan düşünce ise çalışan bireylerin yoksulluğa maruz kalmaması için yeterli ekonomik kazanca sahip olduklarına dair fikriyattır. Türkiye’de de bu fikriyat hâkimdir (Eurofound, 2010, s. 14). Birçok AB ülkesinde geliştirilen sosyal politikalarda çalışan yoksulluğuna özel bir politika bulunmamaktadır (Eurofound, 2013, s. 24).

Çalışan yoksulluğuna yönelik geliştirilen sosyal politikalar; gelir arttırıcı politikalar (asgari ücret, vergi indirimleri ve sosyal transferler/yardımlar), iş gücü piyasası politikaları ve ekonomik büyüme politikaları şeklinde başlıklandırılabilir (Erdoğan ve Kutlu, 2014). Bu çalışmada gelir arttırıcı politika araçlarından sosyal transferler/yardımlara değinilmiştir.

##### **4.1. Asgari Ücret**

Asgari ücret uygulaması, çalışan yoksulluğunu azaltmaya dönük temel bir politika önlemi şeklinde karşımıza çıkmaktadır (Eurofound, 2010, ss. 15-18; Marx ve Verbist, 2008, s. 274). Türkiye’de ve birçok Avrupa Birliği ülkesinde, çalışan bireylere temel düzeyde ücret sağlanarak çalışan yoksulluğunu minimize etmek için kullanılan asgari ücret politikası; sektörel ve hükümet düzeyinde sosyal diyalog yoluyla toplu sözleşme vasıtasıyla tespit edilmektedir (Eurofound, 2013, ss. 15-17).

##### **4.2. Vergi İndirimleri**

Çalışan yoksulluğunu kontrol altında tutmak veya engellemek için gelir arttırıcı politikalarda vergi indirimleri de önem arz etmektedir (Erdoğan ve Kutlu, 2014, s. 85). İngiltere’deki kamu tarafından belirlenen kıstasları taşıyan ailelere yönelik Aile İndirimi (Family Credit), Çocuk Vergi İndirimi (Child Tax Credit), Çalışan Vergi İndirimi (Working Tax Credit), Aile Gelir Katkısı (Family Income Supplement) ve Çalışan Ailelere Vergi İndirimi (Working Families Tax Credit) (Duncan, 2003, ss. 9-17; Crettaz, 2011, ss. 57-59); Amerika’daki Gelir Vergisi İndirimi (Earned-Income Tax Credit) (Marx ve Verbist, 2008, ss. 281-283; Pearson ve Scarpetta, 2000, s. 14); Fransa’daki düşük gelirlilere yönelik sosyal güvence ödemelerindeki indirim uygulamaları (Pearson ve Scarpetta, 2000, s. 14) ve Yeni Zelanda, Kanada ve İrlanda, Finlandiya, Hollanda, Belçika gibi AB ülkelerinde düşük gelirli çalışanlara yönelik vergi

indirimleri (Crettaz, 2011, s. 51; Pena-Casas ve Latta, 2004, s. 80) gibi uygulamalar, gelir artırıcı politikalarda vergi indirimlerine örnek olarak verilebilir.

#### 4.3. Sosyal Transferler/Yardımlar

Asgari ücret uygulaması gibi çalışan yoksulluğunu önlemeye dair bir başka politika uygulaması sosyal yardımlardır (Marx ve Verbist, 2008, ss. 285-286). Hastalık, engelli, konut, yaşlılık, aile yardımları, asgari gelir desteği programları ve işsizlik ödemeleri bahse konu sosyal yardımlardan birçoğuna örnek olarak verilebilir (Lohmann, 2009, s. 492). Bu örneklerin yanında düşük gelirli aileleri desteklemek için yapılan çocuk yararları, çocuk bakımı destek-sübvansiyonları ve annelik yardımları da bu sosyal transferlere örneklerdir (Jaumotte, 2003).

### 5. TÜRKİYE'DE UYGULANAN SOSYAL YARDIMLAR

Türkiye özelinde sosyal yardımlar Aile, Çalışma ve Sosyal Hizmetler Bakanlığı'na (AÇSHB) bağlı Sosyal Yardımlar Genel Müdürlüğü (SYGM), belediyeler, sivil toplum kuruluşları, vakıflar, dernekler tarafından yapılmaktadır. Bu çalışmada ise Sosyal Yardımlar Genel Müdürlüğü tarafından sağlanan sosyal yardımlar üzerinde durulmuştur. Sosyal Yardımlar Genel Müdürlüğü tarafından sağlanan yardımlar; Aile, Barınma-Gıda, Engelli-Yaşlı, Eğitim ve Sağlık yardımları olarak kategorilere ayrılmıştır. Aile Yardımları kapsamında; asker çocuğu, eşi vefat etmiş kadınlara yönelik düzenli nakit, doğum, öksüz ve yetim, çoklu doğum, asker ailelerine yönelik düzenli nakit, işe başlatma, afet-acil durum, terör zararı, vefat ve şehit yakını-gazilere yönelik, işe yönlendirme yardımları yapılmaktadır. Barınma-Gıda yardımları kapsamında; barınma, gıda, aşevleri, yakacak, sosyal uyum, doğalgaz tüketim desteği ve elektrik tüketim desteği yardımları yapılmaktadır. Engelli-Yaşlı yardımları kapsamında; engelli yakını aylığı, engelli ihtiyaç, engelli ve yaşlı bakım projeleri, yaşlı aylığı ve engelli aylığı yardımları yapılmaktadır. Eğitim Yardımları kapsamında; yurt yapımı, yabancılara yönelik şartlı eğitim, ana okulu-ana sınıfı, eğitim materyali, şartlı eğitim, muhtelif eğitim, yükseköğrenim öğrencilerine yönelik ve öğrenci barınma-taşıma-yemek yardımları yapılmaktadır. Sağlık Yardımları kapsamında; kronik hastalık, şartlı sağlık (sağlık ve gebelik), kronik hastalara elektrik tüketim desteği, Genel Sağlık Sigortası (GSS) ödemeleri, silikozis hastalarına yapılan ödemeler, katılım payı ödemeleri, kronik hastalara birikmiş elektrik borcu desteği ve kesintisiz güç kaynağı desteği yardımları yapılmaktadır (SYGM).

Türkiye'deki sosyal yardımların birçoğunu; sosyal güvencesi olmayanlara, çalışmayan ya da çalışamayanlara, fakir ve muhtaç durumda bulunanlara, güçsüz veya kimsesiz birey ve hanelere

sağlanan sosyal yardımlar oluşturmaktadır. Söz konusu gruplar nüfusun en yoksul %6'lık dilimini oluşturmaktadır. Tabii ki bu dezavantajlı birey ve grupların devlet tarafından desteklenmesi gerekmektedir. Fakat sosyal hizmetin bir aracı olan sosyal yardımların kapsayıcılığı unutulmamalıdır. Bahse konu olan nüfusun en yoksul % 6'lık kesimi dışında yoksul vatandaşlara da yönelik sosyal yardımların varlığı mümkündür. T.C. Başbakanlık Aile ve Sosyal Araştırmalar Genel Müdürlüğü'nün (2010) sosyal transfer alıcılarının katılımıyla yapmış olduğu çalışma nüfusun en yoksul % 6'lık kesimi dışında kalan çalışan yoksullara yer vermiştir. Araştırma sonuçlarında; hamallık, merdiven yıkama, temizlikçilik, mevsimlik işçilik, seyyar satıcılık, toplayıcılık, bulaşıkçılık gibi çoğunlukla kayıt dışı sektörde yer alan çalışan yoksulların sosyal yardımlardan faydalandığı tespit edilmiştir.

Sosyal Yardımlar Genel Müdürlüğü tarafından sunulan sosyal yardım uygulamalarında; sosyal güvencesi bulunmama, kayıtlı bir aylık veya gelir hakkından yararlanmama, nafaka bağlanması mümkün olmama veya henüz nafaka almaya hak kazanmama gibi ihtiyaç sahibini sosyal yardıma ulaşmasını zorlaştıracak kıstaslar bulunmaktadır (SYGM). Söz konusu kıstaslar; Türkiye'de sosyal güvenceli olarak istihdamın içinde bulunan çalışan yoksul asgari ücretli bireyler ve hane halklarına yönelik sosyal yardımların varlığını sınırlı tutmaktadır. Sosyal güvencesiz ve güvenceli çalışan yoksullara yönelik sağlanan yardımlara ayrı ayrı değinmekte yarar bulunmaktadır. Sosyal güvencesiz çalışan yoksullara yönelik sağlanan yardımlara; aile, barınma-gıda, engelli-yaşlı, sağlık, eğitim yardımları özelinde ele alınması gerekmektedir. Aile yardımlarından asker çocuğu, doğum, asker ailelerine yönelik düzenli nakit, çoklu doğum, işe yönlendirme yardımları; sosyal güvencesi olmayan çalışan yoksullara yönelik yapılan yardımlardır. Doğum, çoklu doğum, işe başlama yardımları; sosyal güvencesi olan çalışan yoksullara yönelik sağlanan yardımlardır. Barınma-gıda yardımlarından gıda, yakacak, doğal gaz tüketim desteği, elektrik tüketim desteği yardımları sosyal güvencesi olmayan çalışan yoksullara yönelik yapılan yardımlardır. Gıda, yakacak yardımları; sosyal güvencesi olan çalışan yoksullara yönelik sağlanan yardımlardır. Sağlık yardımlarından katılım payı ödemeleri, şartlı sağlık (sağlık ve gebelik), Genel Sağlık Sigortası prim ödemeleri desteği yardımları; sosyal güvencesi olmayan çalışan yoksullara yönelik yapılan yardımlardır. Sosyal güvencesi olmayan çalışan yoksul hane üyelerinden herhangi birinde tüberküloz, silikozis hastalığı bulunması ya da elektrik tüketimine bağlı cihazlara gereksinim duyan kronik rahatsızlığı bulunması durumunda; söz konusu kronik hastalığı bulunan aile üyesine birtakım sosyal yardımlar sağlanmaktadır. Sosyal yardımlar çalışan yoksul olan haneye bir nebze de olsa

ekonomik anlamda olumlu etkileri olmaktadır. Sosyal güvencesi olmayan çalışan yoksul hane üyesine sağlanan diğer sağlık yardımları; kronik hastalara birikmiş elektrik borcu ve kesintisiz güç kaynağı desteği, kronik hastalık, kronik hastalara elektrik tüketim desteği, silikozis hastalarına yapılan ödemeler yardımlarıdır. Sağlık yardımlarından sadece evde bakım aylığı yardımı; sosyal güvencesi olan çalışan yoksul hanelerin üyelerinden birinin ağır engelli olması durumunda yararlandıkları yardımdır. Eğitim yardımlarından muhtelif eğitim, ana okulu-ana sınıfı, şartlı eğitim, öğrenci barınma-taşıma-yemek desteği, eğitim materyali, yükseköğrenim öğrencilerine yönelik yardımları; sosyal güvencesi olmayan çalışan yoksul bireylere yapılan yardımlardır. Muhtelif eğitim, öğrenci barınma-taşıma-yemek desteği, eğitim materyali, yükseköğrenim öğrencilerine yönelik yardımlar; sosyal güvenceli çalışan yoksullara yönelik sağlanan yardımlardır (SYGM). Çalışan yoksullara yönelik sağlanan sosyal yardımların çoğu; sosyal güvencesi olmayan, enformel sektörde çalışan yoksullara yöneliktir. Bu çalışan yoksullar, sosyal güvence kaydı bulunmadıkları için mutlak yoksul gruplarından biri olarak görünmektedir. Mutlak yoksulluk ile mücadele programlarının yanı sıra yoksullukla mücadele politikaları kapsamında çalışan yoksulluğu, kent yoksulluğu, insani yoksulluk vb. yoksulluk türlerine yönelik politikalar gerçekleştirilmelidir.

## **6. SONUÇ**

Yoksullukla mücadele politikalarının temel düzeyde mutlak yoksulluk kıstas alınarak hazırlanması; toplumsal alanda yer alan diğer yoksul kesimlerin sosyal dayanışma ve yardımlaşma ağlarına entegre olmasının önünde büyük bir engel teşkil etmektedir. Küreselleşme ve beraberindeki sermaye yönetim akımları; iş hayatında ücretlerin düşürülmesine, mevcut aile yapılarının değişime uğraması ve devletlerce sağlanan sosyal transferlerin kısıtlanmasının etkisiyle çalışan bireylerde sosyal destek sistemlerinin işlevselliğini yitirmesine sebep olmaktadır. Gelir getirici bir işte çalışmalarına rağmen çalışan kesimin yoksulluk tuzağına sıklıkla düşmesi de küreselleşme ve sermaye yönetim zihniyetleriyle ilişkilidir. Çalışan yoksulluğu birçok ülke tarafından tanımlanmasına rağmen bu kesim; formel ve enformel sosyal yardım ve hizmetlerden yararlanmada engellemelerle karşılaşmaktadırlar.

Türkiye özelinde sosyal güvenlik girişi bulunan bireylere yönelik sağlanan sosyal yardımlar kısıtlı düzeydedir. Söz konusu kısıtlılık durumu sosyal güvenceli çalışan yoksulların kamu tarafından sağlanan sosyal transferlere erişimini engellemekte ve sosyal yardımlaşma-

dayanışma sistemlerine ulaşmalarını güç hale dönüştürmektedir (Kesgin, 2011, s. 72). Bu yüzden Kesgin'in (2011, s. 73) de ifade ettiği üzere sosyal yardımlara dair mevzuatlarda çalışan yoksulları da kapsayacak düzenlemelere ihtiyaç bulunmaktadır. Yoksulluğun artık çok boyutlu ve karmaşık bir görünüme sahip olduğu unutulmamalıdır. Aksi takdirde düşük gelirli çalışanların mağduriyetleri gözden kaçırılmaktadır (Kesgin, 2011).

Çalışan yoksulluğu sorununu aile-akrabalık bağları ve sivil oluşumlarının inisiyatifine bırakılması; bu bireylerin devlet algılarını olumsuz etkileyebildiği gibi kendilerine yardımcı olan sivil oluşumlara minnettarlık duygusu beslemelerine ve aidiyet geliştirmelerine zemin hazırlayabilir. Türkiye'de sivil oluşumlarca sunulan sosyal hizmetlerin denetim mekanizmalarının yeterli olamayışı, formel ve enformel sektörler tarafından sağlanan sosyal yardımların entegre bir sisteme tabi bulunamaması bireylerce geliştirilen aidiyet ve kimlik duygularını suiistimale açık bırakmaktadır. Formel ve enformel sektörler tarafından sağlanan sosyal yardım ve hizmetlerin entegre bir sisteme dâhil edilmesi gerekmektedir. Denge-denetim mekanizmalarının oluşturulması ve yoksullukla mücadelede sadece mutlak yoksullukla değil özelde çalışan yoksulluğunun genelde tüm yoksulluk çeşitlerine yönelik sosyal politika ve yardım uygulamalarının geliştirilmesi gerekmektedir.

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## **ORGANİZE SANAYİ BÖLGELERİNİN KENTSEL GELİŞİME ETKİSİ: SIIRT ÖRNEĞİ**

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### **ÖZET**

Ülkemiz 1950’li yıllardan itibaren hızlı bir değişim süreci içine girmiştir. Bu hızlı değişim ile birlikte ülke içinde bölgelerarası ekonomik gelişmişlik farkları ortaya çıkmıştır. Nüfusun ülke içindeki plansız hareketi, özellikle ekonomik olarak gelişmiş bölgelere doğru olan göç olgusu önemli bazı sorunları da beraberinde getirmiştir. Nüfusun belirli alanlarda toplanması ve yoğunlaşması ile plansız ve çarpık kentleşme, çevre sorunları ve hayat standartlarında düşme eğilimi gibi etkenler belirmiştir. Bu durumun olumsuz etkilerini ortadan kaldırmak için Türkiye’de 1960’lı yıllardan itibaren planlı kalkınma hamleleriyle beraber kentlerin planlı bir şekilde büyümesi ve gelişme göstermesi hedeflenmiştir. Bu amaca yönelik olarak ülkemizde organize sanayi bölgelerinin ilk örnekleri bu dönemde uygulamaya konulmuş ve sayıları yıldan yıla artış göstermiştir. Organize sanayi bölgeleri kentlerin gelişimi ve değişimi üzerinde oldukça önemli bir etkiye sahiptir. Bu çalışmada Siirt ilinde yer alan Organize Sanayi Bölgesi’nin, kentsel gelişime olan etkisi incelenmiştir. Kentin yatay gelişiminde, sosyo-ekonomik ve demografik yapısında ne düzeyde etkide bulunduğu bu çalışmanın temel amacını oluşturmaktadır. Siirt Organize Sanayi Bölgesi 2007 yılında faaliyete geçmiştir. Siirt OSB 70 hektar arazi üzerine ve Şirvan yolunun 8. kilometresine kurulmuş olup modern sanayi faaliyetlerinin gelişmesinde önemli bir yere sahiptir. Siirt Organize Sanayi Bölgesi’nin 2007 yılından itibaren kentte mekânsal olarak yaptığı değişiklikler tespit edilmeye çalışılmıştır. Sonuç olarak Siirt Organize Sanayi Bölgesi’nin planlı ve düzenli bir kent yapısı oluşturması ve ekonomik dengesizlikleri ortadan kaldırması açısından önemli bir yere sahip olduğu anlaşılmıştır.

**Anahtar kelimeler:** Organize Sanayi Bölgesi, Kentleşme, Sanayileşme, Siirt

**THE EFFECT OF ORGANIZED INDUSTRIAL ZONES ON URBAN  
DEVELOPMENT: THE EXAMPLE OF SIİRT****ABSTRACT**

Our country has been in a process of rapid change since the 1950s. With this rapid change, interregional economic development differences have emerged within the country. The unplanned movement of the population within the country, especially the migration to the economically developed regions, has brought along some important problems. Factors such as the aggregation and density of the population in certain areas, unplanned and distorted urbanization, environmental problems and decrease in living standards have emerged. In order to eliminate the negative effects of this situation, it has been aimed that cities will grow and develop in a planned way with the planned development moves since the 1960s in Turkey. For this purpose, the first examples of organized industrial zones in our country were put into practice in this period and their numbers increased from year to year. Organized industrial zones have a very important effect on the development and change of cities. In this study, the effect of the Organized Industrial Zone in Siirt on urban development was examined. The main purpose of this study is to what extent it affects the horizontal development of the city, its socio-economic and demographic structure. Siirt Organized Industrial Zone started its activities in 2007. Siirt OIZ was established on 70 hectares of land and on the 8th kilometer of the Şirvan road and has an important place in the development of modern industrial activities. The spatial changes that Siirt Organized Industrial Zone has made in the city since 2007 have been tried to be determined. As a result, it has been understood that Siirt Organized Industrial Zone has an important place in terms of creating a planned and orderly city structure and eliminating economic imbalances.

**Keywords:** Organized industrial Zone, Urbanization, Industrialization, Siirt

## 1. GİRİŞ

Organize Sanayi Bölgeleri, bir ülkenin gelişip kalkınmasında, sermaye birikiminin elde edilmesinde ve şehirleşme dinamiğinin belirlenmesinde en önemli faktörlerden birisidir (Dumansızoğlu ve Döker, 2017: 89). OSB'ler, ağır sanayi ve entegre tesisler dışında kalan, çeşitli sektörel üretimleri uyumlu ve birbiriyle tamamlayıcı bir nitelikte olan küçük-orta sanayi ölçek ve boyutundaki imalat ünitelerinin, kapsamlı bir biçimde sınırları tayin edilmiş bir alanda, yerleşimi, altyapısı, gerekli sosyal ve teknik hizmetleri ve ortak yapıları ile organize edilmiş bölgeleridir (Bayülken, 2017: 1). Bu bölgeler, yerleşimin ortak amaca uygun olduğu, altyapının gereksinmelerin tamamının karşılandığı, bina ve tesis açık alanları ile tesisatlarının belirli kriterlere göre standartlaştığı sahalardır. Daha çok sanayinin ülke geneline yayılması, geri kalmış bölgelerin refah seviyesinin yükseltilmesi ve şehirlerin düzenli bir şekilde gelişmesinin sağlanması için oluşturulan bu sanayi alanları, yatırımcıların sanayi faaliyetleri için en uygun arsalarla ulaşmalarını sağlamaktadır (Koç ve Bulmuş, 2014: 181). Planlı sanayi bölgesi örneklerinden biri olan Organize Sanayi Bölgeleri yatırımcılara hazır alt yapı sunma, bölgeler arasında dengeli sanayi dağılımını sağlama ve girişimciye neyi, nerede, nasıl üreteceği fikrini verme gibi özellikleriyle endüstrileşme sürecinde ülkelerin vazgeçilmez politikaları haline gelmiştir.

Dünyada planlı sanayi faaliyetleri ve organize sanayi bölgelerinin kuruluşu 19 yüzyılın ikinci yarısında Amerika Birleşik Devletleri ve İngiltere gibi sanayinin ilk ortaya çıktığı bölgelere dayanmaktadır. Türkiye'de ise planlı sanayi faaliyetleri ancak 1950'li yıllardan sonra ortaya çıkmaya başlamış, bu döneme kadar sanayi faaliyetleri ülke genelinde gelişigüzel ve mekânsal planlamadan bağımsız gelişmiştir. Kent içinde gelişigüzel kurulan sanayi kuruluşları, 1960'lı yılların başında gündeme gelen ve sonrasında uygulamaya konulan Organize Sanayi Bölgelerine doğru kayma eğilimi göstermişlerdir (Mutluer, 2003: 20). Günümüzde planlı sanayi faaliyetleri ve modern kentleşme süreçlerine bağlı olarak OSB'lerin sayısında büyük bir artış yaşanmıştır.

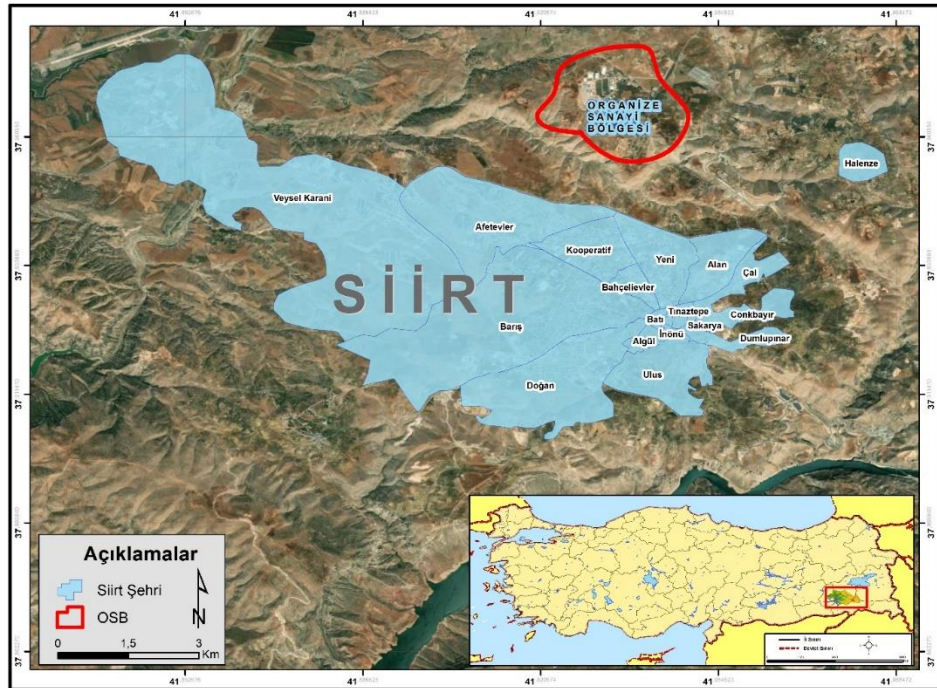
Türkiye gibi henüz sanayileşmesini tamamlayamamış ülkelerde sanayinin belli bölgelerde toplanması, bölgelerarası sosyal ve ekonomik dengesizlikleri gelişmiş ülkelere göre daha da artırmaktadır. Sanayileşmenin yoğunlaştığı alanların nüfusu diğer bölgelerden gelen göçlerle artmakta, yetersiz konut stoku ve plansız bir kent dokusu ortaya çıkmaktadır. Bununla birlikte zamanla mekânsal büyümeye bağlı olarak sanayi tesisleri kent merkezinde kalmakta, tarım alanları yok olmakta ve çeşitli çevre sorunları görülmektedir. Dolayısıyla hem göç alan

yerlerdeki bu sıkıntıları en aza indirmek hem de göç veren sahalardaki nüfusu bulunduğu yerde istihdam edebilecek yatırımlar yapmak için organize sanayi bölgeleri büyük bir işlev görmektedir (Karadeniz ve Yılmaz, 2021: 1820). Organize sanayi bölgeleri, bölgeler arası dengesizlikleri azaltmak, sosyo-ekonomik farklılıkları ortadan kaldırmak için oldukça önemli bölgelerdir. Bu sahalarda yerleştirilecek sanayiler, bir yandan mevcut sanayileşmiş bölgelerin gereğinden fazla büyümesine engel olacak, diğer yandan da ekonomik kaynakların kendilerine yönelmesini sağlayarak bölgeler arasındaki dağılımı etkileyeceklerdir (Hozikligil, 2007: 1).

Bu çalışmada bölgesel gelişmişlik açısından dezavantajlı bir konumda bulunan, Güneydoğu Anadolu Bölgesi'nde yer alan Siirt ili Organize Sanayi Bölgesi ele alınmıştır. Siirt Organize Sanayi Bölgesi'nin Siirt kentine, mekânsal gelişime ve yörenin kalkınmasına etkisi bu çalışmada ele alınmıştır.

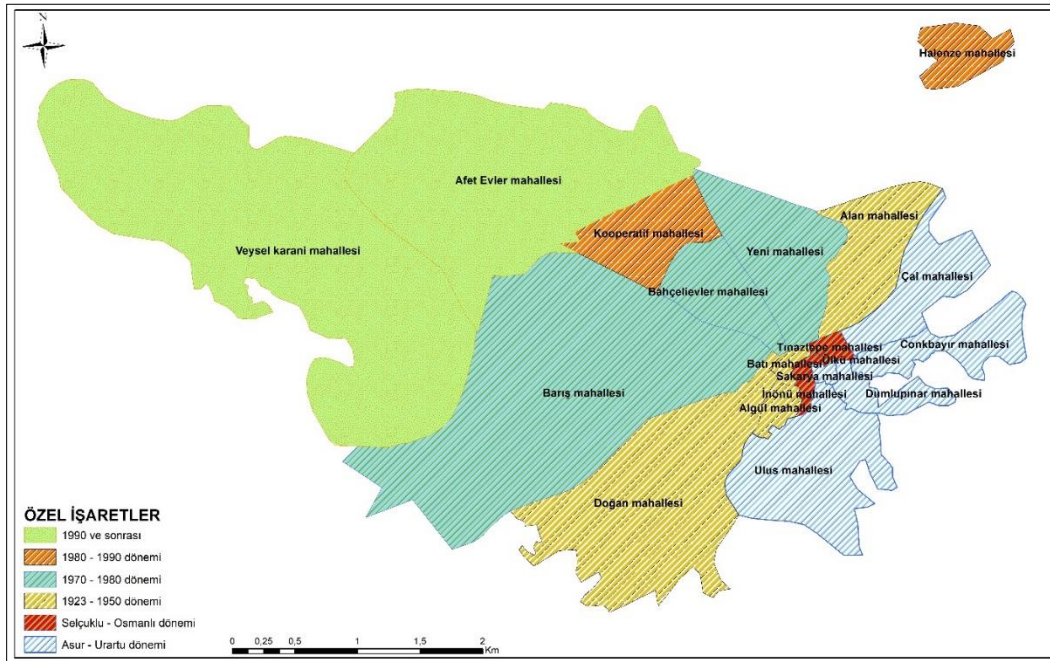
## 2. ÇALIŞMA SAHASININ KONUMU

Siirt ili, Güneydoğu Anadolu Bölgesi'nin Dicle Bölümü sınırları içerisinde yer almakta olup doğuda Şırnak ve Van, kuzeyde Batman ve Bitlis, batıda Batman ve güneyde Şırnak ve Mardin illeri ile çevrilidir. Siirt ili idari olarak, Kurtalan, Erüh, Pervari, Tillo, Şirvan, Baykan ve Merkez ilçe olmak üzere toplamda 7 ilçeden oluşmaktadır. Siirt Organize Sanayi Bölgesi'nin bulunduğu Siirt kenti, Siirt ilinin idari merkezi konumundadır.



Şekil 1. Çalışma sahası Lokasyon Haritası

Siirt kentinin yakın geçmişteki mekânsal gelişim sürecine bakıldığında kent, Cumhuriyetin ilk yıllarında yaklaşık 15000 nüfuslu ve kırsal karakteri çok baskın olan küçük bir Anadolu kenti görünümündeydi. Siirt'te bu dönemde modern kentleşme izleri ise hemen hemen hiç görülmemekteydi. Kent, bu görünümünü 1950'li yıllara kadar pek fazla değişmeden korumuştur. Bu yıllardan itibaren ise tüm ülkede olduğu gibi Siirt kentinde de kentleşme süreci hızlanmaya, kent nüfusu artmaya ve fonksiyonları gelişmeye başlamıştır. Siirt kenti 2000'li yıllara kadar mekânsal olarak büyümeye devam etmiştir. Bu dönemde Siirt, nüfus artışı ve alansal büyüme yaşayarak batısındaki plato yüzeyine doğru iyice yayılmıştır (Alkan, 2021: 22-25). Günümüzde Siirt kenti, 160.000 civarında nüfusu ve gelişme eğiliminde olan ekonomik fonksiyonlarıyla bulunduğu bölge için önemli bir yerleşmedir. Kent, ilk kurulduğu tepelik sahadan hızla uzaklaşarak önce batısındaki platoya bugün ise bu plato sahasını da aşarak Batman-Diyarbakır karayolu etrafında gelişim göstermektedir. Bahçelievler, Yeni, Sakarya, Karakol, Kooperatif, Ülkü, Tınaztepe, Alan, Doğan, Algül, Batı, Dumlupınar, İnönü, Çal, Conkbayır, Alan, Barış, Afetevler, Veysel Karani ve Halenze olmak üzere 20 mahalleden oluşan Siirt kenti, mekânsal ve demografik olarak büyümeye devam etmektedir (Alkan, 2018: 109-121).



**Şekil 2.** Siirt Kenti Yatay Gelişim Haritası (Alkan, 2018'den alınmıştır.)

### 3. BULGULAR

Siirt kentinde sanayi faaliyetlerinin büyük kısmını küçük ve orta ölçekli atölye tipi sanayi oluşturmaktadır. Modern sanayi faaliyetlerinin kente etkisi son zamanlarda artmakla beraber halen istenilen düzeyde değildir. Siirt kentinde modern sanayi faaliyetlerinin gelişmesinde Organize Sanayi Bölgesi'nin önemli katkısı bulunmaktadır.

Siirt Organize Sanayi Bölgesi Şirvan yolunun 8. kilometresinde yer almaktadır. 1995 yılında 700 dönümlük (70 hektar) arazi üzerinde kuruluş çalışmaları başlamış, 2007 yılında tamamlanmıştır. Toplamda 45 sanayi parseli bulunmakta olup, bu parsellerin tamamı yatırımcıya tahsis edilmiştir. Organize Sanayi Bölgesi'nde tekstil, inşaat, eğitim, maden ve teknoloji alanlarında 28 yatırımcı bulunmakta ve üretimleri devam etmektedir. Siirt Organize Sanayi Bölgesi'nde geçici işçi statüsündeki çalışanlar ile birlikte toplamda 1500 kişi istihdam edilmektedir. İnşaat aşamasında olan ve inşaat sürecinin tamamlanması ile beraber 8 yatırımcının daha üretime geçmesiyle bölgede 3500 kişinin istihdamı planlanmaktadır.

Siirt Organize Sanayi Bölgesi'nde en gelişmiş ve teknolojik özelliklere sahip tesis Türkiye-Katar ortaklığıyla yapılmış olan Lineer Çinko İzabe tesisidir. Türkiye'nin hali hazırda tek Çinko Metal Külçe Üretim Tesisi olan Lineer Çinko İzabe Tesisi; Türk-Katar ortaklığı ile yapılmış olup, ilk fazda yıllık 30 bin ton toplamda ise 90 bin ton külçe çinko üretimi yapmak üzere 100 dönüm arazi üzerinde inşa edilmiştir. Hakkâri ve Siirt' te 1900 doğrudan, 1100 dolaylı olmak üzere toplamda 3000 kişiye istihdam sağlayacak projenin toplam yatırım büyüklüğü 102 milyon dolar tutarındadır. Tam kapasitede tesis yıllık 216 milyon dolarlık ithalatın önüne geçecektir ve bu değer Türkiye'nin yıllık çinko ithalatının %38'ini oluşturmaktadır.

**Tablo 1.** Siirt Organize Sanayi Bölgesi'nde Faaliyet Gösteren Tesisler

Yatırımcı	Üretim Konusu	İstihdam/Kişi	Kurulu Alan/m <sup>2</sup>
Lineer Çinko İzabe Tesisi	Çinko Metal Külçe	320	100.000
Fıstık İşleme Tesisi	Fıstık	80	35.000
Lamino Tekstil Fabrikası	Bez Çanta, Maske	160	25.000
Çivi ve Tel Örgü Fabrikası	Tel Örgü, Çivi	30	10.000
Yes Yalıtım Fabrikası	Dış Cephe Kaplama, Kalekim	30	9.907
Botan Kalekim Fabrikası	Kalekim ve Alçı	60	9.051
Şavli Demir Tel Örgü Fabrikası	Tel Örgü	30	4.610
Aydoğdu Alüminyum Fabrikası	Alüminyum Paslanmaz Çelik	40	6.699
Özdoğu Yapı Prefabrik Fabrikası	Prefabrik Yapı Elemanları (Kolon vb.)	60	15.000

Siirt Organize Sanayi Bölgesi'nde yer alan bir diğer önemli tesis Siirt Fıstık İşleme Tesisi'dir. Avrupa Birliği ve Türkiye Cumhuriyeti Mali İşbirliği çerçevesinde finanse edilen ve Sanayi ve Teknoloji Bakanlığı tarafından yürütülen "Rekabetçi Sektörler Programı" kapsamında faaliyete geçirilmiş bir tesistir. Tesiste sürekli olarak 50 mevsimlik ve ihtiyaç halinde 80'e kadar çıkabilen personel sayısı ile hizmet verilmektedir. Tesis aynı zamanda akredite olması için işlemlerin başlatıldığı ve kuruyemiş ile ilgili birçok önemli analizin yapıldığı bir laboratuvarı da bünyesinde bulundurmaktadır. Tesis, en son ihracatını 5 ton ile Almanya'ya gerçekleştirmiştir.

Sahada yer alan bir diğer önemli tesis, Lamino Tekstil Fabrikası'dır. KOSGEB desteği ile kurulan fabrikada yaklaşık olarak 10 ülkeye ihracat yapılmaktadır. 25.000 m<sup>2</sup> arazi üzerine kurulmuş olan ve 160'a yakın kişiye istihdam sağlayan fabrikamızda bez çanta ve son zamanlarda dünya genelinde görülen Covid-19 virüsünden dolayı pandemi sürecinde Maske üretilmeye başlanılmıştır. Halen aktif olarak çalışmaya devam etmektedir.

Siirt Organize Sanayi Bölgesi'nde belirtilen tesisler dışında faaliyet gösteren tesisler şu şekildedir: Çivi ve Tel Örgü Fabrikası, 10.000 m<sup>2</sup> arazi üzerine kurulu fabrikada 30 kişiye istihdam sağlanmaktadır. Tel Örgü ve Çivi üretimi yapılmaktadır. Halen aktif olarak çalışmaya devam etmektedir. Yes Yalıtım Fabrikası, 9.907 m<sup>2</sup> arazi üzerine kurulu fabrikada 30 kişiye istihdam sağlanmaktadır. Dış cephe kaplama ve kalekim üretimi yapılmaktadır. Halen aktif olarak çalışmaya devam etmektedir. Botan Kalekim Fabrikası, 9.051 m<sup>2</sup> arazi üzerine kurulu fabrikada 60 kişiye istihdam sağlanmaktadır. Kalekim ve alçı üretimi yapılmaktadır. Halen aktif olarak çalışmaya devam etmektedir. Şavli Demir Tel Örgü Fabrikası, 4.610 m<sup>2</sup> arazi üzerine kurulu fabrikada 30 kişiye istihdam sağlanmaktadır. Tel Örgü üretimi yapılmaktadır. Halen aktif olarak çalışmaya devam etmektedir. Aydoğdu Alüminyum Fabrikası, 6.699 m<sup>2</sup> arazi üzerine kurulu fabrikada 40 kişiye istihdam sağlanmaktadır. Alüminyum paslanmaz çelik üretimi yapılmaktadır. Halen aktif olarak çalışmaya devam etmektedir. Özdoğu Yapı Prefabrik Fabrikası, 15.000 m<sup>2</sup> arazi üzerine kurulu fabrikada 60 kişiye istihdam sağlanmaktadır. Prefabrik yapı elemanları (kolon vb.) üretimi yapılmaktadır. Halen aktif olarak çalışmaya devam etmektedir.



**Tablo 2.** Siirt Organize Sanayi Bölgesi'nde Arsa Tahsis Sürecinde Bulunan Firmalar (2017)

Yatırımcı	Üretim Konusu	İstihdam/Kişi	Talep Edilen Arsa/m <sup>2</sup>
Fıstık İşleme Tesisi	Fıstık	80	35.000
Lamino Tekstil Fabrikası	Bez Çanta, Maske	160	25.000
Estaş Mermer	Mermer	50	20.000
Güney Alüminyum	Alüminyum Profil	100	16.000
İş Yapı Malzeme	Çelik Kons	100	16.00
Demmond Oto Yedek Parça	Amortisör Balata	150	16.000
Projeksiyon Mühendislik	Çelik Hasır	50	16.000

Öte yandan Siirt Organize Sanayi Bölgesi'nde arsa tahsis süreci devam eden 6 tesis bulunmaktadır. 2017 yılında başvuru yapan Lamino Tekstil Fabrikası, Estaş Mermer, Güney Alüminyum, İş Yapı Malzeme, Demmond Oto Yedek Parça ve Projeksiyon Mühendislik gibi firmaların arsa tahsis süreci devam etmektedir. Siirt Organize Sanayi Bölgesi'nde proje süreci devam eden 5 firma bulunmaktadır. Bunlar; Matriko Tekstil Fabrikası, Bandaroğlu PVC Üretim Tesisi, Alkumru USB Üretim Tesisi, Çermik PVC Isı Cam Üretim Tesisi ve Ninova Tekstil Fabrikası'dır.

Siirt Organize Sanayi Bölgesi'nin Siirt kentinin mekânsal gelişimi üzerine etkisi incelendiğinde, dikkat çekici bazı hususların olduğu anlaşılmaktadır. Buna göre kuruluş yeri açısından Siirt Organize Sanayi Bölgesi, Siirt kentinin kuzeyinde ve Şirvan ilçe yolunun 8. kilometresinde konumlanmıştır. Bu konum Siirt kentini dünyaya bağlayan ve en önemli karayolu ağı konumunda olan Siirt-Batman-Diyarbakır karayolu ağına oldukça sapa kalmaktadır. Bunun yanı sıra Organize Sanayi Bölgesi ile Siirt kenti arasında dar ve derin bir vadi yer almakta olup, bu da kent ile Organize Sanayi Bölgesi arasında hizmetlerin yürütülmesinde engellere yol açmaktadır. Belirtilen bu dezavantajların etkisiyle Siirt Organize Sanayi Bölgesi kuruluşundan bugüne iyi bir büyüme ivmesi kazanamamıştır. Siirt Organize Sanayi Bölgesi'nin kuruluş yeri ile ilgili dezavantajlara rağmen son yıllarda kamu idaresi tarafından yapılan hamleler ve yatırım teşvikleri ile birlikte hızlı bir büyüme trendine girmiş ve bölgede üretim ve istihdam üzerinde önemli etkiler yapmaya başlamıştır. Organize Sanayi Bölgesi'nden Siirt kentine ve diğer karayolu ağlarına doğru yapılan çevre yolları ve yeni bağlantı yolları sayesinde ulaşımdaki sorunlar büyük oranda çözülmüştür. Bununla birlikte bölgede sanayi yatırımlarına devletin yatırım teşviki, istihdam ve kredi desteği, arsa tahsisi gibi büyük destekler sağlaması sonucunda sanayi yatırımlarında son yıllarda büyük artışlar

yaşanmıştır. Nitekim Lineer Çinko İzabe, Fıstık İşleme gibi büyük tesis ve yatırımların Siirt Organize Sanayi Bölgesi bünyesinde yer alması, Siirt şehri için büyük bir istihdam ve ekonomik katma değer oluşturmuştur. Bütün bu olumlu gelişmelerin etkisiyle Siirt Organize Sanayi Bölgesi hem Siirt kentinin mekânsal gelişim yönünü etkilemekte hem de istihdam ve üretim üzerinde belirleyici olmaya başlamıştır.

#### **4. SONUÇ**

Siirt OSB, kentleşmeyi yönlendirmek, çevre sorunlarını önlemek, planlı bir sanayileşme olayını gerçekleştirmek ve bölgelerarası gelişmişlik farkını azaltmaya yönelik olarak faaliyete geçmiştir. Organize Sanayi Bölgesi Siirt kentinin demografik, ekonomik ve mekânsal gelişimini etkilemiştir. Modern sanayi faaliyetlerinin kentte kurulması ve kentin planlı bir şekilde büyümesi için OSB'nin varlığı oldukça önem taşımaktadır. Mevcut durumda iki tane çok önemli modern sanayi tesisine sahip olan Siirt OSB, gelecek için önemli yatırım faaliyetlerine ev sahipliği yapma potansiyeline sahiptir. OSB ile kentin daha planlı bir yapıya kavuşması, istihdam olanaklarını arttırması ve kentin gelişmişlik düzeyinin iyileşmesi öngörülmektedir. Bu bağlamda son yıllarda modern kentleşme açısından atılan adımlar ve hız kazanan modern sanayi faaliyetleri ile birlikte yörede önemli sosyo-ekonomik değişimler yaşanması beklenmektedir.

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**GÖLBAŞI HAVZASI TURBALIKLARININ ALANSAL VE ZAMANSAL (1984 - 2020)  
DEĞİŞİMİ, ADIYAMAN/ TÜRKİYE**

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Samsun

**ÖZET**

Turbalar, bataklık ortamlarda ve yetersiz oksijen şartlarında bitki kalıntılarının birikmesiyle oluşan genç, düşük kalorili ve killi bir kömür çeşididir. Turbalar başta yakacak olmak üzere, bitkisel üretim, ısı yalıtımı, ormancılık, peyzaj, tıp ve tekstil gibi farklı alanlarda kullanılmaktadır. Turbalar jeolojik geçmişin açıklanmasında kullanılan önemli doğal kayıt belgeleridir. Özellikle paleo-iklim ve paleo-vegetasyon araştırmaları için önemli bilgiler içerirler. Turbalıklar ayrıca, önemli karbon yutak alanlarıdır ve küresel iklim değişikliğinin kontrol altında tutulmasında önem taşırlar. Bu çalışma, Türkiye'nin önemli turba işletim alanlarından Gölbaşı Havzası turbalıklarının alansal ve zamansal değişimini incelemek amacıyla hazırlanmıştır. Havza, Güneydoğu Anadolu Bölgesi'nin Orta Fırat Bölümü'nde ve Adıyaman ilinin Gölbaşı ilçesi sınırları içinde yer alır. Çalışma büyük kısmıyla saha çalışmalarına dayalı olarak hazırlanmıştır. Ayrıca, uzaktan algılama yöntemlerinden ve istatistiksel yöntemlerden de yararlanılmıştır. Turba alanlarının zamansal değişimini belirlemek için 1984, 2000 ve 2020 tarihli Landsat uydu görüntülerinden, GoogleEarth görüntülerinden ve güncel drone çekimlerinden yararlanılmıştır. Yapılan analizler neticesinde havzadaki turbalıkların 1984 yılında 1349,05 ha olduğu, 2020 yılında ise 888,19 ha'ya gerilediği belirlenmiştir. Buna göre, Gölbaşı Havzası turbalıklarının son 36 yıldaki alansal daralması 460,86 ha olmuştur. 1984 yılından 2020 yılına değişim oranı ise % 34,16'dır. Alansal azalma özellikle Gölbaşı Gölü ile Azaplı Gölü arasındaki turba çıkarma alanlarında, Azaplı Gölü'nün kuzeydoğusunda ve İneklı Gölü'nün kuzeyinde belirgindir. Turbalıkların daralmasında tarımsal amaçlı kurutma ve turba madenciliğinin belirleyici olduğu anlaşılmıştır. Şu anda, çalışma alanında devam eden turba kazısı turbalıkların bozulmasına ve karbon ayak izinin büyümesine yol açmaktadır. Ancak sulak alanın 2.079 ha'lık bir bölümünün tabiat parkı ilan edilerek koruma altına alınması olumlu ancak yetersiz bir gelişme olarak değerlendirilmiştir.

**Anahtar kelimeler:** Turba, uzaktan algılama, zamansal değişim, alansal değişim, Gölbaşı Havzası, Adıyaman.

**SPATIAL AND TEMPORAL (1984 - 2020) CHANGE OF PEATHENS IN THE  
GÖLBAŞI BASIN, ADIYAMAN/ TURKEY****ABSTRACT**

Peats are a young, low-calorie and clayey type of coal formed by the accumulation of dead plant material in swampy and anaerobic environments. Peats are used in different fields such as fuel, plant production, thermal insulation, forestry, landscape, medicine and textiles. Peats are important natural record documents used to explain the geological history. They involve important information especially for paleo-climate and paleo-vegetation research. Peatlands are also crucial carbon sinks and are in keeping global climate change under control. This study was prepared to examine the spatial and temporal change of the Gölbaşı Basin peatlands, one of the peat mining areas of Turkey. The basin is located in the Middle Euphrates Section of the Southeastern Anatolia Region and within the borders of Gölbaşı district of Adıyaman province. The study is mostly based on field studies. In addition, remote sensing methods and statistical methods were also used. Landsat satellite images dated 1984, 2000 and 2020, Google Earth images and recent drone footage were used to determine the temporal changing of peatlands. As a result of the analyzes, it was determined that the peatlands in the basin were 1349.05 ha in 1984 and decreased to 888,19 ha in 2020. Accordingly, the areal shrinkage of the Gölbaşı Basin peatlands in the last 36 years has been 460,86 ha. The rate of change from 1984 to 2020 is 34,16%. The spatial decrease is especially evident in the peat excavation areas between Gölbaşı Lake and Azaplı Lake, in the northeast of Azaplı Lake and in the north of İnekli Lake. It has been understood that agricultural drying and peat mining are determinants in the decrease of peatlands. Currently, ongoing peat excavation in the study area leads to degradation of peatlands and growth of carbon footprint. However, declaring an area of 2,079 ha in the wetland as a Nature Park and taking it under protection was considered as a positive but insufficient development.

**Key words:** Peat, remote sensing, temporal change, spatial change, Gölbaşı Basin, Adıyaman.

## **GİRİŞ**

Turbalar, bataklık ortamlarda ve yetersiz oksijen şartlarında bitki kalıntılarının birikmesiyle oluşan genç, düşük kalorili ve killi bir kömür çeşididir (Kahraman ve Güçlü, 2001; Kırmacı, 2017; Kowalczyk-Juško vd., 2016). Turbalar başta enerji üretimi olmak üzere, bitkisel üretim, ısı yalıtımı, ormancılık, peyzaj, ilaç sanayi ve tekstil gibi farklı alanlarda kullanılmaktadır (Joosten ve Clarke, 2002; Kowalczyk-Juško vd., 2016). Turbalıklar jeolojik geçmişin açıklanmasında kullanılan önemli doğal kayıt belgeleri arasında yer alırlar. Özellikle paleo-iklim ve paleo-vegetasyon araştırmaları için önemli bilgiler içerirler. Turbalıklar ayrıca, önemli karbon yutak alanlarıdır ve küresel iklim değişikliğinin kontrol altında tutulması açısından önem taşırlar (Tarnocai, 2006; Tırıl, 2006).

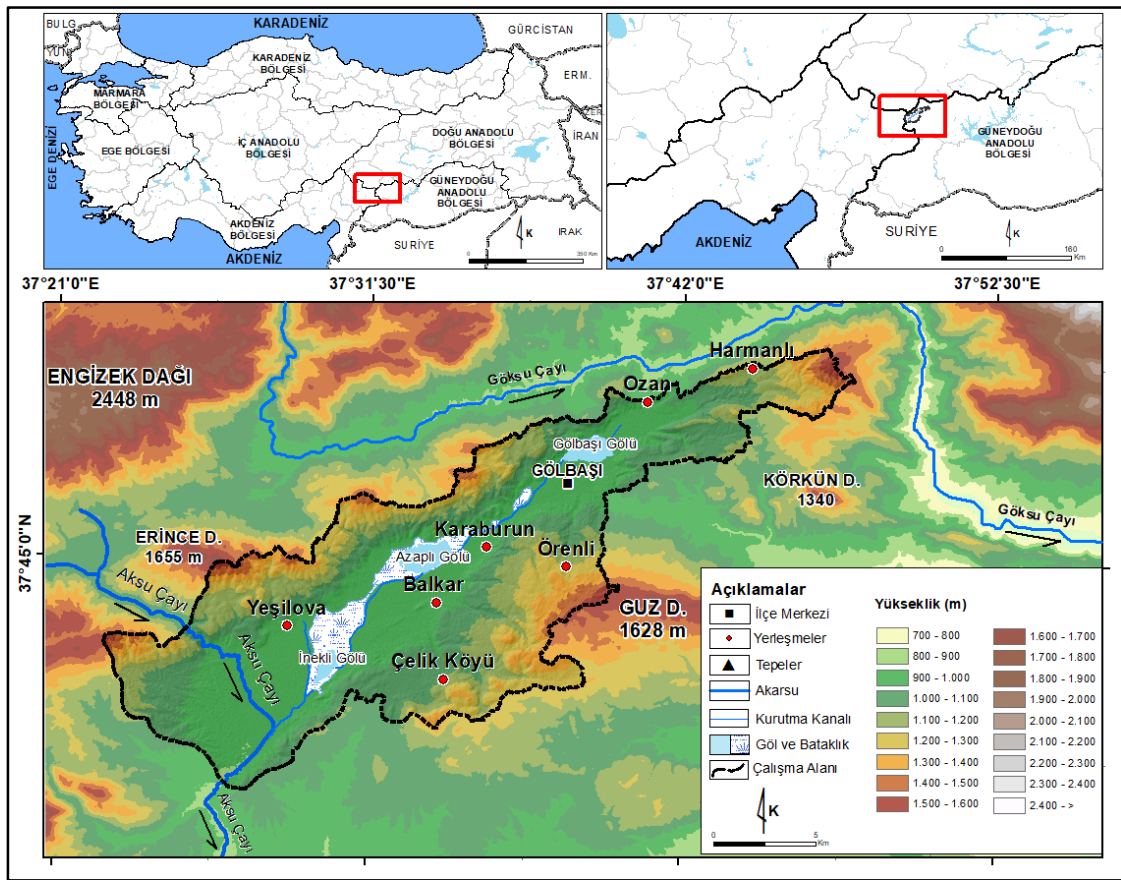
Dünya karalar yüzeyinin yaklaşık %3'ü turbalıklarla kaplıdır (Maltby and Proctor, 1996; Vitt and Short, 2020). Yerel olarak farklılıklar olsa da turba birikimi genellikle 0.5 – 1 mm/yıl arasında değişmektedir (Parish vd., 2008; Çolak ve Günay, 2011). Turbalıklar genellikle Holosen'de oluşmuştur ve çoğunlukla yukarı enlemlerde yayılış gösterirler. Ancak Ekvatorial kuşakta da geniş turbalıklara rastlanır. Bu bağlamda, Rusya, Kanada, ABD ve Endonezya gibi ülkeler geniş turbalıklarıyla öne çıkarlar (Joosten ve Clarke, 2002; Xu vd., 2018). Buna karşılık Türkiye'nin de bulunduğu Orta Kuşakta turba alanları nispeten sınırlıdır.

Turbalıklar bataklık kurutma çalışmaları, tarımsal amaçlı kullanımlar ve turba çıkarımı başta olmak üzere, çeşitli nedenlerle giderek daralmaktadır. Türkiye'nin önemli turba işletim alanlarından biri olan Gölbaşı Havzası da benzer sorunlarla karşı karşıyadır. Turbalıklar ekonomik, ekolojik, biyolojik, hidrolojik ve benzeri özellikleri ile birçok araştırmaya konu olmuştur (Montanarella vd., 2006; Tarnocai, 2006; Parry vd., 2014; Kowalczyk-Juško vd., 2016; Paleckiene vd., 2021; Loisel ve Gallego – Sala, 2022). Benzer şekilde Türkiye'de de turbalarla ilgili önemli çalışmalar yapılmıştır (Kahraman ve Güçlü, 2001; Dengiz vd., 2009; Evrendilek vd. 2011; Hoş – Çebi ve Korkmaz, 2015; Çolak ve Günay, 2011). Buna karşılık, bu çalışmanın konusunu oluşturan Gölbaşı Havzası turbalıklarıyla ilgili literatür son derece sınırlıdır (van Zeist vd., 1970; Gürbüz vd., 2007).

Bu çalışma, Gölbaşı Havzası turbalıklarının 1984 – 2020 yılları arasındaki alansal ve zamansal değişimini sayısal olarak ortaya koyan ilk çalışmadır. Yapılan analizler neticesinde Gölbaşı Havzası turbalıklarının 1984 yılında 1349,05 ha olduğu, 2020 yılında 888,19 ha'a gerilediği ve bu dönemde alansal daralmanın % 34,16'ya ulaştığı belirlenmiştir. Bu verilerin havza yönetim

planının hazırlanmasında dikkate alınması, turbalıklardan sürdürülebilir yararlanma açısından büyük önem taşımaktadır.

Gölbaşı Havzası, Güneydoğu Anadolu Bölgesi'nin Orta Fırat Bölümü'nde ve büyük kısmıyla Adıyaman ilinin Gölbaşı ilçesi sınırları içinde yer alır (Şekil 1). Havzada bir ilçe merkezi ve 12 köy yerleşmesi bulunmaktadır. Havza tabanının bir bölümü (2.079,79 ha) 28.05.2008 tarihinde "Gölbaşı Gölleri Tabiat Parkı" adı ile tabiat parkı ilan edilmiştir. Bu durum, Gölbaşı turbalıklarının korunması ve yönetimi açısından önemli bir adım oluşturmuştur.



Şekil 1. Çalışma sahasının lokasyon haritası

## MALZEME VE YÖNTEM

Çalışma büyük kısmıyla saha çalışmalarına dayalı olarak hazırlanmıştır. Ayrıca, uzaktan algılama yöntemlerinden de yararlanılmıştır. Çalışma sahasının iklim verileri Meteoroloji Genel Müdürlüğü'nden temin edilmiştir. Turba çıkarımı ve nüfusla ilgili verilere TÜİK ve kurumsal internet sitelerinden ulaşılmıştır.

Turbalıkların zamansal ve mekânsal değişimi URL - 1 sitesinden temin edilen ağustos aylarına ait 1984 tarihli Landsat 5 TM (Thematic Mapper), 2000 tarihli Landsat 7 ETM ve 2020 tarihli Landsat 8 uydu görüntülerinden yararlanılarak incelenmiştir. Uzaktan Algılama analizlerinde ağustos ayının seçilmesi, yaz kuraklığı nedeniyle göl sularının nispeten çekilmiş olması, sulak alan dışındaki otsu türlerin kuruması ve kıyaslamaların daha güvenilir bir şekilde yapılmasını temin amacına dönüktür. Uydu görüntüleri atmosferik düzeltmeleri, görüntü zenginleştirmeleri ve bant kombinasyonları gerçekleştirilerek sınıflandırılmıştır. Çalışmada ayrıca, Google Earth görüntülerinden ve güncel drone çekimlerinden de faydalanılmıştır. Çalışma sahasının uydu görüntülerinin analiz edilmesinde ve tüm haritalarının oluşturulmasında ArcGIS 10.3.1 yazılımı kullanılmıştır.

## **BULGULAR**

### **Gölbaşı Havzası'nın Coğrafi Arka Planı**

Gölbaşı Havzası'nda Gölbaşı, Azaplı ve İnekli (Çelik) gölleri ve turbalıkları yer almaktadır. Havza tabanının yükseltisi 874 – 900 m arasında değişmektedir. Göllerin suları havzaya düşen yağışlardan, kaynak sularından ve bunlarla beslenen akarsulardan sağlanmaktadır. Ayrıca, ihtiyaç durumunda, havzanın kuzeydoğu ucundan açılan bir tünelle Göksu Çayı'ndan su takviyesi yapılmaktadır. Çalışma sahasının uzun yıllık sıcaklık ortalaması 14,9 °C ve uzun yıllık yağış ortalaması ise 735 mm'dir. En fazla yağış kış mevsiminde, en az yağış ise yaz mevsiminde düşer. Çalışma sahasında özellikle kış ve ilkbahar mevsimlerinde yağışlar artmakta ve taban suyu seviyesi yükselmektedir. Havza tabanında yer alan göllerin kenarlarındaki sığ bataklık alanlarda turba oluşumu devam etmektedir. Ancak, yaz kuraklığı nedeniyle göl sularının çekilmesi, turbalıkların kısmen kurumasına ve turba oluşumunun sınırlanmasına sebep olmaktadır. Havzadaki turbalıkların başlıca bitkilerini ise *Phragmites australis* (Kamış), *Typha latifolia*, *Juncus inflexus* (Sazak), *Nymphaea alba* (Nilüfer) ve *Carex sp.* (Ayakotu) gibi türler oluşturmaktadır.

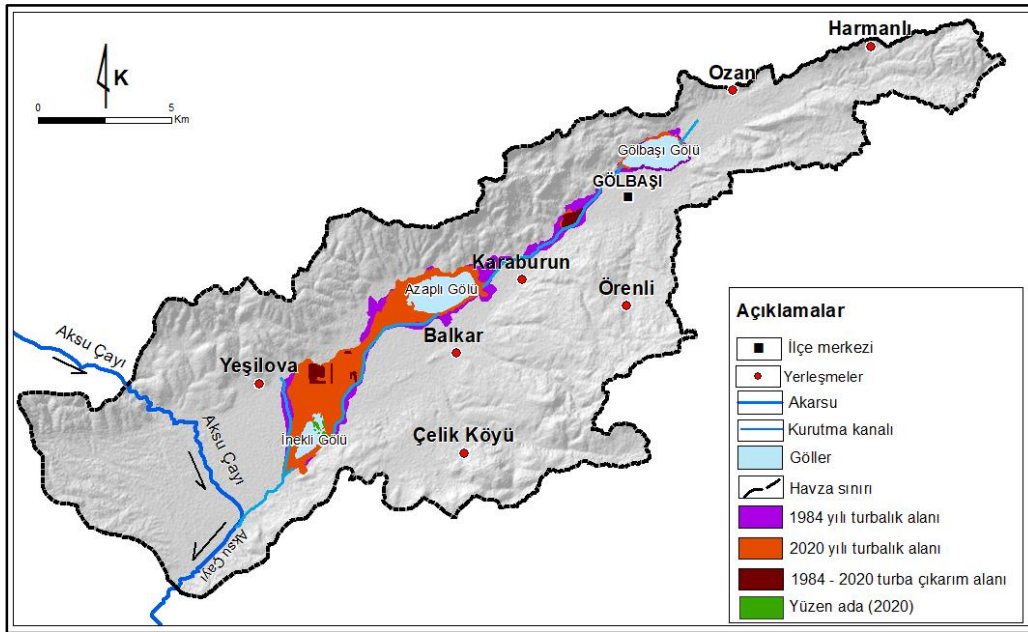
### **Gölbaşı Havzası Turbalarının Alansal - Zamansal Değişimi**

Turbalıkların zamana bağlı alansal değişimlerinin nedenleri arasında drenaj kanallarının açılması, havza dışından su takviyesi ve turba çıkarımı gibi beşerî etkiler öne çıkmaktadır. Havzada 1990 yılından sonra DSİ tarafından, göller arasında iletimi sağlamak ve bataklık alanların kurutulması amacıyla drenaj kanalları açılmıştır (DSİ, 2015). Ayrıca 2005 - 2018



yılları arasında Gaziantep'e içme suyu temin etmek amacıyla Göksu Çayı'ndan su takviyesi yapılmıştır.

Yapılan analizler neticesinde 1984 yılında Gölbaşı Havzası'ndaki turbalıkların 1349,05 ha alan kapladığı, 2000 yılında 1169,25 ha'a, 2020 yılında ise 888,19 ha'a gerilediği belirlenmiştir. Dolayısıyla, Gölbaşı Havzası turbalıklarının son 36 yıldaki alansal daralması 460,86 ha olmuştur. Alansal daralma özellikle Gölbaşı Gölü ile Azaplı Gölü arası, Azaplı Gölü'nün kuzeydoğusu ve İnekli Gölü'nün kuzeyinde meydana gelmiştir (Şekil 2). Alansal daralmanın % 13'ü turba madenciliğiyle, % 86,9'u ise kurutma yoluyla meydana gelmiştir. Öte yandan, turba çıkarımı nedeniyle bataklıklarda muhafaza edilen jeolojik kayıtlar yok olmakta; kurutulan alanlar ise tarım alanı olarak kullanılmaktadır. Ancak, turba çıkarılan alanlarda göl aynası genişlemesi su kuşlarının yüzerek avlandığı habitat alanının genişlemesine sebep olmuştur.



Şekil 2. Gölbaşı Havzası turbalıklarının alansal değişimleri (1984- 2020).

## SONUÇLAR VE TARTIŞMA

Bu çalışma, Gölbaşı Havzası turbalıklarının 1984 – 2020 yılları arasındaki alansal ve zamansal değişimini sayısal olarak ortaya koyan ilk çalışmadır. Yapılan analizler neticesinde Gölbaşı Havzası turbalıklarının 1984 yılında 1349,05 ha olduğu, 2020 yılında 888,19 ha'a gerilediği ve bu dönemde alansal daralmanın % 34,16'ya ulaştığı belirlenmiştir. Bu verilerin havza yönetim planının hazırlanmasında dikkate alınması, turbalıklardan sürdürülebilir yararlanma açısından büyük önem taşımaktadır.

Gölbaşı Havzası turbalıkları tarımsal amaçlı kurutma ve turba çıkarımı gibi sebeplerle daralmaya devam etmektedir. Turbalıkların alansal daralması ise, CO<sub>2</sub> yutak alanlarının azalmasına ve atmosferde sera gazı artışına sebep olmaktadır (Tarnocai, 2006; Tırıl, 2006; Parish vd., 2008). Bu da küresel iklim değişimini ve buna bağlı ekosistem değişikliklerini beraberinde getirmektedir.

Türkiye turba varlığı bakımından zengin değildir ve turba üretimi nispeten sınırlıdır. Bu nedenle ihtiyacın önemli bir kısmı Letonya ve Estonya gibi ülkelerden ithal edilmekte ve ancak bazen de gerekli hallerde ihracat yapılmaktadır (TÜİK, 2022a, b). Mevcut şartlarda, Türkiye’de turba çıkarımının bir süre daha devam edeceği öngörülebilmektedir. Burada önemli olan her havzanın kendine özgü bir ekosisteminin olduğunun ve sistemin çökmesi durumunda geri kazanımların kolay olmayacağına farkında olunmasıdır. Bu nedenle göl sedimanlarının ve turbalıkların makul bir bölümünün mutlak koruma altına alınması, ekosistemlerin geleceği ve bilimsel araştırmaların yapılabilmesi açısından büyük önem taşımaktadır.

Gölbaşı Havzası sulak alanlarının korunması amacıyla havza tabanının 2.079,79 ha’lık bir bölümü tabiat parkı ilan edilmiştir. Ayrıca turba çıkarımı izne bağlanmış ve alansal kısıtlama getirilmiştir (URL - 2). Bütün bu önlemler ekosistemin geleceği açısından olumlu adımlar olarak değerlendirilmiştir. Ancak, alınan önlemlerin arzulanan hedefe ulaşabilmesi için, yerel halkın konu hakkında bilgilendirilmesi ve koruma – kullanma bilinci içinde sisteme dâhil edilmesi gerekmektedir.

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**DERİN TRANSFER ÖĞRENME YÖNTEMLERİYLE BİTKİ YAPRAKLARINDAN  
HASTALIK TESPİTİ**

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**ÖZET**

Dünyada artan tüketim ve nüfus yoğunluğu dolayısıyla tarımsal kaynaklara olan ihtiyaç artmaktadır. Bitkilerden maksimum verimi elde etmek oldukça önemlidir. Bitki hastalıkları bitkinin gelişim sürecini olumsuz etkilemektedir. Hastalık bitkiden elde edilecek hasat miktarını ve verimi de olumsuz etkilemektedir. Bu sebeple bitki hastalığının erken tespiti ve tedavisi oldukça önemlidir. Bitki türlerine ait yapraklardaki hastalıkların otomatik olarak teşhisi ve tanısı için yapay zeka yaklaşımları önemli fırsatlar sunmaktadır. Son zamanlarda derin öğrenme yapay zeka yöntemleri içerisinde başarısını kanıtlamıştır. Derin öğrenme yöntemlerinden evrişimli sinir ağları özellikle görüntü verilerini sınıflandırmada etkileyici bir performans sunmaktadır. Evrişimli sinir ağları modellerinden oluşan ve büyük veri kümelerinde başarısını kanıtlamış olan derin transfer öğrenme yaklaşımları sınıflandırma performansı üzerinde oldukça başarılıdır. Bu çalışmada farklı bitki türlerine ait yapraklar üzerinde bitki hastalık tespiti yapılmıştır. Yapılan deneyler sonucunda oldukça başarılı sonuçlar elde edilmiştir.

**Anahtar Kelimeler:** Bitki hastalığı, Sınıflandırma, Derin Öğrenme, Transfer öğrenme

**DISEASE DETECTION FROM PLANT LEAVES USING DEEP TRANSFER  
LEARNING METHODS****ABSTRACT**

Due to the increasing consumption and population density in the world, the need for agricultural resources is increasing. It is very important to obtain maximum yield from plants. Plant diseases adversely affect the development process of the plant. The disease also negatively affects the amount of harvest and yield to be obtained from the plant. For this reason, early detection and treatment of plant disease is very important. Artificial intelligence approaches offer important opportunities for the automatic diagnosis and diagnosis of diseases in the leaves of plant species. Recently, deep learning has proven its success in artificial intelligence methods. Convolutional neural networks, one of the deep learning methods, offer impressive performance especially in classifying image data. Deep transfer learning approaches, which consist of convolutional neural network models and have proven their success in large data sets, are very successful on classification performance. In this study, plant disease detection was carried out on the leaves of different plant species. As a result of the experiments, very successful results were obtained.

**Keywords:** plant disease, classification, Deep Learning, transfer learning

## 1. GİRİŞ

Son yıllarda nüfus artışı, iklimsel değişiklikler ve çeşitli sorunlardan dolayı gıda arzı oldukça büyük bir öneme kavuşmuştur. Kaynakların sınırlı olmasıyla beraber, mevcut kaynakların etkin bir şekilde kullanılabilmesi gıda ihtiyaçlarına cevap verebilme anlamında sürdürülebilir tarımın önemini arttırmıştır [1]. Mevcut koşullar altında bunu sürdürebilmenin yolu tarımda insan odaklı bir üretim sürecinden makine odaklı bir üretim sürecine odaklanılmasıdır.

4. sanayi devriminin etkisiyle endüstriyel çözümler her alanda etkisini hissettirmektedir. Teknolojik ilerlemelerle beraber gıda ihtiyaçlarını karşılamak için Tarım 4.0 süreci de yeni bir dönemin kapısını aralamıştır. Tarım 4.0 süreci ile gıda arzında verimi ve kaliteyi arttırmak için nesnelerin interneti ve yapay zeka yöntemlerinden yararlanılmaktadır [2]. Teknolojik çözümler ile bitki gelişimini etkileyen hastalıkların tespiti mümkün olabilmektedir.

Tarımda bitki hastalığına dayalı olası sorunların çözümü için hastalığın erken teşhisi oldukça önemlidir [3]. Günümüzde teknolojik gelişmelere rağmen tarımda insana dayalı üretim oldukça yüksektir. Ancak özellikle büyük tarım sahalarında insan müdahalesi oldukça yavaş kalabilmektedir. Bu sebeple tarımsal verim ve kaliteyi arttırmak için bitki hastalıklarının teşhisinde nesnelerin interneti ve yapay zekaya dayalı çözümlerin kullanılması elzemdir. Bitki hastalığı gıda güvenliği için önemli bir risk taşımaktadır. Bu riskle beraber bitki zararlıları, haşereler yabancı otlar bitki gelişimini olumsuz olarak etkilemektedir. Bu sebeple bitki hastalıklarının erken tespiti ve zamanında müdahale edilmesi hastalığın ilerlemesini durdurmak için oldukça önemlidir.

Literatürde bitki hastalıklarını tespit etmek için derin öğrenmeye dayalı çözümler çok popüler bir yaklaşım olmuştur. Patil ve Manohar [4], domates bitkisinin yapraklarındaki hastalığı bölütleme için geliştirilmiş radyal tabanlı işlev sinir ağına dayalı yeni bir yöntem önermişlerdir. Önerilen yöntem veri ön işleme, öznetelik çıkartma ve bölütleme olarak üç evreden oluşmaktadır. Yöntemde Kaggle sitesinden alınan domates yaprak hastalık veri kümesi üzerinde oldukça başarılı sonuçlar elde edilmiştir. Roy ve Bhaduri [5], elma bitkisindeki hastalığı tespit etmek için geliştirilmiş bir YOLOv4 algoritmasına dayalı gerçek zamanlı nesne algılama çerçevesi önermişlerdir. Önerilen yöntem elma bitkisi veri kümesi üzerinde orijinal YOLOv4 modeline göre %9 daha yüksek sınıflandırma doğruluğu elde etmiştir.

Pandian ve ark. [6], 14 yaprak görüntüsünden hastalık tespiti yapmak için 14 katmanlı bir derin evrişimli sinir ağı modeli kullanmışlardır. Modelin başarısını arttırmak için NST, DCGAN ve BIM yöntemleri ile veri artırma stratejisi uygulanmıştır. 132.750 eğitim örneği ve 8850 test

örneğin bulunduğu veri kümesi üzerinde %99.96'lık bir sınıflandırma doğruluğu elde edilmiştir. Abbas ve ark. [7], domates yapraklarından bitki hastalığını tespit etmek için derin öğrenme tabanlı yeni bir yaklaşım önermişlerdir. Önerilen yaklaşımda veri arttırmak için koşullu üretken çekişmeli ağlar ile sentetik görüntüler oluşturulmuştur. Veri arttırımı sonrası DenseNet121 sınıflandırma modeli kullanılarak PlantVillage veri kümesi üzerinde %98'e varan bir sınıflandırma performansı elde edilmiştir.

Mohanty ve ark. [8], 14 ürün türü ve 26 hastalık türü bulunan veri kümesi üzerinde hastalık tespit etmek için yeni bir derin öğrenme modeli önermişlerdir. 54.306 görüntü ve 38 farklı kategorinin olduğu veri kümesi üzerinde %99,35 oranında başarı elde edilmiştir. Ma ve ark. [9] salatalık hastalıklarını tespit etmek amacıyla tüylü küf, antraknoz, külleme ve hedef yaprak lekelerinden oluşan örneklerin bulunduğu bir veri kümesi üzerinde derin öğrenme tabanlı bir sınıflandırma modeli kullanmışlardır. 14.208 semptom görüntüsü içeren artırılmış veri kümesi üzerinde %93,4 sınıflandırma doğruluğu yazarlar tarafından elde edilmiştir.

## **2. MATERYAL VE YÖNTEM**

Bu bölümde öznitelik çıkartmada kullanılan sinir ağı modeli ile sınıflandırma algoritmaları ele alınmaktadır. Ayrıca önerilen yaklaşımı değerlendirmek için kullanılan veri kümesi hakkında bazı bilgiler sunulmuştur.

### **2.1. Evrişimli Sinir Ağları**

Evrişimli sinir ağları (ESA) makine öğrenmesinin bir alt alanı olup; görüntü verileri için piksel verilerini işlemede oldukça başarılı sonuçlar elde etmektedir. Bu ağ türü görüntü verileri dışında ses ve sinyal verilerine de uygulanabilmektedir. 2012 yılında ImageNet yarışmasında Alex Krizhevsky tarafından önerilen ESA modelinin yarışmayı kazanmasıyla derin öğrenme ve ESA popüler makine öğrenmesi yaklaşımlarından olmuştur [10]. ESA modeli, görüntü verileri için matriksel çarpımların olduğu lineer cebire ait çok sayıda matematiksel işlem içermektedir.

Evrişimli sinir ağları, evrişim, havuzlama ve tam bağlı katmandan oluşmaktadır. Bu katmanlar dışında aktivasyon fonksiyonları ve seyreltme gibi işlemler de ağın performansı üzerinde etkilidir. Evrişim katmanından havuzlama katmanına kadar sinir ağının karmaşıklığı artmaktadır. Evrişim katmanında matematiksel işlemlerin birçoğu gerçekleşmektedir. Bu katmanda rasgele değerlerden oluşan bir filtre ile görüntü verisi üzerinde bir çerçeve ile gezilerek matriksel çarpımlar gerçekleştirilir. Bu şekilde görüntünün daha iyi bir temsili yakalanmaya çalışılır. Havuzlama katmanında çeşitli yaklaşımlarla (ortalama havuzlama ve



maksimum havuzlama gibi) özniteliklerin boyutu azaltılır ve matematiksel karmaşıklık azaltılmış olur. Bu katmanda bazı bilgiler kaybolmasına karşın daha etkin bir bilginin ortaya çıkarılması hedeflenmektedir. Son olarak tam bağlı katmanda ise her bir düğüm bir önceki katmanda elde edilen özniteliklerle tam bağlı olmaktadır. Sınıflandırma öncesi elde edilen anlamlı öznitelikler bu bölümde elde edilmektedir.

### **2.1. Transfer Öğrenme**

Transfer öğrenme, daha önceden çok sayıda veri ve kategori içeren büyük bir veri kümesinde önceden eğitilmiş olan ağ modelini kullanan bir derin öğrenme yaklaşımıdır [11]. Önceden başarısını kanıtlamış olan bir ağ modeli, sıfırdan oluşturulacak olan bir ağ modeline göre daha etkin sonuçlar elde etmemizi sağlayabilir. Bu model ile veri tahminini gerçekleştirmek için ince ayarları yapmak çok daha kolay ve hızlı olabilmektedir. Daha önceden başarısını kanıtlamış olan sinir ağı modellerinden biri olan VGG19 ağ modeli [12], Simonyan ve Zisserman tarafından 2014 yılında önerilmiştir. VGG19, büyük ölçekli görüntü sınıflandırmaları için 19 katmana kadar olan bir sinir ağı modelidir. Katmanların derinliği, sinir ağının sınıflandırma performansını arttırmakta oldukça yararlıdır.

### **2.2. Sınıflandırma**

Sınıflandırma bir nesnenin hangi sınıfa ait olduğunu belirleme amacıyla kullanılmaktadır. Bu amaçla etiketli veriler üzerinden bir öğrenme işlemi gerçekleştirilerek veri kümesindeki nesnelere için bir tahmin yapılmaktadır. Bu çalışmada literatürde sıklıkla kullanılan k en yakın komşu, rasgele orman, doğrusal destek vektör makineleri ve doğrusal olmayan destek vektör makineleri karşılaştırma amacıyla kullanılmıştır.

#### **a) k En Yakın Komşu**

k en yakın komşu (kNN), örnekler arasındaki uzaklığa bakarak sınıflandırma işlemi gerçekleştirmektedir. Bu yaklaşımda, her bir örneğin diğer örneklerle olan uzaklığı niteliklere bakılarak incelenir. Başlangıçta verilen k değerine (k=1, 3, 5 vs.) göre, yoğunluk hangi küme ile kesişti ise veri o sınıfta olacak şekilde tahmin edilir. k değerine bağlı olarak sınıflandırma performansı değişkenlik gösterebilmektedir [13].

#### **b) Rasgele Orman**

Rasgele orman yönteminde, eğitim süreci boyunca çok sayıda karar ağacı oluşturularak sınıflandırma işlemi gerçekleştirilmektedir. Karar ağaçlarının özel bir durumudur. Hem sınıflandırma hem de regresyon problemleri için kullanılabilir. Bu çalışmada rasgele orman yöntemi sınıflandırma amacıyla kullanılmıştır. Çok sayıda ağaç yapısı oluşturularak her

bir ağaç yapısında örneğin hangi sınıfa ait olduğuna dair bir bilgi sunulur. Daha sonra bu bilgiler birleştirilerek en yoğun olan sınıfa göre örnek sınıflandırılmaktadır [14].

#### c) Doğrusal Destek Vektör Makineleri

Doğrusal destek vektör makineleri (Doğrusal DVM) ile farklı sınıflara ait örneklerin birbirinden en iyi şekilde ayrılabilmesi için hataları en aza indirebilecek doğrusal bir karar sınırı çizimi yapılmaktadır. Oluşturulan karar sınırı tüm sınıfların en yakın noktalarından maksimum marjine sahip bir sınır çizgisidir. Karar sınır çizgisi ile örnekler arasındaki mesafeyi maksimize eden en yakın noktalar destek vektörleri olarak isimlendirilmektedir. Eğitim sürecinde destek vektörlerini en iyi şekilde tespit etmek ve sınıflar arasındaki marjini maksimize etmek sınıflandırma performansını arttırmaktadır.

#### d) Çekirdek Destek Vektör Makineleri

Doğrusal destek vektör makineleri sınıfları birbirinden ayırmak için doğrusal bir karar çizgisi çekmektedir. Ancak gerçek dünya problemleri genellikle doğrusal olmayan bir yapıya sahiptir. Bu sebeple doğrusal olmayan bir karar çizgisi belirlemek daha tutarlı sonuçlar elde edilmesini sağlayabilmektedir. Temelde çekirdek DVM, doğrusal olarak ayrılamayan veri alt boyutlarını, daha yüksek boyutlarda doğrusal olarak ayrılabilen verilere yansıtarak daha iyi bir sınıflandırma temsili oluşturmaktadır.

### 2.3. Veri Kümesi

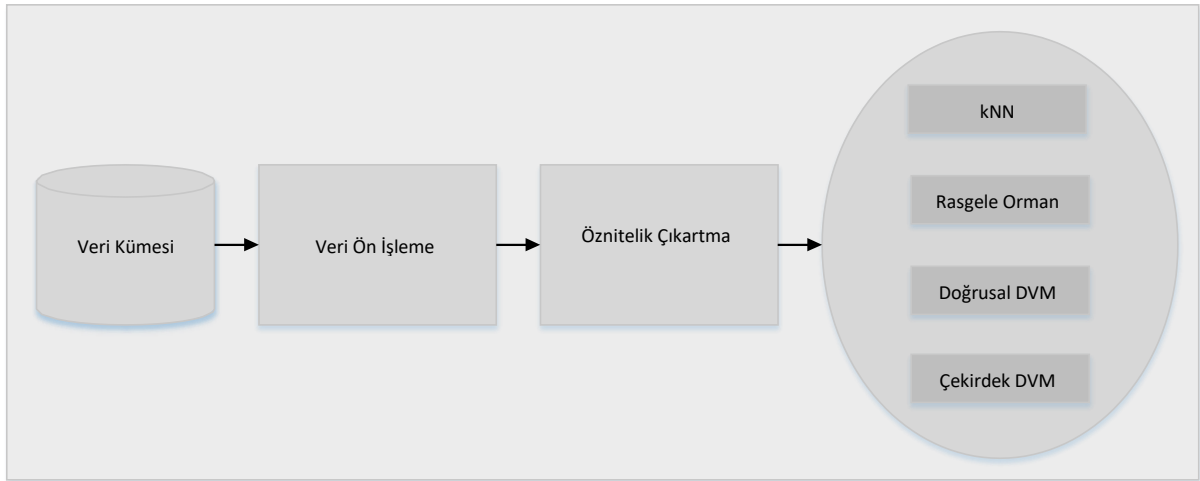
Bu çalışmada kullanılan veri kümesi 12 farklı bitki türüne ait hastalıklı ve sağlıklı verilerden oluşmaktadır [15]. Veri kümesinde 4503 görüntü (2278 sağlıklı; 2225 hastalıklı) bulunmaktadır. Bu çalışmada yöntemin başarısını test etmek için verilerin 1000 tanesi test örneği olarak rasgele seçilmiştir. Diğer görüntüler ise eğitim örnekleri olarak ayrılmıştır. Veri kümesinden örnek görüntüler Şekil 1’de verilmiştir.



**Şekil 1.** Veri kümesinden örnek görüntüler

## 2.1. Önerilen Yöntem

Bu çalışmada bitki yapraklarından hastalık tespitini gerçekleştirmek için derin transfer öğrenmeye dayalı bir yöntem önerilmiştir. Önerilen yöntem üç aşamadan oluşmaktadır. Önerilen yaklaşım, veri ön işleme, transfer öğrenme ile öznelik çıkartma ve sınıflandırma şeklindedir. Şekil 2’de önerilen yaklaşım görülmektedir. İlk aşamada ön işlem süreci yapılmıştır. Orijinal verinin boyutu çok büyük olduğundan dolayı veri boyutu düşürülmüştür. Bu amaçla veri kümesindeki görüntüler 6000\*4000 piksel büyüklüğünden 256\*256 piksel boyutlarına indirilmiştir. Ayrıca matematiksel işlem karmaşıklığı ve verinin daha iyi bir temsili olabilmesi için görüntü verileri üzerinde normalizasyon işlemi gerçekleştirilmiştir.



Şekil 2. Bitki Hastalığını Sınıflandırma

İkinci aşamada verinin daha iyi bir temsiline elde edilebilmesi amacıyla transfer öğrenme yaklaşımı kullanılmıştır. Bu amaçla literatürde de başarısını kanıtlamış olan VGG19 sinir ağı modeli kullanılmıştır. Bu sinir ağı modeli, ImageNet veri kümesi üzerinde başarılı bir şekilde eğitilmiştir. Daha önceden eğitilmiş olan sinir ağı modelinde farklı bir veri kümesinden elde edilen bilgilerin transferinin yapılabilmesi mümkün olmaktadır. Bu şekilde sinir ağı modelinin eğitilmiş ağırlıkları ince ayar yapılarak başka veri kümeleri üzerinde de kolaylıkla ve başarılı sonuçlar üretilerek kullanılabilir. Bu çalışmada veriler, ön işlem adımı sonrasında transfer öğrenme amacıyla kullanılan modellerden biri olan VGG19 sinir ağı modeline sunulmuştur.

Transfer öğrenme yaklaşımıyla öğrenme süreci hızlandırılmaktadır. Süreç hızlandırma ile birlikte daha az veriyle daha iyi performans elde etmemizi de yine transfer öğrenme modelleriyle sağlanabilmektedir. VGG19 büyük ölçekli görüntüleri sınıflandırmak için 19

katman derinliğine sahip bir sinir ağı modelidir. Çalışmada kullanılan veri kümesi üzerinde VGG19 sinir ağı modeli kullanılarak verilerin daha iyi bir temsiline yakalanması amaçlanmaktadır. Bu yaklaşım ile sınıflandırma öncesi yararlı özniteliklerin elde edilmesi sağlanmıştır.

Önerilen yaklaşımın son aşamasında verileri sınıflandırma için sınıflandırma algoritmalarından yararlanılmıştır. Bu amaçla literatürde de sıklıkla kullanılan k en yakın komşu, rasgele orman, doğrusal DVM ve çekirdek DVM yöntemleri sınıflandırma amacıyla kullanılmıştır.

## 2. DENEYSEL SONUÇLAR

Çalışmada kullanılan veri kümesini sınıflandırmak için öncelikle bir ön işlem gerçekleştirilmiştir. Daha sonra ön işlemde geçirilen veriler öznitelik çıkartma amacıyla VGG19 sinir ağı modeline sunulmuştur. Son aşamada ise yeni temsili özniteliklerin bulunduğu veriler sınıflandırma algoritmaları ile sınıflandırılmıştır. Veri kümesi toplam 4503 görüntüden oluşmaktadır. Bu çalışmada bu verilerin başarısını doğru bir şekilde analiz edebilmek için görüntülerin 1000 tanesi test örneği olarak belirlenmiştir. Geri kalan örnekler ise eğitim aşamasında kullanılmıştır. Bu şekilde deneyler sonrasında gerçekleştirilen sınıflandırma performansı, sınıflandırma algoritmalarına bağlı olarak Tablo 1’de verilmektedir. Tabloda görüldüğü üzere k en yakın komşu yöntemi ile en düşük sınıflandırma performansı elde edilmiştir. En iyi sınıflandırma performansı ise çekirdek DVM sınıflandırma algoritması ile elde edilmiştir. Makine öğrenmesinde sınıflandırma performansını gösteren bir diğer önemli ölçüt ise karışıklık matrisidir. Tablo 2’de en iyi sonuçların elde edildiği çekirdek DVM yöntemi için karışıklık matrisi sınıflandırma performansı sunulmuştur.

**Tablo 1.** Önerilen yöntemin sınıflandırma doğruluğu sonuçları

	kNN	Rasgele Orman	Doğrusal DVM	Çekirdek DVM
Önerilen Yöntem	%83.0	%87.0	%91,00	<b>%93,00</b>

**Tablo 2.** Çekirdek DVM yöntemi karışıklık matrisi sonuçları

	TAHMİN	
GERÇEK	511	23
	47	419

### 3. SONUÇ

Dünyadaki nüfus artışından dolayı gıda sorunlarının üstesinden gelebilmek için ürün verimi ve kalitesini arttırmak oldukça önemlidir. Bu amaçla insana dayalı bir üretim ve kontrol süreci yerine makineye dayalı çözümlerin kullanılması elzem hale gelmiştir. Bitki hastalıklarının erken tespiti ve yerinde müdahale olası sorunların çözümünü kolaylaştırmaktadır. Bu çalışmada bu tür sorunların üstesinden gelebilmek için bitki hastalığı veri kümesi üzerinde yapay zeka yöntemleriyle bir sınıflandırma işlemi gerçekleştirilmiştir. Bitki hastalıklarını tespit etmek için bitki yaprak verileri önce bir ön işlemden geçirilmiştir. Daha sonra transfer öğrenme yöntemlerinden VGG19 sinir ağı modeli öznetelik çıkartma amacıyla kullanılmıştır. Ayrıca farklı sınıflandırma algoritmalarıyla da sınıflandırma algoritmalarının performansı karşılaştırılmıştır. Sonuç olarak en iyi sınıflandırma performansı, çekirdek DVM yönteminde %93,00 sınıflandırma doğruluğu ile elde edilmiştir.

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**TARİHİN ŞAHİTLERİ: EDEBİ METİNLER**  
**Veya I. ABDÜLHAMİD'İN TAHTA ÇIKIŞI İÇİN YAZILAN VE ŞAİRİ**  
**BİLİNMEYEN BİR TARİH MANZUMESİ**

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**ÖZET**

Osmanlı Devleti'nin 27. hükümdarı olan I. Abdülhamid, Lale Devri'nin padişahı III. Ahmed'in oğludur. Osmanlı Devleti'nin zor bir döneminde 21 Ocak 1774'te 49 yaşında iken hükümdar olmuştur. 15 yıllık hükümdarlık sürecinde daima Devlet'in iç ve dış meseleleriyle uğraşmıştır. Islahat hareketlerine önem vermiş, bilhassa ordunun ıslahı için yabancı hocalar getirtmiştir. İyi huylu ve merhametli bir padişah olarak bilinen ve ardında birçok mimari eser bırakan I. Abdülhamid, Özi Kalesi'nin Ruslar tarafından işgal edildiğini duyduğunda ani bir felç geçirerek 7 Nisan 1789'da vefat etmiştir. Bu bildirinin konusu I. Abdülhamid'in tahta çıkışı için kaside nazım şekliyle yazılmış ve şairi belli olmayan bir tarih manzumesidir. Doğum, ölüm, düğün, resmi göreve getirilme, inşa, savaş vb. önemli konularda yazılan ve şiirin bir bölümündeki harflerin rakamsal değerlerinin toplanmasıyla o olayın meydana geliş tarihinin ortaya çıktığı şiirlere "tarih manzumesi" denilmektedir. Tarih manzumeleri, ebced hesabı adı verilen rakamsal bir sistemle yazılır. Tarih düşürmenin birçok çeşidi bulunmaktadır. Bildiriye konu olan manzume İstanbul Millet Kütüphanesi Ali Emiri Koleksiyonu 34 AE Mnz 234 numaralı şiir mecmuasında bulunmaktadır. Manzume şekil ve anlam bakımından incelenmiş, tarih düşürme çeşidi hakkında bilgi verilmiş ve manzumenin şairi tespit edilmeye çalışılmıştır.

**Anahtar kelimeler:** Mecmua, Şiir Mecmuası, I. Abdülhamid, Kaside, Tarih Düşürme, İstanbul Millet Kütüphanesi, Ali Emiri Koleksiyonu.



**WITNESSES OF HISTORY: LITERARY TEXTS****Or A ISOSEPHIC POEM WRITTEN FOR ABDULHAMID I'S ACCESSION TO THE THRONE AND ITS POET IS UNKNOWN****ABSTRACT**

Abdulhamid I, the 27th ruler of the Ottoman Empire, is the son of Ahmed III, the sultan of the Tulip Era. In a difficult period of the Ottoman Empire, he became the ruler on January 21, 1774, when he was 49 years old. During his 15-year reign, he always dealt with the internal and external issues of the State. He gave importance to reform movements and brought foreign teachers especially for the improvement of the army. Abdülhamid I, who was known as a good-natured and compassionate sultan and left many architectural works behind, had a sudden stroke when he heard that the Özi Castle was occupied by the Russians, and died on April 7, 1789. The subject of this paper is a poem written in eulogy for Abdülhamid's ascension to the throne and whose poet is unknown. The poems written on important issues such as birth, death, weddings, official tasks, construction and war and collect the numerical values of the letters in a part of the poem are called "Isopsephic Poem". Isopsephic poems are written with a numerical system called abced calculation. Isopsephic Poem has multiple methods. The poem, which is the subject of the paper, is in the poetry magazine number 34 AE Mnz 234 in the Ali Emiri Collection of the Istanbul Millet Library. The poem was examined in terms of form and meaning, information was given about the type of isopsephic poem and the poet of the poem was tried to be determined.

**Keywords:** Magazine, Poetry Magazine, Abdulhamid I, Eulogy, Isopsephic Poem, Ali Emiri Collection, Istanbul National Library.

## GİRİŞ

Cülûs, Arapça kökenli olup “tahta çıkmak”, “oturmak” (Ayverdi, 2011: 203) anlamlarında kullanılan bir kelimedir. Terim anlamı olarak cülûs “hükümdarların ve özellikle Osmanlı şehzâdelerinin tahta geçmesi hakkında kullanılan bir tabir”dir (Özcan, 1993: 108). Osmanlı’da resmî bayram olan cülûs merasiminde, başta yabancı elçiler olmak üzere devlet erkânının tebrikleri ve armağanları kabul edilirdi. Fatih zamanından itibaren cülûz bahşişi vermek kanun haline gelmiş başta askerler olmak üzere birçok görevliye bahşiş dağıtılmıştır (Pakalın, 2004: 312; Tuğluk, 2010, 56). Cülûs, top atılarak tellallar aracılığıyla ülkenin her yerine duyurulur, halk ve asker duaya ve alkışa davet edilirdi (Akkuş, 2007, 51).

Kasideler genellikle övgü için yazılan manzumelerdir. Bu kasidelerde veya kasidelerin nesib kısmında tahta çıkan padişahın cülûsunu anlatan beyitler kaleme alınmışsa, bu şiir “cülûsiye” olarak adlandırılmıştır. Şairlerin tebrik ve temennilerini içeren bu manzumeleri yazmalarının ana nedeni cülûs bahşişi alabilmektir. Cülûsiyeler, sadece padişahın tahta çıktığı yıl için yazılmaz; yıldönümlerinde de kaleme alınan manzumeler mevcuttur. Cülûsiyeler; terakib-bend, tercî‘-bend, kıt‘a gibi nazım şekilleriyle de yazılabilir. Bunların yanı sıra Sultan II. Abdülhamid hakkında mensur cülûsiyelerin yazıldığına da tesadüf edilmektedir (Canım, 2012: 31).

Tarih veya tarih düşürme, ebced hesabına göre harflerin toplamı, bir hadisenin meydana geldiği zamanı gösteren cümle, mısra, beyit ya da bentlerle yapılan edebî sanattır. Genellikle istenilen tarih son mısradaki belirtilir. Ebced hesabının Orta Çağ’dan bu yana kullanıldığı bilinmekle beraber bir edebî sanat olarak tarih düşürmenin ilk defa ne zaman kullanılmaya başlandığına dair kesin bir bilgi yoktur. Bu hususta Tahirü’l-Mevlevî, Ahmet Cevdet Paşa’nın bu sanatın ilk defa H 791 yılında Hâfız-ı Şirâzî’nin vefatıyla kullanıldığını söylemesini eleştirmektedir. Mevlevî, Şeyh Sâdî için yazılan ve vefatı olan H 691 yılını işaret eden beytin ve Abdülkadir Geylanî için yazılan, H 470’de doğduğuna ve 91 yaşında H 561 yılında vefat ettiğine işaretle bulunan beyitlerin -eğer sonradan bulunmuş değilseler- Cevdet Paşa’nın sözünü şüpheli gösterdiğini söyler (1994: 146). Sivas’ın Timurlenk tarafından tahribi H 803 (خراب), İstanbul’un fethi H 857 (طبييت بلدت), Mısır’ın fethi H 923 (لعرب ممالك فاتح) vb. her ne kadar birer tarihi kelime/cümle olsalar da edebî anlamda ilk manzum tarihler XIV. yüzyıldan itibaren gelişmeye başlamış, XVIII. yüzyılda en verimli dönemine ulaşmış (Karabey, 2011: 80) ve XIX. yüzyılın başlarında Adanalı Surûrî ile doruk noktasına ulaşmıştır. Mevlevî, hiçbir şairin Surûrî’nin seviyesine ulaşamayacağını belirtir (1994: 147). Anadolu’da ilk manzum tarih mısramını ise Fatih devri âlimlerinden Hızır Bey’in söylediği rivayet edilir (Demirel, 2008: 380; Kalyon, 1998: 61-

62). Bu bildiride İstanbul Millet Kütüphanesi Ali Emiri Koleksiyonu 34 AE Mnz 234 numarada bulunan şiir mecmuasının 117a sayfasında yer alan kaside nazım şekliyle yazılmış, cülûsiye özelliği gösteren tarih manzumesi incelenecek, yeni harflere aktarımı yapılacak ve daha önce literatüre girmemiş olan bu şiir ilgililerin dikkatine arz edilecektir.

**Tablo 1:** Harflerin Sayısal Karşılıkları

ابجد ebced	ا A, E 1	ب B, P 2	ج C, Ç 3	د D 4
حور hüvvez	ه H 5	و V 6	ز Z 7	
حظي hutti	ح H 8	ط T 9	ك Y 10	
كلمن kelemen	ك K 20	ل L 30	م M 40	ن N 50
سجفس safes	س S 60	ع A 70	ف F 80	ص S 90
قرش karaşet	ق K 100	ر R 200	ش S 300	ت T 400
شخ schaz	ش S 500	ح H 600	ذ Z 700	
ضظظ dazığı	ض D, Z 800	ظ Z 900	غ G 1000	

## 1. TARİH MANZUMESİNİN (CÜLÛSİYE) İNCELENMESİ

### 1.1. Şairi

Şiirin yer aldığı mecmuada şairin kimliğine dair herhangi bir bilgi bulunmamaktadır. Manzumede mahlas bulunmamakla birlikte son beyitte yer alan “İlhâm ile” kelimesinden hareketle mahlasın “İlhâmî” olduğu veya bu kelimeye çağrışım yapılmak istendiği düşünülebilir. Manzumenin yazıldığı dönemde III. Selîm’den başka “İlhâmî” mahlasını kullanan bir Divan şairi tespit edilememiştir.

İlhâm ile târîd için zihn [ü] úalem yazmışdı çün

Sulûân-ı dehr oldı bugün itdi cülÿs èAbdülóamid

I. Abdülhamid tahta çıktığında henüz 13 yaşında olan III. Selîm’in, tahta çıkış tarihinde veya cülusun ileriki bir yıl dönümünde böyle bir manzume kaleme alması ihtimaller dâhilindedir. Özel bir eğitimle yetiştirilen III. Selîm şair, bestekâr ve yenilikçi bir kişiliğe sahiptir. Bu tahminin dışında manzumenin şairine dair herhangi bir bilgi bulunmamaktadır.<sup>86</sup>

<sup>86</sup> Şiirin bulunduğu mecmuadaki bir sonraki manzume II. Selîm’e aittir. Dolayısıyla şair padişahların şiirleri arka arkaya sıralanmış olabileceği düşünülerek “İlhâm ile” kelimesinin “İlhâmî” mahlasını çağrıştırdığı tahmin edilmektedir. III. Selîm 1761 yılında doğmuştur. I. Abdülhamid tahta çıktığında 13 yaşındadır. Mahlasın İlhâmî olma ihtimalinden hareketle aynı yüzyılda bu mahlası kullanmış olabilecek şairler araştırılmış fakat III. Selîm’den başka Divan şairi tespit edilememiştir. Buradan hareketle Kâşif Yılmaz’ın hazırladığı “İlhâmî Divanı” incelenmiş ve bu manzumeye tesadüf edilmemiştir.

## 1.2. Yazılış Tarihi

Manzumenin yazılış tarihine dair herhangi bir bilgi bulunmamaktadır fakat I. Abdülhamid'in tahta çıkış tarihi olan 8 Zilkade 1187 Cuma / 21 Ocak 1774 tarihinden sonra yakın bir zamanda yazıldığı düşünülebilir.

## 1.3. Nazım Şekli

Manzume kaside nazım şekliyle yazılmıştır. Klasik anlayıştaki kasidelerden farklı olarak sadece methiye ve dua bölümleri bulunmaktadır. Kaside aşağıdaki beyitle başlamaktadır:

Geldi zamÀn-ı maèdelet iúbÀl-i kevn ola mezid  
Gösterdi rÿy-ı mekremet dünyÀya eltÀf-ı Óamid

## 1.4. Beyit Sayısı

Kasideler 9 beyitten 100 beyte kadar aynı aruz kalıbıyla yazılan nazım şekilleridir (İpekten, 2005: 38). Çalışmamızın konusu olan kaside ise 11 beyitten meydana gelmiştir. İlk 7 beyit methiye, 8-10. beyitler dua, 11. beyit ise tarihin kaleme alındığı son tarih beytidir.

## 1.5. Vezin

Manzume, recez bahrinin sık kullanılan kalıplarından biri olan *Müstefèilün / Müstefèilün / Müstefèilün / Müstefèilün* vezniyle yazılmıştır. Şairin vezni başarılı uyguladığı; imale, zihaf, med gibi hususlar dışında vezin aksaklıklarının olmadığı görülür.

## 1.6. Kafiye ve Redif

Manzumede redif bulunmamaktadır. Kafiye ise mürdef kafiyedir ve “-îd” sesiyle sağlanmıştır.

## 1.7. Muhtevası

Kaside nazım şekliyle kaleme alınan manzume, içeriği bakımından bir cülûsiye özelliği göstermektedir. Son beyitte I. Abdülhamid'in<sup>87</sup> tahta çıkışına işaret eden tarihin bulunması yönüyle de bir tarih manzumesi özelliği kazanmıştır. Klasik kasidelerde bulunan giriş bölümleri atlanarak I. Abdülhamid'in övgüsüyle şiire başlanmıştır. 8, 9 ve 10. beyitlerde padişaha dua edilmiştir. 11. beytin ikinci mısrasında türüne göre “tam tarih”<sup>88</sup> düşürülerek Abdülhamid'in tahta çıkış tarihi olan hicri 1187 tarihi oluşturulmuştur:

<sup>87</sup> I. Abdülhamid, III. Ahmed'in oğludur. Büyük kardeşi III. Mustafa'nın vefatının ardından 8 Zilkade 1187 Cuma / 21 Ocak 1774 tarihinde tahta çıkmıştır. Saltanatı 1774-1789 yılları arasındadır. I. Abdülhamid, Özü Kalesi'nin Ruslar tarafından işgalini bildiren sadrazam kâimesini okurken aniden gelen bir felç sonucu 11 Recep 1203 / 7 Nisan 1789 tarihinde vefat etmiştir. Ayrıntılı bilgi için bk. Aktepe, 1988: 213-216.

<sup>88</sup> Tam tarih, mısradaki bütün harflerin rakamsal karşılığının toplanmasıyla ortaya çıkan bir tarih türüdür.

SulûÀn-1 dehr oldı bugün itdi cülÿs èAbdülóamîd

سلطان دهر اولدی بوکون استدی جلوس عبد ال حمد =1187/1774

## 2. Metin ve Günümüz Türkçesi

### TÀrîò-i BerÀy-ı SulûÀn èAbdü'l-óamîd ÓÀn

*Müstefèilün / Müstefèilün / Müstefèilün / Müstefèilün*

--- / --- / --- / ---

- 1 Geldi zamÀn-ı maèdelet iúbÀl-i kevn ola mezîd  
Gösterdi rÿy-ı mekremet dünyÀya eltÀf-ı Óamîd

*Adaletli kişinin zamanı geldi, (bundan sonra) varlıkların saadeti artar. Sultan Hamid'in lütufları dünyaya ihsanın ne olduğunu gösterdi.*

- 2 Baòt-ı cihÀn oldı küşÀd èÀlemlere geldi reşÀd  
áam gitdi diller oldı şÀd òulm ü sitem hep nÀ-bedid

*Cihanın bahtı açıldı, âlemlere doğruluk geldi, gam gitti gönüller şad oldu, zulüm ve sitem yok oldu.*

- 3 Bu òüsrev-i èÀli-tebÀr taòt üzre oldı ber-úarÀr  
Kim pÀyine derler neşÀd itdi bu dem çeşm-i ümid

*Yüce bir soydan gelen hükümdar tahtına oturdu. Bu zamanda gözler ümitle doldu (nitekim) onun ayağına "uğurlu (sevinçli)" derler.*

- 4 Nesl-i şehin-şÀh-ı cihÀñ ÓÀn-ı Aómed cennet-mekÀn  
ÓÀt-ı humÀyÿn-hemÀn devrÀne Óáu ide saèid

*(Onun) nesli cihanın sultanlarının sultanı olan, cennet mekân Sultan Ahmed Han'dan (gelmektedir). Hak, onun mübarek zatını dünyaya mübarek, kutlu, uğurlu eylesin.*

- 5 Çóudan çekerdi inüzÀr òayr-ı úudÿmına kibÀr  
Óamd ola Óáuú'a áad-hezÀr èid oldı ber-bÀlÀ-yı èid

*Seçkin insanlar (onun) hayırla (tahta) ayak basmasını uzun zamandır beklerdi. Hakk'a yüzbinlerce şükür olsun ki (onun gelmesiyle) bayram üstüne ne yüce bayram oldu.*

- 6 Hep munúaòırdı òÀs u èÀlem teşrife mÀ-lÀ-kelÀm  
Şimdi bulur devlet niòÀm bi-şübhe bÀrî-i sedid(?)

*Havas-avam herkes şüphesiz (I. Abdülhamid'in) gelmesini bekliyordu. Şimdi şüphe yok ki doğru yol üzere devlet nizamına kavuşur.*

- 7 Bu sÀeat-i feròunde-dem eyler cihÀnı muàtenem(?)  
Ser-şÀr-ı òevú olur ümem kim neşirler oldı cedid

*Bu mübarek zamanlar cihanı ganimetle dolmuş (gibi memnun eder). Nitekim yeni yapılan neşirler (açılışlar, yenilikler) insanları ağızlarına kadar neşeyle doldurmuştur.*

8 Cibril oúur Naâr Àyetin manâýr ide Óaú õÀtın  
DevrÀna õill-i reéfetin her dem ÒudÀ ide medid

*Cebrail yardım/galibiyet ayetini okur, Hak zatını muzaffer etsin. Allah, her zaman merhamet gölgesini dünyanın üzerinde uzatsın.*

9 Neslin ide Óaú ÀşıkÀr şehzÀdelerle kÀm-kÀr  
Olsun cihÀnda pÀyidÀr MevlÀ úıla èömrin mezid

*Hak (Abdülhamid'in neslini göz önünde tuta, (onu) şehzadeleriyle beraber mesut ede, Mevla ömrünü uzun ede, cihanda kalıcı ola.*

10 Tevfú-i Óaúú-ı yÀr-ile Òıør ôafer-i rehber ola  
MeydÀn-ı rezme óaşr ola aèdÀ-yı bed-òÀh-ı èanıd

*Hakk'ın yardımı ile Hızır, zaferlerine rehber ola. Kötülüğünden vazgeçmeyen düşman savaş meydanlarında karşısına çıka.*

11 İlhÀm ile tÀriò içün zihn [ü] úalem yazmışdı çün  
SulùÀn-ı dehr oldı bugün itdi cülýs èAbdülóamid

*Zihin ve kalem bu tarihi ilham ile yazdı. Çünkü Abdülhamid bugün tahta çıktı ve zamanın sultanı oldu.*

## **SONUÇ VE ÖNERİLER**

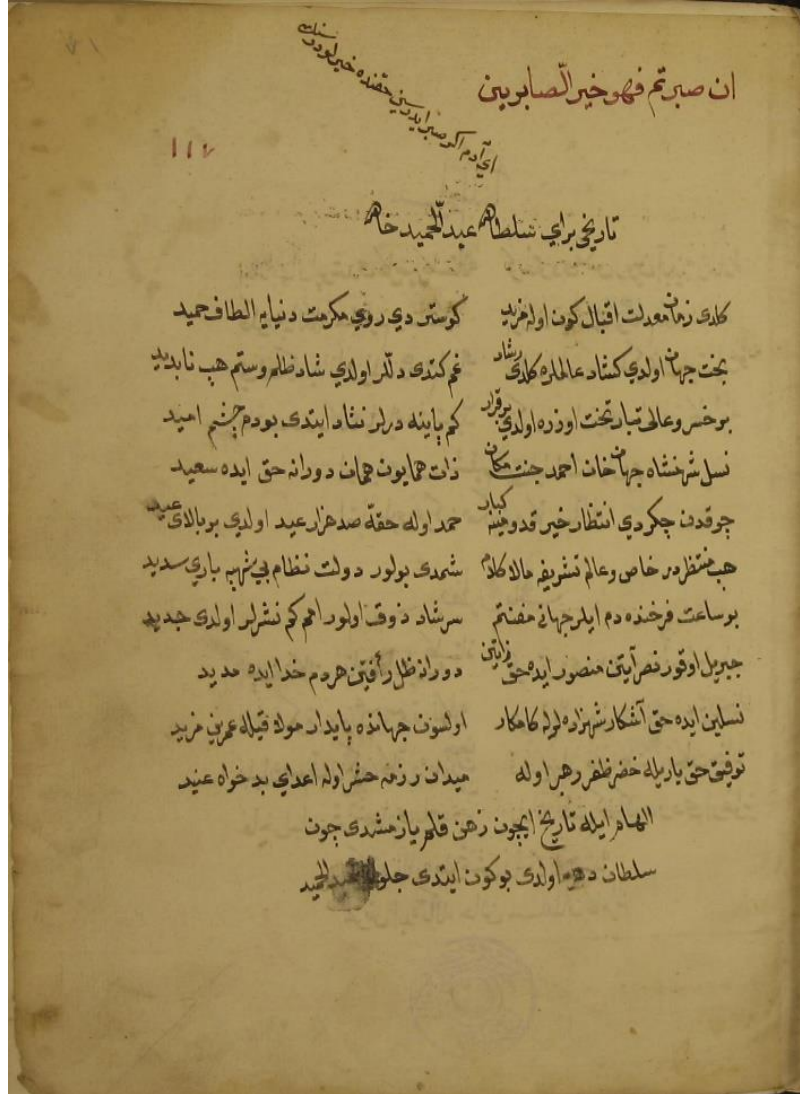
Edebiyat ve tarihin birbirine çok yakın iki bilim dalı olduğu, tarihe mal olmuş olayların edebî metinlere yansıdığı, edebî metinlerin tarihe ışık tutabileceği sonucu, bildirinin en önemli sonuçlarından birini oluşturmaktadır. Kasidenin tarih beytinde ortaya çıkan tarih ile I. Abdülhamid'in tahta çıktığı tarih örtüşmektedir. Bireysel şiir defterleri olarak nitelenebilen şiir mecmualarına alınan manzumelerin tarihe kaynaklık edebilecek derecede önemli olabileceği, I. Abdülhamid'in tahta çıkış tarihini gösteren manzume örneği üzerinden tekrar görülmüştür. Bu nedenle sadece şiir mecmuaları değil farklı özelliklerde yazılan mecmuaların da doğru bir şekilde tasnif edilmesinin önemi büyüktür.

Bu bildirinin sonuçlarından bir diğeri ise klasik Türk edebiyatı şairlerinin mazmun, aruz, kafiye, redif ve mananın dar kalıplarının yanı sıra her bir harfin rakamsal değerinin toplamının istenen sonucu verebildiği, dünya edebiyatlarında eşine nadir rastlanan özgün eserler verdiklerinin tekrar görülmesidir.

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**EK: TARİH MANZUMESİNİN BULUNDUĞU MECMUA SAYFASI**





## **II. SELİM'İN BİLİNMEYEN BİR ŞİİRİ VE BÂKÎ'NİN NAZİRESİ**

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### **ÖZET**

Sarı Selîm olarak da bilinen II. Selîm, Kanuni Sultan Süleyman ile Hürrem Sultan'ın ikinci oğludur. Âlimleri, şairleri, müzisyenleri koruyan, kendisi de zevk ve eğlenceye düşkün biri olarak bilinen II. Selîm, Osmanlı Devleti'nin divan sahibi şair padişahları arasında yer almaktadır. Selîm ve Selîmî mahlaslarıyla manzumeler kaleme alan II. Selîm'in divanının eksik ve tek nüshası İstanbul Millet Kütüphanesi Ali Emiri Koleksiyonu'nda bulunmaktadır. Şiir mecmuaları Türk edebiyatının önemli kaynaklarıdır. Son zamanlarda önemi daha da anlaşılan şiir mecmularında; şüara tezkirelerinde ismi geçmeyen şairlere rastlanmakta, divanı kaybolmuş şairlerin şiirlerine ulaşılmakta, şairlerin hayatları hakkında başka yerde karşılaşılmayan bilgilere rastlanmaktadır. İstanbul Millet Kütüphanesi Ali Emiri Koleksiyonu 34 AE Mnz 234 numaralı şiir mecmuasında yer alan bazı şiirler daha önce hiçbir eserde yer almayan metinlerdir. Bu bildirinin konusu, adı geçen mecmuada yer alan ve II. Selîm'in şiirleri üzerine yapılan çalışmalarda yer almayan bir gazeli ve 16. yüzyıl şairi Bâkî'nin bu gazele naziresinin incelenmesidir. Gazeller şekil ve anlam bakımından incelenmiş ve iki metin karşılaştırılmıştır.

**Anahtar kelimeler:** Mecmua, Şiir Mecmuası, Selîm, Selîmî, Baki, Gazel, Nazire, İstanbul Millet Kütüphanesi, Ali Emiri Koleksiyonu

**AN UNKNOWN POEM OF SELIM II AND BAKI'S NAZIRE****ABSTRACT**

Selim II, also known as Sarı Selim, was the second son of Suleiman the Magnificent and Hürrem Sultan. Sultan Selim, known as a person who protects scholars, poets and musicians and is fond of pleasure and entertainment, is among the sultans of the Ottoman Empire. Sultan Selim, who wrote verse with Selim and Selîmî pseudonyms, is located in the Istanbul National Library Ali Emiri Collection. Poetry magazines are important sources of Turkish literature. In the poetry magazines, which have been understood more recently, poets who are not mentioned in "şuara tezkire"s are found, the poems of the poets who have lost their divan are reached, there is information about the lives of poets that are not encountered elsewhere. Istanbul National Library Ali Emiri Collection 34 AE Mnz 234 poetry in the poetry magazine some of the poems that have not been included in any work before. The subject of this paper is a ghazal that is included in the aforementioned magazine and not included in the studies on Selim II's poems, and the examination of this ghazal nazire by 16th century poet Baki. The ghazals were examined in terms of form and meaning and the two texts were compared.

**Keywords:** Magazine, Poetry Magazine, Ali Emiri Collection, Selim, Selimi, Baki, Ghazal, Nazire, Istanbul National Library.

## 1. KLASİK TÜRK ŞİİRİNDE NAZİRE GELENEĞİ

Nazir; “benzer, karşılık, misil, şebih, akran” (A. Vefik Paşa, 2000: 769), “eş, misil, manend” (Naci, bty: 902) anlamlarına gelen bir kelimedir. Nazire ise “müسابaka yollu şiir karşılığı” (A. Vefik Paşa, 2000: 769), “bir şairin şiirine müşabih olmak üzere o vezin ve kafiyede söylenen manzume” (Naci, bty: 902) anlamlarında tanımlanan ve diğer birçok sözlükte benzer şekillerde tanımı yapılan edebî bir terimdir.<sup>89</sup> Kaynaklardaki ortak ifadeye göre bir terim olarak nazire “bir şairin şiirine özellikle vezin, kafiye, varsa redif, konu ve hayal birlikteliği/yakınlığı gibi hususlar dikkate alınmak suretiyle, genellikle başka bir şair tarafından benzerinin yazılması” olarak tanımlanmıştır (Kut, 2000: 171).

Bazı araştırmacılar nazire mecmualarında rastlanan ve bazı nazirelerin başında yer alan “fermâyed” ifadesinden hareketle mesneviler dışında herhangi bir nazım şekliyle yazılmış olan nazirelerin, zemin veya model şiire bir karşılık, yani bir “cevap” niteliğinde olduğunu düşünmenin mümkün olduğunu söylemektedir (Karavelioğlu, 2011: 26). Bir şiirin nazire olarak kabul edilebilmesi için öncelikle aynı aruz ölçüsü ile yazılması gerekmektedir. İkinci özellik kafiye ve –varsa- redifin aynı olmasıdır. Üçüncü özellik ise anlam ve hayal benzerliği bulunmasıdır. Kimi zaman nazire şiirler, zemin şiirde kullanılan kalıp sözlerin tekrar edildiği görülmektedir. Fakat bu sınırların dışına çıkan istisna nazireler de mevcuttur. Nazire şiirde, beyit veya bent sayısının aynı olması gerekmemektedir (Köksal, 2001: 7-18).

Şairlere nazire yazmaya yönlendiren birtakım saikler vardır. Zemin şiiri geçme arzusu ön plandadır. Üstat şairlere benzeme, meydan okumaya cevap verme, dostluğunu gösterme diğer saiklerdendir. Divan şiirinde nazire yazma geleneği ilk asırlardan başlayarak Divan şiirinin ömrünü tamamladığı 19. yüzyılın sonlarına kadar devam etmiştir.

## 2. II. SELİM VE BÂKÎ’NİN KARŞILAŞTIRILMASI

### 2.1. Hayatları ve Edebî Kişilikleri

<sup>89</sup> Nazire ve klasik Türk şiirinde nazire geleneği üzerine birçok çalışma yapılmıştır. Tekrara düşmemek ve bildiri sınırlarını aşmamak için ayrıntıya girilmeyecek olup araştırmacılar için burada bazı çalışmaların künye bilgileri sunulmuştur: Aktaş H. (2001). “Nazirecilik Geleneği ve Çağdaş Şiirimizin Ufukları”, Hece, 53-54-55, s.282-294; Karavelioğlu, M. A. (2011). “Şeyh Gâlib’in Gubârî’ye Naziresi”, Modern Türklük Araştırmaları Dergisi, 8/1, s.25-41; Köksal M. F. (2001). “Edirneli Nazmî Mecma’ü’n-Nezâ’ir (İnceleme-Tenkitli Metin)”, Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, (Basılmamış Doktora Tezi), Ankara; Köksal M. F. (2003). “Nazire Kavramı ve Klâsik Türk Şiirinde Nazire Yazıcılığı”, Dirîözler Armağanı Prof. Dr. Meserret Dirîöz ve Haydar Ali Dirîöz Hatıra Kitabı, s.215-290; Köksal M. F. (2006). *Sana Benzer Güzel Olmaz Divan Şiirinde Nazire*, Ankara; Mermer A. (2002). “XV. Yüzyılda Yazılmış Bilinmeyen Bir Nazire Mecmuası ve Aydınlı Visâli’nin Bilinmeyen Şiirleri”, Milli Folklor, 56, s. 75-94.

Bir padişah ile bir şairin hayatlarının birebir karşılaştırılması mümkün değildir fakat şairleri ve edebî kişiliklerini daha iyi anlayabilmek için önemli hayat merhalelerinin belirtilmesi uygun görülmektedir. Aşağıdaki tabloda II. Selîm ve Bâkî'nin ön plana çıkan yönleri maddeler halinde gösterilmiştir.

<b>II. Selîm (Sarı Selîm)</b>	<b>Bâkî</b>
<ul style="list-style-type: none"> <li>- Doğum tarihi 1524</li> <li>- Ölüm tarihi 1574</li> <li>- Kânûnî Sultan Süleyman'ın oğludur.</li> <li>- 1542'de 18 yaşında Konya sancakbeyi olmuştur.</li> <li>- 1544'de 20 yaşında Manisa sancakbeyi olmuştur.</li> <li>- 1562'de 38 yaşında Kütahya'ya gönderilmiştir.</li> <li>- 1566'da 42 yaşında padişah olmuştur.</li> <li>- Saltanatı sekiz yıl, iki ay, on dokuz gün sürmüş olup İstanbul'da vefat eden ilk Osmanlı padişahıdır.</li> <li>- Uysal hali ve mütevazı tavırlarıyla babasının gözüne girmiştir.</li> <li>- Su yolları, medreseler, camiler, han ve hamamlar yaptırmıştır. En önemli eseri, Mimar Sinan'a yaptırdığı Edirne'deki Selimiye Camii ve külliyesidir.</li> <li>- Osmanlı tarihinde ulemaya ilk defa cülus bahşişi dağıtan padişaktır.</li> <li>- II. Selîm, zevk ve eğlenceye düşkün bir padişah olarak bilinmektedir.</li> <li>- II. Selîm, âlimleri, şairleri, güzel sanatlarla uğraşanları koruyup kollamış, daha şehzadelğinde, başta Müverrih Âlî olmak üzere, Sâmî, Hâtemî, Firâkî, Ferdî, Niğârî gibi birçok âlim, şair, ressam ve musikişinası etrafına toplamıştır.</li> <li>- Şiirlerinde Selîmî ve Selîm mahlaslarını kullanmıştır.</li> </ul>	<ul style="list-style-type: none"> <li>- Doğum tarihi 1526</li> <li>- Ölüm tarihi 1600</li> <li>- Arkadaş Çevresi: Nev'î, Mecdî, Vâlihî, Hoca Saadeddin, Zâtî, Sâdikî...</li> <li>- Yaşadığı Dönemdeki Padişahlar: Kânûnî, II. Selîm, III. Murad, III. Mehmed</li> <li>- 1555'te Kanuni'ye sunduğu bir kaside ile tanınmaya başlamıştır.</li> <li>- Ahdî, Bâkî'nin gençlik yıllarında çok okuyarak kendini geliştirdiğini, bu nedenle kısa sürede büyük marifetlere sahip olduğunu belirtmiştir (Solmaz 2009: 68).</li> <li>- Bâkî'nin çok yetenekli bir şair olduğu, usta şair olan Zâtî'nin bile Bâkî'nin şiirini çaldığı, "Bâkî gibi şâir-i sâhirin şiirini uğurlamak ayıp değildir." diyerek şairi övdüğü dönemin kaynaklarında yer almaktadır (Eyduvan, 2009: 170).</li> <li>- Tarihçi Selanikî'nin Ferhad Ağa'dan naklen anlattığına göre Kânûnî, Bâkî gibi büyük bir kabiliyeti bulup ona mevki vermesini padişahlığının en zevkli birkaç hadisesinden biri olarak telakki etmiştir (İpşirli 1989: 858).</li> <li>- 1566'da hem babası hem Kânûnî vefat edince boşluğa düşmüş ve bir süre hamisiz kalmıştır.</li> <li>- Kânûnî'nin ölümü üzerine yazdığı ünlü mersiyesinin son iki bendinde yeni padişah Sultan Selîm'e ve devrin söz sahibi ve güçlü adamı Sadrazam Sokullu Mehmed Paşa'ya bağlılığını ifade etmiştir.</li> <li>- Sultan Selîm tahta oturunca Bâkî, padişaha bir cülûsiye sunmuştur (Açıkgöz 1982: 15).</li> </ul>

- II. Selim'in bilinen tek eseri *Divançe*'sidir. Eserin bilinen tek nüshası İstanbul Millet Kütüphanesi Ali Emiri Koleksiyonu'nda bulunan AE 34 Ae Arabi 4341/7 numaralı mecmuanın 109a-120b yaprakları arasında "Dîvân-ı Sultân Selîm Hân-ı Sâni" başlığı ile kayıtlıdır. Yeni harflerle yayımlanan eserde yirmi yedi gazel, bir tesdis, bir kıt'a ve on dört beyit bulunmaktadır. *Divançe*'de yer almayan bir gazeli ve bir beyti daha bulunmaktadır (Kesik 2012: 50, 72).

- II. Selim'in şiiri ve sanatı hakkında şua tezkirelerindeki görüşler Kesik, 2020'den naklen şu şekildedir: "Ahdî (Solmaz 2005: 96-98) ve Beyânî (Kutluk 1997: 14)'ye göre şiiri akıcı ve güzel olup herkes tarafından beğenilmektedir. Aşık Çelebi (Kılıç 2010: 238) ise Selîmî'yi yöneticilik ve şairlik kudreti bakımlarından şiir yazan diğer Osmanlı padişahlarından üstün görmektedir. Hasan Çelebi (Kutluk 1989: 108) ve Âlî (İsen 1994: 293) şiirlerinin kusursuz oluşundan bahsetmiştir." (Emecen 2009: 414-418; Kesik, 2020; Sakaoğlu 2000: 149-160; Turan 1998: 434-440).

- Sultan Selîm'e çeşitli vesilelerle şiirlerini sunmuş ve Kânûnî zamanında olduğu gibi Sultan Selîm'in gönderdiği gazellere nazireler söyleyip padişahın iki gazelini tahmis etmiştir.

- Sultan Selîm, şiir meclislerine davet mektubu gönderecek kadar, kır gezilerine davet edecek kadar Bâkî'yi sevmektedir.

- Bâkî'nin nüktedan, hoşsohbet, neşeli ve rint meşrep bir şair olduğu kaynaklarda nakledilmektedir.

- Çeşitli medreselerde müderrislik; Mekke, Medine, İstanbul kadılıkları, Anadolu ve Rumeli kazaskerliği gibi vazifelerde bulunur.

## 2.2. Gazellerin Karşılaştırılması

Bâkî'nin şiirini II. Selîm'e nazire olarak yazdığı açıkça görülmektedir. Nazire şiirde aranan ilk unsurun, zemin şiirin vezni ile aynı vezne sahip olması olduğunu daha önce belirtmiştik. Aşağıdaki gazelerde de böyle bir birliktelik söz konusudur. Her iki gazel de aruzun *Mef'ûlü / Fâ'ilâtün / Mef'ûlü / Fâ'ilâtün* kalıbıyla yazılmıştır. II. Selîm de Bâkî de aruzu ustalıklı kullanmışlardır.

Naziredeki ikinci husus nazım şekillerinin aynı olmasıdır ki her iki manzume de gazel nazım şekliyle kaleme alınmıştır. Nazire şiirlerin beyit/bent sayısının zemin şiirdeki beyit/bent sayısı ile aynı olup olmaması zorunluluğu bulunmadığına daha önce dikkat çekilmişti. Ele aldığımız manzumelerde de benzer bir durum söz konusudur. Sultan Selîm'in gazeli beş beyit iken Bâkî'nin gazeli yedi beyittir. Fakat mecmuada Bâkî'nin naziresinin sadece ilk beş beyti bulunmaktadır. Aşağıdaki tablonun dışında verilen son iki beyit Sabahattin Küçük neşrinden ilave edilmiştir. Burada şu hususu hatırlatmakta fayda vardır. II. Selîm'in mürettep divanı günümüzde mevcut değildir. Selîm'in bu şiiri çok bilinen bir manzume olmayıp sadece iki mecmuada tesadüf edilmiştir ve şiirler arasında küçük farklar bulunmaktadır. Bu nedenle derleme esnasında iki beytin eksik yazılmış olabileceği de akıldan çıkarılmamalıdır. Nitekim

Bâkî, II. Selîm'in her beytinin sonunda kullandığı kelimeyi kendi naziresinde de kullanmıştır. Bu kullanımlarda beyit sırasının gözetilmediği fakat eksik olduğu düşünülen beyitler ilgili yerine konulursa beyit sırasının gözetilerek bu kelimelerin kullanılmış olabileceği fark edilmiştir. Şöyle ki, söz gelimi Selîm'in gazelinin ikinci beytinin son kelimesi olan "nigâr-hâne", Bâkî'nin naziresinin üçüncü beytinin son kelimesidir. Zemin şiirin üçüncü beytinin son kelimesi olan "erguvâne", nazirenin dördüncü beytinin son kelimesidir... Fakat zemin şiirin ikinci beytinin derleme esnasında unutulduğu varsayılp beyitler birer sıra aşağıya kaydırılırsa, dize sonlarındaki kelimeler de birbirlerini karşılamış olacaklardır. Bu durumda zemin şiirin altıncı beytinin de eksik olduğunu söylemek mümkündür. Mamafih, zemin şiirdeki eksik olduğu varsayılan ikinci beytin son kelimesi "civâne"; altıncı beytin son kelimesi ise "Selîm Hâne" olmalıdır. Bu çıkarımlar elbette -şimdilik- birer varsayımdan ibarettir.

İki gazelde de redif bulunmamaktadır. Kafiyeleler ise -âne sesleriyle sağlanmış mürekkep kafiyedir. Her iki şiirde de kafiyeleleri içinde barındıran son kelimelerin aynı olduğuna yukarıda değinilmişti.

Selîm şiirine sevgiliye seslenerek ikinci tekil şahsı ön plana alarak başlamıştır ve şiir boyunca bu kullanım devam etmiştir. Bâkî ise dışarıdan bakan, gözlem yapan biri edasıyla tabiattaki değişimleri anlatmıştır. Bâkî'nin, Selîm'den daha üstün hayaller yakaladığını söylemek de mümkündür. Sözgelimi Selîm; aklının, fikrinin, gönlünün sürekli sevgiliyle ve ona kavuşmak için kurulan hayallerle dolu olduğunu, böylece bir nigâr-hâne/resim sergisi şeklini aldığını söylerken bu beytin naziresinde Bâkî, bülbüllerin nağmeli ötüşleri ve güllerin kıvrımlarıyla (Çin) bahar vaktinin sanki meşhur Çinli ressam Mani suretine girdiğini, gülistanın ise bu haliyle bir sergi (nigâr-hâne) şeklini aldığını söylemiştir. Beyitte en çok dikkat çeken husus tevriyeli kullanımlardır. Şairin, güllerin kıvrımları için kullandığı Çin ve ressam Mani'nin Nigaristan isimli eserini çağrıştırmak için kullandığı nigâr-hâne beytin anlam katmanlarını artıran hususiyete sahiptir.

Bâkî altıncı ve yedinci beyitte Sultan Selîm övgüsüne yer vermiştir. Selîm Han, gazelinin son beytinde yârine aşk derdini açmak istediğini fakat bunu beyanın mümkün olmadığını söylerken Bâkî, Sultan Selîm'in kerim zatının vasfını yazmakta aciz kaldığını, aklından geçen manaları yazmanın mümkün olmadığını dile getirerek başarılı naziresini övgü ile sonlandırmıştır.

<b>Selīm ŪĀĕĀ</b> <i>Mefĕylŭ / FĀĕilĀtŭn / Mefĕylŭ / FĀĕilĀtŭn</i> ---/-.-.-/-.-.-/-.-.-	<b>Naĕire-i BĀŭi</b> <i>Mefĕylŭ / FĀĕilĀtŭn / Mefĕylŭ / FĀĕilĀtŭn</i> ---/-.-.-/-.-.-/-.-.-
1 CĀnĀ bahĀr iruŕdi gel seyr-i gŭlsitĀne <sup>90</sup> Gĕsterdi ĕaks-i rŕyun Āyine-i zamĀne	1 Aĕdı gŭlŭn niŭĀbın bĀd irdi gŭlsitĀne Gĕsterdi rŕy-ı baĕtı Āyine-i zamĀne
2 .....	2 ŖĀh-ı ŕŭkŕfe dĕndi bir sim-ten nigĀre Her bir nihĀl-i mevzŕn bir serv-ŭad civĀne
3 Fikrŭm cemĀlŭnle ĕaŭlum viĀĀlŭnle <sup>91</sup> Oldı ĕayĀlŭnle gĕnlŭm nigĀr-ĕĀne	3 Bŭlbŭlde āavt-ı rengin gŭllerde āyret-i Ćin FaĀl-ı bahĀr MĀni gŭlŕen NigĀr-ĕĀne
4 <sup>92</sup> Mey laelŭne cĀnĀ hem-reng ũ hem- dem oldı ĀĀlib olursa ŭaŕn mı baĕs itse erĀuvĀne	4 FĀĕir libĀsa ŭo[ydı] eŕĕĀr-ı bĀĀ-ı devrĀn BĀdĀmi-naŭŕ kemĕĀ geydŭrdi erguvĀne
5 Gŭlŕend[e] devr-i gŭlde yĀr-ile ĕiŕret iden Beŕzer saĕĀdetiyle sulŭĀn-ı kĀmurĀne	5 Mektŕbın elde ŭutmiŕ zanbaŭ reh-i ĕemende ĕArĕ ide tĀ ki ŕĀlin sulŭĀn-ı kĀmurĀne
6 .....	6 Yaĕni o ŖĀh-ı muŭbil ol nŭkte-dĀn-ı kĀmil ĀĀĕib-ŭrĀn-ı ĕĀdil SultĀn Selim ĕĀne
7 Ol yĀre derd-i ĕaŕŭum ŕerĕ eylemek dilerdŭm ne gŕne ŭılsun AmmĀ <b>Selimi</b> hergiz mŭmkin degŭl beyĀne	7 ŕĀt-ı kerimi vasfın <b>BĀŭi</b> ne gŕne ŭılsun Melŕyĕ olan maĕĀni mŭmkin degŭl beyĀne

## SONUÇ

Klasik Tŭrk ŕiiri geleneđi iĕinde yer alan nazire yazımı ŕairlerin yetiŕmelerini sađlayan bir okul hŭviyetini kazanmıŕtır. Gŭnŭmŭzde tespit edilebilen oldukĕa hacimli nazire mecmuaları, bu okulun ilk asırlardan son asırlara kadar kesintisiz nasıl devam ettiđini gĕstermektedir. Aynı zamanda nazire ŕiirler, ortak ŕiir zevkinin tespiti iĕin de ĕnem arz etmektedir. BĀkĭ'nin naziresinde zemin ŕiiri geĕme, ondan daha gŭzel ŕiir sĕyleme gayretinden ziyade zemin ŕiir

<sup>90</sup> Karŕılaŕtırma Prof. Dr. Beyhan Kesik tarafından hazırlanan *Selimi DivĀnĕesi*'nin 62. sayfasında bulunan gazel ile yapılmıŕtır. K kısaltması bu esere iŕaret etmektedir.

<sup>91</sup> Fikrŭm cemĀlŭnle: fikr-i cemĀlŭn ile K

<sup>92</sup> Bu beyit K nŭshasında ŕu ŕekildedir:  
Mey-laelŭn ile cĀnĀ hem-reng ũ hem-dem oldum  
ĀĀlib gelŭrse baĕĀe lĀyŭdur erĀuvĀna

sahibi Sultan Selîm'e bir iltifat amacıyla kaleme alındığı hissedilmektedir. Aruzun, kafiyenin ve hatta bazı kelimelerin aynı olmasına rağmen nazire şiirin, zemin şiirden çok farklı ve orijinal hayallere sahip olması, bir taklit veya intihal düşüncesini ortadan kaldırmaktadır. Bâkî'nin naziresi, zemin şiiri geçmiş, başarılı bir nazire kanaatini oluşturmaktadır.

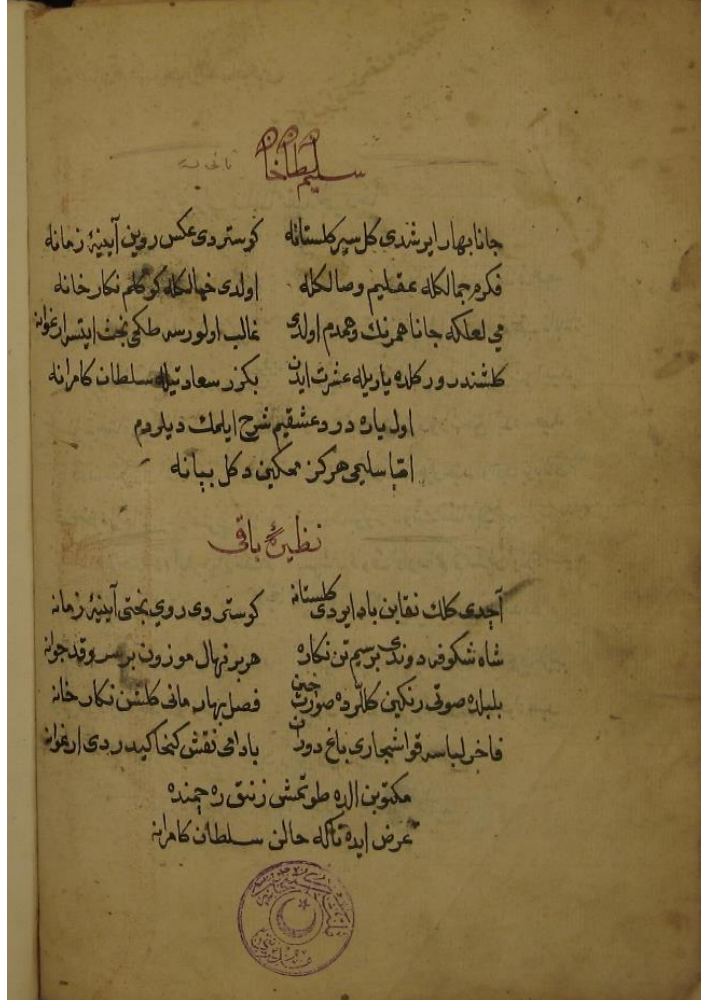
Sadece iki mecmuada bulunan II. Selîm'in bu gazelinden hareketle şiir mecmualarının önemi bir kez daha kendini göstermiştir. Ayrıca çalışmamızda da görüldüğü üzere mecmualarda nazire olarak yazılan şiirlerin de bulunması, şairlerin etkileşimlerini göstermeleri bakımından önemlidir. Bunların yanı sıra, gazelin baş tarafındaki "Selîm Taha" mahlasının yanına kurşun kalem kullanılarak sonradan eklenen "sânîdür" ifadesi, mecmuanın yazıldıktan sonra başka dikkatli bir göz tarafından incelendiğine işaret etmektedir.



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**EK: GAZELLERİN BULUNDUĞU MECMUA SAYFASI**



**FACTORS LIMITING PISTACHIO PRODUCTION**

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**ABSTRACT**

Pistachio (*Pistacia vera*, L) is one of the important agricultural products in the countries where it is grown. It is a must-have product both as a snack and in the baklava industry, and an important economic return in the domestic and foreign markets.,There are many abiotic and biotic factors that limit pistachio production. These factors are fertilization, periodicity, drought, pests, weeds and diseases. In this review study, the effect of these factors will be explained by supporting the literature.

## **INTRODUCTION**

Pistachio (*Pistacia vera* L.) is a thin-shelled, oily, edible fruit and belongs to the family Anacardiaceae. It is mostly used in dessert making, pharmacy and various food industries. Pistachio has many positive effects on health; It is a protein and mineral store, and it is stated that the risk of heart attack and cancer decreases thanks to the calcium, phosphorus, B1, B2, C and E vitamins it contains. In addition, it is reported that it strengthens the mind, gives energy to relieve fatigue, is good for the respiratory and digestive system, and has an anti-inflammatory effect (Çınar ve Okay, 2013). The homeland of the pistachio tree is the Middle East and Central Asia. Most production in the world is made in the USA, Iran, China and Turkey (FAO, 2020). Although pistachio is grown in 56 provinces in Turkey, more than 90% of the production is in the Southeastern Anatolia Region. This region has pioneered the successful cultivation and spread of pistachios, as it is the gene center and the place where it was first cultivated, and due to its ecological characteristics (Yavuz ve ark. 2016). Pistachio yields are high in one year, while the yield decreases the next year depending on the periodicity. Despite this, production has been increasing over the years. When the average values (tons) of pistachio production are compared, the highest production is in the USA, Iran, Turkey, China, Syria and Greece, respectively (FAO, 2020).

There are several factors that limit pistachio production. These include losses caused by environmental-physiological factors, high temperature fluctuations, lack of fertilization, irrigation problem, variety selection, periodicity and disease-pests. One of the important factors limiting the production of pistachio is diseases and pests. The factors limiting production are explained in order below.

## **PHYSIOLOGICAL FACTORS**

Physiological problems observed in pistachio trees are divided into five groups.

### **a) Periodicity**

Periodicity seen in pistachio and many plant varieties is among the important problems encountered in cultivation and causes loss of income for the producer. After the high yield is obtained, the yield of the next year is low. The year that produces more crops is defined as the year of existence, and the year that produces little or no product is defined as the year of absence. In addition, periodicity is more severe in extremely cold winter months and hot climates (Kailis and Harris, 2000). There are many different reasons for this situation. The most important reason are internal and external factors. Internal factors are defined as hormones, carbohydrates,

mineral nutrients, and external factors are defined as temperature, water and available nutrients (Monselise and Goldschmidt, 1982). In some studies, it is suggested that some hormones carried by pistachio seeds prevent the growth and development of flower buds (Lavee, 2007). A large amount of flower buds are formed in pistachios every year. However, these flower buds are fall in the year of existence. Therefore, the periodicity seen in pistachios occurs as a result of the flower buds falling and not standing on the tree (Ak and Kaska, 1992; Spann et al., 2008). Nutrients show significant differences in content between years. In a study, it was observed that total annual macronutrients in leaves and fruits were high in the first spring of the year, and decreased during the seed development in the year of absence (Picchioni et al., 1997).

#### **b) Empty fruit formation**

What can be done to reduce the empty fruit formation rate; The plant should be supported with nutrients, cultural precautions should be taken adequately and watered regularly. On the other hand, the low number of male trees in the garden causes empty fruit formation. Due to the lack of fertilization in pistachios, the formation of empty fruit, temperature, precipitation, fog and wind also affect negatively. High temperatures are undesirable during the flowering period. Again, continuous precipitation during the flowering period negatively affects fertilization.

#### **c) Crack-free fruit formation**

Pistachio fruits should form cracks along their lateral axis. The factors affecting cracking are harvest time, irrigation and feeding the trees. In order to obtain high cracking rate in pistachio varieties; Trees should be watered regularly from mid-August to September and nutritional supplements should be made (Onay et al., 2012).

#### **d) Fertilization**

Another factor limiting production is the fertilization problem. In case of insufficient fertilization in pistachios, flower shedding and empty (pistachio) fruits occur, this situation directly affects the yield. There are a number of *reasons* for this. Reasons such as the low number of male trees, failure of male trees to bloom with females, grafting of males on weak rootstocks are effective (Sağlam and Aydoğan, 2005).

#### **e) Irrigation**

Some researchers state that low yield and periodicity in pistachio are also caused by water stress. They state that irrigation has a positive effect on yield by reducing water stress, leads to improvements in product quality, and therefore irrigation is necessary for average yield (Kamber et al., 1993). Some other researchers supported this opinion and reported that Siirt pistachio

yielded better under irrigated conditions than dry conditions, and therefore Siirt pistachio should be grown under irrigated conditions (Arpacı et al. 1995; Aydın and Saltuk, 2018). However, it is necessary to be careful when watering on heavy soils that hold water. Do not let the water touch the root zone and do not over water, otherwise drying caused by soil pathogens will occur (Aydın and Ünal, 2021).

## **2. PISTACHIO PESTS AND DISEASES**

### **2.1. Pistachio Pests**

Many pests of pistachio cause significant yield loss. The most important ones in the Southeastern Anatolia Region are *Agonoscena pistaciae* Burckhardt and Lauterer, *Kermania pistacella* Ams. and *Capnodis* spp., (Anonim,2008).

*Agonoscena pistacia*; Nymphs feed by sucking the plant sap and form a sweetish substance. According to the density of the pest, the leaves turn yellow and fall and the tree weakens. *Kermania pistacella*; Larvae emerge from the eggs laid by the adult on the shoot tip and feed towards the stem by forming a gallery from the shoot. The leaves and fruit buds on these branches are fall. The larvae that enter from the heads of the fruit clusters form a gallery where the fruit is attached to the stem, causing the fruit to remain small and empty fruit formation. *Capnodis* spp.; Adults of this insect gnaw on leaves, petioles and bark of fresh shoots. At the same time, they leave their eggs under the bud eye, causing damage and drying of the bud eye. The main damage is caused by the larvae. They feed on the root and open galleries and cause the trees to dry out in a short time.

### **2.2. Pistachio Diseases**

Another important factor limiting the production and yield of pistachio is diseases. Important diseases seen in istachio are as follows; *Alternaria* late blight (*Alternaria alternata* (Fr.) Keissl., *Alternaria* spp), *Septoria* leaf spot (*Septoria pistacina* Allescher., *Septoria pistaciarum* Caracc., *Septoria pistaciae* Desmaz., *Pseudocercospora pistacina* Crous,Quadv.&Sarpkaya), Panicle and shoot blight (*Botryosphaeria dothidea*, *Diplodia seriata*, *Lasiodiplodia* sp., *Neofusicoccum* sp., *Neoscytalidium* sp.), *Verticillium* wilt (*Verticillium dahliae* Kleb), *Fusarium* rot root and wilt (*Fusarium solani*, *Fusarium proliferatum*, *Fusarium oxysporum*, *Fusarium redolens*, *Fusarium* spp.), *Phytophthora* root-crown rot (*Phytophthora citricola* Sawada., *Phytophthora capsici* Leonian., *Phytophthora citrophthora* (R. E. Sm. and E. H. Sm.) Leonian., *Phytophthora cryptogea* Pethybr. and Laff., *Phytophthora nicotianae* Breda de Haan var. *parasitica* (Dastur)

G. M. Waterhouse., *P. palmivorum.*, *Phytophthora sp.*). *Rhizoctonia* kök çürüklüğü (*Rhizoctonia solani* kuhn.) (Teviotdale et al., 2001).

**Alternaria late blight;** Leaf symptoms appear in late summer and appear on the leaf as circular lesions 3-7 mm in diameter, dark brown and black. The lesions then enlarge and cover the entire leaf. Infections in the leaf cause leaf blight and premature defoliation. On the fruit, it causes 1-1.5 mm diameter black lesions (Michailides, 2005).

**Septoria leaf spot;** The typical symptom of the disease is black spots that appear mostly on the upper part of the leaf and partly on the fruit peels. These necrotic spots contain black pycnids. Later, these areas enlarge and cover a part of the leaf. At the end of the season, these areas become chlorotic and necrotic. As the photosynthetic area is reduced in severely diseased leaves and as a result of defoliation, the trees become weak and the fruit remains hollow. Thus, the amount and quality of the product decreases (Aydin, 2021).

**Panicle and shoot blight;** This disease causes economic losses in pistachio, mostly in humid and irrigated regions. It causes flower and shoot death as a result of blight. Symptoms usually appear as dark lesions on shoots, petioles, and leaves. Then it passes into clusters. In unfavorable conditions, it appears as needle-sized, black round spots on the fruit surface in midsummer (Michalides and Morgan, 2004).

**Verticillium wilt;** The disease causes rapid drying and death of one or more branches or the entire tree, usually in early summer. The first symptoms are yellowing of the leaves on the branches. Leaf shedding causes a gradual loss of vitality and reduced growth and yield. Pistachio trees can be attacked at any age and are more susceptible to disease in orchards where previously susceptible hosts such as tomatoes, cotton, melons or peppers were grown.

**Fusarium rot root and wilt;** *Fusarium* species cause drying out as a result of root rot and wilt in pistachios, especially in young trees (Nouri et al 2018; Aydın, 2019). These species are soil pathogens. They can also be carried by seeds. As a result of blockages in the transmission bundles and the toxins they secrete, they prevent water and nutrient uptake from the soil. and causes drying in the following periods.

**Phytophthora root-crown rot;** *Phytophthora* species, along with pistachio infect many hosts. It usually affects the underground parts of the plants and causes root and root rot in perennial plants,. Gum formation is seen in the trunk parts with the disease. In pistachio trees, dieback occurs from top to bottom depending on the severity of the disease that occurs in the root and root collar (Aydın and Bağış, 2019).

**Rhizoctonia root rot;** The fungus is a soil and seed-borne pathogen. The fungus can survive as a mycelium in plant tissues that decompose in the soil. Suitable conditions for disease development are cool and moist soils. Canker sores with red-brown spots occur on the stems and roots of infected plants caused by the fungus. It has been reported in Iran that *R. solani* AG4 causes wilt, root and root rot diseases in many pistachio saplings (Ashkan and Abusaidi, 1995; İlkhani et al., 2011). In another study conducted by Aydın and Ünal (2021), in Siirt province in the Southeastern Anatolia Region of Turkey, in the pathogenicity test, the most virulent isolate was Rs2 with 93.75% disease severity. It was determined that this isolate caused the seedlings to dry completely and *Rhizoctonia solani* AG-4 in the anastomosis group.

## **CONCLUSION**

There are many abiotic and biotic factors that limit the production of pistachios. Adverse environmental conditions during fertilization periods have a direct effect on yield. For example, climatic conditions such as excessive precipitation and temperature can negatively affect fertilization, as well as cause an increase in diseases and pests. The selection of varieties and rootstocks is important for a healthy and productive orchard. In modern pistachio cultivation, it is necessary to establish an orchard with male and female varieties suitable for the region. In addition, there should be a sufficient number of male trees at suitable planting intervals in the orchard. Another important issue is irrigation and fertilization. Irrigation should be done in a balanced way, not excessive. After the soil and leaf analyzes are made, the determined amount of nutrients should be applied to each tree properly. Pistachio has a large number of pathogens and pests. Diseases and pests caused by these must be diagnosed in a timely manner and precautions must be taken. Otherwise, epidemics occur from time to time.



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**PAMUKTA (*Gossypium* spp.) FİDE KÖK ÇÜRÜKLÜĞÜ VE SOLGUNLUĞA NEDEN OLAN ETMENLER**

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**ÖZET**

Ilıman ve tropik bölgelerde iyi gelişim gösteren pamuk bitkisi ülkemizde önemli bir tarımsal potansiyele sahip önemli bir endüstri bitkisidir. Diğer kültür bitkilerinde de olduğu gibi hastalık ve zararlılardan etkilenmekte ve bunlara karşı zamanında gerekli önlemlerin alınmaması durumunda kalite, verim düşüklüğü yanı sıra bitkinin tamamen kurummasına neden olur. Pamukta ilk dönemlerde hastalığa neden olan en önemli faktörler arasında fide kök çürüklüğü hastalıkları gelmektedir. Bitkinin daha ileri dönemlerinde ise solgunluk hastalıkları da görülebilmektedir. Fide kök çürüklüklerine ve solgunluğa neden olan birçok patojen vardır. Bunlar; *Rhizoctoniasolani*, *Pythium*spp., *Fusarium* spp., *Thielaviopsisbasicola*, *Alternariaspp.*, *Aspergillus*spp., *Verticilliumdahliae*'dir. Bu patojenler bazen çıkış öncesi bitkiyi etkileyerek çıkışını engellemekte bazen de bitki fide dönemindeyken kök boğazında lezyonlara ve bitkinin devrilip ölümüne neden olurlar. Bu aşamalarda tarlada yer yer boşluklar oluştuğu için yeniden ekim yapmak gerekir. Sonuçta ekonomik açıdan da zarar oluşturmaktadır. Ayrıca bitkinin iletim demetlerini tıkatıp besin ve su alımını engellediğinden dolayı solgunluğa neden olurlar. Bu çalışmada pamuk tarımı yapılan alanlarda sorun olan patojenler, bu patojenlerin bitkiye verdiği zararlar ve mücadeleler literatür bilgilerine dayanarak verilmiştir.

**Anahtar Kelimeler:** Pamuk(*Gossypium*spp.), fide kök çürüklüğü etmenleri (*Fusarium*spp., *Rhizoctoniaspp.*, *Thielaviopsis basicola*, *Pythium*spp., *Verticillium*spp.), mücadelesi

**PATHOGENS CAUSED BY ROOT ROT AND WILT OF SEEDLINGS IN COTTON  
(*Gossypium* spp.)**

**ABSTARCT**

The cotton plant, which develops well in temperate and tropical regions, has an important agricultural potential in our country, but it is also an important industrial plant. As with other cultivated plants, it is affected by diseases and pests, and if necessary measures are not taken against them in a timely manner, it causes a decrease in quality and yield, as well as a complete drying of the plant. Seedling root rot diseases are among the most important factors causing disease in cotton in the early stages. In the latter stages of the plant, diseases can also be seen. There are many pathogens that cause seedling root rot and wilt. These; *Rhizoctonia solani*, *Pythium* spp., *Fusarium* spp., *Thielaviopsis basicola*, *Alternaria* spp., *Aspergillus* spp., *Verticillium* spp. These pathogens sometimes affect the plant before emergence and prevent its emergence, sometimes cause lesions in the root collar and death of the plant when the plant is in the seedling stage. At these stages, it is necessary to sow again as there are gaps in the field. As a result, it also causes economic damage. They also cause wilting because they block the vascular bundles of the plant and prevent nutrient and water intake. In this study, the pathogens that cause a problem in cotton farming areas, the damages of these pathogens to the plant and their struggle are given based on the literature.

**Keywords:** Cotton (*Gossypium* spp.), seedling root rot pathogens (*Fusarium* spp., *Rhizoctonia* spp., *Thielaviopsis basicola*, *Pythium* spp., *Verticillium* spp.), disease control

## GİRİŞ

Malvales takımına bağlı Malveceae familyasının *Gossypium* cinsine ait olan pamuk (*Gossypiumhirsutum* L.) bitkisi, çok değişik alanlarda kullanılan ve eski dönemlere dayanan lifi işlenen ilk endüstri bitkisidir (Anonim, 2006). Aynı zamanda yaygın ve zorunlu kullanım alanları ile insanlık için büyük ekonomik öneme sahip, üreticisi olan ülkeler için katma değer ve istihdam yaratan bir üründür (Majumdar et al.2020; Rehman et al.). Ilıman ve tropik bölgelerdeki 100'e yakın ülkede yaygın olarak yetiştirilen en önemli lif bitkilerinden biri olan pamuk için ideal hava sıcaklığı 21-37°C'dir. Toprağın yeterince süzek, kumlu killi ve organik madde açısından zengin olması önemlidir (Anonim, 2006). Hammadde olarak pamuk, işleme uygulamaları ile çırçır endüstrisi, liflerinin kullanımıyla tekstil endüstrisi, tohumunun kullanılmasıyla yağ ve yem endüstrisi, linterinin kullanılmasıyla da kâğıt endüstrisi gibi birçok endüstri tarafından kullanılan önemli bir endüstri bitkisidir. Petrol bazlı yakıtı alternatif olarak pamuk tohumundan elde edilen yağ ise biyodizel üretiminde hammadde olarak gün geçtikçe daha fazla kullanılmaktadır.

Pamuğun Dünya'da başlıca yetiştiği yerler ABD, Avustralya, Çin, Hindistan, Türkiye, bazı Afrika ülkeleri ve Orta Doğu'nun belli bölgeleridir (Datta, et al., 2020; Ozyigit ve Gozukirmizi, 2009; USDA, 2020a). Dünya pamuk ticareti göz önüne alındığında, 2020/21 itibarı ile Hindistan, ABD, Çin, Pakistan ve Brezilya gibi birkaç büyük üretici toplam dünya ihracatının yaklaşık yüzde 70'ini gerçekleştirmektedir. ICAC verilerine göre 2019/20 sezonunda Türkiye; dünyada pamuk ekim alanı bakımından 11. sırada, birim alandan elde edilen lif pamuk verimi yönünden 4. sırada, pamuk üretim miktarı yönünden 6. sırada, pamuk tüketimi yönünden 6. ve pamuk ithalatı yönünden de 5. sırada yer almaktadır (Anonim, 2020). Türkiye İstatistik Kurumu (TÜİK) verilerine göre Türkiye'de 2019/20 pamuk üretim sezonunda ekim alanları bir önceki yıla göre %8 oranında azalmış ve 478 bin ha olarak gerçekleşmiştir (TÜİK, 2019). Ekim alanları Güneydoğu Anadolu Bölgesi'nde 290 bin ha, Çukurova Bölgesi'nde 95 bin ha, Ege Bölgesi'nde 89 bin ha, Antalya'da ise 4 bin ha olarak verilmiştir. Türkiye'de 23 ilde pamuk üretimi yapılmakta ve yapılan üretimde ekim alanlarının %86'sını Şanlıurfa, Diyarbakır, Aydın, Hatay, Adana ve İzmir karşılamaktadır.

Pamuk, diğer kültür bitkilerinde olduğu gibi hastalıklara yakalanmaktadır. Hastalığa neden olan patojenlere karşı gerekli önlemler alınmadığı takdirde, bitkinin gelişmesi olumsuz ve bitki tamamen kuruyup ölebilir bu da verimi ciddi derecede düşürmektedir. Hastalıklar, konukçu bitki, patojen ve çevrenin bir etkileşimi sonucu ortaya çıkmaktadır. Şiddetli bir patojen, hassas

bir konukçu ve uygun çevre koşullarının olması durumunda, patojen yayılmaya ve hastalık belirtileri oluşturmaya başlamaktadır. Türkiye’de geniş ekim alanlarına sahip olan pamuk bitkisinde pek çok, fungal, bakteriyel ve viral hastalık türü bulunmaktadır. Bu hastalıklar;

#### Fungal Hastalıklar

- Pamuk Yaprak Leke Hastalıkları (*Alternariamacrospora*, *A.alternata*, *Mycospherellagossypina*)
- Pamuk Fide Kök Çürüklüğü Hastalıkları (*Fusarium* spp., *Pythium* spp., *Rhizoctoniasolani*, *Thielaviopsisbasicola*)
- Pamuk Verticillium Solgunluğu (*Verticilliumdahliae*)
- Siyah Kök Çürüklüğü (*Thielaviopsisbasicola*)
- Fusarium Solgunluğu (*Fusariumoxysporum*)
- Pamuk Antraknozu (*Glomerellagossypii*) (Anamorph: *Colletotrichumgossypii*)
- Pamukta Külleme Hastalığı (*Leveillulataurica*, *Oidiopsisgossypii*)
- Sclerotiorum Çürüklüğü (*Sclerotiumrolfsii*)
- Pamuk Cercospora Lekesi Hastalığı (*Mycospharellaareola*) (Anamorph: *Ramulariagossypii*)
- Pamuk Ascochita Yanıklığı Hastalığı (*Ascochytagossypii*)
- Kök Çürüklüğü (*Phymatotrichum omnivorum*)

#### Bakteriyel Hastalıklar

- Pamuk Bakteriyel Yanıklık Hastalığı (*Xanthomonascampestris* spv. *malvacearum*)

#### Viral Hastalıklar

- Pamuk Abutilon Mozaik Virüsü (AbutilonMosaicVirus)
- Pamuk Antosiyanin Virüsü (CottonAnthocyanosisVirus)
- Pamuk Yaprak Kıvrıcıklık Virüsü (CottonLeafCurlVirus)
- Pamuk Yaprak Benek Virüsü (CottonLeafMottleVirus)

Bu hastalıklar pamuk bitkisinde önemli derecede zarara neden olmaktadır. Bu hastalıkların en önemlilerinden biri de pamuk bitkisinde çıkış öncesi ve sonrası çökertene neden olan ‘fide kök çürüklüğü’ hastalığıdır (Şekil 1). Bu hastalık bitkide yıkıcı etki ve simptomlar meydana getirdiğinden dolayı ‘çökerten’ olarak da adlandırılır. Bu hastalığa toprak kökenli funguslar neden olmaktadır. Çoğu zaman bu funguslar tarafından enfekte edilmiş bitkiler çimlenip sağlıklı fide çıkışı olmasına rağmen birkaç gün içinde suda haşlanmış ve pörsümüş şekilde belirtiler gösterip kök boğazı bölgesinden devrilip ölürlür. (KirkpatrickandRothrock, 2001).

Fide kök çürüklüğü hastalığı etmenleri, *Rhizoctoniasolani*, *Pythium*spp.,*Fusarium*spp., *Thielaviopsisbasicola*, *Alternariaspp.*, *Aspergillus*spp. gibi patojenler pamuk üretiminde önemli ekonomik zarar yapmaktadır (Yılmaz, 2009).

Ülkemizde yapılan çalışmalar dikkate alındığında ise en yaygın ve en önemli fide kök çürüklüğü etmeninin *Rhizoctoniaspp.* olduğu diğer etmenlerin ise yer ve yıllara göre değişmekle beraber sırasıyla *Pythium*spp.,*Fusarium*spp., *Alternariaspp.*,*Colletotrichum*spp., *Thielaviopsisbasicola* olduğu bildirilmektedir (Karcılıoğlu, 1976; Saydam andQuereshi, 1979; Demir ve ark., 1999).



**Şekil 1.** Fide kök çürüklüğü hastalıklarının tarladaki görüntüsü

Pamukta hastalıklara neden olan bazı patojenler, zarar şekilleri ve mücadele yöntemleri aşağıda bazı literatür bilgileriyle birlikte verilmiştir.

### **1. *Rhizoctoniaspp.***

Tüm dünyada pamuk yetiştirilen alanlarda görülen en önemli kök çürüklük etmeni *Rhizoctoniaspp.*'dir(Koenning, 2004).İlk belirtiler yeni oluşmuş kökte görülür. Bitkiler toprak seviyesinde enfekte olur. Gövdeyi çepeçevre sararak çökük, kırmızımsı kahverengi lezyonlar oluşturur. Nemli koşullarda lezyonlar toprak seviyesinden bir kaç cm yukarıya kadar uzanabilir. Hafif enfeksiyonlarda bitki ölmeyebilir ve canlılığını sürdürebilir. Aşırı toprak neminin olduğu araziler, hastalığı teşvik eder.





**Şekil 2.**Pamuk fidelerinde *R. solani*'nin kök boğazında meydana getirdiği belirtiler

### **Mücadelesi**

Patojen toprak kökenli bir fungus olduğundan mücadelesi oldukça zordur. Bu zorluk hastalığa yol açan mikroorganizmanın özelliklerinden, yaşam şeklinden, toprak rizosferinde bulunan etmen dışındaki mikrobiyalpopülasyonların çeşitliğinden veya konukçuya ait özelliklerden ve toprağın fiziksel ve kimyasal özelliklerinden kaynaklanmaktadır (PageandCraddock 1965). Hastalığa karşı sağlıklı materyal kullanma, hastalıklı bitkilerin buldukları ortamdan uzaklaştırılması, uygun yetiştirme şartları gibi kültürel mücadele yöntemlerinin, bulaşık alanlarda, etkinliğinin sınırlı olduğu bilinmektedir. Bu nedenle solarizasyon gibi farklı mücadele yöntemlerinin etkisini ortaya koyan araştırmacılar yalnız başına bu mücadelenin etkin bir koruma sağlamayacağını, bu mücadele yöntemi ile birlikte, antagonist mikroorganizma veya kimyasal mücadele uygulaması gerektiğini belirtmişlerdir (Yücel 1989).Kimyasal mücadele olarak uygulanan tohum ilaçlamasında kullanılan Metalaxyl-M 25 g/L+Fludioxonil 10 g/L ve Carboxin 205,9 g/L+Thiram 205,9 g/L'nin 600 g/100 kg tohum dozu çökerten hastalığına neden olan fungusların yaygınlıklarına göre ümitvar sonuçlar elde edilmiştir. (Yılmaz ve Tosun 2019).

### **2.Pythium spp.**

Özellikle düşük sıcaklıklarda ve toprak neminin yüksek olduğu koşullarda tohum çürüklüğüne ve çıkış öncesi çökertene neden olur (Koening, 2004). Aynı zamanda etmen, fide gövdesini (hipokotil) toprak seviyesinden enfekte ederek çıkış sonrası çökertene de neden olabilir(Şekil 3). Hafif enfeksiyonda *Pythium* ile enfekteli bitkiler canlılığını sürdürebilir fakat yeterli gelişme gösteremez ve yapraklarda kloroz belirtileri gösterir.



**Şekil 3.** *Pythium* spp.'nin fidelerdeki zarar şekli

### **Mücadelesi:**

Drenajı kötü olan ve su birikintilerinin olduğu alanlar bu patojenlerin sebep olduğu hastalıklar için elverişlidir. Bu yüzden Oomycetes grubunun sebep olduğu hastalıkların olduğu alanlarda toprağın aşırı su tutması engellenmelidir. Bunun yanı sıra çeşit seçimi de oldukça önemlidir. Bu nedenle hastalığa karşı dayanıklı çeşitler kullanılmalıdır. Bu etmenler toprak patojenleri olduklarından dolayı kimyasal mücadeleleri zor ve uygulanan kimyasal mücadeleye karşı dayanıklılık oluşturma riskleri yüksektir.

### **3. *Thielaviopsis* spp.**

Düşük sıcaklık ve nemin yüksek olduğu koşullarda, killi ağır topraklarda çıkış sonrası çökertene neden olur (Koenning, 2004). Özellikle fide gövdesinin (hipokotil) toprak seviyesinin hemen altındaki kısmı hafifçe şişer, çürür ve siyah bir renk alır. Hastalığa siyah çürüklük ismi de verilmektedir. Fideler gelişerek bitkiler ileri devrede enfekte olduklarında kök boğazında şişkinlik ve siyahlaşma şeklinde ortaya çıkan “collar-rot” adı verilen kök çürüklüğü hastalığına neden olur (Şekil 4).



**Şekil 4.** *Thielaviopsis basicola*'nın fide ve bitki köklerindeki zararı

### **Mücadelesi**

Kimyasal mücadele olarak toprak ilaçlaması önerilmekte fakat patojene etki göstermemesi durumunda kültürel mücadele en uygun yöntemdir. Patojenin konukçusu olmayan bitkiler ile münavebe yapılmalı, fazla nem tutacak olan sık dikimden kaçınılmalı ve fazla asitli olmayan humusça zengin ve iyi drenajlı toprakların seçilmesine özen gösterilmelidir.

### **4. *Fusarium* spp.**

Patojen, toprak kaynaklı bir fungus olup bitkinin iletim demetlerinin tıkanmasına, bitkinin solmasına ve çoğunlukla bitkinin ölümüne neden olmaktadır. *Fusarium* solgunluğuna genellikle konukçuya spesifik olan *F. oxysporum* neden olmaktadır.



**Şekil 5.** *Fusarium* spp.'nin tarladaki genel görüntüsü ve iletim demetlerindeki zararı

### **Mücadelesi**

Pamukta *Fusarium* solgunluğu hastalık etmenini toprak kökenli olmasından ve birçok konukçusunun bulunmasından dolayı mücadelesi zordur. Her ne kadar münavebe, sulama, gübreleme, toprak işleme ve ekim yöntemi gibi faktörlerin hastalık şiddetini azaltabileceği önerilse de kesin ve pratik bir mücadele yöntemi sağlanamamıştır. Bu nedenle en etkin çözüm yöntemi dayanıklı çeşit kullanılması veya duyarlı çeşitlerde dayanıklılığın teşvik edilmesi şeklindedir.

### **5. *Verticilliumdahliae***

Etmen 21-27 °C ve %60-70 nemde iyi gelişmekte, Ph isteği 7-9 arasında olup patojen bitkinin kök ucundan giriş yapar, hem hücre içi hem de hücreler arası ilerleyerek ksileme ulaşır. Bitkinin ksileminde koloniler oluşturarak su ve besin maddeleri ile birlikte bitkinin gövdesine ve yapraklarına taşınmasına ve iletim demetinin tıkanmasına neden olur (Garberand Houston, 1966). Sonuçta pamuk bitkisinde solma, pörsüme ve bitki ölümü şeklinde zararmeydana gelir. Bitkideki solma belirtileri alt yapraklardan yukarıya doğru yayılıp yaprakların damar aralıkları uçtan içe doğru sararır, sonra kuruyup esmerleşir. Hastalık erken dönemde başlamışsa bitkinin boyu kısa kalır, koza sayısında azalmalar olur ve kozalar küçük kalır. İletim demeti kahverengi nekrozlar meydana gelir. Gövde enine kesildiğinde ise iletim demetleri kahverengi noktalar halinde görülür (Anonim, 2000). Bu hastalıktan dolayı pamuk bitkisinin lif kalitesi ve teknolojik özellikleri olumsuz etkilenir (SchnathorstandMathe, 1966).



**Şekil 6.** *Verticillium* spp.'nin bitkinin iletim demetinde ve yapraklardaki zararı

### **Mücadelesi**

*Verticilliumdahliae*, toprakta ve bitki artıkları üzerinde mikrosklerot, hif, misel ve konidi gibi yapılar oluşturup topraktaki varlığını 20 yıldan fazla sürdürebilir (Garber et al., 1996). Bu

nedenle hastalıkla mücadelede kimyasal mücadele, kültürel önlemler ve biyolojik mücadele gibi mücadele şekillerinin yanı sıra dayanıklı çeşitler üzerinde durulmuştur. Fungisit uygulamaları ekonomik olarak oldukça pahalı ve yeterince etkili olmamasından dolayı tercih edilmeyen bir yöntemdir. Bu yüzden geleneksel mücadele yöntemlerini destekleyici olarak alternatif mücadele yöntemlerin kullanılması son yıllarda araştırma konuları arasında yerini almıştır (Conway et al., 1983; Sezgin, 1985; Xiao et al., 1998). Bu hastalığın kontrolünde en etkili olabilecek yöntemlerden biri de dayanıklı çeşitlerin kullanımınıdır (El-Zik 1985, Gencer ve ark. 2001, Karademir ve ark. 2009).

## SONUÇ

Günümüzde tekstil ve tıbbi kullanımda girdi olarak kullanılan başlıca doğal lif, pamuk bitkisidir. Yenilenebilir bir doğal kaynak olan pamuk bu özellikleri ile doğal kaynaklar, sermaye ve iş gücü gibi ekonomik faaliyetlerin istihdamının sağlanmasıyla birlikte ekonomiye büyük bir katkı sağlayabilmektedir (Tokel, 2021). Fakat pamukta meydana gelen solgunluk ve çökerten hastalıkları pamuk ekimi yapılan alanlarda sık rastlanan olumsuz durumlardandır. Hastalığa neden olan fungal patojenler pamuk yetiştiriciliği yapılan alanlarda önemli derecede zarara neden olmaktadır. Çökertene ve solgunluğa neden olan bu hastalık etmenleri, önlem alınmadığı takdirde ve hastalığın epidemiyi yaptığı koşullarda üreticilerin çoğunlukla tarlayı kaldırıp yeniden ekim yapmak zorunda kalmasına ve hastalık şiddeti yeniden ekimi gerektirecek seviyede olmadığı zamanlarda ise fide eksikliğinden dolayı tarlada yer yer boş alanların kalmasına neden olmaktadır. Aşırı sulama, yağmurlu ve bulutlu havalar, yani genel olarak yüksek nem, çökerten hastalığının zararını artırmaktadır. Ancak çökerten etmenlerinden *Rhizoctonia* spp.'nin düşük toprak neminde de gelişebildiği bilinmektedir. Genel olarak bu toprak patojenleri ile mücadelede alınan kültürel önlemlerde çimlenme kapasitesi yüksek, sertifikalı tohumluk kullanmak, erken dönemde soğuk ve ıslak topraklarda ekim yapılması zorunlu ise drenajı iyi yapılmış tohum yataklarına ekim yapılmalıdır. Aynı zamanda derin ekim yapmaktan kaçınılmalı ve toprağı kuru tutarak hastalık etmenlerinin çoğalmasına engel olan özellikle hububat gibi bitkilerle ekim nöbeti uygulanmalı. Bunların yanı sıra uygulanacak olan kimyasal mücadele de ise tohum ilaçlaması yapıldıktan sonra ekim yapılması önerilmektedir.

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**INSTRUMENTS OF NEW AUTHORITARIANISM: WEAKENING INSTITUTIONS  
AND DEPENDENT MEDIA**

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**ABSTRACT**

Nowadays, new types of authoritarianism are emerging. There are several factors in the emergence of new types of authoritarianism. In this study, I will try to explain what instruments are effective in the emergence of new forms of authoritarianism in the 21st century. Thus, I will try to present an analysis of how authoritarianism has become possible today. In this direction, I will draw attention two points. First, I will draw attention to the construction of dependent media. One of the most fundamental pillars of modern democracy has been the independent media. The media enables individuals to act rationally by providing the flow of information to the society, thus, it functions as both surveillance and control over the power. However, especially since the beginning of the 21st century, the independence of the media has begun to weaken significantly and to be replaced by the dependent media. Media control became an important instrument in the emergence of new versions of authoritarianism. Second, I will draw attention to the weakening of institutions. Nowadays, although many countries have formally independent institutions, their capacity to act as checks and balances is significantly limited. In countries with authoritarian tendencies, the sovereigns try to maintain their power with informal patterns by limiting the functions of democratic institutions. This effort takes a concrete form in cases such as partisanship in employment, buying or stealing votes in elections.

**Key Words:** New Authoritarianism, Dependent Media, Weakening Institution

## **YENİ OTORİTERİZMİN ENSTRÜMANLARI: ZAYIFLAYAN KURUMLAR VE BAĞIMLI MEDYA**

### **ÖZET**

Günümüzde otoriterizmin yeni türleri ortaya çıkmaktadır. Otoriterizmin yeni türlerinin ortaya çıkmasında birtakım faktörler söz konusudur. Bu çalışmada, 21.yy'da otoriterizmin yeni formlarının ortaya çıkmasında etkili olan enstrümanların ne olduğunu izah etmeye çalışacağım. Böylelikle otoriterizmin günümüzde nasıl mümkün hale geldiğinin bir analizini sunmaya çalışacağım. Bu doğrultuda, otoriterizmi günümüzde mümkün hale getiren mekanizmalardan en önemlileri olarak gördüğüm iki noktaya değineceğim. İlki, bağımlı medyanın inşasıdır. Modern demokrasinin en temel dayanaklarından biri bağımsız medya olmuştur. Medya topluma bilgi akışını sağlayarak bireylerin rasyonel bir şekilde hareket etmesine imkân verir, böylece iktidar üzerinde hem gözetleme hem de denetleme olarak bir işlev görür. Ancak özellikle 21.yy'ın başlangıcından itibaren medya bağımsızlığı önemli ölçüde zayıflamaya ve yerini bağımlı medyaya bırakmaya başladı. Medyanın kontrolü de otoriterizmin yeni versiyonlarının ortaya çıkmasında önemli bir enstrüman haline geldi. İkincisi, kurumların zayıflamasıdır. Günümüzde pek çok ülke formal olarak her ne kadar bağımsız kurumlara sahip olsa da bu kurumların kontrol ve denge mekanizması olarak hareket etme kapasitesi önemli ölçüde sınırlıdır. Otoriterizm eğilime sahip ülkelerde egemenler demokratik kurumların işlevlerini sınırlayarak, enformel kalıplarla iktidarını sürdürme çabasıdadır. Bu çaba da istihdamda yandaşlık, seçimlerde oy satın alma ya da çalma gibi durumlarda somut bir forma bürünmektedir.

**Anahtar Kelimeler:** Yeni Otoriterizm, Bağımlı Medya, Zayıflayan Kurumlar

## **INTRODUCTION**

In the first decade of the 21st century, a new tendency began to emerge that had become an almost global form: authoritarianism (Bieber, 2020). The old authoritarianism started to appear on the stage of history with its new forms. Re-emerging on the stage of history, this authoritarianism challenges democracy. This authoritarian challenge primarily seeks to keep democracy under control. Going a step further, as Diamond et al. (2016: 4) point out, the extent of authoritarian challenge is not only about keeping democracy under control, but also includes the process of authoritarianism becoming a dominant regime, overshadowing democracy in many countries.

The re-emergence of authoritarianism in the 21st century and its acceptance in many parts of the world can be explained by the structural change in the global economic and political system, as stated by Kouskas and Gökay (2019). The crisis of democracy in Europe and many other regions and the tendency towards authoritarianism as a direct result of this crisis are the result of structural changes in the global system.

When we look at the history of the modern world system, the world economy has always been in a hegemonic cycle. The center of the global economy in the modern world system, whose roots go back to the Italian City States in the 14th century (Arrighi, 2020) and whose beginning was the Netherlands in the 17th century, transferred to the England in the 19th century and to the United States in the 20th century (Wallerstein, 2012). Nowadays, we are in a new shift in the hegemonic structure of the world economy. In the modern world system, which is in a continuous cycle, the center of the global economy is shifting from the Americas to the East and Asia. As Kouskas and Gökay (2019: 17) states

In 2010, four of the top five economies in the world were still from the West (the USA, Japan, Germany, and France); from the Emerging World only China made the grade, coming to the second position. By 2050, four of the top five economies will come from the Emerging World (China, India, Brazil, and Russia) and only the USA will make the cut ranking second, and its economy will be half the size of China's.

Countries like China and Russia have authoritarian qualities. The rise of new actors which have authoritarian characteristics also provides legitimacy to the authoritarian tendencies of the sovereigns in many parts of the world. This rise of countries with a tendency towards authoritarianism such as China and Russia create an international support for their authoritarian regimes for the sovereigns in various countries. Especially when we consider this shift in the

world economy, this tendency of authoritarianism also begins to be embraced to a certain extent voluntarily.

In the re-emergence of authoritarianism, in addition to international external actors, there are also some factors. Now, I will try to explain what are the instruments that are effective in the emergence of new forms of authoritarianism in the 21st century. Thus, I will try to present an analysis of how authoritarianism has become possible today. In this direction, I will draw attention to two of the mechanisms that make authoritarianism possible today: dependent media and weakening institutions.

### **Dependent Media**

Many factors are effective in the re-emergence of authoritarianism. One of them is dependent media. To better understand the role played by dependent media in the re-emergence of authoritarianism, we first need to explain the importance of independent media in democratic regimes.

As Bieber (2020: 125) states, one of the main pillars of democracy is independent media. Independent media has three basic functions in democratic regimes. The media plays an important role in democratic regimes primarily thanks to its informing function. Thanks to this informing function, a free thought market is formed. It is thought that the free thought market will create a democracy culture based on free thought (Curran, 2014: 160-161). Thanks to the free thought market, the freedom to broadcasting emerges. The freedom of broadcasting also ensures that different perspectives take place in the public sphere, thus creating a wide network of information obtained from different and opposing sources (Curran, 2014: 161).

The second role of the media in democratic regimes is that it has a representative function. Media is a truly representative institution and an important partner of the management process (Curran, 2014: 150). According to Curran (2014: 151), in the market-based system, media owners must give what the people want if they want to keep their business, and this ensures that the media reflect the views and values of the people and act as their spokesperson.

The third and most important role of the media in democratic regimes is its power to keep the government under surveillance. As Curran (2014: 141) states, keeping the governments under surveillance is one of the most important dimensions of the democratic function of the media. The media perform an important public service in investigating and preventing the bad practices of public officials, so the media is seen as a counterbalance to the abuse of power over others (Curran, 2014: 141-142). The third function of the media causes the media to be seen as the

“fourth power”. As Erdogan (1999: 34) said, “with the concept of the fourth power, the media is given an independent quality that is the eyes and ears of the people in the democratic political system, represents the truth and the just, inspects the political power, and watches it.”<sup>93</sup>

Of course, this does not mean that the media is completely independent in democratic regimes. Even in the most democratically developed societies, the media are not completely independent. However, when compared to the authoritarian regimes that have started to re-emerge today, independent media are much more common in democratic regimes. In authoritarian regimes, the media is created in line with the official ideology of the political power and is under the control of the political power (Atabek, 2002: 233). Therefore, in authoritarian regimes, the media has lost its independence and has become dependent on political power.

Dependent media plays a very important role in the spread of new authoritarian regimes both at the national and international level. As Diamond et al. (2016: 4-5) said, media initiatives such as Russia's Russia Today (RT) and China's China Central Television (CCTV) are among the reasons for the authoritarian rise in the global level. Each of these has a global reach. For example, as of 2013, CCTV has established seventy international offices, twenty in Africa and a dozen in Latin America; and it has broadcasted in local languages (Cooley, 2015). Similarly, Russia expanded the reach of RT, broadcasting in 34 countries on five continents as of 2014, thus increasing its international media presence (Colley, 2015: 60). As of 2015, RT has reached 600 million people worldwide and has broadcasted in English, Arabic, German, and Spanish (Pomerantsev, 2015: 44-45). Thus, authoritarian countries such as Russia and China, by using their power in the media at the international level, led to the spread and acceptance of their authoritarian tendencies, and tried to lower the prestige of the West and the USA and thus to question the acceptability of democracy.

At the national level, the role of the media in the tendency towards authoritarianism is clearly seen in the words of Igor Yakovenko: "If Stalin was 80 percent violence and 20 percent propaganda, then Putin is 80 percent propaganda and 20 percent violence" (Pomerantsev, 2015: 40). Indeed, after Putin took the presidency in Russia, his first move towards authoritarianism was to control the media. The reconstructed media depended entirely on political power. For example, Surkov determined what the main news of the week should be at the meetings where

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<sup>93</sup> To make what is meant by the concept of the fourth power more obvious, we need to briefly talk about what the first three powers are. In the 17th century monarchies, the first three powers were kings, aristocrats, and third estate. With the capitalist political system, three powers have transformed into legislative power, executive power and judicial power (Erdogan, 1999: 33-34).

he met with the heads of major news channels every Friday and explained which political figures would be allowed on television (Pomerantsev, 2015: 40-41). Thus, governments in authoritarian regimes absolutely benefit from the dependent media.

### **Weakening Institutions**

Another instrument that makes authoritarianism possible is weakening institutions. Nowadays, although many countries have formally independent institutions, their capacity to act as checks and balances is significantly limited. In countries with authoritarian tendencies, the sovereigns try to maintain their power with informal patterns by limiting the functions of democratic institutions. In states with a tendency towards authoritarianism, the rule of law governed by independent institutions has left its place to the party state governed by informal patterns.

This situation manifests itself primarily in the area of employment. The safest and most prestigious employment in authoritarian regimes is in the public sector (Bieber, 2020: 111). Given the importance of working in a state-controlled job, the area of employment becomes a very important weapon for those who control parties and the state. In authoritarian states, the main criterion in employment is not qualification but partisanship, so many state officials remain loyal to the sovereigns out of fear that any change in management will endanger their jobs (Bieber, 2020: 113). The dependence of many working for the public administration thus provides a safe depository of support for ruling parties that provide employment for their members or supporters (Bieber, 2020: 113).

Secondly, this situation takes concrete form in the cases such as buying or stealing votes in elections. Transparency of elections is a sine qua non of democratic regimes. In this sense, transparency is not a delicacy, it is an inevitable necessity. However, in authoritarian regimes, governments can ignore the will of the people to expand their power. They do this especially by manipulating the election processes.

Elections can be stolen in many ways. As Merloe (2015: 83-85) states, election processes are not a one-day event; rather, it includes many components that occur over a long period of time and include a set of rights and responsibilities: state-controlled media must remain neutral, use of state resources must be equal, parties and candidates must compete freely, voting process must be independent, vote counting process must be transparent. Violation of even one of these components of a democratic election is sufficient to steal an election.

What happens in the party state, where independent institutions are weakened, is a violation of some or even most of the above-mentioned components. In authoritarian regimes, the

impartiality of the media is not possible because the media is completely under the control of the government. Where the media is under the control of the government, an environment where parties and candidates can compete freely is not possible. At a time when the media is one of the most effective ways to reach the society, the fact that the opposition candidates have little or no means to express themselves is one of the important features of authoritarian regimes (Merloe, 2015)

## **CONCLUSION**

Certain time periods throughout history have been represented by certain events. The period of 1930-45 was the years of fascism; The period of 1950-70 was the years of welfare state; the period of 1975-2000 was the years of third wave of democracy was experienced. When it comes to the first twenty years of the 21st century, one of the names that can best describe today's world is the rise of authoritarianism. Especially since the 2010s, we have been witnessing the rise of authoritarianism on a global scale. There are many reasons for the resurgence of authoritarianism. In this study, we drew attention to only two points. Dependent media and weakening institutions. Weakening institutions play a crucial role in spreading of authoritarian tendencies. Where each institution fulfills its duty to the full, processes leading to a tendency towards authoritarianism are far less likely to arise. The weakening of institutions paves the way for an context that allows those in power to act as they please. Where institutions are weakened and the practices of those in power are not controlled by any institution, the tendency to authoritarianism inevitably arises. The dependent media, on the other hand, tries to legitimize this authoritarian tendency. Thus, both weakened institutions and dependent media play a crucial role in the re-emergence of authoritarianism.

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**SIİRT KURTALAN KOÇPINAR KİLİNİN YAPISAL ANALİZİ VE KİL İLE  
KADMIYUM (II) İYONUNUN ADSORPSİYONUN İZOTERM ANALİZİ**

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**ÖZET**

Bu çalışmada Siirt/Kurtalan ilçesi Koçpınar köyünden alınan kil adsorplayıcı olarak kullanılmıştır. Temel amaç olarak sulu çözeltilerden kadmiyumun adsorpsiyonla giderimi hedeflenmiştir. Kilin karakterizasyonu için ise, Taramalı Elektron Mikroskobu (FE- SEM), X-ışınları kırınımı (XRD), Enerji Dağılımlı X-ışınları spektroskopisi (EDX), X-ışınları Floresans Spektrometresi (XRF), Yüzey Alanı Ölçümü ( Brunauer, Emmet ve Teller -BET) ve Termogravimetrik Analizleri (TGA) yapılmıştır. Çalışma 318 K sıcaklığında, çalkalayıcı su banyosunda gerçekleştirilmiştir. Elde edilen veriler Freundlich, Langmuir, Temkin, Elovich, ve Dubinin-Radushkevich adsorpsiyon izotermine uygulanmıştır. Adsorpsiyon uyum derecesinin belirlenmesinde regresyon analizi olarak en küçük kareler yöntemi kullanılmıştır. Verilerin adsorpsiyon modellerine uyum derecesinin Freundlich <Dubinin- Raduschkevich <Langmuir <Temkin olduğu görülmüştür.

**Anahtar Kelimeler:** Adsorpsiyon, kil, izoterm, kadmiyum, termodinamik, Temkin izotermi

**SIİRT KURTALAN STRUCTURAL ANALYSIS OF KOÇPINAR CLAY AND  
ISOTHERM ANALYSIS OF CADMIUM (II) ION ADSORPTION BY THE CLAY**

**ABSTRACT**

In this study, clay taken from Koçpınar village of Siirt/Kurtalan district was used as an adsorbent. The main aim is to remove cadmium from aqueous solutions by adsorption. For the characterization of clay, Scanning Electron Microscopy (FE-SEM), X-ray diffraction (XRD), Energy Dispersive X-ray spectroscopy (EDX), X-ray Fluorescence Spectrometer (XRF), Surface Area Measurement (Brunauer, Emmet et al. Wires -BET) and Thermogravimetric Analysis (TGA) were performed. The study was carried out in a shaking water bath at 318 K. Data obtained from Freundlich, Langmuir, Temkin, applied to Elovich, and Dubinin-Radushkevich adsorption isotherms. Adsorption the least squares method as a regression analysis in determining the degree of fit was used. It was seen that the degree of fit of the data to the adsorption models was Freundlich < Dubinin- Raduschkevich < Langmuir < Temkin

**Keywords:** Adsorption, clay, isotherm, cadmium, thermodynamics, Temkin isotherm

## 1. GİRİŞ

Çevre ile etkileşim halinde olan insan, bu etkileşimden bazen zarar görebilmektedir. Çünkü doğayı bilinçli veya bilinçsiz bir şekilde kirletmektedir. Doğaya bırakılan bu katı, sıvı veya gaz atıkları toprağa, suya ve havaya karışarak doğayı kirleterek, canlılar üzerinde birçok olumsuzluğa neden olmaktadır [1].

Özellikle nüfusun hızla artması neticesinde fosil yakıtların aşırı kullanılması, yaşamsal standartların arttırılması gibi aktiviteler küresel ısınmayı tetikleyen olayların başında yer almaktadır. Küresel ısınmaya bağlı olarak gözlemlenen doğal afetler tüm canlıların yaşam koşullarını zorlaştırmaktadır. Küresel ısınmanın bu şekilde sürmesi durumunda 40-50 yıl sonra tarım arazisi kalmayabileceği gibi insanların yaşam alanları da kısıtlanacaktır [2].

Ancak doğanın kirletilmemesi büyük önem arz etmekle beraber, kirlenmiş olan çevrenin de etkin bir şekilde doğru yöntemlerle temizlenmesi ve gerekli önlemlerin alınması zorunlu hale gelmektedir. Çok eskiye dayanan ağır metal kullanımı, dünyada sanayinin ve teknolojinin gelişimi ile birlikte hızla artırmıştır [3]. Özellikle sulu ortamdaki kirleticiler dünya çapında kaygıya neden olmaktadır [4]. Bu yüzden içme suyu ile her türlü atık suyun bu kirleticilerden uzaklaştırılması çok elzem hale gelmiştir. Bu amaçla bilim insanları çeşitli araştırmalar yaparak pek çok yöntem geliştirmektedirler. Bu yöntemlerden en etkili olanlardan biride adsorpsiyon yöntemidir [5].

### 1.1. Adsorpsiyon:

Adsorpsiyon; bir fazdaki maddenin çıkartılıp bir başka fazdaki maddenin yüzeyinde biriktirilmesi olayı olarak tanımlanabilir. Yani atom ve moleküllerin, temas durumunda olan yüzeylerin çekim özelliğine bağlı olarak etkileşimi sonucunda birleşmesi işlemidir [6]. Bu nedenle Adsorpsiyon ile yüzey gerilimi arasında önemli bir ilişki vardır. Adsorpsiyon olayında maddenin hacmi değil yüzeyi önemli rol oynar. Çünkü moleküller arasındaki kuvvetlerin sınır yüzeyinde dengelenmemesi sonucunda meydana gelmektedir. Maddenin uzayda belirli yüzeylere sahip iki hali söz konusudur. Bunlar katı ve sıvı halleridir. Bu nedenle adsorpsiyonun gerçekleşmesi için yüzey temas alanları; sıvı-sıvı, katı-sıvı veya katı – gaz şeklinde yazılabilir. Bu yöntem kirleticileri uzaklaştırmak için kullanılan en yaygın yöntemlerden biridir [7]. Buradan yola çıkarak boşluklu ve tanecikli yüzeylerin adsorplama kapasitelerinin daha yüksek olduğu söylenebilir. Adsorpsiyon süreci, katının yüzeyi ile adsorplanan madde arasındaki denge kuruluncaya kadar devam etmektedir [8]. Bu süreç dört aşamalıdır. İlk önce sıvı olan maddenin içeriğinde bulunan madde, adsorban bölgesine doğru gider. İkinci aşamada adsorban,

sıvı film içerisindeki gözeneklere doğru gider. Üçüncü basamakta ise maddenin difüzyon süreci gerçekleşmekte, son olarak adsorpsiyon olayı gerçekleşerek süreç tamamlanmaktadır. Ayrıca adsorpsiyon işleminde, ortamda bulunan kirleticiler Van der Waals kuvvetlerinin etkisiyle adsorplayıcının yüzeyine tutunarak uzaklaştırılmasına ve adsorplayıcının devamlı kullanılmasına olanak sağlamaktadır.[9]. Adsorpsiyon olayı üç çeşittir [6]. Bunlar, fiziksel, kimyasal ve iyonik adsorpsiyonlardır. Örneğin gazın katı yüzeyindeki adsorpsiyonunu fiziksel veya kimyasal adsorpsiyon olarak sınıflandırmak mümkündür.

❖ **1.1.1. Fiziksel adsorpsiyon (fizisorpsiyon):**

Fiziksel adsorpsiyon atom veya moleküllerin zayıf bağlı olan, hidrojen veya Van der Waals bağı gibi kuvvetlerle bağlanması neticesinde oluşur. Adsorplanan bir molekülün adsorplayıcı ile etkileşime girmesi, adsorplanan molekülün yakınında bulunan adsorplayıcının atomları veya molekülleri ile ayrı ayrı etkileşmesinin toplamıdır şeklinde ifade edilmektedir [10]. Fiziksel adsorpsiyonda gözenek boyutu (hacmi) ve basınç ile sıcaklık önemli yer tutmaktadır [11].

❖ **1.1.2. Kimyasal adsorpsiyon (kemisorpsiyon):**

Kimyasal adsorpsiyonda adsorplanan ile adsorplayıcı arasında meydana gelen bağlar oldukça kuvvetlidir. Moleküller burada yüzeye valans kuvvetleri ile tutunmakta, fiziksel adsorpsiyonda ki Van der Waals kuvvetlerinden çok daha güçlü olan iyonik ve kovalent bağlarla bağlanmaktadır.

[8]. Kimyasal adsorpsiyon, kimyasal reaksiyonlarla gerçekleşmektedir. Bu nedenle bu adsorpsiyon çeşidi geri dönüşümsüz (tersinmez) olup, adsorplayıcı ile adsorplananın moleküllerinin kimyasal yapısını değiştirebilmektedir [12]. Şayet adsorpsiyonun enerjisi 40 kJ/mol den daha küçük ise; fiziksel daha büyük ise, kimyasal adsorpsiyon şeklinde ifade edilmektedir [13].

❖ **1.1.3. İyonik adsorpsiyon**

İyonik adsorpsiyon, elektrostatik çekim kuvvetlerinin etkisi nedeniyle, yüzeyde bulunan yüklü bölgelere iyonik özellikleri olan adsorplananın tutunması şeklinde ifade edilebilir. Burada en önemli unsur adsorplanan ile adsorplayıcının iyonik güçleri ve moleküllerin büyüklükleridir. Fiziksel adsorpsiyon, kimyasal adsorpsiyon ve iyonik adsorpsiyon arasında çok keskin sınırlar mevcut değildir. Bu üç adsorpsiyonun aynı anda ya da art arda görülmesi mümkün olabilir [14].

**1.2. Adsorpsiyon İzotermi:**

Adsorpsiyon izoterm çalışmalarının temel nedeni, adsorplayıcı ile adsorplanan arasındaki ilişkiyi ortaya koymaya çalışarak, adsorplayıcının adsorplama kapasitesini belirlemektir.

Bunun dışında, adsorpsiyon yüzey alanı, adsorpsiyonun enerjisi ve adsorpsiyon olayının ne şekilde gerçekleştiği hakkında bilgi edinmektir. Bu amaç doğrultusunda yapılan deneysel çalışmaların verileri ışığında birçok denklem türetilmiştir. Bunlarda en yaygın olanları, Langmuir, Freundlich, Temkin ve Dubinin-Radushkevich ve Bruanur-Emmet-Teller (BET) İzotermidir [8], [26].

#### ➤ **1.2.1. Langmuir İzoterm Modeli**

İlkönce katı-gaz faz adsorpsiyonunu tanımlamak amacıyla tasarlanan Langmuir adsorpsiyon modeli, çeşitli adsorplayıcıların adsorpsiyon kapasitesini belirlemek ve karşılaştırmak için de kullanılmaktadır. Açıkçası Langmuir izotermi, adsorpsiyon ve dinamik dengenin (desorpsiyon) göreceli oranlarını dengeleyerek yüzeyin kaplama miktarını açıklamaktadır. Burada adsorpsiyon, adsorplayıcının açık olan yüzeyinin fraksiyonu ile orantılı, ancak desorpsiyon kaplanmış olan adsorplayıcının yüzeyinin fraksiyonu ile orantılıdır. Langmuir denklemi aşağıdaki lineer formda yazılabilir [15-16].

$$\frac{C_e}{q_e} = \frac{1}{q_m K_e} + \frac{C_e}{q_m} \quad (1)$$

Burada  $q_e$  (mg/g), adsorplayıcının birim ağırlığı başına adsorplanan madde miktarını,  $C_e$  ise, (mg/L) litre başına adsorpsiyon işleminin bitiminde artı kalan madde miktarını ifade etmektedir.

#### ➤ **1.2.2. Freundlich İzoterm Modeli**

İkinci model olan Freundlich modeli, adsorbanın derişiminin artmasına bağlı olacak şekilde adsorpsiyonun da kapasitesi artmaktadır. Bu çalışmada  $\ln q_e$  'ye karşı,  $\ln C_e$  'nin grafiği çizilir.  $q_e$  ile  $C_e$  arasında logaritmik bir ilişki olduğunu söyleyen Freundlich'e göre;

$$\ln q_e = \ln K_F + \ln \frac{1}{n} C_e \quad (2)$$

Bu ifadede yer alan  $\ln q_e$  nin,  $\ln C_e$  ye karşı çizilen grafiğin eğrisi bir doğru olacaktır.

$1/n$  ifadesi heterojenite faktörünü temsil ederken,  $n$  doğrunun eğimini ifade etmektedir. Ayrıca  $K_F$  ifadesi ise ekstrapolasyonu tanımlamaktadır [6].

#### ➤ **1.2.3. Temkin İzoterm Modeli**

Temkin ile Pyzhev 1940 yılları civarında, adsorpsiyonun enerjisinde meydana gelen düşüşün Freundlich'in belirttiği izotermdeki gibi üstel olmadığını, doğrusal halde olup bağıntısının da aşağıdaki gibi olduğunu ifade etmiştir [12].

$$q_e = RT/b(\ln AC_e) \quad (3)$$

$$B = RT/b \quad (4)$$

Eşitlik 4'ün Eşitlik.3'e uygulanması ile eşitliğin doğrusal hali şöyle yazılabilir:

$$q_e = B \ln A + B \ln C_e \quad (5)$$

Burada verilenlerden b değeri, adsorpsiyon ısıyla ilgili sabit olup ( $J \cdot mol^{-1}$ ) ve  $B = RT/b$  şeklinde ifade edilmektedir Bunun dışında b, Temkin izoterm sabitini, A ise denge bağlanma sabitini temsil etmektedir ( $L \cdot g^{-1}$ ). T ise mutlak sıcaklıktır (K). R ideal gaz sabitini temsil etmektedir. ( $J \cdot mol^{-1} \cdot K^{-1}$ ). Ayrıca, B ve A değerleri ise sırasıyla  $q_e$  ye karşı  $\ln C_e$  nin çizilen lineer grafiğinin eğim ve kesim noktasından hesaplanmaktadır.

#### ➤ 1.2.4. D-R (Dubinin-Radushkevich) İzotermi

Dubinin- Radushkevich adsorpsiyon işlevinin fiziksel ya da kimyasal olduğunu tespit etmek için izotermelerini geliştirmişler. Bu nedenle adsorpsiyonun kimyasal veya fiziksel olup olmadığını bu izoterm ile tespit etmek mümkündür. Doğrusallaştırılan D-R izoterm modeli 5 nolu bağıntıdaki gibidir.

$$\ln q_e = \ln q_m - \beta \epsilon^2 \quad (6)$$

Burada,

$q_e$  : Adsorplayıcının birim kütleinde tutunan adsorplanan iyonunun derişimini ( $mol/g$ ),  $q_m$  : adsorpsiyon kapasitesinin en yüksek değerini ( $mol/g$ ) ve  $\beta$  ise, Ortalama adsorpsiyon serbest enerjisi ile ilişkili olan aktiflik katsayısını temsil etmektedir ( $mol^2/J^2$ ) Ayrıca  $\ln q_e$ ' nin  $\epsilon^2$  ' ye karşı grafiğe geçirilmesiyle ,Y doğru denklemi elde edilmiş olur.

### 1.3. Termodinamik Hesaplamalar

#### 1.3.1. Ağır Metaller

Ağır metaller tam olarak tanımlanamayan, metalik ve açık renk özelliğine sahip tüm elementlerin genel ismidir. Bunlar geçiş elementleri olarak, periyodik cetvelde geniş yer tutmaktadırlar. Fiziksel açıdan ağır metal kavramı,  $5 g/cm^3$ 'den daha büyük özgül ağırlığa sahip ve atom numarası 20 den büyük olan metaller olarak ifade edilmektedirler. Ancak biyolojik açıdan ağır metal terimi çevre üzerinde olumsuz etki yapan, çevreyi kirleten ve yüksek toksisiteye sahip olan kirleticilerdir [17]. Toksik olanlar canlıların bünyelerinde biyobirikime sebebiyet verdiklerinden dolayı, insanlara, hayvanlara ve çevreye çok ciddi zararlar verebilmektedirler. Demir-Çelik fabrikaları, madencilik, otomotiv sanayi, kaplama sanayi, metal işlemleri, boya, petrol ve gübre gibi endüstriyel alanlar çevreye oldukça yoğun ağır metal salınımı yaparak, insan, hayvan ve bitkiler üzerinde vahim sonuçlar oluşturmaktadırlar [18]. İçme sularına karışarak doğrudan insan ve hayvanlara geçebilmekte, ayrıca kanalizasyon suları, endüstriyel atıklar ve tarımsal faaliyetler ile bitkilere, tüketilen besinler aracılığı ile dolaylı

yoldan insan ve hayvan vücuduna nüfuz etmektedirler. Bu nedenle ağır metallerin hem içme sularından hem de atık sulardan giderilmesi hayati öneme sahiptir [14].

### **1.3.2. Kadmiyum**

Simgesi Cd olan kadmiyum, akü, pil, elektrik ve seramik sanayinde kullanılan gümüşü renge sahip toksik ağır metallerden biridir. Çinko bileşikleri ile beraber doğada kadmiyum sülfür şeklinde bulunur [19]. Genellikle kadmiyum, çinko üretimi esnasında ayrılır. Çinko sülfat cevherlerinden elde edilen bazı çinko konsantrelerinin içerisinde %14 civarında kadmiyum bulunmaktadır. Bu element ekosistemimizdeki en tehlikeli ağır metal kirleticileri arasında olup, tüm canlı organizmalar için toksik yapıdadır. Arıtma çamuru ile fosforlu gübrenin uzun süre ve aşırı kullanılması nedeniyle Dünyanın birçok bölgesinde tarım arazileri kadmiyum birikimine maruz bırakılmaktadır. Dolayısıyla Kadmiyum toprak-bitki sistemindeki yüksek oranından dolayı rahatça besin zincirine dahil olabilmektedir. Bu yolla insan, hayvan ve bitki sağlığı yönünden tehlike saçabilmektedir. Bitkilerin aldığı kadmiyum, bitkinin bünyesinde birikerek, fotosentez, klorofil sentezi, protein sentezi, karbonhidrat ve azot metabolizması ve enzim aktivasyonu gibi pek çok metabolik aktivitenin bozulmasına sebebiyet verebilmektedir. Ayrıca, bitki bünyesinde artan kadmiyum verimin ve kalitenin düşmesine, buna bağlı olarak ta önemli ölçüde ürün kaybına yol açmaktadır. Özellikle son yıllarda artan seracılıkta, aşırı gübre kullanılarak yetiştirilen tarım ürünleri mega kentlerdeki ve metropollerdeki insanların, kadmiyum toksisitesinden kaçınmaları neredeyse imkânsız hale gelmektedir. Bu ağır metal ve bileşenleri hem karaciğerde hem de böbreklerde birikerek hipertansiyon, kemik erimesi, anemi ve akciğer kanseri gibi önemli hastalıklara neden olabilmektedir [20].

### **1.3.3. Kil**

Genel olarak kil, muayyen bir kristal bünyesine sahip, tabîî, toprağımsı, ince taneli, muayyen miktarda su katıldığı zaman plastikliği artan bir malzemedir. Killer genellikle karmaşık bir yapıya ve mineral içeriğine sahiptirler. Döküm, seramik, gıda, sondaj, petrol, plastik, kâğıt, dolgu ve ilaç gibi birçok endüstri alanında kullanılmaktadır [21]. Killer, mineral yapıları ve kimyasal bileşik yönünden farklıdırlar bu nedenle hangi endüstri alanında kullanılacaksa o yönden en uygun olan tespit edilmesi ve ıslah edilmesi oldukça önemlidir [22]. Killer doğada bol miktarda bulunmakta ve genellikle mutfak gereçleri için çok eski medeniyetler tarafından kullanılan ham malzemelerdir [23]. İnsanoğlu eski zamanlardan bu yana, vücut sağlığı ve bazı hastalıkların tedavisi için killeri harici ya da dahili olarak kullanmaktadırlar. Günümüzde hala cilt tedavilerinde kullanılan kil, bilimsel açıdan da incelenmeye başlanmıştır.

Ancak bu konuda çok fazla bilimsel makale bulunmamaktadır [24]. Killer doğada yaygın şekilde ve bol miktarda bulunmaktadır. Adsorplayıcının doğada bol miktarda bulunması, kolay elde edilmesi ve uygun yüzey özellikleri taşıması gerekmektedir [25]. Killer bu özellikleri taşıdığı için, sayısız araştırmada [27-28]. adsorplayıcı olarak kullanılmaktadır.

## **2. MATERYAL VE METOT**

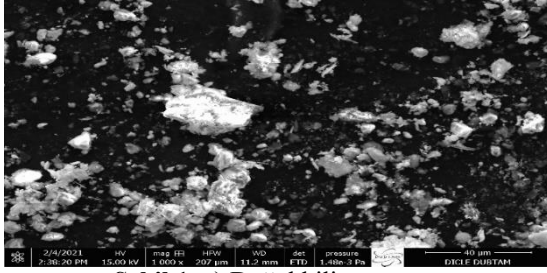
Bu çalışmada kullanılan kil Siirt ili Kurtalan ilçesi Koçpınar köyünden elde edilmiştir. Elde edilen orjinal kil 100 0C de 24 saat boyunca Memmert UN55 marka etüvde kurutulmuştur. Daha sonra desikatörde soğutulan kil, Yüzüncü Yıl Üniversitesi Bilim Uygulama ve Araştırma Merkezinde spektrumunun alınması için laboratuvara gönderildi. Nicolete is 10 FT-IR Spectrometre cihazında ATR ile 400-4000 cm-1dalga sayısında çekimi gerçekleştirilmiştir. Baysan marka olan çeneli kırıcıda kırma ve öğütme işlemi gerçekleştirilmiştir. Toz haline gelen numuneyi eleme işlemi, Protech marka analog ve frekans kontrollü elek sarsma cihazı ile ( -100+120), ( -120+140), (-140+170), (-170+200) ve (- 200) mesh" büyüklüğündeki eleklerle 5 ayrı tanecik boyutuna ayrılmıştır. Bunlardan (-120+140) mesh büyüklüğündeki kil çalışmada kullanılmıştır [6]. Bu sürecin yürütülmesi için sıcaklık, konsantrasyon, temas süresi, adsorbent dozajı incelenmiş olup, kinetik-İzoterm ve termodinamik hesaplamalara uyarlanmıştır [26]. Kilin karakterizasyonu için ise, FE- SEM (Alan Emisyonlu Taramalı Elektron Mikroskobu), XRD (X-Işını Difraktometresi), EDX, XRF, (X-Işınları Floresans Spektrometresi), BET (Yüzey Alanı Ölçüm Cihazı) ve TGA (Termogravimetrik Analiz) analizleri yapılmıştır.

## **3. BULGULAR VE TARTIŞMA**

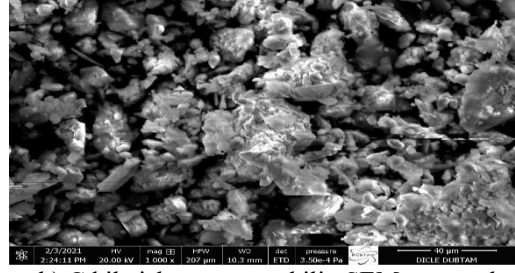
### **3.1. FE-SEM EDX Analizi**

Şekil 1.(a)' da verilen FE-SEM görüntüsü incelendiğinde doğal kilin daha çok dağınık formolojide olduğu, Cd kil etkileşiminden sonra alınan görüntüde ise şekil 1. (b) de görüldüğü gibi parlamaların oluştuğu ve metalin tutulduğu anlaşılmaktadır.

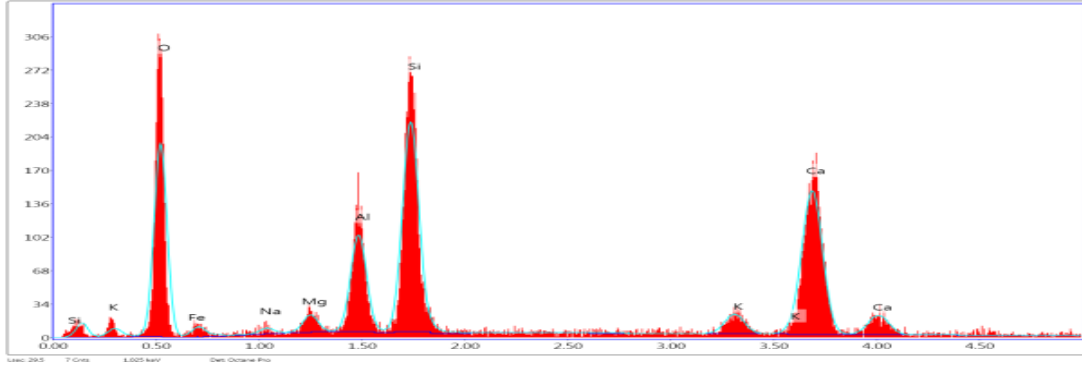




Şekil 1. a) Doğal kilin

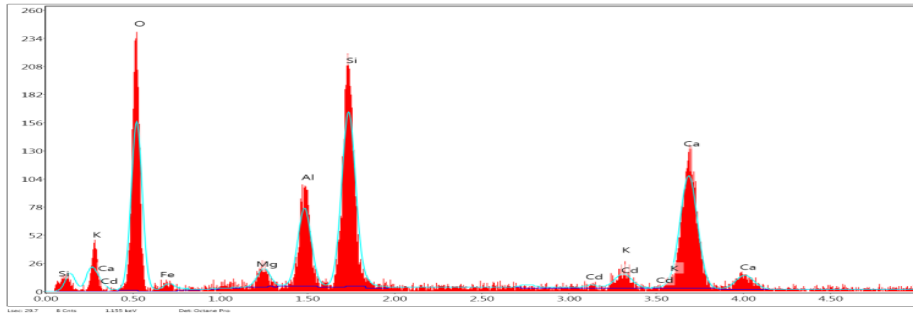


b) Cd ile işlem görmüş kilin SEM görüntüleri



Element	Wt %	Atomic %	Error %	Net Int.	Net Error %	K Ratio	Z	R	A	F
O K	51.84	69.15	10.91	103.09	2.27	0.1218	1.0607	0.9643	0.2216	1.0000
Fe L	5.04	1.93	27.50	3.08	19.28	0.0113	0.8333	1.1185	0.2706	0.9971
Na K	0.85	0.79	71.20	3.09	63.43	0.0025	0.9649	0.9912	0.3044	1.0042
Mg K	1.49	1.31	22.40	10.38	15.97	0.0067	0.9818	0.9990	0.4530	1.0075
Al K	7.06	5.58	8.93	62.35	3.89	0.0399	0.9458	1.0063	0.5925	1.0100
Si K	14.32	10.88	6.72	140.79	2.39	0.0923	0.9668	1.0132	0.6619	1.0074
K K	1.88	1.03	16.20	15.82	14.20	0.0167	0.8973	1.0424	0.9334	1.0630
Ca K	17.52	9.33	4.38	121.60	2.78	0.1548	0.9138	1.0473	0.9525	1.0152

Şekil 2. Doğal kilin EDX diyagramı



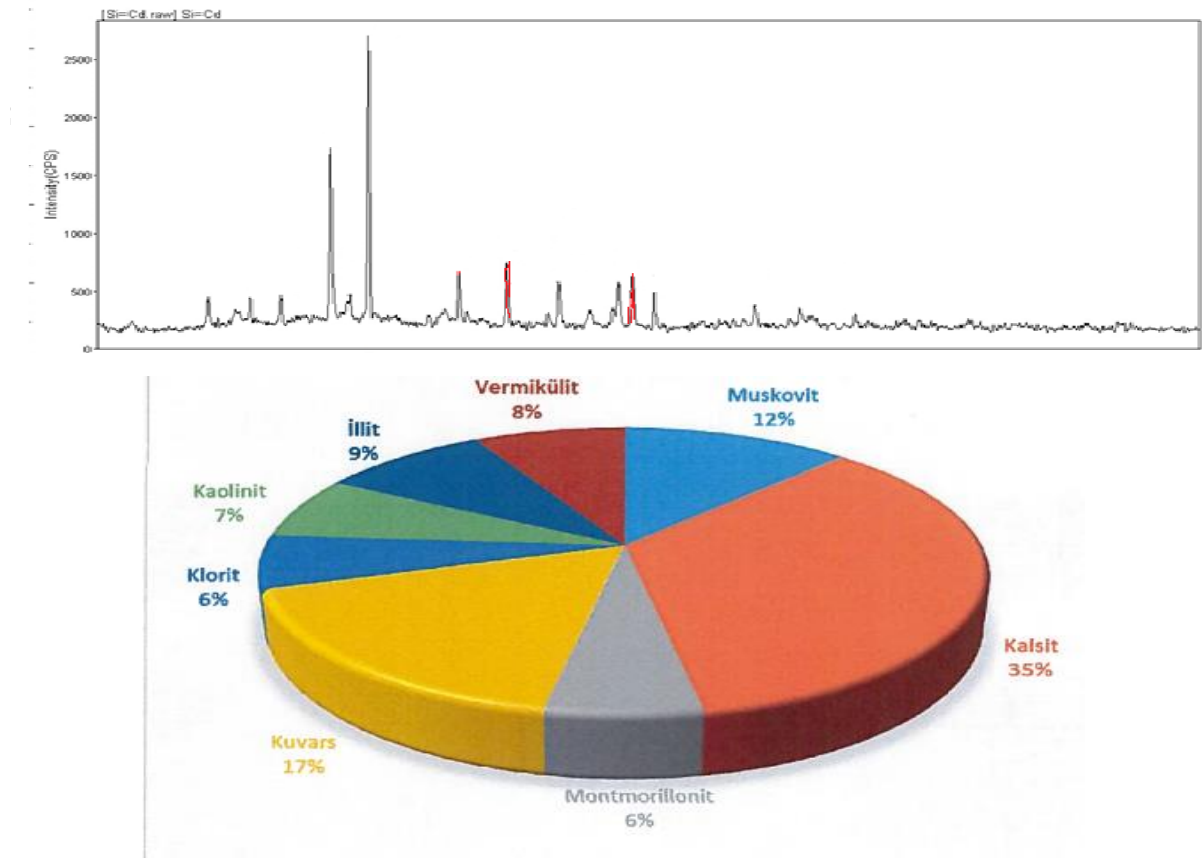
Element	Wt %	Atomic %	Error %	Net Int.	Net Error %	K Ratio	Z	R	A	F
O K	53.56	70.74	11.22	82.08	2.65	0.1302	1.0590	0.9650	0.2296	1.0000
Mg K	1.90	1.65	22.35	9.92	15.99	0.0086	0.9802	0.9995	0.4569	1.0077
Al K	6.88	5.39	9.92	45.28	4.89	0.0389	0.9442	1.0068	0.5930	1.0103
Si K	14.41	10.84	7.10	105.68	2.78	0.0930	0.9652	1.0137	0.6638	1.0074
Cd L	0.59	0.11	59.18	1.91	57.01	0.0048	0.7074	1.2351	1.0855	1.0606
K K	1.39	0.75	23.28	8.72	21.28	0.0124	0.8958	1.0429	0.9334	1.0621
Ca K	16.61	8.76	5.29	86.16	3.67	0.1472	0.9123	1.0477	0.9530	1.0193
Fe K	4.66	1.76	21.55	11.86	19.83	0.0399	0.8140	1.0690	0.9895	1.0640

Şekil 3. Doğal kilin Cd ile muamele edilen EDX diyagramı

Şekil 3'te deney sonrasında yapılan SEM-EDX analizi sonucunda 25-26 ve yaklaşık 10 keV civarında kadmiyum varlığı görülmektedir.

### 3.2. Kilin XRD Analizi

Kilin Cd (II) ile adsorpsiyonu sonrası yapılan XRD diyagramının 2θ açılarına göre; Şekil 4. te kilin ana bileşenleri olan kuvars (Q,SiO<sub>2</sub>), dolomit (Mg-CaCO<sub>3</sub>),kalsit (CaCO<sub>3</sub>) ve alüminosilikatların varlığının yanı sıra, adsorpsiyon sonrası kilde tutunan Cd varlığı(kırmızı ile gösterilen) görülmektedir.



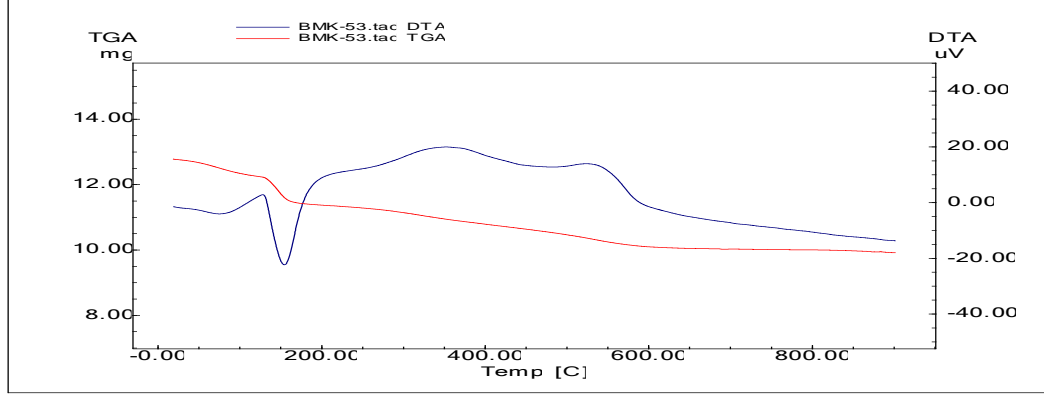
Şekil 5. Doğal kilin XRD detay kil analizi

Detay kil analizine bakıldığında %35 oranıyla en fazla kalsit daha sonra sırası ile %17 kuvars, %12 muskovit, %9 illit, %8 vermikülit, %7 kaolinit, %6 oranında da hem montmorillonit hem de klorit içerdiği anlaşılmaktadır.

### 3.3. Kilin TGA Diyagramı

TGA analizi 130 °C civarında büyük bir kütle kaybı gerçekleştiğini, 150 °C civarında düşüş hızının yavaşladığını, 600 °C'den sonra ise durumun stabil hale geldiğini göstermektedir. Bu

durum, 600 °C sıcaklığından sonra uçucu bileşenlerinden ayrılan kütle, termal kararlılığa kavuştuğunun göstergesidir.



**Şekil 6.** Doğal kilin TGA analizi

### 3.4. Kilin XRF Analizi

Kilin XRF analizi aşağıdaki tablo 1 de verilmiştir.

**Tablo 1.** Karışık tipteki Siirt/koçpınar kilinin XRF değerleri

Numune Adı	A.Za %	Al <sub>2</sub> O <sub>3</sub> %	CaO %	Fe <sub>2</sub> O <sub>3</sub> %	K <sub>2</sub> O %	MgO %	MnO %	Na <sub>2</sub> O %	P <sub>2</sub> O <sub>6</sub> %	SiO <sub>2</sub> %	TiO <sub>2</sub> %
Siirt/koçpınar	21.80	11.5	22.3	5.4	1.8	2.5	0.1	0.4	0.1	32.9	0.6

Koçpınar kilinin XRF sonucuna göre elementlerin oksitlerinin % olarak bulunma miktarları büyükten küçüğe doğru aşağıdaki şekilde sıralanmıştır.



### B.E.T. Analizi

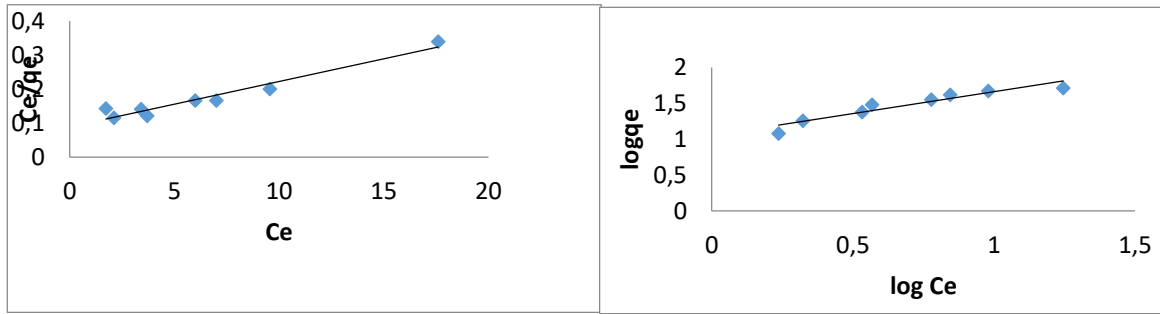
Adsorban olarak kullanılan Koçpınar kilinin spesifik yüzey alanı (B.E.T.=19.178 m<sup>2</sup>g<sup>-1</sup>) olarak ölçülmüştür. Yarıçaplı gözeneklerin toplam gözenek hacmi P/P<sub>0</sub>'de 0,1 µm'den az ölçülmüştür. Ortalama gözenek yarıçapı 4.334.10<sup>-3</sup> µm değerinde bulunmuştur.

## 4. DENEYSEL BULGULAR

### 4.1. İzoterm Çalışmaları

Bu çalışmada adsorpsiyon deneyi için Siirt bölgesinden elde edilen mixed tipli kil kullanılmıştır. Deneyde erlenmayerler içerisindeki 1'er g'lık killerin üzerine 25'er ml lik (50-360 mg/L)Cd (II) çözeltileri bırakılmıştır. Bu çalışma solüsyonları adsorpsiyonun denge testi için 298 K sıcaklığında 100 rpm hızda olan ısıtıcılı çalkalayıcıda 24 saat boyunca

çalkalanmıştır. Santrifüj edilen numuneler atomic absorpsiyon spektroskopisinde (A.A.S.) analiz edilmiştir. Yapılan ölçümler sonucunda 150 ppm optimum çalışma derişimi olarak tespit edildi. 318 K de doğal kil ile kadmiyum giderimi için izoterm çalışması yapılmıştır .Bu çalışmaya bağılı olarak elde edilen veriler, Langmuir, Temkin, Freundlich, ve Dubinin-Radushkevich (D-R) izotermlerine uygulanmıştır. Bunların grafikleri aşağıdaki şekilde oluşturulmuştur.

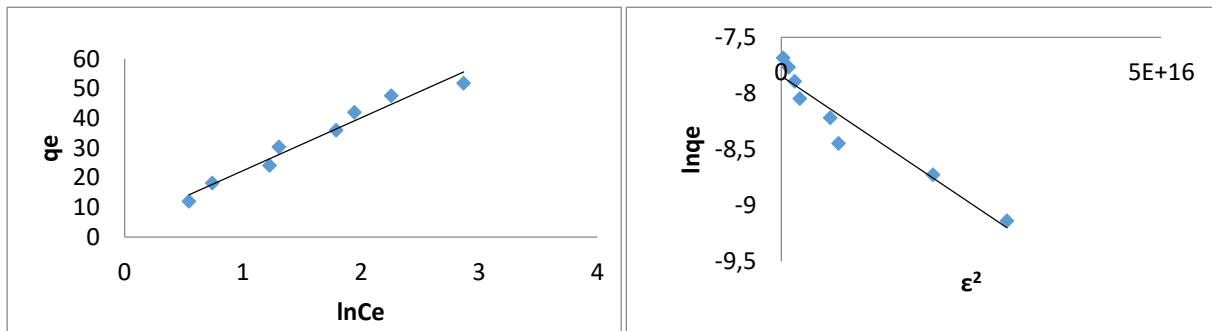


Şekil. 7. (a) Langmuir izoterm grafiğı

(b) Freundlich izoterm grafiğı

(a)

(b)



Şekil. 8. (a) Temkin izoterm grafiğı

(b) D-R izoterm grafiğı

**Tablo 2.** Adsorpsiyon İzoterm deneylerinden elde edilen parametreler

Langmuir İzotermi				Freundlich İzotermi			Temkin İzotermi			Dubinin-Radushkevich İzotermi		
T (K)	$K_L$ (L/mg)	$q_{max}$ (mg/g)	$R^2$	$K_F$	n	$R^2$	B	$K_{TM}$	$R^2$	$K_{DR}$ (L/mg)	E (kJ/mol)	$R^2$
318	0.150	74.627	0.944	11.235	1.637	0.897	17.811	1.290	0.9665	$5.10 \cdot 10^{-17}$	$1.10^5$	0.926

## 5. TARTIŞMA VE SONUÇ

Yapılmış olan deneysel çalışmada Cd (II) iyonlarının kullanılan doğal kilin adsorpsiyonu üzerindeki konsantrasyon sonucu değerlendirildiğinde daha çok Temkin ve Langmuir izoterm modellerine uyduğu anlaşılmıştır.  $R^2$  değerlerinin 0.96 ve 0.94 olduğu tespit edilmiştir. Langmuir, Freundlich, Dubinin- Radushkevich ve Temkin parametrelerini hesaplamak için bu modellere ait lineer grafikler oluşturulmuş ve bu grafiklerden korelasyon değerleri elde edilmiştir. Bu korelasyon katsayılarına göre uyum derecesi büyükten küçüğe göre yazılacak olursa,  $R_T^2 > R_L^2 > R_{D-R}^2 > R_F^2$  şeklinde olmaktadır.

Deneyde adsorplayıcı olarak kullanılan kilin özgül yüzey alanı B.E.T.=19.178  $m^2g^{-1}$  ve yarıçaplı gözeneklerin toplam gözenek hacmi  $P/P_0$ 'de 0,1  $\mu m$ 'den az olarak ölçülmüş olup, ortalama gözenek yarıçapının  $4.334.10^{-3}$   $\mu m$  değerinde olduğu saptanmıştır. Derişim arttıkça adsorplanan madde miktarının arttığı belirlenmiştir. Çevre ve sağlık açısından oldukça zararlı oldukları bilinen ağır metal atıklarının, sulu ortamlardan ve diğer maddelerden uzaklaştırılması açısından adsorpsiyon işlemi oldukça kullanışlı ve etkili bir yöntemdir. Uygun işlemlere ve uygun değer şartlarının oluşturulmasına bağlı olarak Cd (II)'nin adsorplayıcı olarak kullanılması önerilebilir.

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## **THE JAPANESE FRUIT SANDWICH: AN EXAMPLE OF CREATIVITY IN CULTURE APPROPRIATION**

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### **ABSTRACT**

The purpose of this paper is to understand Japanese fruit sandwiches as a process including cultural contact and interaction with Western culture. The history of this sandwich can be seen as a means of understanding a specific feature of the Japanese culture mindset, of adapting cultural products they take over from other cultures into something new and which we can later recognize as symbolic of Japanese culture. Japanese culture has appropriated other cultural products and practices from other cultures, such as they took over the practice of cherry blossom viewing from Korean and Chinese culture, the practice of archery from Chinese culture with its emphasis on ethics and virtue, as well as Zen Buddhist philosophy attached to it. Yet, Japan has made all these cultural appropriation products their own. With respect to the fruit sandwich, we can notice, from the perspective of Western culture, an example of using imagination and creativity, and making us see the sandwich from an entirely different perspective, which gets close to the defamiliarization visible in art, as theorized by Shklovsky. The creativity of Japanese culture consists in creating something completely distinct from the usual sandwich in Western culture. A different type of bread is used, milk bread, which is softer than the usual bread used in Western sandwiches. Fruit also hold a special status in Japan, being seen as luxury items, unlike in Western culture. Why are there expensive fruit parlors in Japan and why are fruit regarded as gift items? What are the conditions that led to this state of affairs and how are the conditions different from those of fruit in Western cultures? How does the visual attention specific to Japanese culture regarding food but not only food, as it is also visible in other arts, apply to fruit and fruit sandwiches?

**Keywords:** fruit parlors, defamiliarization, Westernization, creativity, visual attention.

## 1. INTRODUCTION

While the sandwich could be seen as a universal food across cultures, with the hamburger being a variety of the sandwich, we can find a special type of sandwich in Japanese culture. The Japanese fruit sandwich sounds more like a Western-culture cake, or a dessert food. From the home-made sandwich prepared by mothers for their children to take to school, to the sandwiches that people prepare at home to take them to eat on their jobs for lunch, to the sandwiches that can nowadays be bought in supermarkets, for instance the ready-made sandwiches you can get in the UK, prepared for working men, sandwiches are a very popular means to eat fast and nutritiously. Sandwiches can cover a variety of nutrients, depending on the filling you use, and all can be eaten fast and without any complications, since it does not require plates and cutlery. The nutrients range from the believed basic foods, such as bread, protein in cheese or salami, dairy if they contain butter, and various vitamins and minerals if they contain vegetables. Everything is packed, as well as fast and comfortable to eat during a lunch break at work or at school. According to a survey led by Moneypenny in May 2022 in the UK, 42% of the food eaten at work is a sandwich. Western culture innovations brought to the sandwich would include the crisp sandwich, which was created accidentally by Nigella Lawson, a poor Irish mother, for her children, and afterwards gained great popularity (Holland, 2022). Certain innovations link the sandwich not to usual main foods, but to dessert, such as varieties of sandwich in Western culture including sweet sandwiches, e.g. sandwich cookies, or ice cream sandwiches (Kovel, 2022). Yet, as will be seen from this paper, the Japanese sandwich takes everything further, showing a fresh perspective on what is considered common understanding of the sandwich in Western culture.

The sandwich is one of the foods present all over the world nowadays. It is considered “the most universal of all fast food”, and has the advantages of being “Portable, quick, satisfying, cheap and requiring neither plate nor cutlery”. Everyone, “school children and High Court Judges, [...] soldiers and pacifists, [...] busy call-centre workers and leisurely picknickers”, enjoys this “quickest way of making a meal” (Wilson, 2010, p 7). History claims that it was created in the eighteenth century by the fourth Earl of Sandwich (Wilson, 2010, p. 12).

Its beginnings lie in the Western culture. Japan had gone through periods of not allowing contact with Western culture, remaining isolated for trade and diplomacy, but starting with 1854 it went through a period of Westernization. According to the Ministry of Foreign Affairs Japan (2020), the Japanese have taken the sandwich over during the late 1800s, and developed it into

something that is now recognized as a specific Japanese food. Regarding the beginnings of the Japanese sandwich, it is believed that “Sandwiches grew in popularity in Japan when a western-style food store from Kanagawa Prefecture sold Japan’s first sandwich *Ekiben* at Ofuna Station in 1892. *Ekiben* means a *Bento* (box lunch) that is eaten when riding a train during a journey”. Bento boxes are specific to Japan, and sandwiches were thus adapted to Japanese food culture. Another belief is that “fruit sandwiches originated in a café in Kyoto or in a long-running fruit snack store in Japan, though there are other theories as well.” Therefore, nothing is known for certain regarding the process of adapting the Western sandwich and incorporating it into the Japanese culture mindset. However, this is not all. They did not simply borrow the Western sandwich as such, but changed it according to their culture, reaching a high degree of creativity, to the point where they made an almost different product. The Japanese took everything further, as they have created the fruit sandwich, which is different from the way Western sandwiches are prepared, known, and understood. The Japanese not only use fruit instead of the usual vegetables present in Western culture sandwiches. They also use whipped cream for some sandwiches, while for some others they used instead mascarpone cream or yoghurt. For some fruit sandwiches, they use “regular sliced bread”, while for others they use raisin bread or croissants. Fruit can also be used in different ways: sandwiches may contain whole fruit, or they may “have a diverse range of flavors with many different fruits included together.” These sandwiches can be eaten as dessert or as a light meal (Ministry of Foreign Affairs Japan, 2020). Everything is believed to have started from a misunderstanding from the part of the Japanese as to what sandwiches actually were when they encountered them via Western culture. Therefore, the Japanese imagined their own version of the sandwich based on what they understood it was and imagined it could be, which resulted into a different interpretation. In Figure 1 below, we can see the contrast between a usual, practical, Western sandwich and Japanese sandwiches, to the point where in Fig. 1.c. we can witness flower arrangements done from fruits.



**Fig.1.** Sandwiches in: a. Western culture (Source: <https://indianakitchen.com/recipe/bay-area-classic-ham-sandwich/>); b; c. Japanese culture. b. fruit pieces sandwich (Source: <https://www.justonecookbook.com/japanese-fruit-sandwich-fruit-sando/>); c. Sandwich art forms with flower shapes from fruits (Source: <https://asianinspirations.com.au/recipes/fruit-sando-japanese-fruit-sandwich/>).

We can clearly see above, first of all, in Fig.1.a. the busy, utilitarian, practical Western culture mindset and in Fig.1. b and c the attention paid to detail in Japanese culture. The Japanese sandwiches are like works or art and unlike the Western type sandwich. The Japanese fruit sandos look more refined, light, and actually closer to a dessert than to a regular snack.

One of the distinct aspects of Japanese fruit sandwiches is their visually pleasing, aesthetic aspect. Thus, “There are many highly original fruit sandwiches, and each one is full of creativity”, to the point where they can be shared on Instagram, a social media platform where photos are the primary features that users appreciate: “the sandwiches look like beautiful works of art when cut, as they are filled with fruits of many different shades”, and are considered “photogenic” (Ministry of Foreign Affairs Japan, 2020). The Western sandwiches are considered more of being fast and practical, and Westerners are not preoccupied to the extent that the Japanese are with the visually pleasing image of their sandwiches.

How can we account for the differences between Japanese culture mindset and Western culture mindset when it comes to the way sandwiches are made and presented? What specific cultural features are at work?

## 2. MATERIALS AND METHODS

The Japanese culture is known for taking over various cultural products from elsewhere and then turning them into what could be called their own, specific brand. This is what has happened with the kimono, which was taken over from the hanfu in Chinese culture, with the art of calligraphy, and with the cherry blossoms’ symbol for spring and ephemeral beauty, taken over from the Chinese and Korean culture. Japan has become more popular than other Asian cultures,

even though the origins of various symbols and practices, as well as cultural products, are not its own from the very beginning.

This is what also happened to the sandwich. They called it “sando”, and their sandos belong to “a category of Japanese food known as *yōshoku*, or Western-inspired Japanese food. Though *yōshoku* dishes initially began as simple adaptations of Western foods -- like ketchup-y spaghetti known as *naporitan* and pan-fried cutlets of katsu -- it quickly transformed into its own established category of food that is uniquely Japanese.” One of the main differences in Japanese sandwiches lies in the following fact: “the construction of sandwiches” is obviously “neater”, and their sandwiches “aren’t weighed down with intense slabs of proteins, cheeses, and condiments”. The Japanese even use a different texture of bread for their sandos, which is called *shokupan*, a word which designates “milk bread, a slightly sweet white bread crafted from an enriched dough that is soft and pillowy”. What also sets the Japanese sandwiches apart from Western ones is “the attention to construction. They are generally well made so that the ingredients don't fall out as you eat the sandwich and it doesn't make a mess”. The Japanese sandwiches are also “neatly wrapped like a present”. Fruit sandwiches’ aesthetic aspect consists in the fact that they “contain colorful slices of strawberries, peaches, and kiwis gently encased in a whipped-cream cloak” (Thompson, 2019).

One main feature of Japanese culture is that fruits are having a different status from Western culture, in that “fruits are expensive”, and that “They were (and at times continue to be) a luxury in Japan, and while they became more commonly accessible to the public during the Taishō era (1912-1926), they were mostly bought for gifts (both personal and business) or special occasions.” What happened in Japan is that “Due to this, many fruit shops opened near major train stations and business districts in the early 1900s.” One common feature of Japanese culture is the willingness to buy gifts: “Japan loves to gift, so as the fruit shop business grew, many began to open fruit parlors, a cafe adjacent to the shop which served various fruit dishes such as parfaits and shortcakes. This allowed the public to access luxury fruits at a reasonable price.” It was in this context that “One of the most popular dishes” was “the fruit sandwich, more commonly known as “fruits sando” (*furutsu sando* [...]) in Japanese” (Kaori S., 2021).

Fruit parlors that still exist today and keep fruit sandos on the menu are Sembikiya in Tokyo, which “opened its main Nihonbashi shop in 1834, and began operating the first ever fruits parlor in 1894”. As for Kyoto, “, one of the oldest fruits shops, Yaoiso, which opened in 1869, established a fruit parlor in 1972” (Kaori S, 2021).

The design of the fruit sandwiches starting from “a way for the fruit shops to control their stock, so many of them used multiple fruits, often cut into small slices”. What is more, the fruit sandwiches “were also originally cut into squares, in a British sandwich style”, while “Nowadays, you’ll more often than not see sandwiches cut into triangles.” The “diagonally cut sandwiches only became popular in the post-war era in Japan. This came about in 1961, when the owners of Furenpan bakery decided to cut their sandwich diagonally, to better show off the sandwich filling and to make it easier for people to eat.” (Kaori S, 2021).

Regarding the time when fruit parlors and coffee shops served fruit sandwiches, we can go back to the 1920s: “Fresh fruit sandwiches were first served in Japanese coffee shops and specialty cafés called fruit parlors as early as in the 1920s” (Kikkoman Corporation, 2022).

Regarding the Japanese fruit sandwich, the form can be that of a sandwich, yet the function is that of a cake (Thompson, 2020). This is why it could be seen as a way of representing something different, to the point of reaching defamiliarization (Gunn, 1984), as compared to the sandwich in Western culture.

The Japanese fruit sandwich changed from luxury item in the 20s due to its availability only in the fruit parlors to a “convenience-store level availability” (Thompson, 2020). This is the path taken by most foods, from luxury items, or items that required hard work in order to be cooked, towards becoming items of consumerism, where they can be found everywhere in supermarkets and convenience stores, requiring little to no effort to prepare. Sometimes, it just means the effort to be purchased and eaten, sometimes while walking in the street, towards home or towards school.

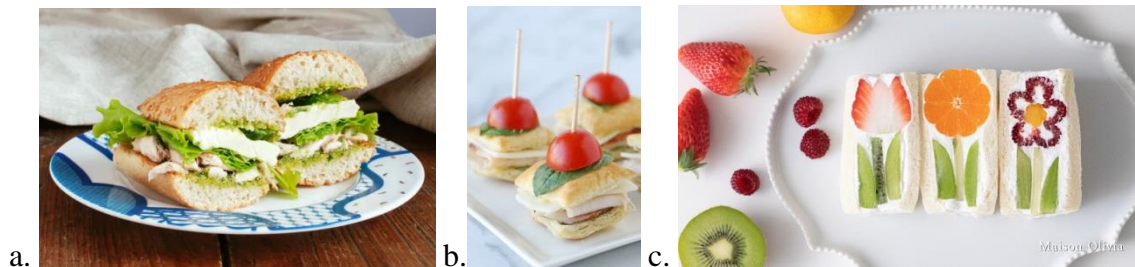
If we refer to appropriation from the point of view of artists, since artists “represent what is already theirs.” Therefore, an “act of representing a culture is not an act of appropriating from it” (Young, 2010, p. 18). In a similar way, the Japanese have not taken, through culture appropriation, the sandwich as such from Western culture. They have, instead, included what was already culturally specific to themselves when they re-created it. Since the sandwich is no longer recognizable as the typical Western-culture sandwich, we could say that the Japanese have worked on it based on their understanding of food, visual culture, artistic effect and mindset altogether. While “The term cultural appropriation has been defined as ‘the taking – from a culture that is not one’s own – of intellectual property, cultural expressions or artifacts, history and ways of knowledge’” (Ziff and Rao, eds., 1997, p. 1), we can clearly see in the

example of the Japanese sando that the Western-type of sandwich is only used as a source of inspiration, over which the Japanese apply their sense of creativity.

### 3. RESULTS

Japanese culture transfers its visual culture preference over to food arrangement, and fruit sandwiches are no exception. We can see the primacy of the visual element in their culture everywhere, starting from haiku poems, where the visual image is central. Their writing system is also extremely visual, therefore calligraphy becomes a means of visual expression. In Western cultures, writing systems and poetry have abstract tendencies. In American culture, sandwiches become more and more utilitarian, and handy for everyday fast use, such as the hamburger. The artistic aspect is not a main feature. The commercial aspect becomes the main feature.

However, for Japanese culture fruit sandwiches, the aesthetically pleasing aspect of their food in general remains one of the main features. As a comparison between Western culture and Japanese culture mindsets, we could compare the sandwiches illustrated under Figure 2:



**Fig.2.** a. Western culture everyday life sandwich (Source: <https://www.today.com/food/5-tips-making-sandwiches-actually-better-next-day-t101209>); b. Western culture appetizer sandwiches (Source: <https://www.pinterest.com/pin/198299189819815169/>); c. Japanese culture fruit sando art (Source: <https://www.lifestyleasia.com/bk/food-drink/dining/japanese-sandwich-recipes/>)

The Japanese sandwich looks aesthetically pleasing, while the Western-culture usual type of sandwich could be regarded as a rough version of the Japanese sando. The Western culture type of sandwich is created abruptly and with concern only for what is practical. It is a sandwich that is considered serious enough to be eaten during lunch break at work, where the tasks are rough and no matter of art themselves. Therefore, neither is the sandwich a piece of art. Yet, sandwiches created for festivities can be more artistic even in Western culture, when they are part of appetizer arrangements. However, since we are talking about the norm and everyday life reality, Japanese culture sees fruit sando as pieces of art even in everyday life, of studying and

of work. The Japanese do not need a special occasion in order to have specially decorated sandwiches. The Western culture members, on the contrary, need special occasions to make their sandwiches different. Otherwise, they reflect the rough way of living and everyday life activities, without taking the time to consider an artistic aspect to them.

As can be seen in Fig. 2.c., the Japanese dedicate a long time and special attention to the aesthetics of the sando. The fruits in this case are arranged so as to suggest a floral arrangement. In Fig. 2.b., the Western counterpart only shows a smaller and more refined version, which does not rise to the level of artistry expressed in the Japanese fruit sando in Fig.2.c., however. The Japanese prove to give more attention to minute details when creating a visual impression. Even if food is art that can be just for fun, it is definitely an aspect Japanese culture relies on. It is not just for special occasions, and it is not just for sandwiches as appetizers. In Japanese culture, even convenience stores/ supermarkets can use fruit sandos with an aesthetically pleasing aspect for everyday use. This is, however, not the norm in Western culture. While the sandwiches in Western culture may look appealing, seeing them as art on a day-to-day basis is not the usual approach.

#### **4. DISCUSSION AND CONCLUSIONS**

While in Western culture we still encounter the example of using Nutella in sandwiches, generally sandwiches in Western culture are not expected to contain fruit and cream, which are regarded as desserts. Occasionally, though, there may be some sweet sandwiches, but this is not part of the usual perception of the sandwich. It is rather an exception to the norm. Yet, Japanese culture turned fruit into a luxury item, making fruit sandwiches a special treat. They could be considered more a dessert food item rather than a usual sandwich by Western culture members, who view sandwiches as everyday reality common items, created in this way to suggest workmen food and busy young people's lunch or meal during the day while running about to their university courses, school classes or workday schedule. In the Western world, sandwiches are considered to fit in with the rush of everyday life, while in the Japanese world, they are regarded as refinement, since fruit are a luxury or still expensive food item even nowadays, in convenience stores.

The fact that the fruit sando is a dessert food item could be related to the idea that it is a delicacy and, therefore, a special treat at all times, and not just a needed source of energy. The way it is understood and decorated makes it a special food item, borrowed from western culture, yet the



borrowing is done though adapting it creatively from one culture into another. Since the Japanese may not have been used to the Western-style sandwich, they may think of it as a special food item. This could be an explanation why they understood it as a savory dessert dish, instead of a utilitarian dish. Instead, for the Japanese, sushi is a usual food, while for Western culture members it can be regarded as an exotic treat. The fruit sando could be regarded in a similar way for the Japanese culture members, as an exotic treat. At the same time, the Japanese culture members have adapted creatively their own sandwich, which is much more different from what we know. Psychologically, this can sound as a creative act, yet it was not intended. It simply resulted as such from contact with a different culture.

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**NIZAMI GƏNCƏVİ YARADICILIĞINDA AZƏRBAYCAN ŞİFAHİ XALQ  
ƏDƏBİYYATININ ROLU (BƏHRUZ BAMDADİNİN EYNİ ADLI MƏQALƏSİ  
ƏSASINDA)****Əsmət xanım MƏMMƏDOVA**

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**XÜLASƏ**

Nizami Gəncəvi (1141-1209) yaradıcılığının xalqilik və bədii sənətkarlıq baxımından zənginləşməsində etnoqrafik biliyin bütün sahələrini özündə ehtiva edən folklor nümunələrinin rolu danılmazdır. Xalq müdrikliyindən - folklordan qaynaqlanan motiv, hadisə, süjet və formullardan yerində və məqamında istifadə zamana meydan oxuyan Nizami əsərlərinin əbədiyaşarlılığını şərtləndirən başlıca amillərdəndir. Azərbaycan xalqının nağıl, rəvayət, zərbül-məsəl, atalar sözləri, tapmaca və lətifələrinin ekvivalentlərinin deyil də, məhz fars dilinə hərfi tərcümə olunaraq verilməsi həm də mübahisə predmeti olan Nizaminin etnik kimlik məsələsinə aydınlıq gətirən məqamlardandır. Qeyd etmək lazımdır ki, Nizami əsərlərini fars dilində yazsa da bəzən fars oxucusuna onun yazdığı incəliklər anlaşılmaz və çətin gəlir. Məlumdur ki, Nizaminin hazırda elmə məlum olan “Divan” və “Xəmsə”si fars dilində qələmə alınmışdır. Lakin şairin farscası nə qədər rəvan, kamil olsa da, hər halda İran alimi Səid Nəfisnin dediyi kimi, “bu farsca bir farsın, tutalım, Firdövsinin farscası deyil”. Doktor Bəhrüz Bamdadi “Nizami Gəncəvi əsərlərində Azərbaycan şifahi ədəbiyyatı və folklorunun rolu” adlı məqaləsində yazır: “Nizami və onun müasirləri Azərbaycan üslubu nümayəndələri folklor və şifahi xalq ədəbiyyatından çox bəhrələnmiş, adi xalq danışığını, ifadə və deyimlərini əsərlərində böyük məharət və bacarıqla işlətməmişlər. Əsrlər keçməsinə baxmayaraq, bu ifadələr, deyimlər bu gün də azərbaycanlılar arasında canlı dil nümunəsi kimi işlədilir, keçən əsrlər, illər onlara heç bir təsir göstərə bilməmişdir” [Bamdadi, 2004: 5]. Alim fikrinə davam edərək, yazır: “...Nizami əsərlərini oxuyub, lazımı şəkildə başa düşmək üçün Azərbaycan (türk) dilinin incəliklərini bilmək lazımdır. Nizami əsərlərindəki bəzi ifadə və tərkiblərin türk olmayan oxucuya qarışıq və anlaşılmaz gəlməsinin səbəbi isə, onların şairin əsərlərindəki həmin incə, zərif mənaları bilməmələridir.) Müəllif belə bir doğru fikri müdafiə edir ki, “bu cəhət ən çox Nizaminin bir türk oğlu türk olmasından irəli gəlir”. Biz bu düşüncədə müəlliflə həmfikir olaraq deyirik ki, həqiqətən, dahi Nizami bir türk dili daşıyıcısı olmaqla çox hallarda tərkibləri, idiomatik ifadələri, atalar sözlərini tərcümə edərək nəzmə çəkmişdir. Bunula da fars dilinin lüğət tərkibini xeyli zənginləşdirmişdir. Bəhrüz Bamdadi bu işdə şairə iki xüsusiyyətin kömək olduğunu bildirir:

1. Azərbaycan dilinə tam sahib olması,
2. Sözyaratma qabiliyyətinə malik zehni və istedadı.

**Açar sözlər:** Nizami Gəncəvi, Bəhrüz Bamdadi, Azərbaycan şifahi xalq ədəbiyyatı, “Xəmsə”

**THE ROLE OF AZERBAIJAN ORAL LITERATURE AND FOLKLORE IN THE WORKS OF NIZAMI GANJAVI (BASED ON BAHRUZ BAMDADI'S ARTICLE OF THE SAME TITLE)****ABSTRACT**

The role of folklore examples, which includes all areas of ethnographic knowledge, in the enrichment of Nizami Ganjavi's (1141-1209) creativity in terms of folk and artistic craftsmanship is undeniable. The use of motifs, events, plots and formulas derived from folk wisdom - folklore, at the right place and at the right time, is one of the main factors determining the longevity of Nizami's works that defy time. In Nizami's works, giving not the equivalents of Azerbaijani people's tales, narratives, parables, proverbs, riddles and anecdotes, but literal translations into Persian is one of the points that clarify the issue of Nizami's ethnic identity, which is the subject of controversy. It should be noted that although Nizami wrote his works in Persian, sometimes the intricacies of what he wrote are incomprehensible and difficult for the Persian reader. Nizami wrote his "Divan" and "Khamsa" in Persian, which are currently known to science. No matter how smooth and perfect the poet's Persian is, in any case, as Iranian scholar Said Nafisi said, "this Persian is not the Persian of a Persian, let's say, Firdowsi". Dr. Bahruz Bamdadi writes in his article "The role of Azerbaijani oral literature and folklore in the works of Nizami Ganjavi": "*Nizami and his contemporaries, representatives of Azerbaijani style, benefited a lot from folklore and oral folk literature, and used ordinary folk speech, expressions and idioms in their works with great skill. Despite the passage of centuries, these phrases and idioms are still used today among Azerbaijanis as examples of living language, the past centuries and years have not had any effect on them*" [Bamdadi, 2004: 5] Continuing his opinion, the scientist writes: "*...In order to read and properly understand Nizami's works, you need to know the intricacies of the Azerbaijani (Turkish) language. The reason why some expressions and compositions in Nizami's works are confusing and incomprehensible to non-Turkish readers is that they do not know the subtle and elegant meanings in the poet's works.*"

The author defends such a correct opinion that "*this aspect mostly comes from the fact that Nizami is a Turk, the son of a Turk*". We agree with the author in this opinion and say that indeed, the genius Nizami, being a native speaker of the Turkish language, often translated compositions, idiomatic expressions, and proverbs into poetry. With this, he greatly enriched the vocabulary of the Persian language. Bahruz Bamdadi says that two features helped the poet in this work:

1. Full command of the Azerbaijani language,
2. A mind and talent with the ability to create words.

**Key words:** Nizami Ganjavi, Bahruz Bamdadi, Azerbaijani oral literature, "Khamsa"

## GİRİŞ

“Nizaminin əsərlərini oxuyan hər bir oxucu bu əsərdə xalqın döyünən qəlbini, onun istək və arzularını gördüyü kimi onun zəngin folklorunu, onun azad hisslərlə dolu zərbi-məsəllərini də öyrənmiş olur. Nizaminin əsərlərində təsadüf edilən nağıllar, dastanlar, məsəllər, atalar sözləri hamın geniş xalq kütlələri arasında deyilib, dildən-dilə gəzən nağıllar və atalar sözləridir. Böyük şair bu nağılları və lətifələri öz sənətkar qələmi ilə bəzəyir, onlara bədii forma və kəskin mənə verir, onlardakı elmi, fəlsəfi, tarixi, ictimai mahiyyəti daha bariz və daha parlaq bir formada oxucuya çatdırır” [M. Mübariz Əlizadə, 1938//2021: 184].

O, əsərlərini fars dilində yazsa da bəzən fars oxucusuna onun yazdığı incəliklər anlaşılmaz və çətin anamlı gəlir. “Nizami hazırda elmə məlum olan əsərlərini – “Divan”ını, “Xəmsə”sini farsca yazıb. Şairin farsçası nə qədər rəvan, kamil olsa da, hər halda məşhur İran alimi Səid Nəfisinin müşahidə etdiyi kimi, bu farsca bir farsın, turalım, Firdövsinin farsçası deyil” [Hüseynov, 2016:10]. Nizami əsərlərində Azərbaycan, türk folklorunun, xalq hikmətlərinin çox geniş, hərtərəfli işlənməsinə dair bir çox tədqiqatçılar fikir söyləmişlər. XXI əsrin başlanğıcında doktor Bəhrüz Bəmdadinin “Nizami Gəncəvi əsərlərində Azərbaycan şifahi ədəbiyyatı və folklorunun rolu” adlı məqaləsi diqqətimizi cəlb etdi. Bəhrüz Bəmdadinin Azərbaycan şairi Nizami Gəncəvi əsərlərindəki folklor nümunələri haqqındakı araşdırmasını sizinlə də bölüşmək istərdik.

### **Əsas araşdırılan mövzu:**

İlk əvvəl alim folklorun ədəbiyyatdakı rolu haqqında məlumat verərək deyir ki, bir xalqın folkloru barədə müzakirə aparmaq üçün birinci mərhələdə onun dilinin və mədəniyyətinin incəliklərini bilmək lazımdır. Sadə xalqın nümayəndələri, sırayı vətəndaşlar, əkinçi, kəndli təbəqəsindən olan insanların inancları, maraqları, adət-ənənələri, sevgiləri, düşüncələri, qürur mənbəyindən bəhs etdikdə meydana çıxan dil zənginliyi, rəngarəngliyi təəccüb doğuracaq dərəcədə diqqət cəlb edir. Onlar sevinclərini, kədərlərini, təcrübələrini, inanclarını mülayim, ifadəli və sadə şəkildə bildirir, düşündüklərini təbiətlə əlaqələndirib hekayələr, əfsanələr, müxtəlif zərbi-məsəllər çərçivəsində, füsunkar şəkildə bəyan edirlər. Folklor və ya ümumxalq ədəbiyyatı adlanan bu cür məsələlər topla olaraq müxtəlif sözlər, ifadələr, birləşmələr, məcazi, kinayəli qəliblər şəklində şeirdə, dastanlarda öz əksini tapır.

Nizami və onun müasirləri – Azərbaycan və ya Aran üslubunun şairləri xalq ədəbiyyatından çox təsirlənmiş və əsərlərində xalq dilində formalaşmış zərbi-məsəllər, hikmətli ifadələri böyük bacarıqla işləmişlər. Hal-hazırda yazıldığı dövrdən əsrlər keçməsinə baxmayaraq, bu hikmətli

sözlər, ifadələr bugünkü azərbaycanlıların dilində yaşamağa davam edir və aradan keçən uzun zaman ərzində onların tərkibində heç bir anlaşılmazlıq, dəyişiklik baş verməmişdir. Azərbaycan şairlərinin, o cümlədən, Nizaminin şeirlərini, dilini başa düşmək üçün türk dili və onun incəlikləri ilə tanış olmaq lazımdır və Nizami şeirlərinin mürəkkəbliyinin, anlaşılmaz olmasının səbəblərindən biri də qeyri-türkdilli oxucuların məhz türk dilinin incəliklərinə bələd olmamalarından irəli gəlir. Hətta bəzi Nizami əsərlərini tədris edən müəllimlər belə bu problemlə (Nizaminin bəzi beytlərinin fars dil daşıyıcıları, müəllimləri üçün anlaşılmaz olması nəzərdə tutulur – Ə.M.) üzləşirlər.

Müəllif belə bir doğru fikri müdafiə edir ki, bu cəhət ən çox Nizaminin bir türk oğlu türk olmasından irəli gəlir. Biz də burada müəlliflə tamamilə həmfikir olduğumuzu bildirib deyirik ki, həqiqətən, dahi Nizami türk dili daşıyıcısı olmaqla bir çox hallarda tərkibləri, idiomatik ifadələri, atalar sözlərini əsərlərində tərcümə edərək nəzmə çəkmişdir. Daha sonra müəllif sözünə davam edərək deyir:

“Azərbaycan şairləri və Nizami əsərlərini oxuyub, lazımı şəkildə başa düşmək üçün Azərbaycan (türk) dilinin incəliklərini bilmək lazımdır və Nizami əsərlərindəki bəzi ifadə və tərkiblərin türk olmayan oxucuya qarışıq və anlaşılmaz gəlməsinin əsas səbəbi isə, dediyimiz kimi, onun əsərlərindəki həmin incə, zərif mənaları bilməmələridir.

[Bamdadi, 2004: 5]

Alim fikrini davam etdirərək, Nizaminin türk dil daşıyıcısı olaraq Azərbaycan folklor nümunələrini öz əsərlərində verməklə fars dilinin lüğət tərkibini zənginləşdirdiyini qeyd edir. Eyni zamanda göstərir ki, burada iki başlıca cəhətə diqqət yetirmək vacibdir:

### **1. Şairin Azərbaycan dilinin lüğət tərkibinə tam sahib olması**

### **2. Nizaminin sözyaratma qabiliyyətinə malik zehni və istedadı**

Bu iki xüsusiyyət fars dilinin köməyinə çatdı və bu cür gözəl ifadələrin, tərkiblərin yaranmasına vəsilə oldu. Qeyd edək ki, azərbaycanlılar bu gün də bu tərcümə metodundan, müasir dövrün ifadəsi ilə desək, kalka üsulundan fars dilində danışan zaman istifadə edirlər. Burada qeyd edilən nümunələr bir azərbaycanlının Azərbaycan türkcəsinin köməyi ilə fars dilində həyata keçirdiyi dil fəaliyyətlərini göstərmək üçündür. Məsələn, Nizami “Xosrov və Şirin” dastanında deyir: *بیا تا یک دهن پر خنده داریم* /biya ta yek dəhən por xənde darim/- *Gəl ağız dolusu deyək, gülüşək*. Bu misrada işlənən idiomatik ifadəyə B. Bamdadi şərh verərək deyir: “یک دهن خندیدن – *“Bir ağız gülmək”* - tərkibinin tərcüməsidir. Sonrakı dövrlərdə *“Bir ağız oxumaq”* tərkibi

işlənsə də, ancaq hər hansı bir fars şairinin bu tərkibi bu şəkildə işlətdiyini güman etmirəm.  
[Bamdadi,2004:4]

**A) Kinayə, məcazi məzmunlu və digər tərkiblərin türk dilindən fars dilinə tərcüməsi**

دام نه ای دانه فشانی مکن، با چو منی مرغ زبانی مکن  
[Sirlər xəzinəsi,87]

*(Tələ deyilsən, dən səpməklə məşğul olma, Mənim kimi birisinə quş dili oxuma)*

مرغ زبانی کردن /**morğ zəbani kərdən**/- birləşməsini bugünkü azərbaycanlılar **“birinin qulağına quş dili oxumaq”** kimi işlədirlər. Müxtəlif yaşda olan insanlardan bu ifadə soruşulsa, mənasının həmin şəxs üçün məlum olduğu aydınlaşar. Bu ifadə başqa sözlə Azərbaycan dilində **“kiminsə qulağını doldurmaq”**, **“danışaraq kimisə müəyyən bir işdən çəkəndirmək”**, yaxud **“kimisə dilə tutub hansısa bir işdən, hərəkətdən əl çəkməyə razı salmaq, fikrini dəyişdirmək”** mənasını verir . Bu hikmətli ifadəyə Həsən Vəhid Dəstgərdinin verdiyi şərh haqqında məqalə müəllifinin (B. Bamdadinin - Ə. M.) aşağıdakı qeydi maraqlıdır.\* .

“Xosrov və Şirin” əsərindən verilən aşağıdakı beytdə vətəndən uzaqda yaşayan qəriblərin işlətdiyi ifadə məsnəvidə aşağıdakı kimi verilmişdir:

به تو باد هلاکم می دواند غلط گفتم که خاکم می دواند  
[Xosrov və Şirin,246]

*(Sənin torpağına əsdim külək tək, Səhv dedim, məni torpaq bura çəkdi)*

خاک دوانیدن /xak dəvanidən/ tərkibi məcazi mənada **“torpaq çəkmək”** (**“torpaq çəkir”**) mənasını verir və bu ifadə doğulduğu ana vətəndən didərgin düşən, qəriblikdə yaşayan, lakin sonra yenidən doğma yurduna qayıdan və orada vəfat edən şəxslər barəsində deyilir.

Bu məqamda adətən belə deyilirdi: **“onu torpaq çəkirdi”**, yəni torpaq (vətən) onu özünə çəkirmiş.

\* Qeyd: “Uzun illər Həsən Vəhid Dəstgərdinin Nizaminin əsərlərinə şərhələr yazmaqla məşğul olmasına baxmayaraq, Nizaminin Azərbaycan dilindən çevirdiyi atalar sözləri, hikmətli ifadələri Azərbaycan dilini bilmədiyindən “Sirlər xəzinəsi”nin bu beytinin şərhində yazır: **“Quş dili danışmaq – boş-boş danışmaqdır**, ona görə ki, quş dilinin heç bir mənası yoxdur!” Əslində isə azərbaycanlılar bilirlər ki, “bu ifadənin mənası – danışan o qədər gözəl, inandırıcı, bəlağətli danışır ki, dedikləri ilə qarşısındakının, dinləyənin fikrini dəyişməyə nail olur ”  
[Nizami, 1399:87].

**B) Nizaminin əsərlərində Azərbaycan türkcəsinə məxsus zərbi-məsəllər**

Azərbaycan üslublu şairlərin, xüsusilə bu üslubun, şübhəsiz, ən böyük iki nümayəndəsindən biri olan Nizami Gəncəvi Azərbaycan ərazisində işlənən bir çox zərbi-məsəllərdən, atalar sözlərindən yaradıcılığında çox bəhrələnmişdir. Nizami əsərlərindən bir sıra tərcümələrdə işlənən türk zərbi-məsəllərini nümunə olaraq çəkir və bu ifadələr türk dilində o qədər şirin və oxunaqlı olmuşdur ki, hətta əsrlər sonra belə müasir Azərbaycanın şəhər və kəndlərində bu ifadələr işlənməkdədir və heç biri indiyə qədər unudulmamışdır. Bu zərbi-məsəllərdən bir çoxu daha sonra fars dilinə yol tapmış və fars dilinin frazeoloji birləşmə, deyimlər, hikmətli sözlər baxımından söz xəzinəsinin zaman-zaman zənginləşməsinə səbəb olmuşdur. Bundan da irəli gələrək farsdilli Nizamisevərlər üçün əlavə izahlar verilsə, şairin demək istədikləri onlar üçün daha aydın olar. “İskəndərnamə”nin birinci hissəsi “Şərəfnamə”dən gətirdiyimiz nümunədə deyilir:

به جایى نخسبد عقاب دلیر،      که آبی توان بستن او را به زیر  
[Şərəfnamə,353]

*(Cəsur qartal altını su basacaq yerdə/Yatmaz və (heç vaxt) yuva qurmaz)*

Bəhruz Bəmdadi qeyd edir ki, Azərbaycan xalqı əgər xüsusi ağıl sahibi olan, zirək bir insanı təsvir etmək, ondan bəhs etmək istədikdə belə deyir: “**O, altına su çıxan yerdə oturmaz, yatmaz**”, yəni او جایى نمی خوابد که آب زیرش برود /u cayi nemixabəd ke ab be zireş berəvəd/-o su basa biləcək yerlərdə yatmaz (yəni, yurd salmaz - Ə.M.)

گرت سر در گل است آنجا مشویش،      وگر بر لب سخن آنجا مگویش  
[Xosrov və Şirin,108]

*(Başına gil də çəkmisənsə, orada yuma,/Ağzında söz danışırınsansa, yarımçıq qoy)*

Bu ifadə Azərbaycanda xalq arasında, xüsusilə, kənd əhalisi arasında işlək olan zərbi-məsəldir. Əgər bir nəfərdən bir işi dərhal yerinə yetirməsi və ya bir yerə özünü tez çatdırması istənilsə, belə deyirlər: “**Başını orada islat, burada yu**”. Yəni، سرت را آنجا خیسانده ای اینجا بشوی və ya dərhal burda ol, yəni “**başını orada islat, burada qırxdır**”. Bu zərbi-məsəl və atalar sözünün xalq arasında işlənən başqa bir variantı da mövcuddur: اگر در دستت روغن می جوشد بگذار زمین و بیا – **“Əlində yağ daşsa da, qoy yerə, gəl”**.

**C) Şəhər və kənd əhalisinin həyat tərzinin təsviri**

بدان کس که او را خمیر است خام،      همه کس دهد نان پخته به وام.  
[Şərəfnamə,243]



*(O adam ki, xəmir yoğurub (çörək bişirəcək),/ Hamı ona bişmiş çörək borc verməyi əsirgəməz)*

Kəndlilərin yaşam tərzində çörək satmaq anlayışı olmamışdır. Amma onların arasında yayılmış və sanki ənənə halını almış hadisələrin biri çörəyin borca verilməsi hadisəsi idi. Bir adamın tabağında çörəyi bitdiyi təqdirdə dərhal qonşusundan borca çörək istəyər, lakin ilk fürsətdə verilən bu borcu qaytaracağını, çörəyi geri verəcəyini qarşı tərəfə söz vermiş.

Belə hallarda borc çörək istəyən adam borcu geri qaytarmağa qadir şəxs olarsa, qonşularının gözündə etibar, hörmət qazanar, nə vaxt yenidən borc istəsə, ona tərəddüdsüz borc verilərdi. Lakin bu məqamda heç bir mal sahibi olmayan, kasıb insan borca çörək istədiyi təqdirdə isə məcburiyyət qarşısında ona borc verilirdi. Bu zərbi-məsəl də məhz elə belə vaxtlarda deyilirdi: **“Xəmiri olana çörək verərlər”** və ya **“Öküzü olana gön borc verərlər”**.

#### **D) Nizaminin əsərlərində Azərbaycan musiqisi nümunələri**

Azərbaycan musiqisi ilə tanışlığı olan hər kəs bilir ki, bu musiqinin əsas məzmununu sevgi, məhəbbət qafiyələrindən əlavə, əxlaqi hikmət, nəsihətlər, yaradılış fəlsəfəsinin bəyan edilməsi və s. məsələləri özündə əks etdirir və azərbaycansevərlər, müxtəlif türkdilli xalqlar, millətlər, tayfalar, nəsillər arasında bu düşüncələri ifadə etməyi əxlaqi bir vəzifə hesab edirlər. Nizaminin baxışı da, fikrimizcə, Azərbaycan musiqisinin təsiri altındadır və o, Barbəd və Nikisanı-iki Azərbaycanlı ozanı (aşığı)xüsusi fəlsəfi libasa bürümüş və onlar eşqdən əlavə imana, əxlaqa, həyat fəlsəfəsinə bağlılıqdan da bəhs edirlər [Xosrov və Şirin:359-379].

Burada qeyd edilməli olan ikinci məsələ Nizaminin Azərbaycan musiqisindən və onun qarşılıqlı müzakirə texnikasından təsirlənməsidir. Bu da Azərbaycan musiqisinin ən ümdə xüsusiyyətlərindən biri hesab olunur. Bu metod **“bağlaşma”**, **“bağlama”** və ya **“deyişmə”** adlanır.

Burada müsabiqədə iştirak etməyə hazırlaşan iki ozan o qədər bədahətən yaratmanın, musiqi pərdələrinin, ayrı-ayrı musiqi guşələrinə, oradakı gah və pərdələrə bələd olmalı, şeirin vəznə, üsulundan agah olmalı və epik, dini, tarixi, dastanvari, hekayə və əfsanələri dərinləndirən bilməlidilər ki, bu məsələlərlə bağlı sual ünvanlandıqda münasib cavabı verə bilsinlər. Bu sual-cavab bir tərəfin məğlub olması və müsabiqə meydanını tərk etməsinə qədər davam edir.

#### **E) Xalq inanc və inanclarının təsvir edilməsi**

Nizaminin əsərlərində xalq inancları da geniş şəkildə əks olunmuşdur. Şair inanc və xalq arasında yayılmış folklor nümunələrinə məsnəvilərində geniş vermiş və bu inanclardan ədəbi-bədii səviyyədə çox faydalanmışdır.

که را با شگونه بود پیرهن، به حاجت بود بازگشتن به تن  
تو زان ره که شد بازگونه نورد، یخواه از خدا حاجت بازگرد .  
[Şərəfnamə, 234]

*(Kim ki, köynəyini tərsinə geyinər. / Arzusu yerinə yetəndən sonra düzəldər.*

*Sənin bu dəfə döyüşdə işin tərs gətirdisə, / Allahdan arzunu, hacətini istə və qayıt gəl)*

Tərsinə köynək geyinmək Allahdan ehtiyacını istəmək üçün bir adət imiş, yəni ehtiyacını diləmək üçün köynəyini tərsinə geymiş adam məqsədinə çatdıqdan sonra yenə də onu düzünə geyinə bilərmiş. Sən də düşdüyün bu əyri, tərsinə olan yola dönmək üçün Allaha yalvar, hacətin, arzun yerinə çatar.

Bu hissədə müəllif “atəşə nal atmaq”, “keçi ayağına əfsun yazma”, “qızdırma ipi” (qızdırması olan adam üçün dua oxuyaraq sapa düyün vurma), pis nəzərə qarşı “göy muncuq”dan istifadə etmək kim inancları toplayaraq şərh etmişdir

مهر ازرق آورید به دست، وز پی چشم بد در ایشان بست  
[Yeddi gözəl, 233]

*(Göy muncuq gətirib, (o cavan) ələ, / Göz dəyməsin deyə üstünə bağlayır)*

“İskəndərnəmə”nin ikinci hissəsi “İqbalnamə”də İskəndərin hind alimi ilə sual cavabından aldığı parçanı məqaləsində yerləşdirən alim “göz dəyməyə”, “pis nəzər”ə qarşı inançı bəyan edir:

کسی را که چشمی رسد ناگهان، دهن دره اش اوفتد در دهان.  
رساننده چشم را جوش خون، بخاری ز پیشانی آرد برون.  
به این مرد و معنی شناسند و بس، که این چشم زن بود و آن پشم رس.  
سپند از پی آن شد افروخته، که آفت به آتش شود سوخته.  
فسونگر دگر گونه گفته است راز، که چون با سپاند آتش آمد فراز  
رسد بر فلک دود مشکین سپند، فلک خود ز ره باز دارد گزند.  
[İqbalnamə, 118]

*Birinə bəd nəzər dəyərsə əgər, / Dəyişər əhvalı tez-tez əsnəyər.*

*Bədnəzər olarsa əgər bir insan, / Alnı hərərətdən tərlər çox zaman.*

*Bu iki əlamət aydın göstərar: / Kimdir gözə gələn, kimdir bədnəzər.*

*Üzərrik yaxarlar göz dəyən üçün, / Od yaxıb-yandırar dərdi büsbütün.*

*Başqa bir bilici belə şərh edir / Üzərrik yananda tüstüsü gedir,*

*Qara pərdə kimi tutur havanı / Fələk də qaytarır dəyən bəlanı)*

**Nəticə:** Yekun olaraq onu demək istərdik ki, biz bu maraqlı araşdırmanı yalnız qısa formada xülasə edə bildik.

Tədqiqat işi əsasən aşağıdakı 5 bölmə üzrə öyrənilmiş, “Xəmsə” məsnəvilərindən olan beytlərə mənbə kimi müraciət edilmişdir:

1. Kinayə, məcazi məzmunlu və digər tərkiblərin türk dilindən fars dilinə tərcüməsi
2. Nizaminin əsərlərində Azərbaycan türkcəsinə məxsus zərbi-məsəllər
3. Şəhər və kənd əhalisinin həyat tərzinin təsviri
4. Nizaminin əsərlərində Azərbaycan musiqisi nümunələri
5. Xalq inanc və inanclarının təsvir edilməsi

Nizami və onun müasirləri Azərbaycan və Aran üslubu nümayəndələri folklor və şifahi xalq ədəbiyyatından çox bəhrələnmiş, adi xalq danışığını, ifadə və deyimlərini əsərlərində böyük məharət və bacarıqla işlətmişlər. Əsrlər keçməsinə baxmayaraq, hələ də o ifadələr, deyimlər bu gün də azərbaycanlılar arasında canlı dil nümunəsi kimi işlədilir, keçən əsrlər, illər onlara heç bir təsir göstərə bilməmişdir.

Müəllif belə bir doğru fikri müdafiə edir ki, bu cəhət ən çox Əbül-üla Gəncəvi, Xaqani Şirvani, Mücirəddin Beyləqani və Nizami Gəncəvi kimi şairlərin türk olmalarından irəli gəlir. Biz də burada müəlliflə tamamilə həmfikir olduğumuzu bildirib deyirik ki, həqiqətən, dahi Nizami bir türk dili daşıyıcısı olmaqla bir çox hallarda tərkibləri, idiomatik ifadələri, atalar sözlərini əsərlərində tərcümə edərək nəzmə çəkmişdir.

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**THE IMPLICATION OF TREASURY SINGLE ACCOUNT ON THE  
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Wudil\_Kano, Nigeria.**ABSTRACT**

The banking segment is the engine of any nation's economy. The economic status of any nation rest on how stable their banking industry is. In other words, any issue that affects banks also has an impact on the economy of the nation. This study assessed the implication of treasury single account on the performance of First banks Nigeria PLC; a study of first bank of Nigeria PLC. A sample of 200 participants was randomly selected across 50 branches of first banks in Plateau, Ondo, Bayelsa, Bauchi, Kaduna and Enugu state. Primary and secondary data were used for this study. Descriptive statistics such as percentage was used to analyse the socio-demographic variable of the respondents in this study and inferential statistics such as regression and correlation analysis were used to analyze the data to test the three hypotheses in this study with the aid of SPSS version 25 software. The results revealed that TSA policy which seeks to reduce Federal Government Deposit in the commercial banks has significantly reduce the level of banks liquidity. TSA policy which seeks to reduce FG Deposit in the commercial banks has significantly reduce Commercial Banks Deposit Mobilization TSA policy which seeks to reduce FG Deposit in the commercial banks has significantly reduce Loans and Advances. The study recommended that relevant regulatory bodies such as central bank of Nigeria (CBN), Nigeria Deposit Insurance Cooperation (NDIC) and the Nigeria Security and Exchange Commission (SEC) should which will drive the effective implementation of the TSA in the states and local governments in order to promote accountability and transparency at all levels of government. The banks should avoid over-reliance of government funds and source for funds from other sectors of the economy. Rural banking should be aggressively undertaken to mobilise funds from the un-banked among rural dwellers among other recommendations were made.

**Keywords:** TSA, Banks, FG deposit, Loans and Advances, Commercial Banks Deposit Mobilization.

## **INTRODUCTION**

The banking sector is the mainstay of any nation's economy. The stability of any nation's economy rests on the stability of the nation's banking sector. Similarly, most issues that affected the banking sector also have a relationship with the economy of that nation (Allison & Ndukwe, 2021; Kanu, 2016). In Nigeria, for the past decades, Money deposit banks have been the custodians of government funds. The banking sector in Nigeria has experienced several reforms and policies, some favourable, others unfavourable. Numerous banks did not survive these reforms (Igbekoyi, 2022). Before the introduction of TSA, government Ministries, Departments, and Agencies (MDA's) operated a multiplicity of accounts in the Money deposit banks. The practice then was that MDA's used part of the funds generated to fund their operation and remitted the residual to the federation account (Igbekoyi, 2022).

This gave rise to leakages, embezzlement of funds, inadequate budgetary and financial planning. Yet the highest beneficiaries of this condition were the banks who relied on deposits from government agencies and lent back to the government at high-interest rates. The banks were operating "armchair banking" as they no longer mobilized funds from other sectors of the economy.

In connection to these, the federal government directed all MDA's to close their accounts with deposit money banks and remit the balances into the federation account with the apex bank of Nigeria which was contained in the central bank of Nigeria (CBN) circular no BPS/CSO/CON/DIR/01/079; dated, February 25, 2015 and addressed to all commercial banks. The circular has the title "Commencement of Federal Government's Independent Revenue Collection Scheme under the Single Treasury Account (TSA) Initiative".

The provision of law for a single account began in 1954 with the introduction of the Oliver Lyttleton's constitution; the document discussed the status of the federation in Nigeria, which states that the apex bank has the authority to operate a single revenue account for the country. However, the law of single revenue account was in operation until 1967 when the Nigerian civil war economy headed by General Yakubu Gowon necessitated the need for multiple accounts to meet its obligations. This practice continued endlessly without regard for section 80(1) and section 162(1) of the 1999 constitution of the federal republic of Nigeria as amended (Mayowaak, 2015). The policy was re-introduced in 2004 under the Olusegun Obasanjo regime by the federal government's economic reform and governance programme. As a result of the immense pressure from the banking industry, on the probable adverse effects of the policy on

the effectiveness and efficiency of their operation, led to the discarding of the policy in 2005 (Pronto, 2016; Babatunde, Olanike, & Oladunmomi, 2021) It was however re-debuted in 2012 under Goodluck Jonathan regime, after a pilot scheme for the single account was ran using 217 ministries, departments, agencies as a test case. The pilot scheme saved the country about 500 billion nairas in frivolous spending but was partially implemented. The operation of treasury single account was officially implemented on Monday, 17th of September, 2015 under the administration of President Muhammadu Buhari (The Stalwart Report, 2015).

The implementation of the policy came with its challenges as the banks struggled, though it is an approach adopted by most developed and developing nations of the world as a control measure to deliver on some macro-economic objectives programmed. Sailendra, Pattanyuk, & Israel (2010), Onodi, Eyisi, & Akujor, (2020) posit that idle cash of MDAs in deposit money banks often flop to earn market-related remuneration and for this reason, the government is not in full control. The government in turn borrows from the pool of their own money (Robert, 2021). This unnecessary contradiction is what the TSA stands to correct. In an article This Day newspaper of 17th August 2016 titled “Counting the gains of Treasury Single Account”, Adeosun pointed out the fact that, as at December 2015, ₦ 2 trillion had been remitted to the coffers of the federal government, and as at first quarter of 2016 the figure had moved to N3 trillion. She said, “These achievements are a huge strategic significance in our national economic recovery efforts”

First Bank of Nigeria Limited established in 1894, was the premier Bank in West Africa, Nigeria’s number one bank brand, and the leading financial services solutions provider. The Bank was founded by Sir Alfred Jones, a shipping magnate from Liverpool, England. With its head office originally in Liverpool, the Bank commenced business on a modest scale in Lagos, Nigeria under the name, Bank of British West Africa (BBWA)

In 1912, the bank acquired its first competitor, the Bank of Nigeria (previously called Anglo-African Bank) which was established in 1899 by the Royal Niger Company. In 1957, the Bank changed its name from Bank of British West Africa (BBWA) to Bank of West Africa (BWA). In 1966, following its merger with Standard Bank, UK, the Bank adopted the name Standard Bank of West Africa Limited and in 1969 it was incorporated locally as the Standard Bank of Nigeria Limited in line with the Companies Decree of 1968.

In 1979 and 1991, the bank's name was changed to First Bank of Nigeria Limited and First Bank of Nigeria Plc, respectively. In 2012, the Bank renamed itself First Bank of Nigeria

Limited as part of a reorganization that resulted in FBN Holdings Plc ("FBN Holdings") detaching its commercial business from the rest of the First Bank Group, in order to comply with the new Central Bank of Nigeria regulations (CBN). First Bank had 1.3 million shareholders worldwide, was listed on the Nigerian Stock Exchange (NSE), and had an unlisted Global Depository Receipt (GDR) program, all of which were transferred to FBN Holdings in December 2012.

As the global operating environment evolves, First Bank has kept pace, responding to the dynamic needs of its customers, investors, regulators, host communities, employees, and other stakeholders. Through a balanced approach to plan execution, First Bank has consolidated its industry leadership by maintaining trans-generational appeal. Thus, the Bank has continuously boosted its customer base which cuts across all segments in terms of size, structure, and sectors. Previous scholars have written extensively on treasury single accounts in Nigeria (Gwaison, Maimako, & Maimako 2018; Ojong, Agba, Eteng, Maruf, Akintola, & Usung, 2021). However, this study is an extension of the past studies which did not cover the individual firm to assess the implication of a single treasury account such as the first bank of Nigeria plc. It is against this background that this study examined the implication of treasury single account on the performance first bank of Nigeria plc.

### **Objectives of the Study**

The general objective of this study is to assess the implication of treasury single account on the performance of the first bank of Nigeria plc. More specifically, the objective includes:

1. to examine the implication of treasury single account on the liquidity of first bank Nigeria plc
2. To assess to what extent of the implication of treasury single account on deposit of first bank Nigeria plc.
3. To identify the implication of treasury single account on loan and advance of first bank Nigeria Plc.

### **Research Questions**

In line with the study objectives, the following questions were raised

- I. what is the implication of treasury single account on the liquidity of first bank Nigeria plc
2. What is the implication of treasury single account on bank deposits of first bank Nigeria plc?
3. What is the implication of on loan and advances of first bank Nigeria plc?

Hypotheses of the Study



The following null hypotheses were tested at a 0.05 level of significance.

HO<sub>1</sub>: there is no significant effect of a single treasury account on liquidity in first bank Nigeria plc

HO<sub>2</sub>: there is no significant effect of a single treasury account on bank deposits in first bank Nigeria plc

HO<sub>3</sub>: there is no significant effect of a single treasury account on loan and advances in first bank Nigeria plc

### **Conceptual Framework**

#### **Concept Treasury Single Account (TSA)**

According to Igbekoyi, (2022), TSA has covered a large part of the world's public sector accounting and finance in the past three decades. The study, further describe as the system of budget that is executed to carry out to take into account a number of fundamental principles, which traditionally include, general principles of the organization and building of a budget system, namely: budget transparency, the principle of separation of revenue, expenditure and sources of financing the deficit budget and other principles. The basic principles are reflected in the legislation of the majority of both federal and unitary state in the world. A treasury single account is a public accounting system under which all government revenue, receipts and income are collected into one single account, usually maintained by the country's central bank and all payments done through this account as well. The purpose is primarily to ensure accountability of government revenue, enhance transparency and avoid misapplication of public funds.

According to Adeolu (2015) Treasury single account is a public sector accounting system by which all revenue, receipts and payment of the government are collected into a single account, which is usually maintained by the apex bank of a country, and payments are done through the same account. It is also a tool used for the effective management of government finances, banking and cash position. The main aim is to ensure accountability of government revenue, enhance transparency and avoid misapplication of public funds. Onyekpere, (2015) Quarm, Sam-Quarm, & Sam-Quarm, (2020).Pointed that the treasury single account is a unified structure of government bank accounts enabling consolidation and optimal utilization of government cash resources. It is a bank account or a set of linked bank accounts through which the government transacts all its receipts and payments and gets a consolidated view of its cash position at any given time. Nelson, Adeoye, & Ogah, (2015) are of the opinion that treasury single account is an account that all ministries and government departments' account balances

are collated by the Central Bank, whereas there is an intermediate account for every ministry and department that shows the total of debit and credit transactions. Thus, the total amount will be reflected eventually on the treasury single account at the end of the day. It is a financial policy introduced by the federal government to consolidate all inflows from the country's ministries, departments, and agencies (MDAs) that is traceable to a single account.

Treasury Single Account (TSA) is one of the financial policies implemented by the federal government of Nigeria to consolidate all the revenue from all MDA's in the country by way of deposit into commercial banks traceable into a single account at the Central Bank of Nigeria (Kanu, 2016). Section 80 (1) of the 1999 Constitution as amended states that "all revenue or other money raised or received by the Federation (not being revenue or other money payable under this Constitution or any Act of the National Assembly into any other public fund of the Federation established for a specific purpose) shall be paid into and form one Consolidated Revenue Fund of the Federation". IMF, (2010) highlighted three essential features of TSA: First, the government banking arrangement should be unified, to enable the ministry of Finance (MOF) (or treasury) to have oversight responsibility for, over government cash flows in and out of these bank accounts. Second, no other government agency operates bank accounts outside the treasury single account arrangement. Third, the consolidation of resources should be comprehensive, and encompass all funds both budgetary and extra-budgetary.

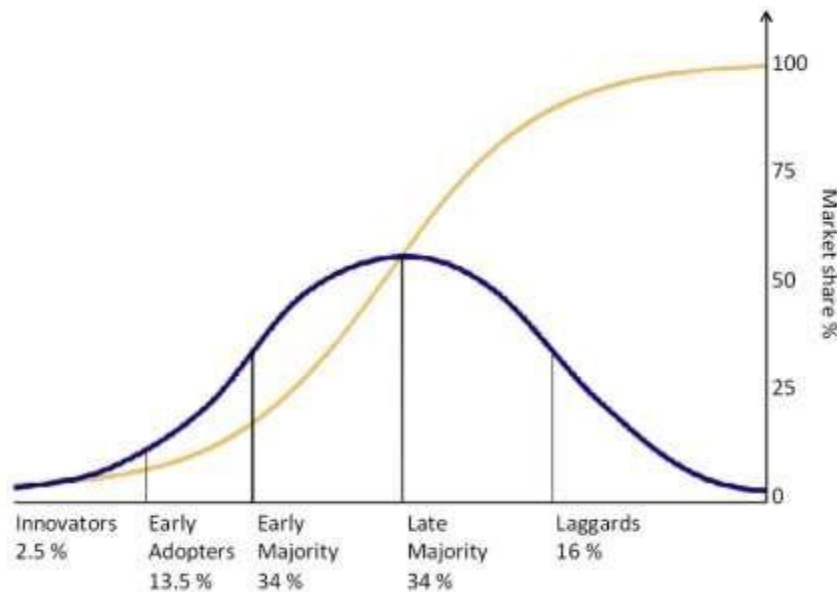
Therefore, the TSA is a payment system in which all revenues due to the government are paid into a unified account domiciled with the CBN. Its objective is to ensure fiscal discipline and transparent management of the nation's finances (Kanu, 2016).

According to (Yusuf, 2016), TSA is a unified structure of government bank accounts enabling consolidation and optimal utilization of government cash resources. It is a bank account or a set of linked bank accounts through which the government transacts all its receipts and payments and gets a consolidated view of its cash position at any given time. This presidential directive would end the previous public accounting situation of several fragmented accounts for government revenues, incomes and receipts, which in the recent past has meant the loss or leakages of legitimate income meant for the federation account. The TSA is a process and tool for effective management of government's finances, banking and cash position. In accordance with the name, it pools and unifies all government accounts through a single treasury account.

## Theoretical Review

### Innovation diffusion theory.

Innovation diffusion theory (IDT) is a seminal theory in the communications literature that explains how innovations are adopted within a population of potential adopters. The concept was first studied by French sociologist Gabriel Tarde, but the theory was developed by Everett Rogers in 1962 based on observations of 508 diffusion studies. The four key elements in the theory are innovation, communication channels, time, and social system. Innovations may include new technologies, new practices, or new ideas, and adopters may be individuals or organizations. At the macro (population) level, IDT views innovation diffusion as a process of communication where people in a social system learn about new innovation and its potential benefits through communication channels (such as mass media or prior adopters) and are persuaded to adopt it. Diffusion is a temporal process; the diffusion process starts off slow among a few early adopters, then picks up speed as the innovation is adopted by the mainstream population, and finally slows down as the adopter population reaches saturation.



**Figure 1.** S-shaped diffusion curve

The cumulative adoption pattern therefore an S-shaped curve, as shown in Figure 1.1, and the adopter distribution represents a normal distribution. All adopters are not identical, and adopters can be classified into innovators, early adopters, early majority, late majority, and laggards based on the time of their adoption. The rate of diffusion also depends on characteristics of the social system such as the presence of opinion leaders (experts whose opinions are valued by others) and change agents (people who influence others' behaviors). At

the micro (adopter) level, Rogers (1995) suggests that innovation adoption is a process consisting of five stages: Namely; knowledge, persuasion Decision, implementation, and confirmation. This theory is related to the study as it presents the process of newness, implementation, and consequences of the innovation as regards the Treasury Single Account (TSA) policy.

### **Stakeholder's Theory**

"A stakeholder is any group or individual who can affect or is affected by the achievement of the organization objectives." (Zhong, Verma, Wei, Morrision, & Yang, 2022) Stakeholders are people who have classifiable relationships with the organization. The purpose of an organization is to manage the interest, needs, and viewpoints of its stakeholder. Stakeholder management is a major thought to be fulfilled in an organization (Friedman & Miles, 2006). The implementation of treasury single account could be likened to stakeholders 'theory; this is because the adoption of treasury single account was as a result of the pressure from stakeholders/citizens who are majorly against corruption. The stakeholder's theory suggests that government should take into consideration the interest, needs, and viewpoints of the stakeholders/citizens, and some responses should be informed of strategic opinions. It also provides insight to factors that motivate the federal government to implement treasury single accounts (Ekubiat & Ime, 2016).

### **Public Finance Management Theory**

This theory deals with matters relevant to the financing of public sector. The theory presumes that all aspects of resource mobilization and expenditure management should be properly considered by governments for the benefit of the citizen. Public finance management are laws, rules, and processes that are used by sovereign nations for revenue mobilization, allocation of public funds, the undertaking of public spending, accounting for such funds, and auditing of the results. It plays an important role in the governance process the collection of sufficient resources from the economy in an appropriate manner, and the efficient use of collected resources constitute good public financial management. The major aim for the implementation of treasury single account is to avoid misappropriation of public funds (Ekubiat & Ime, 2016).

### **Modern Money Theory (MMT)**

This is a macroeconomic theory that analyses and describes the modern economies as the economy in which the national currency is fiat money, that is a currency established and created as money by the government. The modern money theory, majorly contributed in the study of

the relationship between the treasury and the central bank. The central bank is the treasury's bank; it receives payments on behalf of the treasury. The central bank stands between the treasury and the spending unit, as well as the treasury and tax payers making payments to the government (Randall, 1998). The modern monetary theory gives insights on how monetarily sovereign governments operate and their impact on the economy. The modern monetary theory claims that a sovereign government's finances are nothing compared to those of households and firms. The sovereign government cannot be insolvent in its own currency. Thus, it can always make payments when due in its own currency. Governments don't need to borrow their own currency in order to spend (Randall, 2012) This theory shows the relevance of aggregating the central bank and the treasury into a government sector that finances itself through the creation of money, in order to ensure the smooth running of the monetary and fiscal policy (Ekubiat & Ime, 2016).

### Empirical review

Author(s)and Year	Topic	Methodology	Country	Findings	Gap
Udo & Esara, (2016)	The adoption of treasury single account (TSA) by state governments of Nigeria: benefits, challenges, and prospects	Descriptive cross-sectional survey(t-test)	Nigeria	TSA adoption and full implementation by the state governments is of greatest benefit	
Kanu, (2016)	The positive effect of the implementation of treasury single account and economy	Descriptive cross-sectional survey(chi-square)	Nigeria	The Implementation of treasury single accounts in the public accounting system impacted negatively the liquidity base and the performance of the banking sector in Nigeria.	
Oti, Igbeng, & Obim, (2016)	The appraisal of policy impact of treasury single account in Nigeria	survey and exploratory research design(t-test)	Nigeria	Bankers decry the distortion of their liquidity management plan, the federal government on the other hand claims a huge success	

Chukwudi, Ogbonna, Harrison, & Amuji (2018)	The impact of treasury single account (TSA) on the performance of banks in Nigeria.	multivariate model(regression)	Nigeria	Diamond Bank Nigeria Plc, observed a negative relationship between liquidity ratio and capital adequacy. First bank, observed that there were both positive and fairly strong relationships between the liquidity ratio and capital adequacy
Ndubuaka, Oheagbu, & Nsimoh (2017)	The impact of TSA on the performance of the banking system in Nigeria.	Panel Regression	Nigeria	TSA had a significant impact on Credit to the Private Sector, Deposit Mobilization, and Loans and Advances.
Quarm, Sam-Quarm, & Sam-Quarm,. (2020).	The Ramifications of the Treasury Single Account, the Platform, and Government Cash Management in Developing Economies in the Wake of the Covid-19 Pandemic	cross-sectional survey	Ghana	<b>The</b> government lacking efficient and effective control over its cash resources will definitely pay for its institutional deficiencies in multiple ways
Otse, (2021).	Approach to public expenditure management and the effect of treasury single accounts system on public university administration	Reconnoiter survey (performance ratio analysis method)	Nigeria	There was no significant change in value to the administration of the universities, university autonomy was eroded, bureaucratic bottlenecks increased, excess power to the CBN, and too many interests in oversight functions.
Ojong, Agba, Eteng, Maruf, Akintola,, & Usung, (2021).	Treasury Single Account (TSA) and Revolving Funds in Public Institutions.	Survey method (Pearson Product Moment Correlation Coefficient )	Nigeria	There is a significant link between appropriation control of TSA, cash management of TSA, payment mechanism

				of TSA, and DRF in public hospitals.	
Igbekoyi, (2022).	The Treasury Single Account System and Financial Stability in Nigeria	Time series regression	Nigeria	TSA system had a negative impact on government debt performance, with a significant negative impact on advances from commercial banks and external debt finance charges. However, it had an insignificant negative impact on overdrafts from Central bank of Nigeria (CBN). In the case of stock market performance, it was revealed that the TSA system had a significant negative impact on stock market liquidity and stock market size.	
Onodi, Eyisi,& Akujor, (2020).	Treasury Single Account (TSA) implementation and financial performance of commercial banks in Nigeria	Panel Regression	Nigeria	customers' deposit has a significant effect on profit after tax, return on assets and return on equity of commercial banks in Nigeria.	

### Methodology

This research, adopted ex post facto research design to show the influence of independent variables on the dependent variable and test the claim using statistical hypothesis testing techniques. Ex post facto research then is a method of teasing out possible antecedents of events that have happened but cannot, be manipulated by the investigator. The treasury single account was already implemented in 2015. Hence, this study assesses the implication of treasury single account on the performance of first bank Nigeria Plc. This study used a questionnaire to generate responses from the bank employee and customers of First bank plc titled Treasury Single Account Effectiveness Questionnaire (TSAEQ). Secondary sources such as the Central Bank of Nigeria Statistical Bulletin and First Annual Reports. This includes federal government deposit which was used as a proxy for TSA, first bank liquidity, first bank deposit, and first bank loans and advances were used as proxies for performance as observed in some previous

literatures. Data were used from 2012-to 2020. The population of the study is made up of all the 1516 employees in the 62 branches of the first bank in Plateau State, Bauchi state, Ondo state, Enugu State, Kaduna State, and Bayelsa State Nigeria. (First bank, 2020). A simple random sampling method was used for the sample selection. The sample of the study consisted of 255 participants mainly employees from 50 first bank branches selected from each state in the six geopolitical zones namely: Plateau state, Bauchi State, Kaduna State, Enugu State Ondo, and Bayelsa State respectively. According to Mugenda and Mugenda (2003), a sample size of 10% of the sample size is considered adequate for a survey study. The 255 participants are more than 10% of the total population of employees of the first bank in the 6 states Nigeria, hence the choice of this sample is Justified. This study will adopt simple random sampling techniques. Descriptive and inferential statistics were used to analyze the data collected. Descriptive statistics were used to analyze the socio-demographic variable of the respondents. However, inferential statistics such as regression and correlation analysis were used to analyze the data to test the hypotheses with the aid of SPSS version 25 software.

**Model Specification**

This model was adapted from the work of Gwaison, Maimako and Maimako (2018) investigating the Impact of the treasury Single Account (TSA) on the performance of the Nigerian economy. The model was modified to examine the implication of the Treasury Single Account on the performance of First bank Nigeria PLC as follow to form the analytical model in equation 4,5, and 6 respectively.

Conceptual Model

- 1.  $BL=f(FG Dp)$  .....1
- 2.  $BD=f(FG Dp)$  .....2
- 3.  $LAD=f(FG Dp)$ .....3

Where

- BL = First Bank Liquidity
- BD = First Bank Deposit Mobilization
- LAD =First bank Loans and Advances
- FG Dp= Federal Government Deposit

From the conceptual model in equations 1,2, and 3. We derive the analytical model in equation 4,5, and 6 respectively

- 1.  $BL= \beta_0+\beta_1 (FG Dp) +\varepsilon$  .....4



2.  $BD = \beta_0 + \beta_1 (FG Dp) + \varepsilon$  .....5

3.  $LAD = \beta_0 + \beta_1 (FG Dp) + \varepsilon$  .....6

Where

$\beta_0$  = Intercept

$\beta_1$  = Coefficient of the explanatory variable (slope)

$\varepsilon$  = Represents the error term in the model

### Results Presentations and Interpretations

**Table 1.** Analysis of Responses from the Questionnaire

Items	No. of Respondents	Percentage (%)
Questionnaire distributed	255	100
Questionnaire retrieved	211	82.74
Un-retrieved Questionnaire	44	17.25
Questionnaire used in the analysis	200	78.43
Unable questionnaires	11	4.31

**Source:** Field survey, 2021

255 questionnaires were administered to respondents from selected first bank branches in Plateau, Bauchi, Kaduna, Enugu, Ondo, and Bayelsa states respectively. From the total questionnaires distributed, 211 (82.74%) were retrieved while 44 (17.25%) were not retrieved because every effort to collect them from the respondents failed. 11 (4.31%) of the retrieved questionnaires were not used because they were not scored properly by the respondents. Therefore, 200 (78.43%) of the total questionnaire were used in the analysis of this study.

**Table 2: Socio-Demographic Variables of the Respondents.**

<b>Statement of Items</b>		<b>Frequency</b>	<b>Percentage (%)</b>
<b>Age Range</b>	Below 25years	41	20.5
	26-35years	54	27.0
	36-45years	77	38.5
	46-55years	21	10.5
	56years and above	7	3.5
	<b>Total</b>	<b>200</b>	<b>100.0</b>
<b>Gender:</b>	Male	80	40.0
	Female	120	60.0
	<b>Total</b>	<b>200</b>	<b>100.0</b>
<b>Marital Status</b>	Single	86	43.0
	Married	89	44.5
	Divorced	12	6.0
	<b>Total</b>	<b>200</b>	<b>100.0</b>
<b>Years of Experience</b>	1-10years	62	31.0
	11-20years	82	41.0
	21-30years	50	25.0
	31years and above	6	3.0
	<b>Total</b>	<b>200</b>	<b>100.0</b>
<b>Academic qualification</b>	ND/NCE	82	41.0
	B.Sc/HND	88	44.0
	M/Sc/PhD	20	10.0
	Others	10	5.0
	<b>Total</b>	<b>200</b>	<b>100.0</b>
<b>Position/Level</b>			
	Junior Staff	62	31.0
	Senior Staff	82	41.0
	Management Staff	56	28.0
	<b>Total</b>	<b>200</b>	<b>100.0</b>

**Source:** Author's Computations SPSS version 25

Table 2 revealed that 40% of the respondents were male, while 60% were female. This implies that majority of the respondents were female who dominate their male counterparts in selected first bank branches. The findings revealed that 20.5% were aged below 25 years, 27.0% were 26-35 years, 38.5% were 36-45 years, 10.0% were 46-55 years and 3.5% were 56 years and above. This means majority of the respondents were 36-45 years. More so, 43.0% of the respondents are single, 44.5% are married and 6% are divorce. This means majority of the respondents were married. The findings further revealed that 41.0% of the respondents had ND/NCE, 44.0% had HND/B.Sc, 10% had M.Sc /Ph.D and 5% had others not specify qualifications. This implies that most of the respondents have HND/B.Sc level of education. Hence, they can be more objective in their response. The years of experience shows that 31.0% had 1-10 years experience in first bank, 41.0% had 11-20 years experience, 25.0% had 21-

30years of experience and 3.0% had 31years and above years of experience. This implies that most of the respondents have 11-20years experience. Hence, they can be more reliable in their response. Lastly, 31.0% of the respondents are junior staff, 41.0 were senior staff and 28% were management staff. This implies that most of the respondents were senior staff. Therefore, they will be more reliable in their response since they are enlightened.

### Test of Hypothesis

Hypothesis 1: There is no significant effect of a single treasury account on the liquidity of first bank Nigeria plc

**Table 1:** Regression analysis between TSA (FG Deposits) and first banks Nigeria liquidity

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	Beta		
1	(Constant)	-.566	.085		-6.685	.002
	The implication of treasury single account on first Nigeria bank liquidity	.373	.027	.703	13.928	.002

**Source: Author's Computations SPSS version 25**

$$\text{Regression Model ; BL} = -0.566 + 0.373(\text{FG Dp})$$

The regression model explains that Federal Government Deposit (FG Dp) has a positive relationship with the first bank Nigeria Liquidity (BL). An increase in One Naira of FG Dp would lead to a proportionate increase of 0.373Naira and vice versa. The correlation coefficient of 70.3 percent indicates a strong positive relationship between Federal Government Deposit and first Bank Nigeria liquidity. The P-value was 0.002 which was less than 0.05 means that the P-value is statistically significant at the 5% level. Since t cal (-6.685) is outside our acceptance region (+/- 1.96), we, therefore, reject the null hypothesis and uphold the alternative hypothesis. That is, there is a significant impact of FG Deposit on first Bank Nigeria Liquidity. Therefore the TSA policy which seeks to reduce FG Deposits in the Commercial banks would significantly reduce first bank Nigeria Liquidity.

Hypothesis 2: there is no significant effect of a single treasury account on bank deposits in first bank Nigeria plc

**Table 2:** Regression analysis between TSA (FG Deposits) and first bank Nigeria deposit

<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value.
		B	Std. Error	Beta		
1	(Constant)	-.666	.080		-8.318	.001
	The implication of treasury single account on first bank Nigeria	.326	.020	.751	16.001	.001

**Source: Author's Computations SPSS version 25**

Regression Model; BD= -0.666 +0.326(FG Dp)

The regression model explains that Federal Government Deposit (FG Dp) has a positive relationship with first bank Nigeria Deposit (BD). An increase in One Naira of FG Dp would lead to a proportionate increase of 0.326 Naira in the first bank Nigeria Deposit and vice versa. The correlation coefficient of 75.1 percent indicates a strong positive relationship between Federal Government Deposit and the first bank Nigeria Deposit. The P-value was 0.001 which was less than 0.05 means that the P-value is statistically significant at 5% level. Since t cal (-8.318) is outside our acceptance region (+/- 1.96), we, therefore, reject the null hypothesis and uphold the alternative hypothesis. That is, there is a significant impact of FG Deposit on Commercial Bank Deposit. Therefore, the TSA policy which seeks to reduce FG Deposit in Commercial banks would significantly reduce first bank Nigeria Deposit

Hypothesis 3: there is no significant effect of a single treasury account on loan and advances in first bank Nigeria plc

**Table 3:** Showing Regression, Correlation analysis between TSA (FG Deposits) and Loans and Advances in first bank Nigeria plc

<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value.
		B	Std. Error	Beta		
1	(Constant)	-.928	.081		-11.412	.000
	The implication of treasury single account on loans and advances of first banks Nigeria.	.382	.020	.803	18.940	.000

**Source: Author's Computations SPSS version 25**

Regression Model  
LAD = -0.928+ 0.382 (FG Dp)

The regression model explains that Federal Government Deposit (FG Dp) has a positive relationship with loans and advances in first bank Nigeria plc. An increase in One Naira of FG Dp would lead to a proportionate increase of 0.382 Naira and vice versa. The correlation coefficient of 80.3 percent indicates a strong positive relationship between Federal Government Deposit and loans and advances of first bank Nigeria plc. The P-value was 0.000 which was less than 0.05 means that the P-value is statistically significant at the 5% level. Since t cal (18.940) is outside our acceptance region (+/- 1.96), we, therefore, reject the null hypothesis and uphold the alternative hypothesis. That is, there is a significant impact of FG deposits on loans and advances of banks in Nigeria. Therefore the TSA policy which seeks to reduce FG Deposits in the Commercial banks would significantly reduce loans and advances in the first bank Nigeria plc.

### **DISCUSSION OF FINDINGS**

The regression model explains that Federal Government Deposit (FG Dp) has a positive relationship with First Bank Nigeria Liquidity (BL). An increase in One Naira of FG Dp would lead to a proportionate increase of 0.373Naira and vice versa. This agreed with the findings of Kanu (2016), Chukwudi, Ogbonna, Harrison, and Amuji (2018), Adetunmobi, Adesina, Faboyeda, and Adejana(2017) that also confirmed that the implementation of Treasury Single Account impacted negatively on the liquidity base of banks in Nigeria. It was recommended that if the policy is executed it will lead to the prompt payment of all income going into the nation's purse without the intermediation of multiple banking arrangements.

The regression model explains that Federal Government Deposit (FG Dp) has a positive relationship with the first bank Nigeria plc Deposit (BD). An increase in One Naira of FG Dp would lead to a proportionate increase of 0.326 Naira in first bank Nigeria plc Deposit and vice versa. This agreed with the findings of Olowokure and Adetoso (2017) and Ndubuaka, Oheagbu,and Nsimoh (2017) also confirm that the implementation of the Treasury Single Account impacted on the deposit of banks in Nigeria.

The regression model explains that Federal Government Deposit (FG Dp) has a positive relationship with loans and advances in first bank Nigeria plc (LAD). An increase in One Naira of FG Dp would lead to a proportionate increase of 0.382 Naira and vice versa. This agreed with the findings of Ndubuaka, Oheagbu,and Nsimoh (2017) and Olowokure and Adetoso

(2017) that also confirm that the implementation of the Treasury Single Account impacted the loans and advances of in first bank Nigeria plc

### **CONCLUSIONS/RECOMMENDATIONS**

The policy has greatly improved the management of government revenue. Its implementation has paved way for the timely payment and capturing of all revenues going in the government treasury, without the intermediation of multiple banking arrangements. Besides, the system has reduced the mismanagement of public funds by revenue-generating agencies. It is also expected to help check excess liquidity, inflation, high-interest rates, round-tripping of government deposits, and the sliding value of the naira. In view of these benefits, we call for strict compliance with the directive on TSA by the relevant government organizations. The implementation of the order will, however, require the cooperation of the National Assembly with the Executive arm to ensure strict compliance by the MDAs. The fears that have been raised about the implications of the new measure are hardly necessary. The implementation of TSA has a positive relationship with First Bank Nigeria liquidity, deposit and loan, and advances

Based on the findings of the study, the followings recommendations are made:

1. Relevant regulatory bodies such as CBN, NDIC and SEC should which will drive the effective implementation of the TSA in the states and local governments in order to promote accountability and transparency at all levels of government.
3. To cushion the liquidity impact on the financial system, the central banks of Nigeria (CBN) should ensure an orderly migration of cash balances from the first bank accounts to the TSA should be considered and complemented with monetary policy measures.
4. The banks should avoid over-reliance on government funds and source funds from other sectors of the economy. Rural banking should be aggressively undertaken to mobilize funds from the un-banked among rural dwellers.
5. The government should find other avenues to encourage the private sector. The policy however should not be killed by policy intricacies.

6. The choice of the TSA should be informed and guided by the availability of clear operational basis technology infrastructure that supports the implementation of the model of their choice. CBN should go beyond the guidelines and put in place measures to correct any lapses or negative impact of the policy both on the banking sector and the economy at large.

7. First Banks should source funds from other sectors of the economy; more than 50% of the population of Nigeria does not have access to financial services. Savings and investments should be encouraged instead of people keeping their money under their pillow. It entails that unwavering commitment and sincerity of purpose are needed for the system to work effectively.

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**IMPACT ON RECENT MEGA RAIN FLOOD IN SINDH ON POVERTY IN  
PAKISTAN: A CASE STUDY OF SINDH****Shoukat RAFIQUE**

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**ABSTRACT**

The current research investigates Impact on Recent Mega Rain Flood in Sindh on Poverty in Pakistan: A Case study of Sindh. Data were collected from Eight most vulnerable flood affected Districts i.e. Ghotki, Sukkur, Khairpur Mirs, Larkana, Qambar Shahdakkot, Shikarpur, Kashmore and Dadu. It was revealed that after heavy rain disaster in Sindh affected three million people left their homes without getting anything from their belongings. In many cases specially in K.N.Shah (DADU) people evacuated their houses in one hour time. In this situation OGDCL come forward and rescue the people in all districts by providing tents, Ration and cooked foods. It was revealed that due to poor management in all districts 1200 people were died and thousands of Livestock losses in all districts. Dadu district is more affected compare to whole Pakistan. The flood victim people are living in Schools, Colleges and Pacca Bands where few N.G.Os are supporting them. According to UN 12 million people directly affected in flood in Sindh and overall 20 million people displaced from various districts.

**Key Words:** Recent Mega, Rain/Flood, Poverty

## INTRODUCTION

Corporate Social Responsibility (CSR) is an integral part of OGDCL's business model as the Company believes in responsible business conduct while treating society as a stake holder beside, obligatory commitments with the Federal, Provincial and local Government, Company also earmarks a portion of its profit for public welfare programs. A low-pressure area developed over the Bay of Bengal that moved very rapidly towards westward and can be seen in the charts given below over Central India on both 850 hpa and 500 hpa geopotential heights on 15<sup>th</sup> of August. The low turned into well-marked low and remained persistent for the next two days with its extension over Southeast Sindh. Meanwhile, another Low-Pressure system was developed over the Bay of Bengal and moved very rapidly towards westward and merged with the seasonal low on 20-27<sup>th</sup> of August, 2022.

OGDCL has always been the first to come to the rescue of affected communities in times of national emergencies such as famine, drought, earthquakes, floods, accidents etc. The Company provides immediate financial or material support to people in financial crisis. The types of assistance offered are:

- Tents
- Rashon Bags
- Hygiene kits
- Mosquito nets
- Medical Camps/ Assistance



In recent Mega Flood in Sindh affected 2 million People in Sindh. CSR of OGDCL provided Rashon bags, Medical camp and cook foods, tents, Hygiene Kits, and Mosquito nets to the various flood affected area in Sindh, Baluchistan, Punjab and KPK.



Pakistan began receiving abnormally heavy rain in mid-June, and, by late August, drenching downpours were declared a national emergency. The southern part of the Indus River, which traverses the length of the country, became a vast Manchar lake District Dadu. Villages have become islands, surrounded by putrid water that stretches to the horizon. More than 1,500 people have died. Rain/Floodwaters could take months to recede.

The deluges were made worse by global warming caused by greenhouse-gas emissions, scientists said Thursday, drawing upon a fast-growing field of research that gauges the influence of climate change on specific extreme weather events soon after they occur and while societies are still dealing with their shattering consequences.



During recent flood Sindh recorded highest rain fall range 1200 mm to 15,00 m.m due to Poor governance and mismanagement, thousands of people were dying and also 20,000 livestock animals drown during the flood.

A Public health expert, who was part of response teams led by an international non-profit organisation after the 2022 flood hit millions of people in Sindh Province badly affected Dadu District. “With most of the flood affected areas having limited access to safe drinking water, the biggest threat is from waterborne diseases such as diarrhoea, typhoid, and cholera. Also, mosquito breeding that has increased because of stagnant water may also lead to high numbers of malaria and dengue cases, which Pakistan has already been grappling with three district which were badly affected i.e Dadu, Kamber Shahdadkot and Khairpur Mirs.

**EXERGY PERFORMANCE ASSESSMENT OF HYBRIDIZE-NANOFUIDS  
ZEOTROPIC BLEND AS REFRIGERANT REPLACEMENT IN VAPOR  
COMPRESSION REFRIGERATION SYSTEM**

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**ABSTRACT**

Refrigeration plays a significant role in the wellbeing of occupants in rural and urban areas while it also contribute positively to daily activities in domestic, commercial and industrial sectors. However, the conventional refrigerants used has a negative impact on the ecosystem while the power intake of refrigeration systems using these refrigerants is equally high, necessitating the need for reduction in energy intake and the menace caused by the working fluid. The performance of eleven (11) different sample compositions of hybrid-nanofluids zeotropic blend ( $\text{TiO}_2/\text{Al}_2\text{O}_3/\text{CuO}$  by weight) based on exergy tools was investigated in this study. The primary objective was to understudy the various sample compositions using second law approach, identify the areas and locations where irreversibility occurs in each sample, and to determine the best optimum performance in order to identify the one with superior enactment within the selected ratios. Different tests on global parameters and thermophysical properties were experimentally examined, and almost all the samples were observed to enhance healthy upshots, indicating superior heat transmission efficiency. Similarly, the viscosity survey revealed that the novel refrigerants rendered suitable outcome than the orthodox base oil, signifying better propelling capacity of compressors with optimum operating parameters. Therefore, with proper selection in composition, hybrid-nanofluids zeotropic mixtures are environmentally friendly with good characteristics healthier than CFCs and HCFCs, and can offer healthier compressor/refrigerator working fluid substitute for future applications.

**Key Words:** Exergy efficiency, Exergy destruction, Power consumption, Heat transfer, Hybrid-nanofluids zeotropic, Eco-friendly refrigerant.

## 1. INTRODUCTION

One of the greatest achievement by scientists in the 20<sup>th</sup> century was the conception of refrigeration system which has over the years contributed vastly to global comfort, commercial and domestic mainstays for viable development. However, it is imperative to reduce the negative discharge of refrigerants on the atmosphere and energy ingestion of fridges and air conditioners. Perkins 1830s introduced the first generation of refrigerants, with the discovery of vapor-compression device. Afterwards, any fluid that could enable refrigeration system function effectively was used as refrigerants, most of which are toxic, while others were highly volatile (Babarinde *et al.*, 2014). Chlorofluorocarbons (CFC) 11 and Hydrochlorofluorocarbons (HCFC) 22 from discoveries in 1930s were the refrigerants of choice used in the cooling industry. Anxieties aroused between 1970s and 1980s, about the weakening of ozone stratum or whether CFCs could be liable to the abrupt escalation of universal warming danger for wellbeing of the planet. The threat pose on the environment paved way for Montreal protocol in 1987 at the Vienna Resolution to enforce the rejection of ozone draining substances (ODSs) and subsequent prohibition of any HCFC consumption on refrigerators. This intensified scientific researches on improving refrigeration energy efficiency, greenish performance and other methods towards developing a novel technique of heat transmission fluids in refrigeration systems. By so doing, nano-zeotropic and nanolubricants which show a proven boost on the service effectiveness of cooling systems were embraced. The idea was to observe where irreversibility occurs based on second law of thermodynamic, so as to identify the areas where losses occur in the system and to determine the way to go about improving the system. Nano-zeotropic mixtures show brilliant physiognomies and material properties, which stand to advance effective working process of refrigerators. Vapour compression systems discharges quite a number of heat to the surroundings which take place through a finite temperature difference. In view of this, exergy analysis as well as exergy equilibrium offer adequate understanding on how and where the enhancement in the system (Yumrutas *et al.*, 2002). Meanwhile, several scholars have investigated the various methods of improving the performance of refrigeration system (Rasti and Hatamipour, 2013; Joybari *et al.*, 2013), but merely concentrated on the reform of the system design modules.

A number of investigational report have been established in literature concerning HC and HFC as well as their combination substitutes to R134a. Amongst these studies is the combination of three hydrocarbons (30% propane, 55% n-butane, 15% iso-butane) which showed a brilliant

output as compare to R134a. Similarly, Fatouh and Kafafy (2006) carried out an experimental study on the performance of household refrigerator operating with LPG and various controls to substitute R134a. The results revealed that energy intake, cooling time and compression ratio with the LPG were lesser than those of R134a with almost 4.3%, 7.6%, and 5.5% respectively. Furthermore, LPG performance coefficient was 7.6% greater than that of R134a. From the outcome, LPG is a striking standby for R134a in home fridges. Taiwo *et al.* (2015) conducted an experiment on the performance of VCRS via LPG as auxiliary to R134a. Results indicated a COP of 9.5 % with a reduction energy consumption of 12% paralleled to R134a. Thermal conductivity reduction affected the energy storage, melting and solidification degrees, hence, causing a lengthy system reaction time. Nevertheless, this drawback can be improved by fins with nanoparticles concentration on advancement solid-liquid boundaries (Mahdi and Nsofor, 2017). Pryazhnikov *et al.*, (2017) conducted a study, and established that thermal conductivity of nanofluids is not only influenced by unit application but also by mass, product size and the particular fluid itself. Dossat and Horan (2001) used  $Al_2O_3$  nano-refrigerants to explore the numerical augmentation of heat transfer in refrigeration system. An improved heat removal physiognomies with better thermo-physical possessions was obtained by refrigerant as a result of more particles observed, resulting with improved performance of refrigeration system. According to the results of the experimental research, the refrigeration system containing nano-refrigerant operated normally. They found that with a blend of inorganic oil/  $Al_2O_3$ , the freezing capacity increased by 11.5 % while the power consumption decreased by 11.5%.

For performance evaluation of a VCRS employing several alternative refrigerants, Dalkilic and Wongwises (2010) used a variety of alternative refrigerants. In this paper, results of a theoretical performance examine using mixtures such as R134a/R152a, R32/HC290 as well as HC1270/HC600a were presented, and the outcomes of the study compared with R12, R22, and R134a revealed that the said mixtures are potential alternatives.

Abhishek and Gupta (2011) carried out an experimental survey to compare the performance of zeotropic mixtures between two environmentally pleasant fluids (R134a and R404a) to substitute R134a in a small refrigerator. The findings revealed that utilizing the refrigerant R-404a, produced a better efficiency with the specified parameters than with R-134a. When R134a was employed, the system consumed less energy. R404a performed consistently better than R134a in the residential refrigerator under all operating conditions, demonstrating that it may be utilized as a replacement for R134a in this application. The use of  $Al_2O_3$  as an additive in



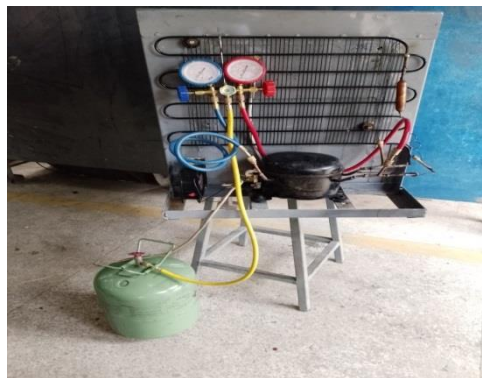
R22, R600, R600a, and R134a refrigerants in polyol ester lubricant oil (POE oil) in a VCRS using  $\text{Al}_2\text{O}_3$  as an additive in R22, R600, R600a, and R134a refrigerants was considered. A significant enhancement in refrigeration ability was achieved while experiencing a significant reduction of 11.5 percent energy intake (Kumar and Singh, 2017)

In a related study conducted by Ajayi *et al.* (2017) on substance flowing capacity of Cu Nanoparticles additive of R600a and R134a refrigerant using duct adiabatic tube in a VCRS, and found that isothermal region for Cu/R6000a and Cu/R134a Nano refrigerant was greater when compared to pure R600a and R134a refrigerants. When compared to the results obtained with that of R600a/Cu and R134a/Cu, it indicated a slow heat removal with low rising temperature. Apart from that, the systems' coefficient of performance had been raised as well. The present study aims at carrying out a performance assessment of hybridize-nanofluids zeotropic mixtures as working fluids (refrigerant) replacement in VCRS using second law of thermodynamic model. The objectives are to: forecast the heat transmission performance of hybridized nanofluids of  $\text{Al}_2\text{O}_3$ ,  $\text{TiO}_2$ /CuO with zeotropic fluid; determine different zeotropic mixtures fraction volume concentration (contents and sizes) for HFC nanofluid refrigerant; determine the effect of different nanofluid-zeotropic composition based upon system operational efficiency; and to evaluate the best operating zeotropic mixtures for optimum performance of the VCRS. The rationale behind this experimental survey is that noticeable thermo physical variations occur by increase particles concentration, causing rise in thermal conductivity. On the other hand, zeotropic mixtures viscidness stood reduces, enabling unrestricted fluid flow movements, as well as improvement in performance of VCRS when compared to conventional refrigerants. This work is limited to evaluating the effect of varied nanofluid-zeotropic composition to determine the best optimum performance. The scope also includes measurement of some global parameters along the inlet and exit axis. Areas that are not covered in this study includes leak analysis and characterization.

## **2. MATERIALS AND METHODS**

In this study, a VCRS test rig was developed. Two inlet and outlet pressure gauges were attached to record the suction and discharge pressure during testing. Thermometer fixed at the evaporator cabinet to measure the temperature variations at the specified interval at both the inlet and outlets. Provision was made at the inlet of the compressor and expansion device as service ports for injecting and flushing out the used mixtures. Vapor removal was inputted in

the system through the fitted amenity harbors. It was allow for about 80% charge and readings were taken at the standard atmospheric conditions. The experiment was repeated in duplicate for everyone sample for the various mixtures. POE (Poly Ester) compressor oil was used with nanofluid-zeotropic mixtures of (23% Difluoromethane; 25% Pentafluroethane and 52% Tetrafluroethane). The results of the different combination of the hybridize-nanofluids zeotropic mixtures based-nanofluids were compared with those in the open literature. Figure 1 shows the pictorial view of the VCR test rig.



**Figure 1:** Vapour compression refrigeration test rig

## **2.1. Nanofluids**

Related to usual solid-liquid deferments, nanofluids have greater heat removal amongst particles and fluids owing to high external area; enhanced dispersal stability with principal Brownian signal; lower particle congestion and propelling power related to base fluid. It can be mix with refrigeration compressor oil or with refrigerant. In cooling structures, they improve tribological physiognomies, compressor efficiency.

## **2.2. Nanofluids Preparation**

Nanoparticles of  $\text{Al}_2\text{O}_3$ ,  $\text{TiO}_2$  and  $\text{CuO}$  were introduced to refrigerant by dispersing it in the host lubricant POE (Poly Ester) in the compressor of the VCRS. Various samples with different concentration were measured by digital weight balance. Each mass fraction of the particles is mixed with base lubricant and the amount of each sample of nanolubricant prepared varied based on individual composition. Resultant nanofluid was homogenized for 15 minutes followed by stirring for up to an hour using drilling machine.

### 2.3 Model Formulation

The following assumptions were made: steady-state flow operation is assumed in all the system individual parts; the working fluid has varied percentage composition throughout the cycle; pressure losses along each component are neglected with 75% isentropic proficiency. Model equations for various processes of VCRS on the basis of energy and exergy analysis are given as follows:

#### 2.3.1. Energy Analysis of VCRS

By applying the energy balance mathematical model expression given by (Bolaji *et al.* 2011) as:

a) Work consumed by the compressor ( $\dot{W}_C$ ) is given according to Equation 1;

$$\dot{W}_C = \dot{m}(h_1 - h_2) \quad (1)$$

b) Mass flow rate ( $\dot{m}$ ) = QE =  $\dot{m} \times RE$  (2)

c) Heat rejected in the condenser ( $Q_c$ ) is thus:

$$Q_c = \dot{m}(h_2 - h_3) \quad (3)$$

d) For capillary tube (expansion valve)

$$h_3 = h_4 \quad (4)$$

e) Heat absorbed in the evaporator ( $Q_e$ )

$$Q_e = \dot{m}(h_1 - h_4) \quad (5)$$

f) Coefficient of performance (COP)

$$COP = \frac{Q_e}{\dot{W}_C} \quad (7)$$

#### 2.3.2. Exergy Analysis of VCRS

(a) Particular exergy at every given point is by Equation 8;

$$(h - h_0) - T_0(s - s_0) \quad (8)$$

(b) Compressor exergy destruction

$$I_{comp} = ED_{xd\ 1-2} = \dot{m}T_0(\psi_{out} - \psi_{in}) + W_{el} = \dot{m}T_0(S_1 - S_2) + \dot{W}_C \quad (9)$$

(c) Condenser

$$I_{dest,cond} = ED_{xd\ 2-3} = T_0S_{gen} = \dot{m}T_0 \left( S_3 - S_2 + \frac{q_c}{T_c} \right) \quad (10)$$

(d) Expansion valve

$$I_{dest,exp} = ED_{xd\ 3-4} = T_0S_{gen} = \dot{m}T_0(S_4 - S_3) \quad (11)$$

(e) Evaporator

$$I_{dest, evap} = ED_{xd\ 4-1} = \dot{m}T_0 \left( S_1 - S_4 - \frac{q_{Evap}}{T_{Evap}} \right) \quad (12)$$

(f) Overall exergy destruction in all the locations is given by

$$\dot{X}_{Total} = (ED_{xd\ total}) = ED_{xd\ 1-2} + ED_{xd\ 2-3} + ED_{xd\ 3-4} + ED_{xd\ 4-1} \quad (13)$$

(g) Product exergy rate =  $Q_e^*(1-T_0/T_r)$  (14)

(h) Exergy efficiency =  $(Q_e^*(1-T_0/T_r))/\dot{W}_C$  (15)

### 2.3.3. Performance Evaluation of the Thermo-Physical Properties

This is given from bulk concentration by Bhattad *et al.* (2018):

(a) Particle bulk concentration

$$\omega_{no} = \frac{m_o}{(m_o + m_R)} \quad (16)$$

(b) Particle Bulk (volume) concentration

$$\psi_n = \frac{\omega_{no}\rho_o}{[\omega_{no}\rho_o + (1-\omega_{no})\rho_n]} \quad (17)$$

(c) Density of Hybrid-Nanofluids-Zeotropic Mixtures

$$P_{nf} = (1 - \phi_s)\rho_f + \phi_s\rho_p \quad (18)$$

(d) Isobaric Specific Heat of Hybrid-Nanofluids-Zeotropic Mixtures

$$C_{nf} = \frac{(1-\phi_s)P_f C_f + \phi_s P_p C_p}{P_{nf}} \quad (19)$$

(e) Thermal Conductivity of Hybrid-Nanofluids-Zeotropic Mixtures

$$K_{nf} = kbf \left\{ \frac{[(1+2\phi)(1 - ((kbf/K_{TiO_2})))/(2(kbf/K_{TiO_2})+1)]}{(1-\phi)(1 - (kbf/K_{TiO_2}))/((kbf/K_{TiO_2})+1)} \right\} \quad (20)$$

(f) Dynamic Viscosity of Hybrid-Nanofluids-Zeotropic Mixture

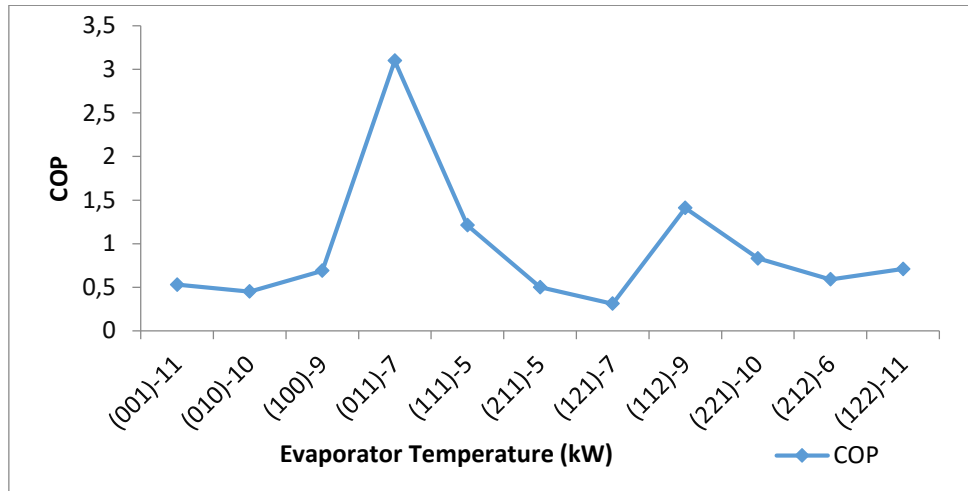
$$\mu_{nf} = \mu_{bf}(1 + 2.5\phi) \quad (21)$$

(g) Surface tension of nanorefrigerants,

$$\sigma_{r,n,o} = \sigma_r + (\sigma_{n,o} - \sigma_r)X_{n,o}^{0.5} \quad (22)$$

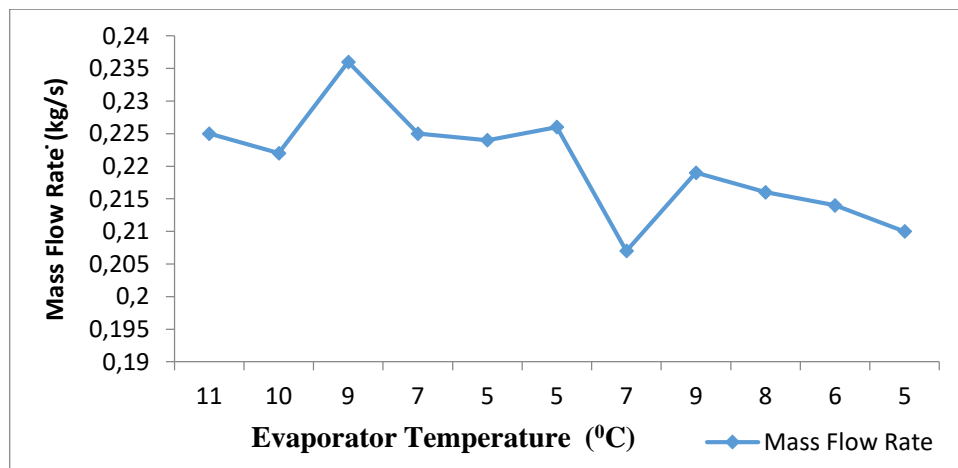
## 3. RESULTS AND DISCUSSIONS

The outcomes obtained for both measured and calculated values in the experimental assessment of the VCRS were made according to ISO 8187. Variations in the Coefficient of Performance (COP) is shown in Figure 2.



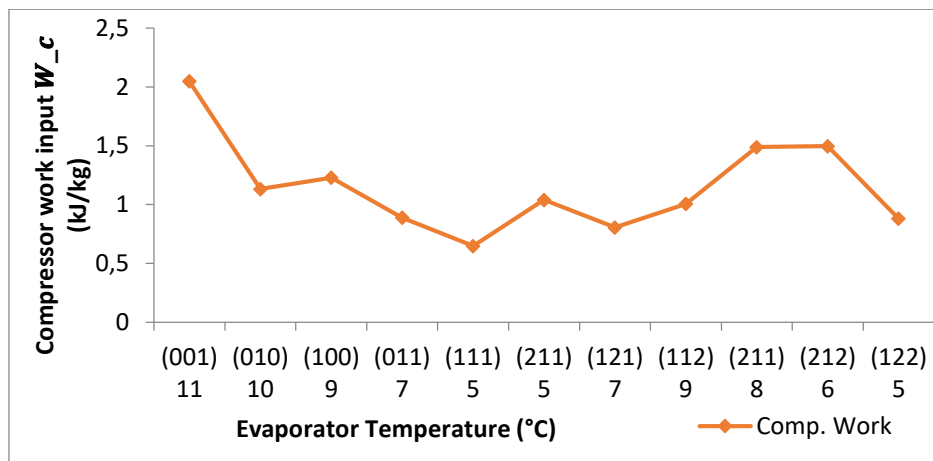
**Figure 2:** Plot of COP versus evaporator temperature and volume fraction.

The COP variation of systems working with hybridize-nanofluids zeotropic blends (in the ratio of 011; 100; 112; 211 by weight) has the evaporating temperature increases the condensing temperature decreases from 11 to 16 °C and -11 to -5 °C, as shown in Figure 2. It is revealed from the Figure that COP of the system using hybrid combination of (011) zero gram-TiO<sub>2</sub>, 7.5g-Al<sub>2</sub>O<sub>3</sub>/CuO blend is the highest, followed by (211, 112 and 100) among all examined ratios, and was 3.1%, 0.83%, 0.71% and 0.69 % higher than others because of its smaller compressor work requirement and higher refrigeration capacity as compared to the results obtained by (Babarinde *et al.* 2014; Bhattad *et al.* 2018; Ajayi *et al.* 2017) with 5.5% and 6.2% rise in COP using R134a and R134a/LPG (28:72) systems. The variations of mass flow rate against evaporating temperatures regarding hybridize-nanofluids zeotropic blend examined refrigerants as depicted in Figure 3.



**Figure 3:** Plot of mass flow rate vs evaporator temperature

As shown in Figure 3, it was perceived that mass flow rate of (100) 15g- CuO, zero gram of Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub>, refrigerant charge of 0.236 kg and 0.226 kg is higher than when the system used 121 % fraction and 112 blend refrigerants mass charge because of its lower liquid density. Hence, lower compressor work requirement at 0.21 kg is expected because the variation in mass flow rate in terms of evaporating temperature was observed to drop in this particular work, because, the variation regarding evaporating temperature of the assessed refrigerants is actually neglected. Moreover, theoretical results also revealed that fluid bulk stream rate increased by increase in the evaporator temperature. Variations in the Compressor power consumption using the refrigerant is shown in Figure 4



**Figure 4:** Plot of compressor power consumption versus evaporator temperature

Compressor power requirement of a VCRS using hybridize-nanofluids zeotropic blend refrigerants are presented in Figure 4. The situation revealed that the compressor power requirement working with mixtures of (001, 100, 010) TiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and CuO with a less volume fraction and evaporation temperature has firmness for lowering power consumptions in a refrigeration system from 2.199 kW to 0.696 kW for array of evaporator temperatures amid -11°C and -9°C. In addition to this, the Figure depicts that compressor power intake in VCRS rises with an upturn in evaporator temperature due to the rise in bulk flow ratio of refrigerants.

#### 4. CONCLUSION

Experimental investigation of ecological alternative refrigerant in VCRS using hybrid-nanofluids zeotropic blends of varying different nanoparticles of (TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>/CuO by weight) for replacing conventional refrigerant was carried out to determine the best optimum

performance blends amongst the selected ratios using compressor work efficiency, COP, and power consumption rate as the leading enactment parameters. The study was executed by varying eleven different combination ratios, and results obtained were in use as the reference point for contrast with theoretical work. The optimum performance composition of the different blend was selected based on the experimental performance results, such that system yield highest coefficient of performance over three different fraction ratios between (011,112 and 111) operating settings. Result shows that the COP was found to be highest at (011) zero grams-TiO<sub>2</sub>, 7.5g-Al<sub>2</sub>O<sub>3</sub>/CuO blend by about 3.10% and the compressor power output, volumetric cooling capacity and TEGWI were found to increase by 13.51%, 5.78% and 1.06 kg/sec CO<sub>2</sub> respectively. Survey shows that the suspended mixtures rises the heat removal factor even with a small particle portion of 0.003% with the optimum improvement of 0.0075 vol.% application. The outcomes confirmed that hybrid-nanofluids zeotropic blend is an energy efficient and environmental friendly substitute for conventional refrigerant in VCRS.

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**AZƏRBAYCAN, AVROPANIN ENERJİ MARAQLARINA CAVAB VERƏN  
ETİBARLI TƏRƏFDAŞDIR**

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**XÜLASƏ**

Müstəqilliyinin ilk illərindən başlayaraq Azərbaycan Respublikası, başda ABŞ və Avropa İttifaqı olmaqla, qərb dövlətlərinin marağına cavab verən ölkə olaraq diqqət mərkəzinə yerləşmişdir. Təkcə enerji təhlükəsizliyi baxımından deyil, şərq-qərb, şimal-cənub nəqliyyat dəhlizlərinin kəsişmə nöqtəsində yerləşməsi səbəbilə də, Azərbaycanın XXI əsrin güclü dövlətlərindən birinə çevriləcəyi yönündə bir sıra tutarlı proqnozlar irəli sürülmüşdür. 1994-cü ilin sentyabrında imzalanan “Əsrin müqaviləsi” ilə bu proqnozların doğruluq payını artıracağıının ilk ciddi işarətini verən Azərbaycan, Bakı-Tbilisi-Cehyan Neft Kəmərinin reallaşması ilə dünya enerji təhlükəsizliyinə ixracatçı dövlət kimi uzun illər töhfə vermə yoluna faktiki olaraq daxil olmuşdur. Sonrakı illərdə Bakı-Tbilisi-Ərzurum Gaz Kəmərinin çəkilməsi, bu kəmərin Avropaya uzanan yeni kəmərlərin əsasını təşkil etməsi, qitənin enerji təhlükəsizliyi baxımından etibarlı tərəfdaş olacağını göstərmişdir. Son illərdə ABŞ və Avropa Birliyinin ən həssas məsələ kimi yanaşdıqları məsələlərin başında enerjide Rusiyadan asılılığın aradan qaldırılması məsələsi gəlir. Xüsusilə 2022-ci ilin əvvəllərində Rusiyanın Ukraynaya hücum etməsi ilə başlayan dövrdə, Qərbin Rusiyanı müharibədən çəkindirərkən, özünün enerjide bu dövlətdən ciddi şəkildə asılı olması, onun tətbiq edə biləcəyi sanksiyaların miqyas və gücünü azaltmışdır. Gələcəkdə Avropanın rus qazından tamamilə imtina etməsi və alternativ enerji mənbələrinə yönəlməsi üçün ən az 600 milyard Avroya ehtiyacı olacaq. Bu gün də Avropa dövlətləri Rus qazından imtina etməyin çətinliyini dərk edərkən, alternativ mənbələrə yönəlməkdə, bu zaman Azərbaycan həm istehsalçı, həm transit, ən əsası isə etibarlı tərəfdaş kimi ilk sıralarda yer almaqdadır.

**Açar sözlər:** Avropa Birliyi, Azərbaycan, enerji təhlükəsizliyi, enerji siyasəti, qaz kəmərləri, neft kəmərləri

**AZERBAIJAN IS A RELIABLE PARTNER THAT MEETS EUROPE`S ENERGY INTERESTS****ABSTRACT**

Since the first years of its independence, the Republic of Azerbaijan has been in the center of attention as a country that meets the interests of Western countries, especially the United States and the European Union. Not only from the point of view of energy security, but also due to the location at the intersection of the east-west, north-south transport corridors, a number of coherent forecasts were put forward for the transformation of Azerbaijan into one of the powerful states of the XXI century. With the “contract of the century” signed in September 1994, Azerbaijan, which gave the first serious indication that it would increase the share of these forecasts, actually entered the path of contributing to World Energy Security as an exporting country for many years with the implementation of the Baku-Tbilisi-Jeyhan oil pipeline. The construction of the Baku-Tbilisi-Erzurum gas pipeline in subsequent years, the foundation of new pipelines extending to Europe, showed that the continent will be a reliable partner in terms of energy security. At the forefront of the issues that the United States and the European Union have treated as the most sensitive in recent years is the issue of eliminating dependence on Russia in energy. Especially in the period that began with the Russian invasion of Ukraine in early 2022, when the West was deterring Russia from the war, its serious dependence on this state in energy reduced the scale and strength of the sanctions it could impose. In the future, Europe will need at least 600 billion euros to completely abandon Russian gas and focus on alternative energy sources. Even today, while European states are aware of the difficulties of abandoning Russian gas, focusing on alternative sources, Azerbaijan is in the first place as a producer, transit and, most importantly, a reliable partner.

**Key words:** European Union, Azerbaijan, energy security, energy policy, energy cooperation

## GİRİŞ

**Avropanın enerji təhlükəsizliyi problemi.** Avropanın enerji təhlükəsizliyinə problem yaradan Avropa daxili məsələlərdən biri Avropa dövlətlərində milli bazarların enerjinin generasiyası və paylanması sahəsindəki inhisarçı strukturu idi. Bu isə enerji sisteminə üçüncü tərəfin müdaxiləsini qeyri mümkün edir, eyni zamanda da vahid enerji strategiyası aparmağa mane olurdu.

Bu maneənin aşılması üçün ilk addım ilk dəfə 1996-cı ildə Avropa Birliyi elektrik enerjisi bazarında rəqabətin güclənməsi, enerji satışı ilə məşğul olan subyektlərlə azad münasibətlərin qurulması məqsədilə ilk direktivlər qəbul etdi. 2003-cü il direktivləri bu sahədə inteqrasiyanı yenidən gücləndirdi. Eyni zamanda elektrik enerjisi bazarında dövlətlərə qarşılıqlı əlaqədə hərəkət etməyə imkan verdi. Qazın idxalı, paylanması, enerji bazarlarında reallaşdırılması sahəsində də analoji direktivlər 1998, 2003-cü illərdə qəbul edildi [4]. Bazar qərarlarının üçüncü paketi 2009-cu ildə qəbul edildi. Burada vertikal şəkildə inteqrasiya olunmuş enerji şirkətlərinin bölünməsi nəzərdə tutulurdu. 2009-cu ildə qəbul edilmiş Lissabon protokoluna da Avropa Birliyinin enerji təhlükəsizliyi sahəsində strategiyası əlavə edilmişdi. Burada Avropa Birliyinin enerji strategiyasının əsas istiqamətləri öz əksini tapmışdı. Bunlara daxil idi [13]:

1. Enerji bazarının fəaliyyətinin təmin edilməsi;
2. İttifaqda enerji təchizatının təhlükəsizliyini təmin edilməsi;
3. Enerji effektivliyinə və enerjinin effektiv saxlanmasına nail olmaq;
4. Enerji şəbəkələrinin qarşılıqlı əlaqələndirilməsinin təmin edilməsi;
5. Yeni və bərpa edilən enerji resurslarının inkişaf etdirilməsi.

Lakin qəbul edilən bu qərarlara baxmayaraq Avropa Birliyi nəinki öz enerji asılılığını zəiflədə bilmədi, eyni zamanda Avropada sənayenin inkişafı, eyni zamanda infrastruktur və informasiya texnologiyalarının inkişafı Avropa ölkələrinin enerji idxalına ehtiyacını daha da artırdı. Lakin ehtiyacın artması ilə bərabər 2000-ci ildən etibarən Avropanın siyasətində baş verən dəyişikliklər də enerji təhlükəsizliyi məsələsini həddindən çox aktuallaşdırdı. Göstərilən dəyişikliklərin başlıca səbəbi isə NATO-nun və Avropa Birliyinin 2004-cü ildən etibarən şərqlə doğru genişlənməsi oldu. Bu genişlənmə istər istəməz Rusiya ilə toqquşmalara gətirib, çıxarmalı idi. Eyni zamanda Avropa Birliyinə daxil olan ölkələr də əvvəldən bəri Rusiya qazından istifadə edirdilər. Bu da Avropa Birliyi qarşısında enerji təhlükəsizliyi sahəsində mühüm vəzifələrin qoyulmasına gətirib çıxardı. 2005-ci ildə AB ölkələri üç əsas prinsipə

dayanan enerji siyasətini müəyyən etdilər. Bunlar: rəqabətlik, dayanıqlılıq, enerji daşınmasının təhlükəsizliyi [4].

AB-nin şərqə doğru genişlənməsi Avropaya əsas enerji ixracatçısı olan Rusiya ilə Ukrayna, eyni zamanda Rusiya ilə AB ilə enerji ixracatı və başqa iqtisadi-siyasi məsələlərdə müxtəlif mübahisələrin meydana çıxmasına səbəb oldu. 2006-cı ildə Avropada baş verən enerji böhranı AB-ni yenidən enerji təhlükəsizliyi məsələlərinə qayıtmağa məcbur etdi. 2009-cu ildə yaşanan enerji böhranı isə Avropanı bu məsələdə təxirəsalınmaz strategiya müəyyən etməyə sövq etdi. 2009-cu il enerji böhranının başqa səbəbləri də var idi. Əslində bu Ukrayna ilə Rusiya arasında XX əsrin 90-cı illərindən başlayan geosiyasi qarşıdurmanın, enerji sektoruna yansımaları idi. Məhz bu səbəbdən də Rusiya Ukraynanın enerji tranzitindəki roluna zərbə vuran yeni bir enerji layihəsini - Yamal-Avropa qaz kəməri layihəsini gerçəkləşdirməyə başladı. Kəmərin 1994-2006-cı illərdə tikilmiş, uzunluğu 2000 km, diametri isə 1420 mm idi. Kəmərin gücü ildə 32.9 kub.metr idi [16]. Kəmərin Rusiya-Belorus-Polşa-Almaniya marşrutu üzrə fəaliyyət göstərir. Kəmərin Rusiya-Belorus hissəsi “Qazprom” şirkətinin mülkiyyətindədir. 2004-2005-ci ildə Ukraynada baş verən “narıncı inqilab” Rusiya ilə Ukrayna arasında geosiyasi qarşıdurmanı daha da alovlandırdı. Ona görə də Ukrayna Rusiya tərəfindən “enerji tranziti üçün etibarlı olmayan” ölkə elan edildi və Rusiya Ukrayna ərazisindən yan keçən qaz kəmərlərinin inşasına start verdi. 2011-ci ildə Rusiya Ukraynadan yan keçən yeni bir qaz kəməri layihəsini - “Şimal axını” layihəsini həyata keçirdi. Kəmərin Rusiya və Almaniyanı Baltik dənizi vasitəsilə birləşdirirdi. 2014-cü ildə Ukrayna ilə yeni münaqişənin baş verməsi, Avropanın daxilində Rusiyadan qaz ixracı sahəsində yeni problemlərin meydana gəlməsinə səbəb oldu. Belə ki, 2015-ci ildə Rusiya “Şimal axını-2” qaz kəməri marşrutunu tikməyə başladı ki, müasir dövrdə artıq hazırdır. Lakin hazırda Ukraynada baş verən müharibə nəticəsində fəaliyyətini dayandırmışdır [11].

İyul 2009-cu ildə AB-də qəbul edilən üçüncü enerji paketinin də məqsədi məhz AB qaz bazarını Rusiyanın inhisarından qorumaq, daha da əlverişli enerji bazarları tapmaq idi. Lakin bunlara baxmayaraq AB hələ də Rusiyanın enerji resurslarından asılıdır. Bu resursların AB-nə çatdırılması üçün vacib tranzit vasitəçi isə hələ də Ukraynadır.

**Cədvəl 1: Rusiya qazının Qərbi Avropa ölkələrinə idxalının 2017- 2018-ci illər üzrə hərəkəti**

Ölkələr	Aİ-nin Rusiyadan idxal etdiyi qazın həcmi (milyd. m <sup>3</sup> )		İdxaldakı payı (%-lə)		İstehlakdakı payı (%-lə)	
	2017	2018	2017	2018	2017	2018
Avropa İttifaqı	163,2	150,5	44	43	33	31
Belçika	0	0,1	0	2	0	0
Bolqarıstan	3,3	3,1	100	100	94	95
Çex Respublikası	8,8	8	99	100	98	93
Danimarka	0	0	0	0	0	0
Almaniya	62,1	43,1	85	95	66	47
Estoniya	0,5	0,5	100	100	99	97
İrlandiya	0	0	0	0	0	0
Yunanıstan	2,9	3,2	51	63	55	63
İspaniya	0	0,9	0	5	0	3
Fransa	9,1	9,8	22	26	19	21
Xorvatiya	0	0	0	0	0	0
İtaliya	33,1	32,8	49	49	43	44
Latviya	1,2	1,4	100	100	100	96
Litva	1,3	1,3	40	40	56	59
Luksemburq	0,2	0,2	28	45	23	25
Macarıstan	12,7	12,1	100	100	119	117
Malta	0	0	0	0	0	0
Niderland	9,4	14,1	25	27	24	37
Avstriya	0	0	0	0	0	0
Polşa	10,3	9,7	85	76	53	48
Portuqaliya	0	0	0	0	0	0
Rumıniya	1,2	1,3	100	100	10	11
Sloveniya	0,2	0,3	100	100	22	30
Slovakiya	4,4	4,4	100	100	85	85
Finlandiya	2,3	2,5	100	97	96	95
İsveç	0	0	0	0	0	0
Böyük Britaniya	0,1	1,5	0	7	0	2

Mənbə: [7]

2000-ci ildə Avropa Komissiyası “Avropada enerji təhlükəsizliyinin strategiyası” adlı Yaşıl Kitabı qəbul etdi. Lakin bütün bunlara baxmayaraq Avropa hələ də təbii sərvətlər hesabına əldə edilən enerji daşıyıcılarının idxalından asılıdır. Ekspertlərin yekdil rəyinə görə 2030-cu ilə qədər olan perspektivdə Avropa bazarlarının göstərilən enerji resurslarından asılılığı artmaqda davam edəcəkdir. Proqnozlaşdırıldığına görə bu AB enerji tələbatının 70%-ni əhatə edəcəkdir. Bu baxımdan idxal olunan neftə olan tələbat 2030-cu ilə doğru 76%-dən 90%-ə, qaza olan tələbat 40%-dən 70%-ə, kömürə olan tələbat isə 50%-dən 70%-ə yüksələcəkdir [5, 10-11]. Buna doğru demək lazımdır ki, 2019-cu ildə AB-də istifadə edilən enerjinin 39%-i AB ölkələrinin daxilində istehsal edilmiş, qalan 61%-i isə başqa ölkələrdən idxal olunmuşdur.

2019-cu ildə AB-də istehsal edilən enerjinin ümumi çəkisinin 37%-i bərpa olunan məbələrdən, 32%-i atom enerjisindən, 19%-i kömürdən, 8%-i təbii qazdan, 4%-i isə neftdən alınmışdır. İdxal edilən qazın 41%-i Rusiya vasitəsilə əldə edilir. Eyni zamanda Rusiya həm də neftin və kömürün AB-ə olan əsas ixracatçısıdır. Avropaya yeni qoşulan Şərqi Avropa ölkələri üçün isə Rusiyanın enerji resursları onların enerji ixracının 90%-ni təşkil edir [11].

Qazın AB üçün Rusiyadan sonra ikinci ixracatçısı Əlcəzairdir. Lakin bu ölkədə siyasi sabilliyin tez tez pozulması AB-nin enerji resurslarından istifadəsi üçün xeyli risklər yaradır.

Son illərdə AB-n bazarlarına təbii maye qaz resursları da daxil olmağa başlamışdır ki, bunun da əsas ixracatçıları Qatar, Nigeriya daha sonra isə ABŞ-dır. 2018-2019-cu illərdə maye qaz idxalı 75% artmış və ümumi qaz ixracının 25%-ni təşkil etmişdir. 2019-cu ildə maye qazın əsas idxalatçıları İspaniya, Fransa, İtaliya, Niderland və Belçika olmuşdur.

AB ölkələrinin daimi, fasiləsiz və etibarlı şəkildə enerji resursları ilə təminatında yaranan problemlərin bir səbəbi də yeni inkişaf edən Cənub Şərqi Asiya ölkələri, o cümlədən Hindistan, Çinin fəal surətdə dünya enerji bazarına daxil olmaları və onların sürətlə fəal enerji idxalatçılarına çevrilmələridir. Hazırda Çin enerji idxalatına görə AB ölkələrini xeyli qabaqlamışdır ki, bu da təkcə Çinin özünü enerji istehsalçıları üçün cəlbedici bir abzara çevirmişdir. Lakin coğrafi yaxınlıq səbəbindən Çin özünü Mərkəzi Asiya enerji istehsalçılarına tutdu. 2014-cü ildə Çinlə-Türkmənistan arasında 2200 km-lik qaz kəməri haqqında saziş imzalandı [6, 141].

Lakin Şimali Afrikanın və Yaxın Şərq ölkələrinin enerji ehtiyatlarının istifadə edilməsinin bir çox problemlə cəhətləri vardır. Bunlardan birincisi, həmin ölkələrin özündə enerji daşıyıcılarına olan tələbatın artmasıdır. İkincisi, Yaxın Şərq və Şimali Afrikanın ölkələrində inqilablar, bunlardan da meydana gələn hərbi münaqişələrin AB-nin qlobal və çox milyardlıq enerji layihələri, nəticədə də AB ölkələrinin enerji təhlükəsizliyi üçün çoxlu maneələr yaratmalarıdır. Buna misal olaraq Liviyada olan vətəndaş müharibəsini göstərə bilərik. Belə ki, Liviyanın AB ölkələrinin enerji idxalatındakı payı cəmi 1% olduğu halda, Liviyada vətəndaş müharibəsi AB ölkələrində enerji daşıyıcılarının qiymətinin xeyli artmasına təsir etmiş oldu.

**Azərbaycan, Avropa dövlətləri üçün etibarlı tərəfdaşdır.** Yuxarıda qeyd olunanlar, AB ölkələrini yeni enerji daşıyıcıları mənbələri axtarmağa, daha az riski özündə etivə edən layihələri reallaşdırmağa istiqamətləndirdi. Bu baxımdan Qafqaz regionu xüsusilə Azərbaycanın enerji resurslarının AB ölkələri üçün cəlb ediciliyi daha da artmış oldu. Eyni zamanda Azərbaycan Mərkəzi Asiya enerji daşıyıcılarının daha ucuz formada AB ölkələrinə

ixrac edilməsi üçün əlverişli tranzit rolunu oynamalı idi. Beləliklə, AB ölkələrinin Rusiya ilə global qarşılıqlılaşması, Rusiyanın enerji daşıyıcılarından siyasi təsir vasitəsi kimi istifadə etməsi, eyni zamanda Yaxın Şərqi regionu və Şimali Afrikada qeyri stabil siyasi vəziyyət AB ölkələrini daha əlverişli enerji qaynaqları axtarmağa məcbur etdi ki, bu da Azərbaycanın tarixi bir fürsəti qazanmasına səbəb oldu. Lakin Azərbaycanın enerji daşıyıcılarının aşkar edilməsi və istismara verilməsi, eyni zamanda Azərbaycanın Mərkəzi Asiya ölkələrinin enerji daşıyıcıları üçün əlverişli tranzit dəhlizinə çevrilməsi imkanları AB qarşısında başqa bir problemin ortaya çıxmasına səbəb oldu. Bu isə Avropaya təhlükəsiz birbaşa nəqliyyat dəhlizinin açılması idi. Azərbaycandan Avropa bazarlarına XX əsrin 90-cı illərində açılan enerji nəqliyyat dəhlizləri Rusiya vasitəsilə açılırdı ki, bu da Avropa ölkələrində məlum səbəblərdən o qədər də maraq doğurmurdu. Buna görə də təbii şəkildə Avropaya ən yaxın ölkə kimi Türkiyənin əhəmiyyəti xeyli artmış oldu. Göstərilən amil eyni zamanda XX əsrin 90-cı illərində yenidən müstəqillik almış Azərbaycana siyasi dəstək verən Türkiyə ilə Azərbaycan arasında əməkdaşlıq perspektivlərini daha da genişləndirmiş oldu.

Avropa ölkələrinin Azərbaycanla enerji əməkdaşlığının ilk addımları hələ 1989-cu ildə atılmışdır. Lakin 1993-cü ildə hakimiyyətə ümummilli lider Heydər Əliyevin gəlməsindən sonra Azərbaycanla AB arasında enerji siyasəti sahəsində əməli əməkdaşlığın əsası qoyulmuş oldu. Bu əməkdaşlığın ilk nəhəng addımı 20 sentyabr 1994-cü ildə Azərbaycanla dünyanın 11 böyük neft şirkəti arasında Xəzər dənizinin Azərbaycana məxsus hissəsində Azəri-Çıraq-Günəşli neft yataqlarının birgə emalı və əldə olunan neftin birgə nəqli üçün beynəlxalq müqavilə imzalandı [9, 121]. Müqavilənin imzalanmasında dünyanın yeddi ölkəsindən (Azərbaycan, ABŞ, Böyük Britaniya, Rusiya, Türkiyə, Norveç, Səudiyyə Ərəbistanı) 11 böyük neft şirkəti-Amoco, BP, McDermott, Unocal, «LUKOYL», Statoil, TPAO, Pennzoil, Ramco, SOCAR, Delta- iştirak edirdi. Müqavilənin həyata keçirilməsi üçün isə Azərbaycan və müqaviləyə üzv olan şirkətlər tərəfindən 1995-ci ildə Azərbaycan Beynəlxalq Əməliyyat Şirkəti yaradıldı. “Əsrin müqaviləsinin” müddəti 2024-cü ilə qədər nəzərdə tutulmuşdu. Lakin 2017-ci ilin sentyabrında Azərbaycan və beynəlxalq şirkətlərin konsorsiumu arasında yeni bir “Əsrin müqaviləsi” imzalandı. Müqavilənin şərtlərinə görə Azərbaycanın enerji yataqlarına 2050-ci ilə qədər qoyulacaq investisiyaların məbləği 40 mlrd.dollar olmalı idi. Bu investisiyaların 25%-i İngiltərənin BP şirkətinin payına düşməli, Azərbaycanın Neft fondunun qazancı isə ilə 3.6 mlrd. dollar olmalı idi [9, 112].



SSRİ-nin dağılmasından sonra Cənubi Qafqaz respublikaları AB və ABŞ-ın siyasi və iqtisadi maraqlarını özlərinə cəlb etdilər. Buna səbəb həm AB və ABŞ-ın enerji təhlükəsizliyi aspektləri idisə, eyni zamanda Cənubi Qafqazın xüsusilə də Azərbaycanın Qərb ölkələrinin şübhə ilə baxdıqları İran və Rusiyanın sərhədlərində yerləşmələri, eyni zamanda NATO-nun üzvü olan Türkiyə ilə həmsərhəd olmaları, həm Türkiyənin Qərb ölkələri üçün Rusiya və İrana alternativ nəqliyyat dəhlizi oynaya biləcəyi perspektivi idi.

ABŞ analitik mərkəz olan “Stratfor” cəmiyyətinin rəhbəri Corc Fridman Azərbaycanın ABŞ-ın siyasi, iqtisadi maraqları üçün əhəmiyyətini belə ifadə edirdi: “... Azərbaycanın ABŞ üçün əhəmiyyəti onun mənəvi keyfiyyətlərində deyil, onun Rusiya və İran arasında ayırma xətti olmasındadır... Azərbaycanın mövqeyi strateji əhəmiyyətə malikdir, xüsusilə də İrandakı vəziyyəti nəzarətdə saxlamaq, eyni zamanda Xəzər dənizindən çıxan nəqliyyat kəmərləri vasitəsilə Rusiyanın nüfuzunun azaldılması baxımından daha qiymətlidir” [3, 1].

Yuxarıda göstərilənlərdən əlavə ABŞ Azərbaycanı OPEK-ə alternativ olan neft mənbəyi kimi baxırdı ki, bu da Qərb ölkələrinin enerji təhlükəsizliyini təmin etmək üçün enerji daşıyıcılarının global idxalının diversifikasiyası baxımından çox zəruri idi. Bu baxımdan hələ “Əsrin müqaviləsinin” bağlanması əvvəl 1993-cü ildən başlayaraq alternativ enerji nəqliyyat vasitəsi olan Bakı-Tbilis-Ceyhan neft kəməri layihəsinin ilkin konturları da cızılmağa başladı [1].

29 noyabr 1995-ci ildə isə Azərbaycan Prezidenti Heydər Əliyevin Böyük Britaniyaya rəsmi səfəri çərçivəsində Azərbaycan və Britaniya arasında Sənaye və Ticarət üzrə birgə Azərbaycan-Britaniya birgə şurasının yaradılması haqqında saziş imzalandı. Bağlanmış sazişin nəticəsi olaraq, 15 avqust 1996-cı ildə “Britaniya Yaxın Şərq bankının “Bakı nümayəndəliyi açıldı [1]. Həmin ildə də Britaniyanın, BP şirkətinin təşəbbüsləri ilə Bakıda Britaniya Biznes qrupu yaradıldı. 2000-ci ildə Azərbaycan iqtisadiyyatında Britaniya kapitalına məxsus şirkətlərin sayı 307-ə çatdı ki, bunların da çox enerji sahəsinə maraq göstərirdi.

Onu da göstərmək lazımdır ki, “Əsrin müqaviləsi” Azərbaycanla Türkiyə arasında enerji əməkdaşlığının ilk böyük addımı idi. Əsrin müqaviləsində iştirak edən Türkiyənin TPAO şirkəti müqavilədəki paylardan 6.75%-ə malik idi. Əslində onun payının artması Azərbaycan Dövlət Neft şirkəti olan SOCAR-ın öz payının bəzi hissəsindən imtina etməsi hesabına olmuşdu. TPAO-nun “Əsrin müqaviləsi”ndə iştirak etməsi gələcəkdə iki qardaş ölkə - Azərbaycan və Türkiyə arasında enerji sahəsində strateji əməkdaşlığın başlanğıcını qoyacaqdı.

Avropa Birliyi ölkələrinin Azərbaycan və Türkiyə ilə enerji əməkdaşlığının əslində Rusiyanın “Qazprom” şirkətindən olan aparıcı asılılığı azaltmağa yönəldiyinin Rusiya hakim dairələri də fərqiə varmışlar. Rusiyanın bu baxımdan Azərbaycanla 2009-cu ildə Azərbaycanla Azərbaycan qazının alqı-satqısı barəsində bağladığı müqavilə, əslində Azərbaycanın Avropa bazarlarına birbaşa çıxışını bloklamaq məqsədi güdüdü. 2010-cu ildən başlayaraq Bakı-Novo Filya kəməri vasitəsilə Azərbaycan qazının ixracına başlandı. Lakin 2014- cü ildə Azərbaycan qazının bəzi siyasi səbəblərdən dolayı verilməsi dəfələrlə dayandırıldı [8, 50]. Bu isə qazın Rusiyaya və Rusiya vasitəsilə ayrı-ayrı ölkələrə ixracını sual altına qoymaqla, bərabər Azərbaycan-Türkiyə əməkdaşlığını da strateji zərurətə çevirməkdədir.

2011-ci ildə AB ilə Azərbaycan arasında əməkdaşlıq zəminində “Cənubi Qafqaz qaz dəhlizinin” genişləndirilməsi barəsində bəyannamə imzalandı. 2013- cü il dekabrında “Şahdəniz” yatağının ikinci bölümü istismara verildi. 20 sentyabr 2014-cü ildə “Cənub Qaz dəhlizinin” təməlinin qoyulması mərasimi keçirildi [12, 113].

Avropanın enerji təhlükəsizliyinin təminatı məsələsində xüsusi məsələlərdən birini də Trans Xəzər qaz dəhlizi layihəsi xüsusi yer tutur. Layihə ilk dəfə 1996-cı ildə ABŞ tərəfindən Mərkəzi Asiya enerji resurslarının, xüsusilə də Qazaxıstan və Türkmənistan qazının Xəzər dənizinin altı ilə Qafqaz və Türkiyə vasitəsilə Avropaya nəqlini nəzərdə tuturdu. Kəmərin uzunluğu 300 km olmalı Türkmənistanı Azərbaycanın Səngəçal terminalı ilə birləşdirməli, buradan isə BTC, BTE, TANAP vasitəsilə Avropa bazarlarına və Türkiyə bazarına çıxmalıydı. 1999- cu ildə Türkiyə, Gürcüstan, Azərbaycan, Türkmənistan arasında Transxəzər qaz kəməri layihəsinin həyata keçirilməsi haqqında memorandum imzalandı. Lakin “Şahdəniz” yatağında qaz ehtiyatlarının tapılması, eyni zamanda Rusiya və İranın məsələyə müdaxilə etmələri, layihənin arxa plana keçməsinə səbəb oldu. Lakin 2006- cı ildə Rusiya ilə Ukrayna arasında enerji böhranı bu layihənin yenidən dirçəlməsinə səbəb oldu [2, 1357]. 2011-ci ildən başlayaraq Avropa Birliyi Transxəzər qaz kəməri layihəsinin reallaşması, Türkmənistanın bu məsələyə qoşulması üçün danışıqlarda birbaşa vasitəçi və krator rolunu oynamağa başladı. Lakin Rusiyanın Türkmənistan qazını Çin bazarına yönəltmək, eyni zamanda Nabucco layihəsinin uğursuzluğu, eyni zamanda İranın Türkmənistanla ayrıca qaz kəməri layihələrini bağlaması Transxəzər qaz kəməri layihəsinə bloklamış oldu. Hazırda Çinin idxal etdiyi qazın 45%-i Türkmənistan qazıdır ki, bu da ölkənin Çindən iqtisadi asılılığının artmasına səbəb olmaqdadır [2, 1359].

Türkiyə Azərbaycan enerji əməkdaşlığında xüsusi layihələrdən biri də Trans Anadolu qaz Kəməri layihəsinin həyata keçirilməsidir. Kəməri perspektivlərinin doğrudan da həm Avropa Birliyi üçün, həm də Azərbaycan Türkiyə enerji partnyorluğu üçün mühüm əhəmiyyət daşımasını müasir dövrdə baş verən hadisələr- xüsusilə 2022-ci ilin fevralından başlayan Ukrayna-Rusiya müharibəsi, müharibənin başlanmasından doğan AB ölkələrinin üzvləşdikləri enerji problemləri göstərmiş oldu.

Dekabr 2011- ci ildə Türkiyə ilə Azərbaycan arasında “Şahdəniz “ yatağında istehsal edilən qazın Türkiyə vasitəsilə Avropaya ixracı haqqında memorandum imzaladılar. 26 iyun 2012-ci ildə isə İstanbulda Türkiyə ilə Azərbaycan arasında Transanadolu Qaz kəməri layihəsi - TANAP barəsində müqavilə imzalandı. 2012-ci ildən başlayaraq kəmərin inşası texniki hazırlıq işləri görülməyə başlandı. 2015-ci ilin martından başlayaraq kəmərin tikintisinə başlanıldı və 2018-ci ildə artıq kəmərin tikintisi başa çatdırıldı. Layihənin qiyməti 8.5 mlrd.dollardır. Kəmərin buraxılış həcmi 16.5 mlrd.kubmetr olmaqla yanaşı, 2023-cü ildə onun buraxılış gücünü 23 mlrd.kubmetrə, 2026-cı ildə isə onun həcmi 31 mlrd.kub metrə, uzaq gələcəkdə isə 61 mlrd.kub metrə çatdırmaq nəzərdə tutulur. Türkiyə ərazisində kəmərin uzunluğu 1850 km.-dir. 21 noyabr 2018-ci ildə TANAP layihəsi Türkiyə ilə Yunanıstan sərhəddində Maritsa qəsəbəsi yaxınlığında TAP kəməri ilə birləşdirildi. Bununla da Azərbaycan və gələcəkdə də Mərkəzi Asiya qazının birbaşa Avropaya açılması başa çatdı [15].

31 dekabr 2020- ci ildən başlayaraq TANAP layihəsi üzrə qazın Türkiyəyə nəql edilməsinə başlanıldı. Mart 2021- ci ildən artıq bir mlrd.kub metr qaz ixrac edilmişdir. Belə hesab edildiyinə görə Avropaya il ərzində 10 mlrd.kub metr qaz ixrac ediləcəkdir. TANAP layihəsi hazırda istismar edilən “Şahdəniz-2” qaz ehtiyatlarının nəqli üçün nəzərdə tutulsa da, sonradan layihədə Türkmənistan və Qazaxıstan kimi nəhəng qaz ehtiyatları olan ölkələrin də iştirakı nəzərə alınmışdır. Bundan başqa mart 2021-ci ildə SOCAR Xəzər dənizində “Şəfəq Asiman” qaz qaynaqlarının da yaxın vaxtlarda istifadəyə veriləcəyini açıqlamışdır. Mütəxəssislər “Şəfəq Asiman” qaz yataqlarında 500 mlrd kub metrə qədər az ehtiyatı olduğunu bildirmişlər. 2021-ci ilin sentybarında isə Azərbaycan və Türkmənistan Xəzər dənizində hər iki dövlətin sərhədləri yaxınlığında yerləşən, “Dostluq” adlandırılan qaz yataqlarının birgə istismar ediləcəyi haqqında bəyanat vermişlər [10].

Artıq AB ölkələri qaz idxalatının təhlükəsizliyini təmin edilməsi üçün Xəzər regionu ölkələrindən qaz idxalatının artırılması yönündə TAP vasitəsilə qaz ixracının məhdud formada genişləndirilməsi layihələri üzərində işləyirlər. Bundan başqa Balkan ölkələrinin də TAP qaz

ixracı kəmərinə qoşulması prosesi də sürətlənməkdədir. Belə ki, 2021-ci ildə Serbiyada Yunanıstandan TAP vasitəsilə qaz əldə edilməsinə hesablanan “Niş-Dimitrovqrad-Bolqarıstan qaz kəməri”nin inşasına başlanmışdır. Bu isə Serbiyanın artıq ənənəvi qaz ixracatçısı Rusiya ilə enerji əməkdaşlığına məhdudiyət qoyacağı anlamına gəlir [10]. Aydındır ki, belə bir qaz kəməri layihəsinin işə düşməsi Balkanlarda Türkiyənin siyasi və iqtisadi nüfuzunun da artmasına səbəb olacaqdır, eyni zamanda Azərbaycan və Türkiyə əməkdaşlığının daha yeni səviyyəyə qalxmasına gətirib, çıxaracaqdır.

Azərbaycan TANAP layihəsinə başqa ölkələrin qoşulması üçün də öz fəaliyyətlərini davam etdirir. Xüsusilə də Türkmənistanın TANAP layihəsinə qoşulması və Türkmənistanla birgə enerji layihələrinin həyata keçirilməsi istiqamətində intensiv danışıqlar aparılmaqdadır. Ümumiyyətlə Mərkəzi Asiya ölkələrinin enerji ehtiyatlarının Azərbaycan və Türkiyə vasitəsilə AB ölkələrinə ixrac edilməsi perspektivləri hər iki ölkənin Mərkəzi Asiya ilə iqtisadi əməkdaşlığının yeni mərhələyə qədəm qoymasına, eyni zamanda Azərbaycan və Türkiyənin Mərkəzi Asiyada iqtisadi və siyasi çəkisinin daha da artmasına səbəb olacaq.

13 fevral 2013- cü ildə Albaniya, İtaliya və Yunanıstan TAP layihəsinə siyasi dəstək verilməsi və layihənin həyata keçirilməsi istiqamətində əməli işlər görülməsi barəsində saziş imzaladılar. 2013- cü ilin payızında Shell, Bulgargaz, DEPA, Gas Natural Fenosa, EON, Gaz de France, Hera, Enel, Axpo şirkətləri TAP layihəsinin səhmdarları olaraq təsdiq edildilər və onlar arasında 25 il müddətinə əməkdaşlıq müqaviləsi imzalandı [14].

TAP layihəsinin uzunluğu 870 km olub, TANAP layihəsinin davamı kimi fəaliyyətə başladı. Bunun 550 km-i Yunanıstanın ərazisinə düşür, Albaniya ərazisindən keçən hissə isə 216 km-dir. Dəniz bölgəsinə düşən təxminən 105 km-lik hissə isə Albaniyanın Fieri şəhərindən başlayaraq İtaliyanın cənubundakı qaz nəqliyyat şəbəkəsi ilə birləşir.

TAP Cənub-Şərqi Avropanın bir neçə ölkəsini-Bolqarıstanı, Albaniyanı, Bosniya, Hersoqovina, Monteneqro, Xorvatiyanı qaz ilə təmin etmək gücünə malikdir. Bunun üçün vasitəçi rolunu İoniya Adriatik Qaz kəməri adlanan təsisat oynayır (İAP). TAP-ın maliyyə yükü 4.5 mlrd dollar kəsb etmişdir. TAP layihəsinin ilkin buraxılış həcmi 10 mlrd kub metr müəyyən edilmişdir, lakin gələcəkdə kəmərin buraxılış həcmi 20 mlrd. kub metrə qədər qaldırılması gözlənilir [14].

AB ölkələri TAP layihəsinin baş tutması məsələlərinə böyük önəm verdilər. Lakin Rusiyanın aparıcı şirkətləri Avropanın qaza artan tələbatının fonunda 10 mlrd kub metr qazın yalnız dəryadan damla olduğunu göstərirlər və bunun Rusiyanın “Qazprom” şirkətinin qaz satış

imkanlarına heç cür təsir göstərməyəcəyini deyirlər. Lakin Rusiyanın aparıcı mətbu orqanlarının və hakimiyyət dairələrinin göstərilən layihələri diqqətdə saxlaması Rusiyanın doğrudan da həmin layihələrin həyata keçirilməsindən narahat olduğunu göstərir. Rusiyanın aparıcı analitiklərinin fikrincə göstərilən layihələrin hazırda Rusiyanın ixracat imkanlarına o qədər də yüksək təsiri yoxdur. Lakin həmin layihələr iqtisadi aspektlərdən çox siyasi aspektlər daşıyır.

### **NƏTİCƏ**

Burada qeyd etmək lazımdır ki, AB ölkələrinin enerji təhlükəsizliyi enerji qaynaqlarını təhlükəsiz, siyasi risklər olmadan, daha aşağı qiymətlərlə əldə etmək strategiyasını əldə rəhbər tutur. Lakin enerji tədarükçüsü və enerji tranziti perspektivinə malik olan ölkələr üçün isə enerji təhlükəsizliyi strategiyası enerji daşıyıcılarının Avropa bazarlarına təhlükəsiz çatdırılmasından başqa, həm də bəzi enerji istehsalçısı olan dövlətlərin inhisarından azad olmaq, müstəqil iqtisadi layihələrin gerçəkləşdirilməsində əməkdaşlıq etmək, əldə edilən maliyyə, iqtisadi və siyasi dividendlərdən istifadə edərək öz siyasi və iqtisadi məqsədlərini gerçəkləşdirmək, ölkədə iqtisadi dirçəlişə nail olmaq məqsədi daşıyır. Bu baxımdan Türkiyə-Azərbaycan enerji əməkdaşlığının böyük önəmi vardır. AB ölkələrinin enerji strategiyası hədəfləri Türkiyə və Azərbaycanın enerji əməkdaşlığını qaçılmaz hala çevirir. Ancaq bu əməkdaşlığın bazasında məhsuldar qarşılıqlı əlaqələrin gerçəkləşdirilməsi üçün mühüm zəmin yaranır. Bu zəmin isə yerli iqtisadi layihələrin tətbiqində, qeyri enerji sektorunda iqtisadi proqramların həyata keçirilməsində, Qafqazda və Yaxın Şərqi regionunda siyasi sabilliyin qorunmasında, münaqişələrin məhsuldar dialoqa əsaslanaraq həll edilməsində, eyni zamanda həm Azərbaycan və Türkiyə arasında, həm də başqa türk dövlətləri ilə də iqtisadi, siyasi inteqrasiyanın gerçəkləşməsində mühüm rol oynayır və gələcəkdə də oynayacaqdır.

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***Tilia rubra* DC. subsp. *caucasica* V.Engler (KAFKAS İHLAMURU) YAPRAK UÇUCU YAĞININ KİMYASAL BİLEŞİMİ**

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**ÖZET**

İnsanların bitkileri tedavi, ilaç, besin, süs eşyası vb. ihtiyaçları için kullanmaları beşeri hayattaki varlığı kadar eskiye dayanmaktadır. İhlamur türleri (*Tilia* sp.) özellikle kış aylarında grip ve soğuk algınlığı tedavisinde göğüs yumuşatıcı, terletici ve kas gevşetici etkilerinden dolayı vazgeçilmeyen bitkilerdendir. Bu çalışma, *Tilia rubra* DC. subsp. *caucasica* (Kafkas ihlamuru) bireylerinden toplanan yapraklarının su destilasyonu ile elde edilen uçucu yağın yüzde oranı, kimyasal yapısı ve tespit edilen uçucu bileşiklerin kimyasal sınıflarının belirlenmesi amacıyla yapılmıştır. Yaprak örneklerinin uçucu yağı Clevenger aparatı yardımıyla hidrodestilasyon metodu ile elde edilmiştir. Gaz kromatografisi-kütle spektrometresi (GC-MS/FID) cihazı ile yaprak uçucu yağının bileşenleri tespit edilmiştir. Hidrodestilasyon işlemi sonucunda hesaplanan uçucu yağ verimi yüzde olarak %1,04 w/w olarak belirlenmiştir. Yaprak uçucu yağını oluşturan bileşenlerin %99,03'ünün yapısı tanımlanmıştır. Bulunan verilere göre yaprak uçucu yağında 3 bileşen tanımlanamazken 90 adet bileşiğin yapısı belirlenmiştir. En yüksek yüzde orana sahip olan ana bileşikler sırasıyla %45,68 oranında  $\alpha$ -pinen, %15,32 oranında (*E*)-2-hegzanal ve %4,41 oranında hegzanal olmuşlardır. Yaprak uçucu yağında % oran ve bileşik sayısı bakımından en yüksek bulunan kimyasal sınıflar monoterpenler (%49,65 oran ve 13 bileşik), aldehydler (%25,03 oran ve 16 bileşik) ve monoterpenoidler (%8,06 oran ve 17 bileşik) olarak bulunmuştur. Analiz edilen uçucu yağın terpen veya terpenoid sınıfları bakımından incelendiğinde toplamda 38 adet bileşik ve %60,72'lik oranda belirlenirken, en büyük terpen sınıfının monoterpenler (%49,65) olduğu tespit edilmiştir.

**Anahtar Kelimeler:** Kafkas ihlamuru, kimyasal bileşikler, kimyasal sınıflandırma, yaprak uçucu yağ



**CHEMICAL COMPOSITION OF *Tilia rubra* DC. subsp. *caucasica* V.Engler  
(CAUCASIAN LINDEN) LEAF ESSENTIAL OIL****ABSTRACT**

People's use of plants for their needs such as treatment, medicine, food and ornaments is as old as their existence in human life. Linden species (*Tilia* sp.) are indispensable plants in the treatment of flu and colds, especially in winter, due to their chest softening, diaphoretic and muscle relaxant effects. This study was carried out to determine the percentage of essential oil obtained by hydro distillation of leaves collected from *Tilia rubra* DC. subsp. *caucasica* (Caucasian linden) individuals, its chemical structure and chemical classes of determined volatile compounds. The essential oil of the leaf samples was obtained by hydro distillation method with the help of Clevenger apparatus. The components of the leaf essential oil were determined by gas chromatography-mass spectrometry (GC-MS/FID) device. The essential oil yield calculated as a result of the hydro distillation process was determined as 1.04% w/w percent. The structure of 99.03% of the components that make up the leaf essential oil has been defined. According to the data found, while 3 components could not be identified in the leaf essential oil, the structure of 90 compounds was determined. The main compounds with the highest percentage were  $\alpha$ -pinene at 45.68%, (*E*)-2-hexenal with 15.32% and hexanal with 4.41%, respectively. The chemical classes with the highest percentage and number of compounds in leaf essential oil are monoterpenes (49.65% ratio and 13 compounds), aldehydes (25.03% ratio and 16 compounds) and monoterpenoids (8.06% ratio and 17 compounds) were found as. When the analyzed essential oil was examined in terms of terpene or terpenoid classes, a total of 38 compounds and 60.72% were detected, while the highest terpene class was determined to be monoterpenes (49.65%).

**Keywords:** Caucasian linden, chemical classification, chemical compounds, leaf essential oil

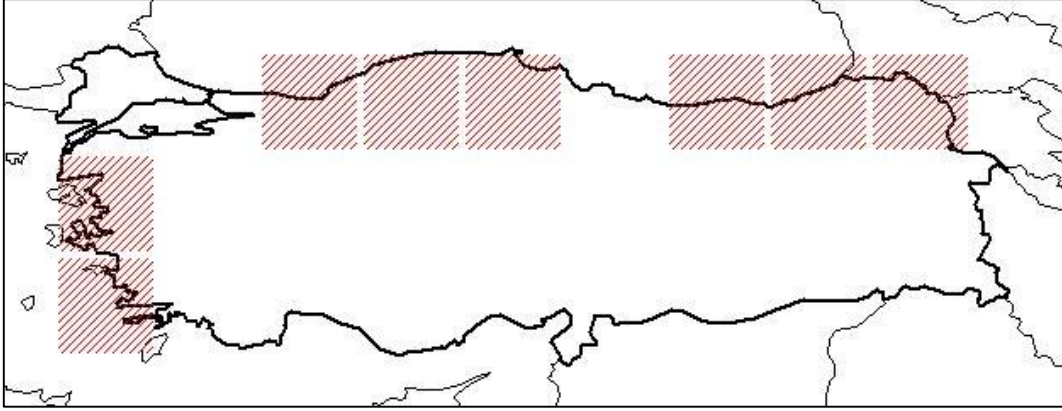
## 1. GİRİŞ

Büyük çoğunluğu Orman Genel Müdürlüğü tarafından idare edilmekte olan ormanlarımızın (22,7 milyon hektar, ülke yüzölçümünün yaklaşık % 29,2) tamamına yakını devletin hüküm ve tasarrufu altındadır. Özel mülkiyete ait orman alanı ise yaklaşık 30 bin hektardır (OGM, 2020; OGM, 2021). Ülkemiz içerisinde barındırdığı odunsu taksonlar ve sahip olduğu bitki tür çeşitliliği bakımından düşünüldüğünde zengin bir ülke durumundadır. Türkiye florasında doğal olarak yetişen 300’den fazla yarı çalı, 550’den fazla çalı ve ağaç olmak üzere toplamda 850’nin üzerinde odunsu bitki bulunmaktadır (Koç ve Fakir, 2019).

Ülkemiz sınırları içerisinde doğal yayılış gösteren *Tilia* (ıhlamur) cinsine ait Kafkas ıhlamuru (*Tilia rubra* subsp. *caucasica*), Kış ıhlamuru (*Tilia cordata*), Yaz ıhlamuru (*Tilia platyphyllos*) ve Gümüşü ıhlamur (*Tilia tomentosa*) olmak üzere dört adet tür yer almaktadır (Parlak vd., 2019). Kafkas ıhlamuru Anadolu’nun değişik bölgelerinde, özellikle Kuzeydoğu Anadolu’da çok görülmektedir. *Tilia rubra* subsp. *caucasica* doğal olarak yayılışı Artvin, Balıkesir, Bolu, Giresun, Gümüşhane, Kars, Kastamonu, İzmir, Samsun, Trabzon, Rize ve Zonguldak’ta bulunmaktadır (Erdoğan Genç vd., 2021).

İhlamurlar (TSE Standart No: 3223); yaprak ıhlamur, yapraklı çiçek ıhlamur ve çiçek ıhlamur olarak üç gruba ayrılmaktadır. Sadece çiçek yapraklarından oluşan ve içerisinde en fazla %1 oranında çiçek bulunan grup yaprak ıhlamur olarak adlandırılmaktadır. Çiçek durumları brahteleri ile birlikte toplandığında, yapraklı çiçek ıhlamur olmakta ve ikinci kalite olarak kabul edilmektedir. Çiçek ıhlamur ise sadece çiçek durumlarından ibaret olup içerisinde %1 oranında brahte (çiçek yaprağı ve sapı) bulunabilir ve birinci kalite olarak kabul edilmektedir (Baytop, 1984; Tuttu vd., 2017).

35-40 m’ye kadar boylanabilen Kafkas ıhlamurunun yaprağı 66-128 mm uzunluk ve 52-106 mm genişlikte, genişçe yumurtamsı, yürek şeklindedir. Temmuz ayında çiçek açar ve taç yapraklar ise açık sarı renklidir. Çiçek kurulu 1 kez dallanır, genellikle 3-5 çiçeklidir ve brahtesi ise açık yeşil renklidir. Meyve yapısı 10-11 mm uzunluğunda, elipsoid şekilde nadiren ters yumurtamsıdır (Oral, 2018). Şekil 1’de Kafkas ıhlamurunun ülkemizdeki dağılımı verilmiştir.



Şekil 1. Kafkas ıhlamuru'nun ülkemizdeki dağılımı (Tübives, 2022)

*Tilia rubra* DC. subsp. *caucasica* (Kafkas Ihlamuru) türü Dünya pazarındaki odun dışı orman ürünü olarak yer edinen türlerden biridir. Bu tür bulunduğu ülke ekolojisine ve ekonomisine önemli ölçüde fayda sağlamaktadır. Kafkas ıhlamuru türü ihraç ettiğimiz odun dışı orman ürünleri arasında bulunmaktadır (Özyurt ve Yücesan, 2020). Ihlamur insanlara şifa kaynağı olarak aynı zamanda orman köylümüşe ekonomik gelir kapısı oluşturarak da fayda sağlamaktadır. 2021 yılı sonu itibariyle ormanlarımızda 24 bin hektar alanda 441 ton faydalanılabilir ıhlamur bulunmaktadır. Ihlamurun orman köylüsüne katkısına bakıldığında 2021 yılı itibariyle yaklaşık 6 milyon TL, ülke ekonomisine katkısı ise yaklaşık 35 milyon TL'dir. Türkiye İstatistik Kurumu (TÜİK) verileri ne göre ABD, Almanya, Dominik Cumhuriyeti, Kosova başta olmak üzere 60 farklı ülkeye 2021 yılı sonu itibariyle 186 ton ıhlamur ihracatı yapılmış ve karşılığında 1.966.163 dolar döviz girdisi sağlanmıştır (OGM, 2022).

Bekletildiğinde içindeki aktif maddeler kaybolduğundan dolayı ıhlamur çayının daima taze olarak demlenip, içilmesi tavsiye edilmektedir. Grip sebebiyle yükselen ateşi düşürmek için birçok farklı kültürlerde geleneksel olarak ıhlamur çayı tüketilmektedir. Ihlamur çayının sıcak olarak içildiğinde boğaz ağrısını ve öksürüğü aldığı; çayın buharının burun tıkanıklığını açmaya faydalı olduğu ifade edilmektedir. Aynı zamanda yatıştırıcı etkisinden dolayı ıhlamur çayının gerginliği aldığı, stresi azalttığı ve uykuya geçişi kolaylaştırdığı bilinmektedir. Tabiatı doğal olarak yetişen Ihlamur ağacının çiçek ve yaprakları temmuz, ağustos aylarında toplanır ve kurutularak saklanmaktadır (Tamtürk, 2013). Ihlamur türleri bünyelerinde ürettikleri aromatik, uçucu yağlar ve benzeri sekonder metabolitler bakımından zengin bitkilerdir. Bu sebeple tıp, eczacılık, parfümeri, kozmetik ve gıda gibi alanlar için oldukça önemli bitkilerdir (Koç ve Fakir, 2018).

Bu çalışmada, Gümüşhane ilinde doğal yayılış gösteren *Tilia rubra* DC. subsp. *caucasica* V.Engler (Kafkas İhlamuru) yapraklarından su destilasyonu ile elde edilen uçucu yağın yüzde oranının, kimyasal yapısının ve tespit edilen uçucu bileşiklerin kimyasal sınıflarının belirlenmesi amaçlanmıştır.

## **2. MATERYAL VE METOD**

### **2.1. Materyal**

Kafkas İhlamuru yaprakları 2021 yılı temmuz ayında (çiçek açtığı zaman) Gümüşhane ili, Torul ilçesi, Köstere Köyü, Düzler Mahallesi'nden toplanmıştır. Doç. Dr. Mutlu Gültepe tarafından bitki materyalinin teşhisi yapılarak Karadeniz Teknik Üniversitesi, Fen Fakültesi, Biyoloji Bölümü Herbaryumuna KTUB Gültepe 721 herbaryum numarası ile depolanmıştır. Gölgede ve açık havada kurutulan yapraklar analiz edilinceye kadar uygun koşullarda bekletilmiştir.

### **2.2. Metod**

#### **2.2.1. Hidrodestilasyon İşlemi**

Kurutulmuş bitki yapraklarından (*Tilia rubra* subsp. *caucasica*) alınan 100 gramlık numune, küçük parçalara ayrıldıktan sonra içerisinde 1000 mL saf su bulunan 2000 mL'lik cam balona eklenmiştir. Yaprak numuneleri, yaklaşık 4 saat gömlekli ısıtıcı üzerinde ısıtılmış ve modifiye soğutuculu clevenger tipi cihazda uçucu yağın birikmesi beklenmiştir. Toplanan uçucu yağ kahverengi vialer GC kalitede 1 mL hegzan ile alınmış ve susuz Na<sub>2</sub>SO<sub>4</sub> (sodyumsülfat) ile kalan su kurutularak analizler için -18 C°'de saklanmıştır. Elde edilen uçucu yağ ekstraktından alınan 1 µL'lik çözeltiler GC-MS cihazına enjekte edilerek analiz yapılması sağlanmıştır (Karataş vd., 2021). Çalışmada kullanılan Clevenger düzeneği Şekil 2'de gösterilmiştir.

#### **2.2.2. Uçucu Bileşenlerin GC-MS Analizi**

GC-MS cihazına 1 mL hegzan eklenmiş uçucu yağ ekstraktından alınan 1 µL'lik çözelti enjekte edilmiş ve kimyasal bileşen analizi gerçekleştirilmiştir. Uçucu yağ analizinde Agilent marka gaz kromatografisi (GC Agilent-7890) cihazı ile 5975 E Seri GC/MSD marka kütle spektrometresi cihazları çalışmada kullanılmıştır. Analiz için 30 m x 0.32 mm, film kalınlığı 0.25 µm olan HP-5 apolar kapiler kolondan faydalanılmıştır. Uçucu bileşenlerin analizi için kullanılan Agilent-7890 model GC-MS cihazı Şekil 2'de verilmiştir.



Şekil 2. Çalışmada kullanılan modifiye soğutuculu Clevenger ve Agilent-7890 cihazı

### 2.2.3. Bileşenlerin Aydınlatılması

Elde edilen uçucu yağların kütle spektrumları analizi MS detektöründe, miktar analizleri ise FID detektöründe gerçekleştirilmiştir. Uçucu bileşenler gaz kromatografisi kolonundan ayrıldıktan sonra kütle spektrofotometresinde her birinin tek tek kütle spektrumları belirlenmiştir. Tespit edilen bileşiklerin, alıkonma indeks (RI-Kovats) değerleri deneysel olarak hesaplandıktan sonra belirlenen RI değerlerinin literatür verileriyle ve NIST, WILEY gibi kütüphanelerle karşılaştırılması sonucu yapıları tanımlanmıştır (Adams, 2007).

## 3. BULGULAR VE TARTIŞMA

Kafkas ıhlamuru yaprakları (100 g kurutulmuş) ile gerçekleştirilen hidrodestilasyon işlemi sonucunda hesaplanan uçucu yağ verimi yüzde olarak %1,04 w/w olarak bulunmuştur.

Öz, (2022) Kafkas ıhlamuru (*Tilia rubra* subsp. *caucasica*) çiçekleri ile yaptığı çalışmada, elde edilen çiçek uçucu yağ oranının % 1,10 w/w olduğunu ifade etmiştir. Toker vd., (1999) Kafkas Ihlamuru (*T. rubra*), Yaz ıhlamuru (*T. platyphyllos*) ve Gümüşü Ihlamur (*T. tomentosa*) bitki kısımlarından elde edilen uçucu yağ verimlerini Yaz ıhlamuru (*T. platyphyllos*) yaprak ve çiçeklerinde yağ miktarının sadece %0,03 oranında olduğunu, araştırılan diğer iki ıhlamur türünde ise bu oranın daha düşük olduğunu dile getirmişlerdir.

Çalışmada elde edilen uçucu yağ verimi karşılaştırıldığında, Kafkas ıhlamuru çiçeklerinden daha düşük bulunurken diğer diğer ıhlamur türlerine oranla daha fazla olduğu söylenebilir.

Analiz edilen uçucu yağda belirlenen 90 adet doğal bileşiğin yapısı, alıkonma zamanları ve kütle spektrumları dikkate alınarak GC-MS/FID cihazında bulunan NIST ve Willey kütüphanelerindeki bileşiklerle ve literatürle karşılaştırılarak tanımlanmıştır. 3 bileşiğin yapısı ise belirlenememiştir. Uçucu yağın analizinde tespit edilen bileşiklerin % 99,03'lük kısmı tanımlanmıştır. Uçucu bileşenlerin yüksek eşleşme oranları (en az %80) göstermiş ve alıkonma zamanlarının karşılaştırılması ile kimyasal yapıları aydınlatılmıştır. *Tilia rubra* subsp.

*caucasica* (Kafkas ihlamuru) yaprak uçucu yağının GC-MS/FID analiz sonuçları Tablo 1’de gösterilmiştir.

**Tablo 1.** Kafkas Ihlamuru (*Tilia rubra* subsp. *caucasica*) yapraklarından elde edilen uçucu yağın GC-MS/FID analiz sonuçları

Sıra No	RT (min)	% Alan	Bileşik Adı	Bileşik Sınıfı	Kovats İndeksi	Literatür Kovats İndeksi
1	4,97	1,55	Pentanal	Aldehid	697	697
2	5,05	0,67	2-Etil-furan	Diğer	702	702
3	5,24	0,06	Tetrahidro-2,5-dimetil-furan	Diğer	710	727
4	5,49	0,76	Metil-siklohegzan	Hidrokarbon	720	720
5	5,80	0,10	2-Metil-1-butanol	Alkol	733	733
6	6,21	0,05	(E)-2-Pentenal	Aldehid	750	750
7	6,51	0,05	1-Pentanol	Alkol	763	763
8	7,41	<b>4,41</b>	<b>Hegzanal</b>	<b>Aldehid</b>	800	800
9	9,00	0,87	(E)-3-Hegzen-2-on	Keton	843	844
10	9,30	<b>15,32</b>	<b>(E)-2-Hegzenal</b>	<b>Aldehid</b>	851	851
11	9,40	0,80	(Z)-3-Hegzen-1-ol	Alkol	853	853
12	9,79	1,55	(E)-2-Hegzen-1-ol	Alkol	864	863
13	9,88	1,34	1-Hegzanol	Alkol	866	866
14	10,77	0,23	2-Heptanon	Keton	890	890
15	11,20	0,20	Heptanal	Aldehid	901	901
16	12,34	0,05	$\alpha$ -Thujen	Monoterpen	926	926
17	12,71	<b>45,68</b>	<b><math>\alpha</math>-Pinen</b>	<b>Monoterpen</b>	934	934
18	13,31	0,17	Kamfen	Monoterpen	947	947
19	13,68	0,06	(Z)-2-Heptenal	Aldehid	955	956
20	13,85	0,50	Benzaldehid	Aldehid	958	958
21	14,48	0,13	Sabinen	Monoterpen	972	972
22	14,62	0,47	$\beta$ -Pinen	Monoterpen	975	975
23	14,76	0,09	1-Okten-3-ol	Alkol	978	978
24	14,97	0,50	2,3-Oktanediön	Keton	983	983
25	15,11	0,67	6-Metil-5-hepten-2-on	Keton	986	986

26	15,3 0	1,30	$\beta$ -Mirsen	Monoterpen	990	990
27	15,4 1	0,11	6-Metil-5-hepten-2-ol	Alkol	992	993
28	15,8 7	0,09	Oktanal	Aldehid	1002	1002
29	16,2 5	0,16	( <i>E,E</i> )-2,4-Heptadienal	Aldehid	1010	1010
30	16,9 0	0,04	<i>p</i> -Simen	Monoterpen	1023	1023
31	16,9 2	0,04	<i>o</i> -Simen	Monoterpen	1024	1024
32	17,1 2	0,86	Limonen	Monoterpen	1028	1028
33	17,2 6	0,34	Okalıptol	Monoterpenoid	1031	1031
34	17,4 1	0,14	2,2,6-trimetil-siklohegzanon	Keton	1034	1035
35	17,5 6	0,13	<i>cis</i> - $\beta$ -Osimen	Monoterpen	1037	1037
36	17,8 5	0,77	Benzenasetaldehid	Aldehid	1043	1043
37	18,0 6	0,11	<i>trans</i> - $\beta$ -Osimen	Monoterpen	1047	1047
38	18,5 9	0,26	$\gamma$ -Terpinen	Monoterpen	1058	1058
39	19,1 8	0,35	1-Oktanol	Alkol	1070	1070
40	19,2 8	0,19	<i>cis</i> -Linalool oksid	Monoterpenoid	1072	1072
41	19,5 3	0,24	3,5-Oktadien-2-on	Keton	1077	1076
42	20,0 5	0,41	$\alpha$ -Terpinolen	Monoterpen	1088	1088
43	20,3 8	0,49	1-Nonen-4-ol	Alkol	1095	1097
44	20,6 0	0,47	Linalool	Monoterpenoid	1099	1099
45	20,8 0	1,26	Nonanal	Aldehid	1103	1103
46	21,4 6	0,05	Feniletıl Alkol	Alkol	1117	1117
47	23,2 5	0,31	<i>trans-p</i> -Menthan-3-on	Monoterpenoid	1154	1154
48	23,6 7	0,07	3-Etil-benzaldehid	Aldehid	1163	1168
49	23,7 8	0,24	<i>cis-p</i> -Menthan-3-one	Monoterpenoid	1165	1165
50	23,8 6	1,14	Borneol	Monoterpenoid	1167	1167

51	24,0 5	0,24	Terpinen-4-ol	Monoterpenoid	1171	1171
52	24,2 5	0,06	2,4-Dimetil-benzaldehid	Aldehid	1175	1175
53	24,7 4	0,06	1-(3-metilfenil)-etanon	Keton	1185	1182
54	25,0 4	0,13	$\alpha$ -Terpineol	Monoterpenoid	1191	1191
55	25,2 1	0,18	Metil salisilat	Ester	1195	1195
56	25,4 7	0,24	Safranal	Monoterpenoid	1200	1201
57	25,6 8	0,28	Dekanal	Aldehid	1205	1205
58	25,9 9	0,03	Verbenon	Monoterpenoid	1211	1211
59	26,4 6	0,81	$\beta$ -Siklositral	Monoterpenoid	1222	1222
60	27,1 2	0,15	Butanoik asit, 2-metil-, hegzil ester	Ester	1236	1236
61	27,3 4	0,06	Pulegon	Monoterpenoid	1241	1242
62	28,1 8	0,15	$\beta$ -Siklohomositral	Monoterpenoid	1259	1257
63	28,7 7	0,13	1-Dekanol	Alkol	1272	1272
64	32,4 8	0,03	1,2-Dihidro-1,5,8-trimetil-naftalen	Terpen benzeri	1354	1354
65	32,4 9	0,02	Dehidro-ar-ionen	Terpen benzeri	1355	1355
66	32,6 5	0,17	Öjanol	Terpen benzeri	1359	1359
67	33,3 5	0,06	Butanoik asit, oktil ester	Ester	1375	1375
68	33,8 6	0,05	$\beta$ -Damaskenon	Monoterpenoid	1386	1386
69	34,5 5	0,11	Difenil eter	Eter	1402	1404
70	35,2 4	0,17	Dodekanal	Aldehid	1419	1419
71	35,4 3	0,15	Karyofilen	Seskiterpen	1423	1423
72	35,7 0	0,53	$\alpha$ -Ionon	Monoterpenoid	1430	1430
73	36,6 9	1,85	<i>trans</i> -Geranilaseton	Monoterpenoid	1453	1453
74	37,1 6	0,02	( <i>Z,E</i> )- $\alpha$ -Farnesen	Seskiterpen	1465	1467
75	37,5 4	0,06	1-Dodekanol	Alkol	1474	1474



76	38,1 5	1,28	$\beta$ -Ionon	Monoterpenoid	1489	1489
77	38,7 5	0,05	$\alpha$ -Muurolen	Seskiterpen	1503	1503
78	38,9 6	0,35	$\alpha$ -Farnesen	Seskiterpen	1509	1509
79	39,1 5	0,19	2,4-Di-tert-butilfenol	Diğer	1513	1513
80	39,4 8	0,70	Bulunamadı		1522	MS
81	39,7 3	1,88	Benzoik asit, 2,6-dimethoksi-, metil ester	Ester	1528	1536
82	41,5 1	0,15	<i>cis</i> -3-Hegzenil benzoat	Ester	1573	1573
83	41,7 6	0,24	Benzoik asit, hegzil ester	Ester	1580	1580
84	42,5 2	0,51	2,2,4-Trimetil-1,3-pentanediol dizobutirat	Ester	1599	1587
85	43,7 5	0,12	Benzofenon	Keton	1632	1631
86	44,3 1	0,03	$\alpha$ -Kadinol	Seskiterpenoid	1647	1647
87	44,8 2	0,18	Bulunamadı		1660	MS
88	48,1 1	0,08	$\alpha$ -Hegzilsinnamaldehyd	Aldehyd	1751	1750
89	51,4 1	0,47	Hegzahidrofarnesil aseton	Seskiterpenoid	1845	1845
90	52,2 7	0,09	Bulunamadı		1871	MS
91	53,9 2	0,30	Farnesil aseton	Seskiterpenoid	1920	1921
92	60,0 4	1,64	Fitol	Diterpenoid	2115	2115
93	65,5 4	0,15	Trikosan	Hidrokarbon	2300	2300
<b>Toplam</b>	<b>100,00</b>					

**RT:** Alıkonma Zamanı, **Kovats Indeks:** Deneysel Alıkonma İndeksi, **Literatür Kovats Indeks:** Literatür Alıkonma İndeksi

Yaprak uçucu yağı ana bileşenlerinin %45,68 oranında  $\alpha$ -pinen (monoterpen), %15,32 oranında (*E*)-2-hegzanal (aldehid) ve %4,41 oranında hegzanal (aldehid) olduğu belirlenmiştir.

Tablo 1’de belirtilen ve yapısı tanımlanan bazı terpen ve terpenoidler bileşiklerin;  $\alpha$ -pinen,  $\beta$ -mirsen, borneol, *trans*-geranilaseton,  $\beta$ -ionon ve fitol, bazı aldehid bileşiklerin; hegzanal, (*E*)-2-hegzanal ve nonanal, bazı alkol bileşiklerinin; (*E*)-2-hegzan-1-ol, 1-hegzanol ve (*Z*)-3-hegzan-1-ol, bazı ester bileşiklerin; benzoik asit, 2,6-dimethoksi-, metil ester ve 2,2,4-trimetil-

1,3-pentanediol dizobutirat, bazı hidrokarbon bileşiklerin; metil siklohegzan ve trikosan olduğu görülmektedir.

Kafkas Ihlamuru (*T. rubra*), Yaz ihlamuru (*T. platyphyllos*) ve Gümüşü Ihlamur (*T. tomentosa*) uçucu yağ bileşenlerinin araştırıldığı farklı bir çalışmada Kafkas Ihlamuru yapraklarından damıtılan uçucu yağda (*E*)-kaur-16-ene (%29,3), (*Z*)-3-hegzetil benzoat (%12,0), hegzadekanoik asit (%11,1), geranil aseton (%4,9), nonakosan (%4,8) olarak karakterize edildiğini ifade edilmiştir (Toker vd., 1999).

*Tilia rubra* subsp. *caucasica* çiçek uçucu yağında 49 bileşenin tespit edildiği ve 3 bileşenin belirlenemediği ifade edilmiş ve uçucu yağ ana bileşenlerinin ise nonanal (%8,10), *trans*-geranilaseton (%7,15), trikosan (%7,46), metilsiklohegzan (%5,23), hegzanal (%5,13) ve  $\alpha$ -pinen (%4,84) olduğu bildirilmiştir (Öz, 2022).

*Tilia platyphyllos* (Yaz Ihlamuru) yaprakları ile yapılan bir çalışmada, dört farklı bölgeden toplanan yaprakların koku bileşenleri GC-MS (gaz kromatografisi/kütle spektrometresi) ile kombine edilmiş HS-SPME (Tepe boşluğu-katı faz mikro ekstraksiyon) tekniği ile belirlenmesi çalışılmıştır. Yaprak uçucu bileşenlerinin analizi sonucunda miktar olarak en fazla bulunan etken bileşenler olarak: (%64,84) (*E*)-2-hegzanal, (%22,73) 1-desin, (%15,66) 2-etil furan, (%8,77) benzaldehid tespit edildiğini ifade etmişlerdir (Koç ve Fakir, 2019).

*Tilia cordata* yaprakları (üç farklı genotip) ile yapılan farklı bir çalışmada, Headspace-GC/MS ve GC/MS analizleri sonucunda ortalama olarak baskın bileşenleri:  $\beta$ -Osimen (%43,79), heneikosan (%26,35),  $\alpha$ -kadinol (%19,84), terpinolen (%14,27), limonen (%14,17), epi- $\alpha$ -muurolol (%11,82) olarak ifade edilmiştir (Zorić vd., 2020).

Sarıkaya ve Doğdu (2021) tepe boşluğu katı faz mikroekstraksiyon (HS-SPME) analiz yöntemi ile *Tilia tomentosa* (Gümüşü Ihlamur) yaprak çiçek ve brahte uçucu bileşenlerini tespit etmek amacıyla yaptıkları çalışmada 42 farklı bileşenin belirlendiğini bildirmişlerdir. Analiz edilen uçucu yağın ana bileşenleri olarak %19,35 hegzanal, %18,45 (*E*)-2-hegzanal, %14,30 2,4 heptadienal ve %12,46 limonen bulunduğunu bildirmişlerdir.

Kafkas Ihlamuru (*Tilia rubra* subsp. *caucasica*) yaprak uçucu yağında belirlenen bileşiklerin kimyasal sınıflandırılması, yüzde miktarı, bileşik sayısı ve ana bileşenleri Tablo 2. de verilmiştir.

**Tablo 2.** Kafkas İhlamuru (*Tilia rubra* subsp. *caucasica*) yaprak uçucu yağında belirlenen bileşiklerin kimyasal sınıflandırılması, yüzde miktarı, bileşik sayısı ve ana bileşenleri

Bileşik Sınıfı	% Oranı	Bileşik Sayısı	Ana Bileşen
Monoterpenler	49,65	13	$\alpha$ -Pinen
Aldehidler	25,03	16	(E)-2-Hegzenal
Monoterpenoidler	8,06	17	trans-Geranilaseton
Alkoller	5,12	12	(E)-2-Hegzen-1-ol
Esterler	3,17	7	Benzoik asit, 2,6-dimethoksi-, metil ester
Ketonlar	2,83	8	(E)-3-Hegzen-2-on
Diterpenoidler	1,64	1	Fitol
Hidrokarbonlar	0,91	2	Metil-siklohegzan
Bilinmeyenler	0,97	3	
Diğerleri	0,92	3	2-Etil-furan
Seskiterpenoidler	0,80	3	Hegzahidrofarnesil aseton
Seskiterpenler	0,57	4	$\alpha$ -Farnesen
Terpen benzeri	0,22	3	Öjanol
Eterler	0,11	1	Difenil eter
<b>Toplam</b>	<b>100</b>	<b>93</b>	

Kafkas ihlamuru yapraklarından elde edilen uçucu yağda belirlenen bileşiklerin kimyasal sınıflandırma sonuçları Tablo 2’de incelendiğinde tespit edilen 93 adet bileşiğin 14 gruba ayrıldığı görülmektedir.

Yaprak uçucu yağında belirlenen kimyasal bileşen sınıfları değerlendirildiğinde yüzde oran olarak en fazla bulunan bileşik sınıfının % 49,65 ile monoterpenler, ana bileşenin ise  $\alpha$ -pinen olduğu görülmektedir. Diğer bileşik sınıflarında ise sırasıyla % 25,03 ile aldehidler olup ana bileşenin (E)-2-hegzenal, % 8,06 ile monoterpenoidler olup ana bileşenin trans-geranilaseton ve % 5,12 ile alkoller olup ana bileşenin (E)-2-hegzen-1-ol olduğu bulunmuştur. Bu sınıflarda belirlenen bileşik sayısı bakımından en fazla bulunan bileşik sınıflarının sırasıyla monoterpenoidler 17 adet, aldehidler 16 adet, monoterpenler 13 adet ve alkoller 12 adet olduğu belirlenmiştir. Yaprak uçucu yağ örneklerinde toplamda 38 adet bileşik ve %60,72’lik oranda terpen veya terpenoid sınıfı bileşikler bulunduğu görülmektedir (Tablo 2).

Öz (2022) Kafkas ihlamuru (*Tilia rubra* subsp. *caucasica*) çiçekleri ile yaptığı uçucu yağ analizi sonucunda uçucu yağdaki ana bileşik sınıflarını hidrokarbonlar (% 23,90 ve 7 bileşik), aldehidler (% 22,74 ve 8 bileşik), monoterpenoidler (% 16,48 ve 9 bileşik), monoterpenler (% 12,51 ve 6 bileşik) ve % 9,23 (8 bileşik) ile esterler olduğunu ifade etmiştir.

Zorić vd. (2020) *Tilia cordata* yaprakları (üç farklı genotip) ile yaptıkları analiz sonucunda uçucu yağlardaki ana bileşik sınıflarını monoterpen hidrokarbonlar (%87,05), alifatik hidrokarbonlar (% 36,59) ve oksijenli seskiterpenler (%34,60) olduğunu beyan etmişlerdir.

Koç ve Fakir (2019), yaz ıhlamuru yapraklarının uçucu bileşen analizinde, kimyasal yapılarının aromatik alkol, aromatik aldehid ve monoterpen hidrokarbon sınıflarına ait bileşiklerden oluştuğunu beyan etmişlerdir.

Kafkas ıhlamuru ve diğer ıhlamur türleri ile yapılan uçucu yağ çalışmalarında belirtilen uçucu bileşenler ile çalışmada ortaya çıkan sonuçlar karşılaştırıldığında benzer bileşiklerin  $\alpha$ -pinen, (*E*)-2-hegzanal, hegzanal, geranilaseton olduğu anlaşılmaktadır. Yapılan çalışmalarda uçucu bileşenlerin ait oldukları kimyasal sınıflar olarak monoterpenlerin öne çıktığı ve bu sonucunda bizim çalışmamızla uyumlu olduğu görülmektedir. Tespit edilen bileşenlerin kimyasal sınıflandırılması ve uçucu bileşik miktarları arasında bulunan bazı farklılıkların sebebi olarak çalışmalara konu olan türlerin farklılığı, toplama zamanları, depolama şartları, analiz parametreleri, iklim şartları, farklı yetiştirme yeri, doğal çeşitlilik gibi birçok faktör sayılabilir.

#### **4. SONUÇ ve ÖNERİLER**

Ülkemizin bitki zenginliği içerisinde yer alan Kafkas ıhlamuru yaprak uçucu yağının kimyasal içeriğinin incelendiği bir araştırma niteliğindedir. Çalışma sonucunda su destilasyonu işlemi ile uçucu yağ verimi yüzde %1,04 olarak hesaplanmıştır. Elde edilen uçucu yağın GC-MS/FID ile analizi ile 93 adet bileşik tespit edilmiş ve bu bileşiklerden 90 adet bileşiğin yapısı tanımlanmıştır. Analiz edilen uçucu yağın ana bileşenleri olarak  $\alpha$ -pinen, (*E*)-2-hegzanal ve hegzanal bulunmuştur. Bileşiklerin kimyasal sınıflandırılmasında miktar olarak en fazla bulunan bileşik sınıfı monoterpenler (% 49,65) olmuştur. Çalışma kapsamında, ülkemizde doğal olarak yayılış göstermekte olan dört ıhlamur türünden biri olan ve Gümüşhane ilinde yetişen Kafkas ıhlamurunun yaprak uçucu bileşenleri incelenmiştir. Araştırma sonucunda elde edilen verilerin bitki ile ilgili yapılacak daha sonraki çalışmalara ve parfümeri, kozmetik, tıp, ilaç ve gıda gibi alanlara katkıda bulunabileceği düşünülmektedir.

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**ŞEKER PANCARI (*Beta vulgaris* L.) EKİM ALANLARINDA YABANCI OT  
SORUNU; AĞRI İLİ ÖRNEĞİ**

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**ÖZET**

Yabancı otlar şeker pancarı ekim alanlarında önemli verim ve kalite kayıplarına sebep olmaktadır bundan dolayı yabancı otlarla mücadele etmek için önceden yabancı otları bilmek ve tanımak gerekmektedir. Bundan dolayı bu çalışmayı 2022 yılında Ağrı ili şeker pancarı ekim (*Beta vulgaris* L.) alanlarında bulunan yabancı ot türleri, rastlama sıklıkları, yoğunlukları ayrıca bölge çiftçisinin yabancı ot sorunlarını çözmedeki yaklaşımlarını, mücadele yöntemlerini belirlemek amacıyla yürütülmüştür. Çalışma kapsamında 50 şeker pancarı ekim alanlarında sürveyler yapılmış. Ayrıca şeker pancarı üretimi yapan 100 çiftçi ile yüz yüze anket yapılmıştır. Çalışma sonucunda; şeker pancarı ekim alanlarında 1 parazit, 1 dar yapraklı ve 11 geniş yapraklı olmak üzere 13 familyaya ait toplamda 40 yabancı ot türü tespit edilmiştir. Tespit edilen bu familyalar içinde en fazla yabancı ot sayısına; Poaceae (11 tür), Asteraceae (8 tür) ve Brassicaceae (7 tür) familyaları sahip olmuştur. Rastlama sıklıkları en yüksek yabancı ot türleri sırasıyla; *Chenopodium album* L. (%92), *Amaranthus retroflexus* L. (%86) ve *Convolvulus arvensis* L. (%80) olmuştur. Yoğunlukları en yüksek yabancı otlar ise, *Chenopodium album* L. (2,82 adet/m<sup>2</sup>), *Convolvulus arvensis* L. (2,15 adet/m<sup>2</sup>) ve *Amaranthus retroflexus* L. ( 1,86 adet/m<sup>2</sup>) olmuştur. Yapılan anket sonucunda; çiftçilerin %82'si şeker pancarı ekim alanlarında en büyük sorunun yabancı otlar olduğunu ve %75'i tarlalarda yabancı otun çok yoğun olduğunu ifade etmişlerdir. Şeker pancarı ekim alanlarında en fazla yoğunlukta bulunan yabancı ot türlerin *Convolvulus arvensis* L. (%86), *Chenopodium album* L. (%72) ve *Amaranthus retroflexus* L. (%70) olduğunu belirtmişlerdir. Ankete katılım gösteren çiftçilerin çoğunluğu yabancı otlara karşı mekanik mücadele yaptıklarını belirtmiştir.

**Anahtar kelimeler:** Sürvey, Yabancı ot, Anket, Şeker pancarı, Rastlama sıklığı

**WEED PROBLEM IN SUGAR BEET (*Beta vulgaris* L.) CULTIVATION AREAS; THE CASE OF AĞRI PROVINCE****ABSTRACT**

Weeds cause significant yield and quality losses in sugar beet cultivation areas. Therefore, it is necessary to know and recognize weeds in advance to combat weeds. Therefore, this study was carried out in order to determine the weed types, their incidence and density, as well as the approaches and control methods of the farmers in the region in solving the weed problems in the sugar beet (*Beta vulgaris* L.) cultivation areas of Ağrı province in 2022. Within the scope of the study, surveys were made in 50 sugar beet fields. In addition, a face-to-face survey was conducted with 100 farmers producing sugar beet. In the results of study; a total of 40 weed species belonging to 13 families, including 1 parasite, 1 narrow-leaved and 11 broad-leaved, were detected in sugar beet cultivation areas. The highest number of weeds among these identified families were found as; Poaceae (11 species), Asteraceae (8 species) and Brassicaceae (7 species) families. Weed species with the highest frequency rates are respectively; *Chenopodium album* L. (92%), *Amaranthus retroflexus* L. (86%), and *Convolvulus arvensis* L. (80%). The weeds with the highest densities were *Chenopodium album* L. (2.82 plants/m<sup>2</sup>), *Convolvulus arvensis* L. (2.15 plants/m<sup>2</sup>) and *Amaranthus retroflexus* L. (1.86 plants/m<sup>2</sup>). As a result of the survey; 82% of the farmers stated that the biggest problem in sugar beet cultivation areas is weeds and 75% stated that weeds are very dense in the fields. They stated that the weed species with the highest density in sugar beet cultivation areas were *Convolvulus arvensis* L. (86%), *Chenopodium album* L. (72%), *Amaranthus retroflexus* L. (70%). The majority of the farmers who participated in the survey stated that they use mechanical control against weeds.

**Keywords:** Survey, Weed, Questionnaire, Sugar beet, Frequency



## 1. GİRİŞ

Endüstri bitkileri içerisinde yer alan şeker pancarı (*Beta vulgaris* L.) insan ve hayvan beslenmesinde önemli bir yere sahiptir. Şeker pancarı Amaranthaceae familyasından, yazlık, iki yıllık bir endüstri bitkisidir (Özer ve Ertunç, 2005). Şeker pancarı sakarozun (yani şekerin) ekonomik olarak üretilebildiği iki bitki kaynağından biri olan önemli bir endüstriyel bitkidir (Gurel *et al.*, 2008). Şeker ve hayvan yemine ek olarak, şeker pancarı biyoyakıtlar, insan beslenmesi, plastikler ve ilaçlar için birçok katma değerli yan ürün sağlayabilir (Finkenstadt, 2014). Şeker kamışı subtropik ve tropik ve iklim kuşağında yetişirken, şeker pancarı ise Şeker pancarı farklı iklim ve topraklara karşı çok toleranslıdır ve marjinal arazilerde yetiştirilebilir (Stevanato ve Panella 2013). Ayrıca ülkemizin içinde de bulunduğu kuzey yarım kürede 30° güney, 60° kuzey enlemleri arasındaki farklı bölgeler de ve iklim kuşaklar da yetişmektedir (Gencer, 1988). Dünyada ve ülkemizde şeker pancarı ekim alanlarında son yıllarda azalmalar olmuş olsa da Ağrı ilinde şeker pancarı ekim alanlarında artış gözlemlenmiştir (Çizelge 1.1).

**Çizelge 1.1.** Dünya, Türkiye ve Ağrı ili şeker pancarı ekim alanları ve üretim miktarları

Yıllar	Ekim alanı			Üretim miktarı		
	Dünya (ha)	Türkiye (da)	Ağrı (da)	Dünya (ton)	Türkiye (ton)	Ağrı (ton)
2010	4.693.567	3.291.669	35.020	228.301.586	17.942.112	89.903
2011	5.074.334	2.972.648	28.675	278.756.561	16.126.489	86.931
2012	4.828.580	2.806.945	15.065	269.558.344	14.919.940	44.049
2013	4.344.285	2.913.282	11.485	247.624.316	16.488.590	31.845
2014	4.469.091	2.887.851	7.420	270.249.852	16.743.045	28.397
2015	4.209.450	2.744.873	6.334	240.759.023	16.022.783	28.610
2016	4.584.596	3.224.477	15.406	278.771.758	19.592.731	65.117
2017	4.980.532	3.392.742	25.460	313.936.939	21.149.020	98.210
2018	4.784.905	2.921.044	22.544	273.387.904	17.436.100	84.819
2019	4.650.878	3.137.891	22.916	280.918.827	18.054.320	59.474
2020	4.439.073	3.381.078	31.850	252.968.843	23.025.738	124.974
2021		3.054.051	48.130		17.767.085	178.962

**Kaynak:** (FAO, 2022; TÜİK, 2022)

Dünya’da 2000 yılında toplam şeker pancarı ekim alanı 6 milyon hektar civarında iken, 2020 Dünyada 2000-2020 yılları arası kıtalara göre şeker pancarı üretim oranlarına bakıldığında en fazla üretim miktarı %69 oran ile Avrupa birinci sırada yer alırken, bunu sırasıyla Asya (%14) ve Amerika (%13) kıtaları takip etmiştir. Dünyada 2000- 2020 yılları arasında en fazla şeker pancarı üretim birinci sırada Fransa (33.531.894,48 ton) yer alırken, Türkiye 16.519.015,19 ton üretim miktarıyla 5. Sırada yer almaktadır (FAO, 2022)

Dünya nüfusunun sürekli artması tarım ürünlerine olan gereksinimin artması ve sanayi kollarının gelişmesinden dolayı şeker pancarına olan ihtiyaçta artmaktadır. Fakat Dünya’da ve ülkemizde önemli kültür bitkilerinden biri olan şeker pancarı sınırlayan etmenler bulunmaktadır. Bu etmenlerin başında yabancı otlar gelmektedir. Şeker pancarından iyi bir verim elde etmek için mutlaka yabancı otlarla mücadele etmek gerekmektedir. Bu nedenden dolayı ekim alanlarının tümünde yabancı otlara karşı mücadele edilmektedir. Şeker pancarı tohumu, yavaş çimlenir ama yabancı otlar kısa zamanda gelişip büyüdüklerinden erken çimlenen yabancı otlar kısa sürede pancar fidelerini bastırır bundan dolayı şeker pancarında erken dönemlerde daha fazla verimi etkilemektedir (Özer 1993). Yabancı otların şeker pancarında meydana getirdiği ürün kaybı ortalama %5.8 iken, Türkiye’de %6-40 ve Asya ülkelerinde %45 oranlarındadır. Yabancı otlar, sadece ürün verimini değil, ürün kalitesini de ciddi şekilde düşürmektedirler (Jabran and Chauhan 2018). Yabancı otların değişik kültür bitkilerinde oluşturduğu zarar oranı birbirinden farklı olup, bazıları sadece bir kültür bitkisinde sorun oluştururken, diğer bazı türler birden fazla kültür bitkisinde ürün azalmasına sebep olmaktadır (Günçan, 2018). Şeker pancarı ekim alanlarında en fazla tek yıllık yabancı otlar bulunur. Sonrasında çok yıllık yabancı otlar en az ise iki yıllık yabancı ot türleri bulunmaktadır. (Günçan, 2000). Tüm dünyada olduğu gibi ülkemizde de yeni kimyasalların ortaya çıkışı ve tarım yeni tekniklerin ortaya çıkması ile yabancı ot yoğunluğunda ve popülasyonunda sürekli değişikliklerin olduğu ve bun ek olarak belirli dönemlerde büyük problemler yaratan yabancı ot türlerin günümüzde bugün ekonomik zarara neden olmayan türlerin olmuşlardır (Işık ve ark., 2000; Ögüt ve Boz, 2007).

Şeker pancarında yabancı otlar bazı hastalık ve zararlılara yataklık etmekte ve bunların yayılmasına sebep olmaktadır (Er ve İnan, 1987). Tarım alanlarında yabancı otların neden oldukları zararları azaltmak ya da ortadan kaldırmak için yabancı otlarla mücadele gün geçtikçe daha fazla önem kazanmaktadır. Bu sebepten dolayı yabancı otlarla mücadele zamanını iyi tespit edip, maliyetleri en aza indirmek amacıyla günümüzde yeni yöntemler geliştirilmelidir (Malaslı, 2010). Yabancı otlardan dolayı meydana gelen bu kayıpların önüne geçebilmek için etkili bir yabancı ot kontrol stratejisinin takip edilmesi son derece önem arz etmektedir. Yabancı otlarla ekonomik ve etkili bir mücadele yapmanın en temel ilkesi, yabancı ot türlerinin ve bu türlerin biyolojilerinin iyi bilinmesi gerekmektedir (Özer ve ark., 1998). Bunun içinde şeker pancarı üretimi yapılan alanlarda bulunan yabancı otların bilinmesi ve bunların biyolojik/ekolojik özelliklerinin bilinmesi uygulanacak yabancı ot kontrol yönteminin

seçilmesinde ve etkili olmasında büyük önem arz etmektedir. Sonrasında bölgenin ekolojik özellikleri de göz önünde bulundurularak bölgeye göre özel çözüm önerileri geliştirilmelidir (Özaslan ve Kendal, 2014). Bu çalışma Ağrı ili şeker pancarı ekim alanlarında bulunan yabancı ot türleri, rastlama sıklıkları, yoğunlukları ayrıca bölge çiftçisinin yabancı ot sorunlarını çözmedeki yaklaşımlarını, mücadele yöntemlerini belirlemek amacıyla yürütülmüştür.

## 2. MATERYAL VE METOD

Araştırma 2022 yıllarında Ağrı Merkez ve İlçelerine (38° 59' - 40° 02' kuzey paralelleri ile 42° 15' - 44° 36' doğu meridyenleri) bağlı köylerde şeker pancarı yetiştiriciliği yapılan 50 tarlada sorun olan yabancı ot türleri, rastlama sıklıkları ve yoğunluklarını belirlemek amacıyla sürvey çalışması gerçekleştirilmiştir. Buna ek olarak şeker pancarı yetiştiriciliği yapan 100 çiftçi ile yüz yüze görüşmeler gerçekleştirilerek anket çalışması yapılmıştır.

### 2.1. Sürvey çalışması

Ağrı ili şeker pancarı üretim alanlarında görülen yabancı ot türlerini, rastlama sıklıklarını ve yoğunluklarını belirlemek amacıyla yapılan bu çalışma, 2022 yılı vejetasyon dönemlerinde toplamda 50 şeker pancarı tarlasına gidilerek Sürveyler yapılmıştır. Sürvey yapılan ilçeler ve tarlalar 2021 yılı toplam şeker pancarı ekim alanları (da) dikkate alınarak belirlenecektir. (Çizelge 2.1).

**Çizelge 2.1.** Ağrı ilinde ilçelere göre 2021 yılı toplam şeker pancarı üretim alanları ve bu alanlara göre yapılacak Sürvey sayıları (TÜİK, 2022)

İlçeler	Ekim alanları (da)	Örnekleme sayısı
Diyadin	80	1
Eleşkirt	4.250	8
Hamur	252	1
Merkez	2.115	4
Patnos	23.883	33
Taşlıçay	332	1
Tutak	938	2
<b>Toplam</b>	<b>31.850</b>	<b>50</b>

S

ürveylerden önce şeker pancarı ekim alanları belirlenip, sonrasında bu alanlara doğru hatlar halinde gidilerek, her 10 km'de bir rastlantısal olarak durulmuş ve en yakın şeker pancarı tarlasına girilmiştir (Uygur, 1985). Sırma ve ark., (2001)'dan yararlanılarak tarlanın büyüklüğüne göre çerçeveler atılmıştır (Çizelge 2.2).

**Çizelge 2.2.** Sürveylerde tarla büyüklüğüne göre atılan çerçeve sayısı

Tarla büyüklüğü (da)	Atılan çerçeve (adet)
0-5	4
5-10	6
10-20	8
20-50	12
50	16

Sayımlar için 1 m<sup>2</sup>'lik kare çerçeve kullanılmış, kenar tesirinden uzak, 5-10 m içeriden tarlayı temsil edecek şekilde başlayıp ve çerçeve rastgele atılarak içerisine giren yabancı otlar sayılmıştır. Yabancı ot türlerinin teşhisinden, yabancı otların % Rastlama Sıklığı (R.S) (Odum, 1983; Uygur, 1985)'e göre hesaplanmıştır. Rastlama Sıklığı; Bir yabancı ot türünün sürvey yapılan bölgeler içerisinde % kaçında karşılaşıldığını gösteren değerdir. Bu değerlerin hesaplanması aşağıdaki formül ile yapılacaktır.

$$R.S (\%) = 100 \times N/M$$

R.S: Rastlama Sıklığı (%)

N = Bir türün bulunduğu tarla sayısı

M = Ölçüm yapılan toplam tarla sayısı

Yabancı otların yoğunluklarının belirlenmesinde aritmetik ortalama esas alınarak değerlendirme yapılacaktır. Yabancı ot yoğunlukları (adet/m<sup>2</sup>) yapılacak olan sürveylerdeki toplam m<sup>2</sup>'deki yabancı ot sayısı, yapılan sürvey sayısına bölünerek türlerin teker teker yoğunlukları hesaplanmıştır (Odum, 1971).

$$Yoğunluk (adet/m^2) = B/m$$

B; Alınan örnekte toplam birey sayısı

m; Toplam örnekleme sayısı

Sürvey yapılan ekim alanlarında belirlenen yabancı otların rastlama sıklıkları ve yoğunluk değerlerine göre sınıflandırılması ve önemli türlerin vurgulanması amacıyla farklı araştırmacılar tarafından geliştirilen ve uyarlanan skala değerleri (Tepe, 1989; Uludağ, 1993) kullanılmıştır. Skala değerlerinin anlamları (Arslan, 2018)'e göre değerlendirilmiştir. İlgili skala değerleri Çizelge 2.3' te belirtilmiştir.

**Çizelge 2.3. Yabancı otların yoğunluk ve yaygınlıklarının derecelendirilmesi**

Yaygınlık		Yoğunluk			
Ç	: $\geq$ %50	Çok yaygın	A	$\geq$ 10 adet m-2	Çok yoğun
Y	%25-49	Yaygın	B	5,00 - 9,99 adet m-2	Yoğun
O	%13-24	Orta yaygın	C	1,00 - 4,99 adet m-2	Orta yoğun
N	<%12	Düşük yaygın	D	0,10 - 0,99 adet m-2	Düşük yoğun
			E	0,01 - 0,09 adet m-2	Çok düşük yoğun
			F	<0,01 adet m-2	Nadir

## 2.2. Anket çalışması

Araştırma ağırlı ilinde şeker pancarı üretimi yapan 100 çiftçi ile yüz yüze bazı çiftçiler ile tarlalarında bazıları ile köy de evlerinin önünde ve bazı çiftçiler ile de kahvede görüşülerek yürütülmüştür. Çiftçi görüşmeleri TÜİK verilerine göre domates ekim alanları baz alınarak (Çizelge 2.1) yapılmıştır.

Ankete katılan üreticilere;

- Şeker pancarı üretimi ile ilgili karşılaştıkları sorunlar
- Şeker pancarı üretim alanlarında sorun olan yabancı otlar,
- Yabancı ot mücadelesi gibi konularda sorular yöneltilmiştir.

Anket çalışması sırasında çiftçilerin daha iyi tanınması için yabancı ot fotoğrafları ile birlikte bitkilerin canlı materyalleri gösterilmiştir. Üreticilerimizin farklı görüş ve düşüncelerini not edip değerlendirilmiştir.

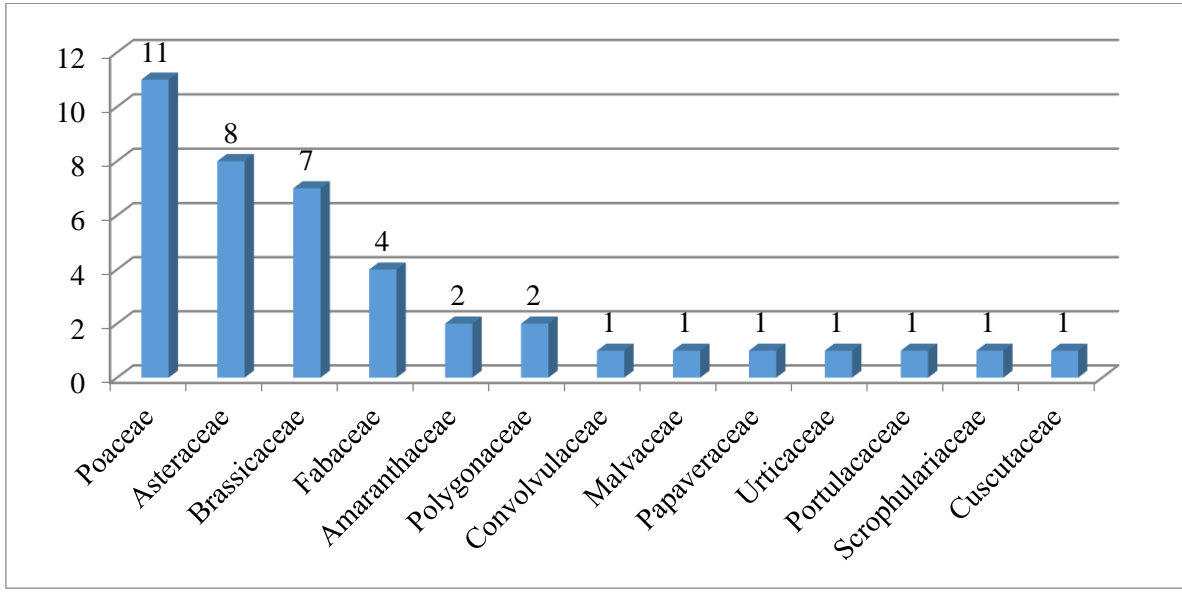
## 2.3. Veri analizi

Anket sonucunda elde edilen veriler SPSS 20 istatistik paket programında dökümleri alınmıştır. Bulgular frekans ve yüzde dağılımı olarak gösterilmiştir.

## 3. ARAŞTIRMA ve BULGULAR

### 3.1. Araştırmada tespit edilen yabancı ot türleri, rastlama sıklıkları ve yoğunlukları

Araştırmanın yürütüldüğü 2022 yılı Ağrı ili şeker pancarı üretimi yapılan tarlalarda yapılan Sürveyler sonucunda tespit edilen yabancı ot familyaların sahip oldukları yabancı ot tür sayılarına göre dağılımları Şekil 3.1’de sunulmuştur.



**Şekil 3.1.** Tespit edilen yabancı ot familyalarının sahip oldukları yabancı ot tür sayılarına göre dağılımları

Ağrı ili şeker pancarı üretimi yapılan tarım arazilerinde yapılan Sürveyler sonucunda 1 parazit, 1 dar yapraklı ve 11 geniş yapraklı olmak üzere 13 familyaya ait toplamda 40 yabancı ot türü tespit edilmiştir. Tespit edilen bu familyalar içinde en fazla yabancı ot sayısına; Poaceae (11 tür), Asteraceae (8 tür) ve Brassicaceae (7 tür) familyaları sahip olmaktadır. Bu familyaları sırasıyla; Fabaceae (4 tür), Amaranthaceae (2 tür), Polygonaceae (2 tür), Convolvulaceae, Malvaceae, Papaveraceae, Portulacaceae Urticaceae, Scrophulariaceae ve Cuscutaceae (1 tür) familyaları takip etmektedir (Şekil 3.1). Tursun ve ark. (2003), yaptıkları çalışmada, 1 parazit, 1 tohumuz, 2 dar yapraklı ve 18 geniş yapraklı olmak üzere 22 familyaya ait toplamda 41 yabancı ot türü tespit etmişlerdir. Ayrıca en fazla yabancı ot sayısına familyaların sırasıyla Poaceae (8 tür), Asteraceae (5 tür) Fabaceae (3 tür) olduğunu belirtmiştir. Yapılan başka bir çalışmada ise 1 parazit, 1 dar yapraklı ve 16 geniş yapraklı olmak üzere 18 familyaya ait toplamda 56 farklı yabancı ot türü belirlemişlerdir. En fazla yabancı ot sayısına: Asteraceae (15 tür), Amaranthaceae (9 tür) ve Poaceae (8 tür) familyaları sahip olmuştur (Akça ve Işık, 2016). Gökçe (2018), yaptığı çalışmada ise 10 familyaya ait 17 adet yabancı ot türü tespit etmiştir. Tespit ettiği familyalar içinde en fazla yabancı ot sayısına sahip familyaların sırasıyla; Amaranthaceae (5 tür), Asteraceae (3 tür), Poaceae (2 tür) ve Fabaceae (2 tür) olmuştur. Büyükdemir ve Kara (2020), yaptıkları çalışmada sürveyler sonucunda, 17 familyaya ait 25 adet yabancı ot türü tespit etmişlerdir. En fazla yabancı ot sayısına sahip familyaların sırasıyla; Poaceae (5 tür) Asteraceae (3 tür), Amaranthaceae (2 tür) Polygonaceae (2) ve Fabaceae (2 tür) olmuştur. Akar ve Ögüt Yavuz (2020), yaptıkları çalışmada sürveyler sonucunda, 1 parazit,

1 dar yapraklı ve 20 geniş yapraklı 22 familyaya ait toplamda 51 yabancı ot türü tespit etmişlerdir. Ayrıca en fazla yabancı ot sayısına sahip familyaların sırasıyla; Asteraceae (9 tür), Brassicaceae (9 tür) Poaceae (6 tür) olduğunu belirtmiştir. Yukarıda belirtilen çalışmaların sonuçları ile yürüttüğümüz çalışmada elde ettiğimiz sonuçlar büyük oranda benzerlik taşımaktadır. Yapılan sürveyler sonucunda tespit edilen yabancı ot türleri, familyaları, bilimsel adları, Türkçe adları ve yaşam döngüleri Çizelge 3.1’de sunulmuştur.

**Çizelge 3.1.** Tespit edilen yabancı ot türleri, familyaları, bilimsel adları, Türkçe adları ve yaşam döngüleri

<b>Familya</b>	<b>Bilimsel adları</b>	<b>Türkçe adları</b>	<b>Yaşam Döngüsü</b>
<b>Dar Yapraklı</b>			
Poaceae	<i>Avena fatua</i> L.	Yabani yulaf	A
	<i>Agropyron repens</i> L.	Ayrık otu	P
	<i>Cynodon dactylon</i> (L.) Pers	Köpek dişi ayırığı	P
	<i>Digitaria songuinialis</i> (L.) Scop.	Çatal otu	A
	<i>Seteria verticillate</i> L.	Yapışkan kirpi darı	A
	<i>Sorghum halepense</i> (L.) Pers	Kanyaş	P
	<i>Alopecurus myosuroides</i> Huds.	Tilkikuyruğu	A
	<i>Seteria viridis</i> L.	Kirpi darı	A
	<i>Phragmites australis</i> (Cav.) Trin. ex. Steudel	Kamış	P
	<i>Echinochloa crus-galli</i> (L.) P.Beauv	Darıcan	A
<b>Geniş Yapraklı</b>			
Amaranthaceae	<i>Chenopodium album</i> L.	Sirken	A
	<i>Amaranthus retroflexus</i> L.	Kırmızı köklü tilkikuyruğu	A
Asteraceae	<i>Taraxacum officinale</i> L.	Karahindiba	P
	<i>Lactuca serriola</i> L.	Yabani marul	P
	<i>Echinochloa crus-galli</i> (L.) P.Beauv	Darıcan	A
	<i>Sonchus asper</i> (L.) Hill	Eşek marulu	A
	<i>Conyza canadensis</i> L.	Kanada şifa otu	A
	<i>Carduus nutans</i> L.	Deve dikenini	P
	<i>Anthemis altissima</i> L.	Papatya	A
	<i>Cirsium arvense</i> (L.) Scop	Köygöçüren	P
Asteraceae	<i>Xanthium strumarium</i> L.	Domuz pıtrağı	A
Brassicaceae	<i>Descurania sophia</i> L.	Sadır otu	A
	<i>Sisymbrium loeselii</i> L.	Bülbül otu	A

A; Tek yıllık, P; Çok yıllık

Çizelge 3.1 (Devam)

<b>Familya</b>	<b>Bilimsel adları</b>	<b>Türkçe adları</b>	<b>Yaşam Döngüsü</b>
<b>Geniş Yapraklı</b>			
Brassicaceae	<i>Cardaria draba</i> (L.) Desv	Yabani tere	P
	<i>Lepidium perfoliatum</i> L.	Geniş yapraklı tere	P
	<i>Capsella bursa-pastoris</i> (L.)	Çobançantası	A
	<i>Boreava orientalis</i> Jaub. and Spach	Sarı ot	A
	<i>Sinapis arvensis</i> L.	Yabani hardal	A
	<i>Conyza canadensis</i> L.	Kanada şifaotu	A
Convolvulaceae	<i>Convolvulus arvensis</i> L.	Tarla sarmaşığı	P
Fabaceae	<i>Bromus tectorum</i> L.	Püsküllü çayı	A
	<i>Medicago sativa</i> L.	Yonca	P
	<i>Trifolium repens</i> L.	Ak üçgül	P
	<i>Vicia sativa</i> L.	Fiğ	A
Malvaceae	<i>Malva neglecta</i> Wallr.	Ebegümece	A
Papaveraceae	<i>Papaver rhoeas</i> L.	Gelincik	A
Polygonaceae	<i>Rumex crispus</i> L.	Kıvırcık labada	P
Polygonaceae	<i>Polygonum</i> spp.	Çobandeğneği türleri	P
Urticaceae	<i>Urtica dioica</i> L.	Isırgan otu	P
Portulacaceae	<i>Portulaca oleracea</i> L.	Semizotu	A
Scrophulariaceae	<i>Verbascum</i> spp.	Sığırkuyruğu türleri	P
<b>Parazit</b>			
Cuscutaceae	<i>Cuscuta</i> spp.	Küsküt	Parazit

A; Tek yıllık, P; Çok yıllık

Ağrı ili şeker pancarı üretimi yapılan tarım alanlarında yapılan Sürveyler sonucunda 11 geniş yapraklı 1 dar yapraklı ve 1 parazit olmak üzere 13 familyaya ait toplamda 40 yabancı ot türü belirlenmiştir. Bu yabancı otlar 11 dar yapraklı, 28 geniş yapraklı ve 1 parazit türlerinden oluşmaktadır. Tespit edilen yabancı otlardan 23 tür tek yıllık 16 tür çok yıllıktır ve 1 tür parazit türler olmaktadır. Bunlar içerisinde dar yapraklılarda 6 tür tek yıllık ve 5 tür çok yıllık, geniş yapraklı yabancı otlardan ise 16 tür tek yıllık ve 12 tür çok yıllık olmaktadır (Çizelge 3.1). Gökçe (2018), yaptığı çalışmada 10 familyaya ait 17 adet yabancı ot türü tespit etmiştir. Gürsoy (2002), yaptığı çalışma sonucunda, 27 geniş yapraklı, 3 dar yapraklı ve 1 tohumuz olmak üzere 31 familyaya ait toplamda 169 yabancı ot türü tespit etmiştir. Tursun ve ark. (2003), Yaptıkları sürveyler sonucunda; 18 geniş yapraklı, 2 dar yapraklı 1 tohumuz ve 1 parazit olmak üzere 22 familyaya ait toplamda 41 yabancı ot türü tespit etmişlerdir. Özkan ve Kaya (2008), yaptıkları sürveyler sonucunda 18 farklı familyaya ait 1 tohumuz, 5 dar yapraklı, 28 geniş yapraklı 34 yabancı ot türü tespit etmişlerdir. Yapılan başka bir çalışmada, 1 parazit, 1 dar yapraklı 16 geniş yapraklı olmak üzere 18 familyaya ait toplamda 56 yabancı ot türü tespit etmişler (Akça ve Işık 2016). Büyükdemir ve Kara (2020), Yaptıkları sürveyler sonucunda 17 familyaya ait 25 adet yabancı ot türü tespit etmişlerdir. Akar ve Ögüt Yavuz (2020), yaptıkları



sürveyler sonucunda 20 geniş yapraklı, 1 dar yapraklı ve 1 parazit olmak üzere 22 familyaya ait toplamda 51 yabancı ot tespit etmişlerdir. Yukarıda belirtilen çalışmalar da tespit ettikleri yabancı ot türleri ile çalışmamızda tespit ettiğimiz yabancı ot türleri büyük oranda benzerlik taşımaktadır. Ağrı ili şeker pancarı tarlalarında yapılan Sürveyler sonucunda tespit edilen yabancı ot türlerinin yoğunlukları, rastlama sıklıkları ve skala değerleri Çizelge 3.2’de sunulmuştur.

**Çizelge 3.2.** Tespit edilen yabancı ot türlerin rastlama sıklıkları, yoğunlukları ve skala değerleri

Bilimsel adları	Rastlama sıklığı (%)	S D	Yoğunluk (adet/m <sup>2</sup> )	S D
<i>Agropyron repens</i> L.	8	N	0,005	F
<i>Alopecurus myosuroides</i> Huds.	22	O	0,1	D
<i>Amaranthus retroflexus</i> L.	86	Ç	1,86	C
<i>Anthemis altissima</i> L.	16	O	0,008	F
<i>Avena fatua</i> L.	20	O	0,12	D
<i>Boreava orientalis</i> Jaub. and Spach	12	N	0,007	F
<i>Bromus tectorum</i> L.	16	O	0,009	F
<i>Capsella bursa-pastoris</i> (L.)	52	Ç	0,64	D
<i>Cardaria draba</i> (L.) Desv	36	Y	0,24	D
<i>Carduus nutans</i> L.	24	O	0,15	D
<i>Chenopodium album</i> L.	92	Ç	2,82	C
<i>Cirsium arvense</i> (L.) Scop	64	Ç	0,94	D
<i>Convolvulus arvensis</i> L	80	Ç	2,15	C
<i>Conyza canadensis</i> L.	40	Y	0,41	D
<i>Cuscuta</i> spp.	14	O	0,08	E
<i>Cynodon dactylon</i> (L.) Pers	38	Y	0,51	D
<i>Descurania sophia</i> L.	16	O	0,01	E
<i>Digitaria songuinialis</i> (L.) Scop.	8	N	0,013	E
<i>Echinochloa crus-galli</i> (L.) P.Beauv	20	O	0,09	E
<i>Lactuca serriola</i> L.	14	O	0,02	E
<i>Lepidium perfoliatum</i> L.	12	N	0,01	E
<i>Malva neglecta</i> Wallr.	8	N	0,006	F
<i>Medicago sativa</i> L.	6	N	0,005	F
<i>Papaver rhoeas</i> L.	8	N	0,002	F
<i>Phragmites australis</i> (Cav.) Trin. ex Steudel	24	O	0,35	D
<i>Polygonum</i> spp.	42	Y	0,85	D
<i>Portulaca oleracea</i> L.	16	O	0,09	E
<i>Rumex crispus</i> L.	60	Ç	0,52	D
<i>Seteria verticillate</i> L.	10	N	0,07	E
<i>Seteria viridis</i> L.	16	O	0,1	D

<i>Sinapis arvensis</i> L.	72	Ç	1,47	C
<i>Sisymbrium loeselii</i> L.	26	Y	0,12	D
<i>Sonchus asper</i> (L.) Hill	32	Y	0,28	D
<i>Sorghum halepense</i> (L.) Pers	8	N	0,065	E
<i>Taraxacum officinale</i> L.	18	O	0,05	E
<i>Trifolium repens</i> L.	34	Y	0,19	D
<i>Urtica dioica</i> L.	4	N	0,009	F
<i>Verbascum</i> spp.	18	O	0,012	E
<i>Vicia sativa</i> L.	2	N	0,002	F
<i>Xanthium strumarium</i> L.	18	O	0,01	E

Ç: Çok yaygın, Y:Yaygın, O: Orta yaygın, N: Düşük yaygın ve A:Çok yoğun, B: Yoğun, C: Orta yoğun, D: Düşük yoğun, E: Çok düşük yoğun, F: Nadir

Çalışmada tespit edilen 40 yabancı ot türünden 7'sinin rastlama sıklıkları %50 ve (çok yaygın Ç: >%50) üzeri olarak tespit edilmiştir. Bu yabancı otlar sırasıyla; *C. album* (%92), *A. retroflexus* (%86), *C. arvensis* (%80), *S. arvensis* (%72), *C. arvensis* (%64), *R. crispus* (%60) ve *C. bursa-pastoris* (%52) olmuştur. Sürveyler sonucunda tespit edilen yabancı otlardan 7 türün rastlama sıklığı %25-49 (Y: Yaygın) arasında tespit edilmiştir. Ayrıca tespit edilen yabancı otlar içerisinde 14 tür ise orta yaygınlıkta (O: R= %13-24) tespit edilmiştir. Tespit edilen yabancı otlar içerisinde 11 tür nadir (N: R=%0-12) olarak tespit edilmiştir. Buna ek olarak rastlama sıklıkları en düşük yabancı ot türleri sırasıyla: *A. repens*, *D. songuinialis*, *M. neglecta*, *P. rhoeas* ile *S. halepense* (%8), *M. sativa* (%6), *U. sioica* (%4), *V. sativa* (%2) olmuştur (Çizelge 3.2). Özkan ve Kaya (2008), yaptıkları çalışmada rastlanma sıklıklarına göre önemli olarak tespit ettikleri yabancı ot türlerinin; *C. album*, *A. retroflexus*, *C. arvensis*, *S. arvensis*, *C. arvensis*, *P. aviculare*, *E. crus-galli*, *A. azurea*, *C. dactylon*, *C. draba*, *B. tectorum* ve *Sonchus* spp. olmuştur. Sabancı (2013), yaptığı çalışmada şeker pancarı ekim alanlarında sık rastlanan yabancı otların, *C. album*, *L. serriola*, *C. nutans* ve *E. crus-galli* olduğunu belirtmiştir. Akça ve Işık (2016), yaptıkları çalışmada rastlama sıklıkları en fazla olan yabancı ot türleri; *C. album* (%100), *A. retroflexus* (%96), *C. arvensis* (%82), *X. strumarium* (%68), *A. blitoides* (%60), *E. crus-galli* (%49) ve *Cuscuta* sp. (%46) olmuştur. Kulan (2019), yaptığı çalışma sonucunda rastlama sıklıkları en yüksek olan yabancı ot türlerin sırasıyla; *A. retroflexus* (%85), *C. album* (%64), *S. nigrum* (%41), *E. crus-galli* (%17) ve *X. strumarium* (%14) olmaktadır. Yapılan başka bir çalışmada ise rastlanma sıklıkları en yüksek yabancı ot türleri; *Setaria* spp. (%26,91), *C. album* (%20,87), *E. crus-galli* (%20,79), *P. oleracea* (%19,64), *A. retroflexus* (%18,69), *S. nigrum* (%16,19), *H. ellipticum* (%13,73), *S. halepense* (%13,71), *A. theophrastii* (%12,06), *C. dactylon* (%8,52) olmaktadır. (Büyükdemir ve Kara 2020). Akar ve Öğüt Yavuz (2020),

yaptıkları çalışmada ise rastlama sıklıklarının en yüksek olan yabancı ot türlerin; *A. retroflexus* (%100), *C. album* (%100), *C. arvensis* (%87.67) ve *Polygonum* spp. (%73.97) olmaktadır. Yürüttüğümüz çalışmada rastlama sıklıkları en yüksek olarak belirlediğimiz yabancı ot türleri ile yukarıda belirtilen çalışmalarda rastlama sıklıkları en yüksek olarak tespit edilen yabancı ot türleri benzerlik taşımaktadır.

Yapılan Sürveyler sonucunda tespit edilen yabancı otlardan 4 türün yoğunluğu 1 adet/m<sup>2</sup> ve üzeri olup, skala değerlerine göre Orta yoğunlukta ((C) Y=1,00 - 4,99 adet/ m<sup>2</sup>) tespit edilmiştir. Bu yabancı otlar sırasıyla; *C. album* (2,82 adet/ m<sup>2</sup>), *C. arvensis* (2,15 adet/ m<sup>2</sup>), *A. retroflexus* (1,86 adet/ m<sup>2</sup>) ve *S. arvensis* (1,47 adet/ m<sup>2</sup>) türleri olmuştur. Ayrıca yapılan sürveyler sonucunda 15 yabancı ot türü Düşük yoğun ((D) Y=0,10 - 0,99 adet/ m<sup>2</sup>), 12 tür Çok düşük yoğun ((E) Y=0,01 - 0,09 adet/ m<sup>2</sup>) ve 9 tür ise Nadir ((F) Y=<0,01 adet/m<sup>2</sup>) olarak tespit edilmiştir. Yoğunlukları en düşük 5 yabancı ot türü ise *M. neglecta* (0,006 adet/m<sup>2</sup>), *A. repens* (0,005 adet/m<sup>2</sup>), *M. sativa* (0,005 adet/m<sup>2</sup>), *P. rhoeas* (0,002 adet/m<sup>2</sup>) ve *V. sativa* (0,002 adet/m<sup>2</sup>) olarak tespit edilmiş (Çizelge 3.2). Kordalı ve Zengin (2008), yaptıkları çalışmada en fazla yoğunlukta tespit ettikleri yabancı otların *S. arvensis*, *C. album*, *C. arvensis*, *C. arvense*, *A. retroflexus*, *Tragopogon* spp., *S. viridis*, *G. tuberosum*, *F. convolvulus* ve *C. draba* olduğunu belirtmişlerdir. Tursun ve ark. (2003), yaptıkları çalışmada tespit ettikleri yabancı otlar en önemli türlerin sırasıyla; *A. retroflexus*, *C. album*, *C. arvensis*, *S. nigrum* ve *S. arvensis* olarak belirlemişlerdir. Yapılan başka çalışmada ise en fazla yoğunlukta *A. retroflexus*, *C. album*, *C. arvense*, *P. aviculare*, *L. amplexicaule* ve *C. arvensis* yabancı ot türleri tespit etmişlerdir Sutay ve Zengin (2007). Gökçe (2018), yaptığı çalışmada tarafından yoğunlukta, *A. retroflexus*, *A. blitoides*, *X. spinosum*, *C. album* ve *Cuscuta* spp., yabancı ot türleri tespit etmiştir. Akça ve Işık (2016), yaptıkları çalışmada en fazla yoğunlukta *A. retroflexus* (4.01 adet/m<sup>2</sup>), *C. album* (2.41 bitki/m<sup>2</sup>), *E. crus-galli* (2.22 bitki/m<sup>2</sup>), *S. verticillata* (1.96 bitki/m<sup>2</sup>) ve *C. arvensis* (1.45 bitki/m<sup>2</sup>) yabancı ot türlerini tespit etmişler. Büyükdemir ve Kara (2020), yaptıkları çalışmada en fazla yoğunluğa sırasıyla; *Setaria* spp. (2,79 bitki/m<sup>2</sup>), *E. crus-galli* (2,10 bitki/m<sup>2</sup>), *S. halepense* (1,34 bitki/m<sup>2</sup>), *P. oleracea* (1,10 bitki/m<sup>2</sup>), *C. album* (1,03 bitki/m<sup>2</sup>), *A. retroflexus* (0,82 bitki/m<sup>2</sup>), *C. dactylon* (0,79 bitki/m<sup>2</sup>), *S. nigrum* (0,74 bitki/m<sup>2</sup>), *Polypogon* sp. (0,65 bitki/m<sup>2</sup>), *H. ellipticum* (0,61 bitki/m<sup>2</sup>) türleri sahip olmuştur. Akar ve Ögüt Yavuz (2020), yürüttükleri çalışmada yoğunlukları en yüksek yabancı ot türleri; *C. album*, *A. retroflexus*, *C. arvensis* ve *Polygonum* spp. olmuştur. Kulan (2019), yaptığı çalışmada yoğunlukları en yüksek yabancı ot türlerin sırasıyla: *C. album* (39,08 bitki/m<sup>2</sup>), *A. retroflexus* (29,11 bitki/m<sup>2</sup>), *S.*

*nigrum* (17,48 bitki/m<sup>2</sup>), *E. crus-galli* (6,04 bitki/m<sup>2</sup>) ve *C. arvense* (1,60 bitki/m<sup>2</sup>) olarak tespit etmişlerdir.

### 3.2. Anket analizi sonuçları

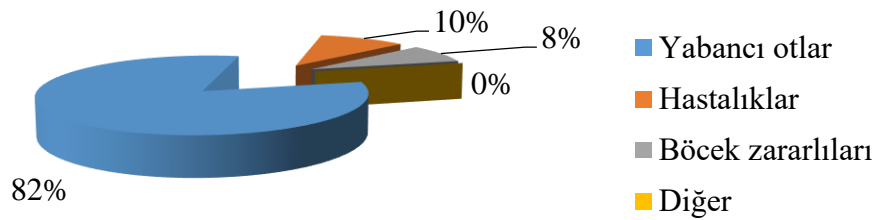
Araştırmaya katılanların cinsiyetlerine, yaş gruplarına ve eğitim durumları göre dağılımı ile ilgili yöneltilen sorulara verilen cevap frekans ve yüzde değerleri Çizelge 3.3’de verilmiştir.

**Çizelge 3.3.** Çalışmamız katılım gösteren çiftçilerin cinsiyetleri, yaşları ve eğitim durumlarına göre dağılımları

Cinsiyet	%	Yaş	%	Eğitim Durumu	%
Erkek	94	20-30	13	Okumadım	12
Kadın	6	31-40	35	İlkokul	43
		41-50	40	Ortaokul	28
		50+	12	Lise	13
				Üniversite	4
Toplam	100	Toplam	100	Toplam	100

Ankete katılım gösteren çiftçilerin %94’ü erkek ve %6’sı kadın olmakta ve %40’ı 41-50 yaş aralığın da olmaktadır. Çiftçilerin %43’ü ilkokul, %28’i ortaokul, %13’ü lise, %12’si okuryazar değil ve %4’ü üniversite mezunu olmaktadır. Şeker pancarı ekim alanlarında bitki koruma sorunlarını önemine göre sıralayınız sorusuna verdikleri cevapların yüzde değerleri Şekil 3.2’de sunulmuştur.

Şeker pancarı ekim alanlarında bitki koruma sorunlarını önemine göre sıralayınız?



**Şekil 3.2.** Şeker pancarı ekim alanlarında bitki koruma sorunlarını önemine göre sıralayınız sorusuna verdikleri cevapların yüzde değerleri

Ankete katılım gösteren çiftçilerin %82'si şeker pancarı ekim alanlarında en büyük sorunun yabancı otlar olduğunu, %10'u hastalıklar ve %8'i ise böcek zararlıları olduğunu belirtmişlerdir. Çiftçilere yöneltilen Yabancı ot problemi verim için ne derece önemlidir ve tarlanızdaki yabancı ot yoğunluğu ne seviyededir sorularına verilen cevapların yüzde oranları Çizelge 3.4'te verilmiştir.

**Çizelge 3.4.** Yabancı ot problemi verim için ne derece önemlidir ve tarlanızdaki yabancı ot yoğunluğu ne seviyededir sorularına verilen cevapların yüzde oranları

Yabancı ot problemi verim için ne derece önemlidir?		Yabancı ot yoğunluğu tarlanızdaki ne seviyededir?	
	Frekans		Frekans
Hiç önemli değil	0	Hiç yok	0
Az önemli	0	Az yoğun	0
Orta önemli	10	Orta yoğun	3
Önemli	15	Yoğun	22
Çok önemli	75	Çok yoğun	75

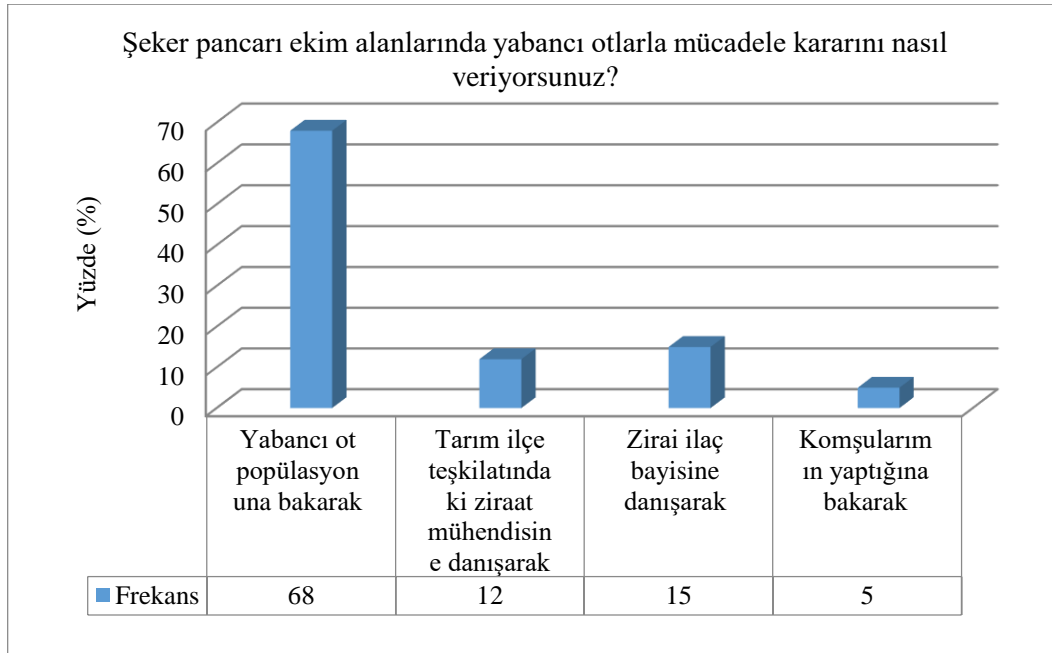
Ankete katılım gösteren çiftçilerin %75'i yabancı otların şeker pancarında verim için çok önemli olduğunu ve benzer şekilde çiftçilerin %75'i şeker pancarı ekim alanlarında yabancı otların çok yoğunlukta olduğunu belirtmişlerdir. Çiftçilere yönelttiğimiz tarlanızda sorun olan yabancı ot türleri hangileridir işaretleyiniz Sorusuna verilen cevapların yüzde değerleri Çizelge 3.5'te verilmiştir.

**Çizelge 3.5.** Tarlanızda sorun olan yabancı ot türleri hangileridir işaretleyiniz sorusuna verilen cevapların yüzde ve frekans değerleri

Yabancı otlar	Yaygın adları	%
<i>Amaranthus retroflexus</i> L.	Kırmızı köklü horoz ibiği	70
<i>Chenopodium album</i> L.	Sirken	72
<i>Cirsium arvense</i> (L.) Scop.	Köy göçüren	25
<i>Convolvulus arvensis</i> L	Tarla sarmaşığı	78
<i>Polygonum</i> spp.	Çoban değneği türü	52
<i>Rumex crispus</i> L.	Kıvırcık labada	33
<i>Sinapis arvensis</i> L.	Yabani hardal	45
Diğer		35

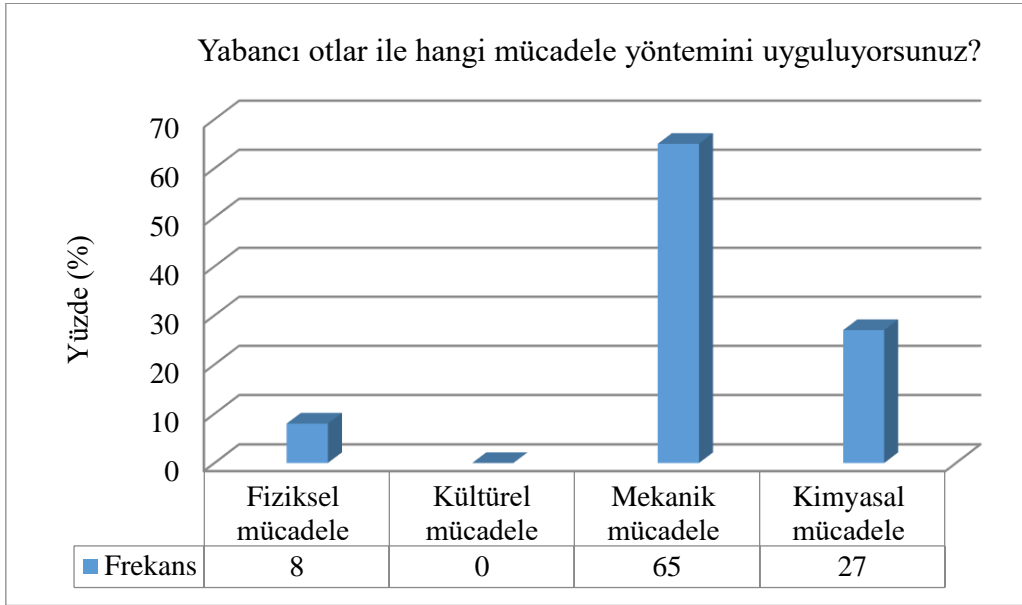
Ağrı ilinde şeker pancarı üreticiliği yapan çiftçilerle yapılan anket çalışmasında çiftçilere yöneltilen “Tarlanızda sorun olan yabancı ot türleri hangileridir işaretleyiniz?” sorusuna çiftçilerin sorunlu olarak gördükleri yabancı ot türleri sırasıyla; *C. arvensis* (%78), *C. album*

(%72), *A. retroflexus* (%70), *Polygonum* spp. (%52), *S. arvensis* (%45), *R. crispus* (%33) ve *C. arvensis* (%25) olarak belirtmişlerdir. Ayrıca ankete katılım gösterenlerin %35'ü ise diğer yabancı otlar olarak bildirmişlerdir. Tursun ve Seyithanoğlu (2006), yaptıkları anket çalışmasında anketlerine katılım gösteren çiftçilerin %51,95'i *X. strumarium*, %48,12'si *Cuscuta* spp., %42,00'ü *S. halepense*, %41,62'si *Seteria* spp. ve %35,11'i *C. album* yabancı ot türlerinin şeker pancarı ekim alanlarında yoğunlukta olduğunu bildirmişlerdir. Buda elde ettiğimiz sonuçlar ile benzerlik taşımaktadır. Çiftçilere yönelttiğimiz şeker pancarı ekim alanlarında yabancı otlarla mücadele kararını nasıl veriyorsunuz sorusuna verilen cevapların yüzde ve frekans değerleri Şekil 3.6'da verilmiştir.



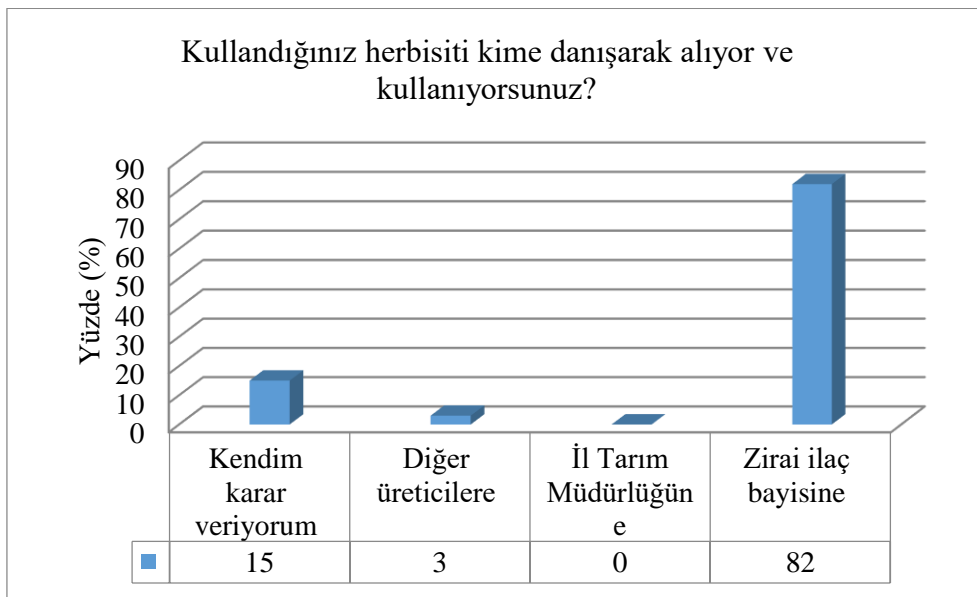
**Şekil 3.6.** Şeker pancarı ekim alanlarında yabancı otlarla mücadele kararını nasıl veriyorsunuz sorusuna verilen cevapların yüzde ve frekans değerleri

Çalışmaya katılan çiftçilerin %68'i yabancı ot popülasyonuna bakarak mücadele kararını verdiklerini ifade etmişlerdir. Ankete katılım gösteren çiftçilere yönelttiğimiz yabancı otlar ile hangi mücadele yöntemini uyguluyorsunuz sorusuna verilen cevapların frekans ve yüzde değerleri Şekil 3.7'de verilmiştir.



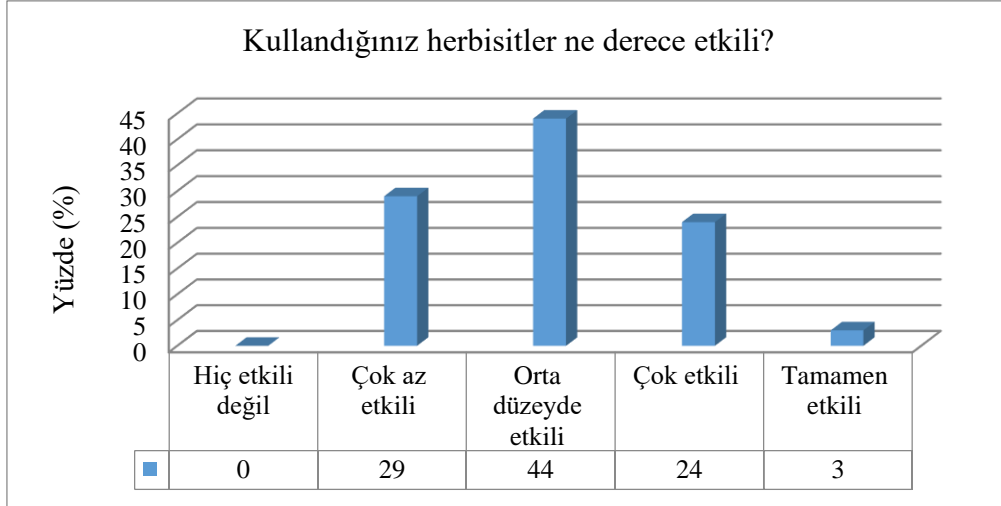
**Şekil 3.7.** Yabancı otlar ile hangi mücadele yöntemini uyguluyorsunuz sorusuna verilen cevapların yüzde ve frekans değerler

Ankete katılım gösteren çiftçilerin %65'i yabancı otlara karşı mekanik mücadele yaptıklarını, %27'si kimyasal mücadele ve %8'i fiziksel mücadele yöntemlerini kullandıklarını ifade etmişlerdir. Gül, (2019) yaptığı çalışmada çiftçilerin %96,8'i şeker pancarı ekim alanlarında kültürel mücadele yaptıklarını, %97,8'i mekanik mücadele ve %100'ü kimyasal mücadele yaptıklarını belirtmişlerdir. Kullandığınız herbisiti kime danışarak alıyor ve kullanıyorsunuz?" sorusuna verilen cevapların yüzde değerleri Şekil 3.8'de verilmiştir.



**Şekil 3.8.** Kullandığınız herbisiti kime danışarak alıyor ve kullanıyorsunuz? Sorusuna verilen cevapların yüzde değerleri

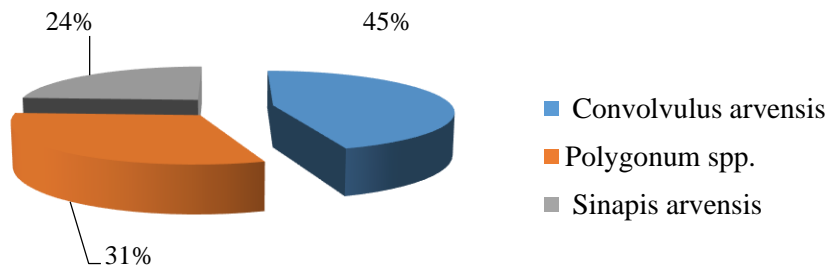
Ankete katılım gösteren çiftçilerin %82'si Zirai ilaç bayisine danışarak, %15'i kendi karar verdiğini belirtmişlerdir. Kullandığınız herbisitler ne derece etkili sorusuna verilen cevapların yüzde değerleri Şekil 3.9'da verilmiştir.



**Şekil 3.9.** Kullandığınız herbisitler ne derece etkili? Sorusuna verilen cevapların yüzde değerleri

Ankete katılım gösteren çiftçilerin %4'ü orta düzeyde, %29'u çok az ve %24'ü ise çok etkili ve %3'ü kullandığı herbisitlerin tamamen etkili olduğunu ifade etmiştir. Şeker pancarında kullandığınız herbisitlerin etki etmediğini düşündüğünüz yabancı ot türleri var mı varsa isimlerini yazınız sorusuna verilen cevapların frekans ve yüzde değerleri Şekil 3.10'da verilmiştir.

Şeker pancarında kullandığınız herbisitlerin etki etmediğini düşündüğünüz yabancı ot türleri var mı varsa isimlerini yazınız:



**Şekil 4.23.** Şeker pancarında kullandığınız herbisitlerin etki etmediğini düşündüğünüz yabancı ot türleri var mı varsa isimlerini yazınız sorusuna verilen cevapların frekans ve yüzde değerleri



Çiftçilerin %26'sı kullandıkları herbisitini *C. arvensis*'e etki etmediğini, %18'i *Polygonum* spp. ve %14'ü ise *S. arvensis*'e etki etmediklerini belirtmişlerdir. Çiftçiler tarafından belirtilen yabancı ot türleri Dünya'da hepsi, Türkiye'de ise *S. arvensis* herbisitlere karşı dayanıklılık kazanmış yabancı ot türleri olarak rapor edilmiştir (Heap, 2022).

#### **4. SONUÇ ve ÖNERİLER**

Yabancı otlar şeker pancarı ekim alanlarında önemli verim ve kalite kayıplarına sebep olmaktadır. Yabancı otlarla mücadele etmek için önceden yabancı otları tanımak gerekmektedir. Bundan dolayı yürüttüğümüz çalışmada sonucunda Ağrı ili şeker pancarı ekim alanlarında 13 familyaya ait toplamda 40 yabancı ot türü tespit edilmiştir. En fazla yabancı ot sayısına Poaceae, Asteraceae ve Brassicaceae familyaları sahip olmuştur. Tespit edilen yabancı ot türlerinden rastlama sıklıkları en yüksek olan türler sırasıyla *C. album* (%92), *A. retroflexus* (%86) ve *C. arvensis* (%80) olmuştur. Yoğunlukları en yüksek yabancı ot türleri sırasıyla; *C. album* (2,82 adet/ m<sup>2</sup>), *C. arvensis* (2,15 adet/ m<sup>2</sup>) ve *A. retroflexus* (1,86 adet/ m<sup>2</sup>) olmuştur. Ankete katılım gösteren çiftçilerin %82'si şeker pancarı ekim alanlarında en büyük sorunun yabancı otlar olduğunu ve tarlalarda yabancı otun çok yoğun olduğunu ifade etmişlerdir. Ayrıca -çiftçilerin %65'i yabancı otlara karşı mekanik mücadele yaptıklarını ve %68'i yabancı ot popülasyonuna bakarak mücadele kararını verdiklerini ifade etmişlerdir. Çiftçilerin yarısına yakını şeker pancarı ekim alanlarında kullandıkları herbisitlerin orta düzeyde etkili olduğunu ve bazı yabancı ot türlerine etki etmediklerini belirtmişlerdir. Bu sürveyler ve çiftçilerin vermiş oldukları cevaplar doğrultusunda domates alanında sorun olan yabancı otlara karşı daha iyi ve ekonomik mücadele yöntemi belirlemek gerekir.

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## **GELECEĞİN TARIM MODELİ KAPALI DİKEY TARIM TESİSLERİ**

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### **ÖZET**

Azalan tarım alanları, değişen iklim koşulları, salgın hastalıklar, artan gıda temini ve tarımdaki işgücü azalması yenilikçi teknolojilerin kullanımını zorunlu kılmaktadır. İklim değişikliğinin artan olumsuz etkileri ve salgın hastalıklar, insanlarda ve hükümetlerde gelecekte gıdaya kolay ulaşamama endişesi oluşturmaktadır. Gelecekte hedef tarım stratejilerimizi değiştirmek, suyu, enerjiyi ve yetiştirme alanlarını optimum şekilde kullanan bitki fabrikalarında dikey olarak topraksız yetiştiricilik projelerini devreye sokmak gerekebilecektir. Bitki yetiştiriciliği için gerekli tüm koşulların (CO<sub>2</sub>, sıcaklık, ışık, aydınlık-karanlık zaman, ortam nemi, kök ortamında mineral besin maddeleri, pH, EC, oksijen) optimum şekilde kontrol edilebildiği, iklim değişikliğinden bağımsız, dikey katlar şeklinde, alanın ve suyun en ekonomik kullanıldığı “Bitki fabrikaları” gıda üretiminin teminatı rolü ile popüler üretim modeli olarak karşımıza çıkmaktadır. Ülkemizin sahip olduğu ekolojik zenginlik ve su kaynakları iklim değişikliğinden payını almaktadır. Ülke olarak gelecek yıllarda gıda güvenliği konusunda tedbir almak adına, kapalı mekânlarda kontrollü dikey tarım yetiştiriciliğinin bitkisel, endüstriyel ve ekonomik açılarından her yönüyle incelenmesi gerekmektedir.

**Anahtar kelimeler:** Atık enerji, sera ısıtması, termik santral

## **GELECEĞİN TARIMI**

Bitki fabrikaları, yeni nesil sanayileşmiş tarımı temsil etmektedir. İnsan sezgisine dayanan tarımdan kesin veri yönetimine dayanan bir değişimi simgelemektedir. Tarımın endüstri ve diğer sektörler ile ilişkiye girmesine fırsat sunmaktadır. Bu yeni nesil tarım için şu aşamada bazı belirsizlikler varsa da, özellikle marjinal bölgelerde yakın gelecekte piyasanın önemli ölçüde bu tarım şekline kayabileceği ve artacağı tahmin edilmektedir (1). Bitki fabrikaları, doğadaki iklimsel değişimlerden bağımsız olması ve metropol büyük kentlerin içerisinde tarımsal üretim yapmaya olanak tanınması nedenleriyle gelecekte gıda gereksinimi için etkili bir çözüm olarak gösterilmekte ve son yıllarda oldukça ilgi görmektedir.

Bitki fabrikaları, kapalı bir mekanda (bina, konteyner vb) bitkilerin katlı raflarda dikey yetiştirildiği iklim koşullarından CO<sub>2</sub>, sıcaklık, ışık, aydınlık-karanlık, zaman, ortam nemi, kök ortamında mineral besin maddeleri, pH, EC, oksijen, su koşullarının optimum düzeyde kontrol ve otomatizasyonunun sağlanabildiği tarımsal yapılardır. Bitki fabrikalarında iç ortam iklim koşulları bitkilerin istediği seviyelerde kontrol edilerek, klasik dış mekân tarımsal yetiştiriciliğinden 10 kata kadar daha hızlı sebze üretebilmektedir. Bitki fabrikalarında çoklu yetiştirme katları kullanıldığı için, sebzelerin küçük bir alanda kesintisiz kitlesel, seri üretimi kolaylaşmaktadır (1).

Küresel ısınma nedeniyle iklim değişikliğinin etkilerinin sıklaştığı, suyun çok değerli olduğu günümüzde bitki fabrikalarında aeroponik gibi sistemlerde yapraklı sebzeleri yetiştirmek için açık alanda gereken suyun sadece % 1'i, serada gerekli olan suyun sadece % 2'si veya daha azı yeterli olabilmektedir (1). Bitki fabrikaları bu nedenle suyun çok değerli olduğu özellikle Çin, Ortadoğu, Akdeniz havzası ülkelerinde dikkat çekmektedir. Bu yönüyle geleceğin tarım fabrikaları olma potansiyeli taşımaktadır (1). Bitki tarafından suyun yaklaşık % 95'i kökler tarafından emilir ve yapraklardan buharlaşır. Bir bitki fabrikasında yetiştiricilik söz konusu olduğunda, ışık kaynağı tarafından üretilen ısıyı gidermek için içerisi soğutulduğundan, su buharı, klimanın soğutma ünitesinde yoğunlaştırılır ve bu, bitkilerin sulanması için geri dönüştürülerek kullanılabilir (1).



**Şekil 1.** Kapalı dikey fabrikalarında raflı sistemlerde marul yetiştiriciliği

Açık alanda yetiştirilen sebzeleri, toprak, diğer yabancı maddeler ve mikroorganizmalardan temizlemek için çok fazla su kullanılmaktadır. Dış yapraklar hasatta ya da ambalajlama sırasında bertaraf edilmektedir ve toplam ağırlığın sadece% 60'ı gerçekten tüketilmektedir. Buna karşılık, bitki fabrikalarında yetişen sebzelerinin % 95 veya %100 ayrılmadan olduğu gibi tüketilmektedir (1). Hijyenik koşullarda üretildiği için temizleme amacıyla su sarfiyatı yapılmamaktadır. Açık alanda yetişen sebzelere göre bitki fabrikalarında üretilen sebzelerin raf ömrü tüketim kalitesi (gevreklik ve besin içeriği) düşmeden 4-5 kata kadar uzayabilmektedir. Bitki fabrikalarının verimliliği, iklim koşullarının optimizasyonu ve yüksek bitki yoğunluğu ile artırılabilir. Bitkiler zararlılara, şiddetli yağmurlara veya kuvvetli rüzgâra maruz kalmamaktadır ve bu dış faktörlerle ilişkili kayıp riski bulunmamaktadır. Açık alanda üretime göre 10 kat raflı bir fabrikada yetiştirme alanı ve üretkenlik 10 kat artırılmaktadır. Bu nedenle, metrekaşe başına toplam üretkenlik konvansiyonel üretime göre, potansiyel olarak artmaktadır (1).

Yaşam döngüsü değerlendirmesi açısından, bir bitki fabrikası 10 yıldan fazla süre kullanılırsa geleneksel tarıma göre daha fazla kaynak tasarrufu sağlanmaktadır. Geleneksel tarımda, tarım makineleri işletmek, pestisit, gübre ve su uygulamak için enerji gerekmektedir. Açık alanda yetiştirilen bitkilerin bitki fabrikasında yetiştirilenlerle karşılaştırıldığında gübre miktarının neredeyse iki katına çıktığı bildirilmiştir. Beklenmedik iklimsel olaylarla ilgili kayıplar (aşırı yağışlar sel, kuraklık, ekstrem sıcaklıklar vb) açık alanda sebze yetiştiriciliğinin en büyük riskleridir (1).

Sanayide gün boyunca elektrik kullanımı zirvede iken gece elektrik kullanımı çok azalmaktadır. Elektrik enerjisi şirketleri, pik elektrik talebini azaltmak için çalışmaktadır. Yapay ışık kullanan bitki fabrikalarında, ışıklar sadece geceleri açılmaktadır ve böylece ucuza daha fazla elektrik kullanılabilir. Seralarda bitkiler güneş ışığı kullanılarak yetiştirilmektedir. Seralarda yapay aydınlatma için elektrik maliyeti düşüktür ancak seraları ısıtmak için önemli miktarda yakıt gerekmektedir. Öte yandan, bitki fabrikaları dış koşullara kapalıdır, asgari iklimlendirme maliyetleri ile yalıtılmış alanlardır ve bu nedenle iklimlendirme için enerji kullanımı azalmaktadır ve çevre dostudur (1).

Bitki fabrikaları hijyenik ortamlar olduğu için ve sıfır pestisit ile üretim yapıldığından yetiştirilen ürünler yıkanmadan tüketilebilmektedir. Ayrıca, fabrika bitkileri geleneksel tarla bitkilerinden daha fazla C vitamini, karoten ve polifenol içermektedir. Devam eden araştırmalar yoluyla özellikle LED aydınlatma sistemlerinde ışığın dalga boyları ile düzenlemeler yapılarak insan beslenmesine katkıları gün geçtikçe artmaktadır (1) (Şekil 2). Böbrek hastalarına potasyum içeriği düşük yeşil sebzelerin üretilmesi ya da selenyum biofortifikasyonu sebzeler gibi özel taleplere göre spesifik ürünler yetiştirilebilmektedir.

Dünyada nüfus artışının mevcut hızla devam etmesi durumunda, gıda üretiminin % 60 oranında artması gerektiği bildirilmektedir [2]. Buna karşın, tarımsal alanın sadece % 2 oranında artabileceği tahmin edilmektedir. Mevcut tarım alanları ile artan gıda üretimine cevap vermek mümkün görünmemektedir. 2030 yılında dünya nüfusunun 8,5 milyara, 2050 yılında ise 9,7 milyara çıkacağı tahmin edilmektedir. Nüfus artışına ek olarak, 2050 yılında, kentsel alanlarda yaşayanların sayısının 6 milyar kişiyi geçmesi ve bu nüfusun % 90'ının gelişmekte olan ülkelerde yaşaması beklenmektedir (3).

İklim değişikliğinin tarım üzerindeki olumsuz etkileri, SARS-Covit-19 gibi küresel salgın hastalıklar ve hızlı artan dünya nüfusunun gıda güvenliği üzerindeki baskılarının çözümüne yönelik arayışlar, hem akademiye hem de özel sektörde uzun zamandır yürütülmektedir. Bunların içerisinde ümit var olarak gösterilen çözümlerin başında kontrollü koşullarda topraksız tarım uygulamaları gelmektedir. Topraksız tarım ilk olarak NASA tarafından keşfedilen ve son yıllarda uzay araştırmalarında da çok sık kullanılan bir yöntem olmuştur (4).





**Şekil 2.** Kapalı dikey tarım tesislerinde bitkiler güneş ışığı yerine LED aydınlatmalar ile yetiştirilmektedir.

İklim değişikliğinden bağımsız, zirai ilaç kullanılmayan, gıda güvenlik zinciri koşulları tam olarak sağlanmış, topraksız tarım uygulamaları her geçen gün hayatımıza yeni tarım uygulamaları olarak girmektedir. Bunlardan bazıları İnce Akan Su Kültürü (Nutrient Film Technique), Derin Akan Su Kültürü (Deep Flow Technique), Püskürtmeli Su Kültürü (Aeroponic) ve Med-Cezir (Ebb-flow) uygulamaları olarak göze çarpmaktadır. Bu su kültürü sistemlerinin kapalı bitki fabrikalarında özellikle yeşil yapraklı bitkilerde (marullar, ıspanak, taze baharatlar; fesleğen, tere, roka vb) başarılı bir şekilde ticarileştiği görülmektedir.

## **KAPALI DİKEY TARIM TESİSLERİNDE KULLANILAN SU KÜLTÜRÜ SİSTEMLERİ**

Topraksız tarım uygulamaları iki ana gruba ayrılmaktadır.

- A) Katı Ortam Kültürü ( Substrat Culture)
- B) Sıvı Ortam Su Kültürü (Water Cultures, Hydroponics)
  - a. Durgun Su Kültürü (Floating Culture)

- b. İnce Akan Su Kültürü (NFT, Nutrient Film Technique)
- c. Derin Akan Su Kültürü (DFT, Deep Flow Culture)
- d. Püskürtmeli Su Kültürü (Aeroponic)
- e. Med-Cezir Su Kültürü (Ebb-Flow)

Kapalı dikey tarım tesislerinde kullanılan su kültürleri topraksız tarım sistemlerinin kullanımının sayısız faydaları mevcuttur (3). Bu faydalar aşağıdaki gibi sıralanmaktadır:

1. Bitkiler toprakta olduğundan % 50 daha hızlı büyürler çünkü besin ve suya daha kolay ulaşırlar,
2. Tüm yıl boyunca kapalı bir yerde güneş ışığı olmadan yapay ışıklandırma ile ürün yetiştirmek mümkündür,
3. İklim ve coğrafyadan bağımsız yapılar oluşturularak, her yerde ve her koşulda yetiştirme yapılabilir,
4. Besinler bitkilerin direkt ulaşacağı şekilde mevcuttur ve yetiştirme ortamına ait değildirler,
5. Pestisit kullanılmaz. Bitkiler hastalıklardan arınmış bir ortamda yetiştirmeye başlarlar,
6. Yetiştiricilik için daha küçük kök hacmi veya kaplar kullanılabilir,
7. Bitki yetiştiriciliğinin mümkün olmadığı yerlerde/mekarlarda yetiştiricilik yapmak mümkündür, örneğin toprağın fakir olduğu yerler, kayalık alanlar, elektrik ve suyun sağlanabildiği her koşulda üretim yapılabilir,
8. Toprakta yapılan yetiştiriciliğe oranla daha az iş gücüne gerek vardır. Toprak hazırlığı, çapalama veya yabancı ot mücadelesine gerek yoktur,
9. Bitkilerin büyüme koşullarının kontrol altında olması bitkiler için mümkün olan en iyi ortamın sağlanmasını kolaylaştırır ve kaliteli ürün ve yüksek gelir elde edilmesini sağlar,
10. Zararlı ve hastalık saldırısına maruz kalmadan hijyenik ortamlarda üretildiğinden kontamine olmayan bitkilerin raf ömrü uzun olmaktadır,
11. Sağlık açısından daha yüksek besin öğeleri içerirler; düşük nitrat, yüksek vitaminler, mineraller, antioksidanlar,
12. Bu yöntemler ile yetiştirilen bitkilerin, insan sağlığına olumsuz yan etkisi bulunmamaktadır. Bu ürünlerin vitamin, mineral ve antioksidan içerikleri toprakta yetiştirilen ürünlerden daha yüksek olabilmektedir.

## **SONUÇ**

İklim deęişikliğinden bağımsız, dikey katlar şeklinde, alanın ve suyun en ekonomik kullanıldığı “Bitki fabrikaları” gıda üretiminin teminatı rolü ile popüler üretim modeli olarak karşımıza çıkmaktadır. Ülkemizin sahip olduęu ekolojik zenginlik ve su kaynakları iklim deęişikliğinden payını almaktadır. Ülke olarak gelecek yıllarda gıda güvenliği konusunda tedbir almak adına, kapalı mekânlarda kontrollü dikey tarım yetiştiriciliğinin bitkisel, endüstriyel ve ekonomik açılardan her yönüyle incelenmesi gerekmektedir.

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**MONITORING THE QUALITY OF EDUCATION.**

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**ABSTRACT**

The purpose of the study is to evaluate the effectiveness of school-based monitoring of the educational process. To monitor the educational process at primary schools, we looked at a variety of approaches and methodologies, including continuous observation, test circumstances, explication, surveys, analysis of learner educational activity results, and student testing. Two viewpoints are taken into consideration while examining the monitoring of the educational process during school-based practical training: that of the university personnel and that of the development of student's skills in carrying out such monitoring. The submissions can help improve educational content, assess the efficacy of educational technologies being measured, identify issues with the educational process, and proposing solutions.

**Keywords:** monitoring, educational process, primary school, monitoring practices, feedback.

## **INTRODUCTION**

A crucial part of providing students with a high-quality education, according to the body of educational research literature known as effective schooling research, is the practice of monitoring student learning. One of the key distinctions between effective schools and teachers and those who are not has been demonstrated in the literature to be the rigorous monitoring of students' progress. Monitoring student progress is a powerful predictor of student accomplishment in studies that aimed to quantify the relative effect sizes of various educational strategies. What does it entail to "monitor student learning"? Monitoring is defined as KEEPING WATCH OVER; SUPERVISING in the American Heritage dictionary, but it also has another, more precise definition: TO SCRUTINIZE OR CHECK SYSTEMATICALLY WITH A VIEW TO COLLECTING CERTAIN SPECIFIED CATEGORIES OF DATA.

For our purposes, we will define monitoring as TEACHERS' ACTIVITIES TO KEEP TRACK OF STUDENT LEARNING to make INSTRUCTIONAL DECISIONS AND provide FEEDBACK TO STUDENTS ON THEIR PROGRESS. When educators talk about classroom monitoring, they usually mean one of the following teacher behaviors:

- Questioning students during classroom discussions to check their understanding of the material being taught;
- Circulating around the classroom during seatwork and engaging in one-to-one contacts with students about their work
- Assigning, collecting, and correcting homework; recording completion and grades
- Conducting periodic reviews with students to confirm their grasp of learning material and identify gaps in their knowledge and understanding
- Administering and correcting tests; recording scores
- Reviewing student performance data collected and recorded and using these data to make needed adjustments in instruction

## **WHAT OUGHT TO BE MONITORED BY THE FRAMEWORK?**

Both the individual and the system should be under constant observation. Information regarding their school is necessary for instructors, parents, and head teachers. Officials from the ministry of education need data compiled at several administrative levels. To support their cost-effectiveness estimations, ministries of finance need information on the system resource inputs, consumption, and cost.

The monitoring of quality of education in terms of inputs, processes, and outputs can be classified in a three-part typology:

- Compliance monitoring, intended to ensure educational institutions comply with standards and norms, focuses on educational inputs such as teachers, textbooks, classrooms, and equipment.
  - Diagnostic monitoring focusing on instructional processes and whether students are learning. It provides information on the quality of education provided by schools.
  - Performance monitoring focusing on monitoring academic achievement of students through testing. This provides information on the results of investments made in education.
- (Adapted from Richards, 1988)

The preparation for this report involved reviewing a sizable number of papers. Of these, 23 are studies or evaluations that unmistakably show a connection between one or more ways to track students' progress in learning and their final results, which are typically achievements. There are fifteen reviews and eight studies. Three feature secondary kids, five elementary pupils, and fifteen are inclusive of grades K–12. The dependent variable for fourteen of these is a general achievement. Language arts is the outcome emphasis of three documents. Other ones are student attitudes — 5, science — 2, social studies — 1, and mathematics — 3. Multiple outcome areas were the focus of certain studies. In 19 of the research, normal education pupils of varied racial and socioeconomic backgrounds and academic levels are the subjects. Three of them deal with special education, while one is devoted to Chapter 1 participants.

### **Monitoring seatwork**

The necessity of keeping an eye on the class during seatwork periods has been well demonstrated by research contrasting the conduct of excellent teachers (i.e., those whose students achieve high or better than would be predicted given background variables) with that of less effective teachers. This kind of observation entails teachers moving about the classroom, keeping track of how well or poorly students are doing on their assignments, and working one-on-one with students as necessary. The most successful instructors:

- Have systematic procedures for supervising and encouraging students while they work.
- Initiate more interactions with students during seatwork periods, rather than waiting for students to ask for help
- Have more substantive interactions with students during seatwork monitoring, stay task-oriented, and work through problems with students

-Give extra time and attention to students they believe need extra help

-Stress careful and consistent checking of assignments and require that these be turned in

Monitoring as a part of classroom reviews

According to research, including monitoring techniques in routine classroom evaluations is associated with improved student accomplishment in the future. Daily, weekly, and monthly reviews can all help students learn new content more effectively. If they include questions and other learning probes, they can also highlight any areas that require additional training.

Research on the effects of teacher training demonstrates the efficacy of using review sessions to monitor student learning: students of teachers trained in methods for conducting periodic classroom reviews that include the use of learning probes had achievement levels that were higher than before the teachers had been trained and higher than the achievement levels of students of untrained teachers.

How do you monitor students' comprehension and work during a lesson?

Teachers say they monitor students by:

Asking them to interpret or summarize material presented to them in the lesson

Thinking about the questions that students are asking and noting what parts of the lesson don't seem to be understood

Asking questions from various levels of Bloom's taxonomy of learning objectives

Asking students to act things out or draw them

Walking around the class and checking worksheets, calling attention to errors and noting good work being done

having students do quick problems on individual chalkboards

encouraging children to listen to each other by summarizing comments of others and calling on children who don't seem to be listening

Effective monitoring practices

Effective English and math teachers used efficient monitoring techniques on a consistent basis. During seatwork periods, they did more than just circulate among students. These teachers were meticulous in noting individual students as they moved or looked around the classroom, and they addressed individuals frequently, usually privately, to keep students accountable and on-task. These teachers were concerned that students work steadily on both classwork and tests, and their careful monitoring allowed them to address students who were not working as expected right away. The nature and process of effective monitoring—both of behavior and



academic work—appeared to be extremely important in both math and English classes for keeping students on task and accountable for their work.

More effective math and English teachers were extremely consistent in checking assignments regularly. Homework was assigned virtually every day, and a daily routine in most teachers' classes involved students' exchanging papers and checking them in class as directed by the teacher. Usually the more effective teachers had students sign papers they graded, and at least one effective math teacher cautioned her students to grade papers with care.

When checking daily assignments in class, more effective math and English teachers provided feedback to students as to content as well as a review or further explanation of concepts and processes. By explaining how to figure grades and having grades announced for recording purposes, teachers enabled students to hear how they stood in relation to the rest of the class and gave evidence of the fact that the teachers took seriously the work they assigned. By taking up, checking, and returning papers, teachers provided additional feedback by means of written comments and possible modification on student grading. The advisability of using these effective monitoring practices is further underscored in the following guidelines concerning seat work and homework. (Excerpted from "Teacher behavior and Student Achievement," by Jere E. Brophy and Thomas L. Good. In *Handbook of Research on Teaching* (Third Ed.), edited by Merlin C. Wittrock. New York: Macmillan Publishing Co., 1985)

## **CONCLUSION**

There are several ways and techniques to monitor the progress of education in different fields. It is found that this monitoring system helps to optimize the quality of education in primary schools. The teachers noted that by participating in the project, they upgraded their professional skills, improved their pedagogical and self-study skills, and increased their self-esteem and motivation. Teachers' perception of critics and recommendations is often a disincentive for educators. The results of the study are preliminary due to several limitations, which include a small number of participants, potential bias in school choice and limited opportunities for observation. In my opinion, further research on training primary school teachers on the basics of monitoring makes sense.

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**ŞİRKET DEĞERLEMESİNDE FİYAT/KAZANÇ YÖNTEMİ: YAZILIM  
SEKTÖRÜNDE BİR UYGULAMA**

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**ÖZET**

Şirket değerlemesi finans alanında 1980’li yıllardan sonra önemi hızla artmıştır. Özellikle sermayenin serbest dolaşımı, varlık ve hisse senedi alımları, şirket birleşmeleri, bölünmeleri, şirketlerin halka arzı şirket değerlemesinin önemini daha da arttırmıştır. Rekabet ortamında şirket değerinin artırılmasına ilişkin alternatif yolların belirlenmesi ve şirket değerinin stratejik yönetimi de günümüzde önem kazanmıştır. Şirket değerlendirme yaklaşımları finans alanında yapılan yeni çalışmalar ile birlikte değerlendirme yaklaşımlarının sayısı göreceli olarak artmış olsa bile özünde şirket değerlendirme yöntemlerini dört gruba ayırmak mümkündür. Bu yöntemler; Aktif Bazlı Değerleme Yöntemleri (Maliyet yaklaşımı), Gelir Bazlı Değerleme Yöntemleri, Piyasa Bazlı Değerleme Yöntemleri ve Diğer Değerleme yöntemleridir. Bu çalışmada değerlendirme yöntemleri genel hatları ile açıklandıktan sonra Piyasa bazlı değerlendirme yöntemlerinden biri olan Fiyat/Kazanç oranı yöntemi ile halka açık olmayan ve bilişim sektöründe yer alan bir firmanın değeri hesaplanacaktır. İlgili firmanın değerlemesi yapılarak benzer firmalara bu yöntem ile değerlendirme çalışmasının nasıl olması gerektiği hususunda katkı sağlanacaktır.

**Anahtar Kelimeler:** Değerleme, Şirket Değerleme Yaklaşımları, Fiyat/Kazanç Yöntemi

**PRICE/EARNING METHOD IN COMPANY EVALUATION: A CASE STUDY IN  
THE SOFTWARE INDUSTRY****ABSTRACT**

The importance of company valuation in finance has increased rapidly after the 1980s. Especially the free movement of capital, asset and stock purchases, company mergers, divisions, public offering of companies have increased the importance of company valuation. Determining alternative ways to increase company value in a competitive environment and strategic management of company value have also gained importance today. Company valuation approaches Although the number of valuation approaches has increased relatively with the new studies in the field of finance, it is possible to divide the company valuation methods into four groups. These methods are; Asset Based Valuation Methods (Cost Approach), Income Based Valuation Methods, Market Based Valuation Methods and Other Valuation Methods. In this study, after the valuation methods are explained in general terms, the value of a company that is not open to the public and is in the software sector will be calculated with the Price / Earnings ratio method, which is one of the market-based valuation methods. By making a valuation of the relevant company, a contribution will be made to similar companies in terms of how the valuation should be done with this method.

**Key Words:** Valuation, Company Valuation, Company Valuation Methods, Price / Earnings Ratio Method,

## 1.GİRİŞ

Şirket değerlendirme çalışmaları, 1980’li yılların başından itibaren hızla uygulamaya konulmuştur. Rekabetin kaçınılmaz olduğu günümüz dünyasında işletme yönetiminin şirket değerini maksimize edecek uygun yönetim yaklaşımı geliştirmesi kaçınılmaz hale gelmiştir. Buna paralel olarak artık işletme yönetiminin amacı sadece değeri maksimize etmek değil bu değerini sürekli artırılmasına yöneliktir (Gündoğmuş ve Öztanır, 2021:309).

Finans bilimi değerlemeyi bugün açısından değil geleceği düşünerek ele almaktadır. Şirket değerlemesinin anlamı varlıklarının gerçek değerini ortaya koymak ya da varlıkların elde edeceği gelirleri değerlemektir. Ancak şirket değerlemesinde genel olarak tek bir hesaplama yöntemi bulunmayıp birden fazla hesaplama yöntemi bulunmaktadır. Birden fazla hesaplama yöntemi ile elde edilen sonuçlar karşılaştırılmakta ve şirket değeri hakkında fikir sahibi olunmaktadır (Gündoğmuş ve Öztanır, 2021:309).

Geçmişten günümüze firmalar kar rakamlarını maksimize etmeye odaklanmışken artık bu anlayış yerini şirket değerini maksimize etmeye bırakmıştır. Son yıllarda yaşanan gelişmelere paralel olarak şirketlerin başarısı bir anlamda şirket değerinin ne kadar arttırıldığı ile ölçülmektedir. Buna paralel olarak şirket değerinin doğru hesaplanması kritik bir önem arz etmektedir (Ede, 2016:3).

Şirket değerinin artışı şirket başarısının bir parçası olduğu günümüzde değerlemenin doğru hesaplanması yatırımcıların doğru karar vermesi açısından çok büyük önem arz etmektedir. Yatırımcılar şirketin değerine bakarak yatırım kararlarını yönlendirir ve şirketin değer potansiyeline göre getiri beklentisine girerler. Bu nedenlerle şirket değerinin doğru belirlenmesi yatırım kararlarına doğrudan etki yapmakta olup kritik rol oynamaktadır. Ayrıca şirket değerlendirme yöntemleri şirketin performansını ve yatırım kararlarını doğrudan etkiledi gibi şirket devirleri, birleşmeleri gibi konularda da önemli rol oynamaktadır (Ede, 2016:3).

Şirket değerlendirme çalışmaları; yatırımcılara verecekleri kararlarda ışık tutarak kendilerine yatırım yapmayı düşündükleri varlıkların olması gerektiği fiyatları hakkında bilgi vermektedir. Halka arz, şirket birleşmeleri, bölünmeleri, satın alma, gayrimenkullerin fiyatlarının belirlenmesinde ihtiyaç duyulan bilgi ihtiyacının giderilmesinde değerlendirme çalışmalarının önemi büyüktür.(Hatipoğlu ve Yener, 2013:8).

Değerleme kavramı ile ifade edilmek istenen söz konusu ekonomik değere sahip varlığın fiyatını tespit etmektir. Finans biliminde birçok değer tanımı olmakla beraber yatırım kararı

alınırken önemli olan ilgili varlıkların olması gereken fiyatlarını referans almaktır (Hatipoğlu ve Yener, 2013:8).

Varlıkların değerinin tespit edilmesi insanoğlunun en çok ilgilendiği konulardan biri olmuştur. Değer kavramı farklı toplumlarda, farklı kültürlerde ve farklı zamanlarda insanoğlu için farklı anlamlar ifade etmiştir. Zaman içerisinde geçmişten günümüze buğdayla, gümüşle, altınla ifade edilen değer kavramı artık para ile ifade edilmektedir. Değerin tanımı bilim disiplinlerine göre farklılık arz etse de çatı itibari ile birbirine benzemektedir (Güler, 2010:3).

## **2.DEĞER KAVRAMI**

Geçmişten günümüze varlık değerlemesi finans biliminin karmaşık konularından biri olmuştur. Ekonomik değere sahip olan varlıkların gerek finansal gerekse reel olarak bir değeri bulunmaktadır. Değerlemeye konu olan varlıklara yatırım yaparken bu varlıkların gerçek değerinin bilinmesi oldukça önemlidir. Herhangi bir varlık için gerek finansal gerekse reel değerlendirme yapılabilir fakat bazı varlıkların değerlendirilmesi diğerlerine göre oldukça karmaşıktır (Öztürk,2008:3).

Değerleme; Herhangi bir varlığın değerinin tahmin edilmesi, belirlenme süreci ve varlığın parasal olarak karşılığını ifade etmektedir. Değerlemeyi yapan analistlerin önyargılı ve de taraflı davranışlarından dolayı değerlendirme sonucunun her zaman objektif sonuçlar verdiği düşüncesi yanlış olabilir. Bu taraflı ve de önyargılı davranışları minimum seviyeye indirmek varlıkların gerçek değerinin belirlenmesi için oldukça önemlidir.(Öztürk,2008:3).

Literatürde değerlendirme ile ilgili değişik tanımlar görmek mümkündür. Değer, herhangi bir varlığın sağladığı toplam fayda, kullanım değeri veya başka birine satıldığında alınacak tutarı ifade etmektedir (Ünlü,2008:3).

Değerin kelime karşılığı bir şeyin önemini belirlemeye yarayan ölçü veya bir varlığın karşılığı ya da kıymeti olarak ifade edilmektedir. Finans biliminde değer kavramı farklı ekonomi düşüncelerine göre farklı tanımlarla ifade edilmektedir. Noklasik ekonomi düşüncesine göre bir varlığın değeri serbest piyasa ekonomisinde getireceği fiyattır. Bu düşünce yaklaşımda pazarın fiyatı ile değeri eşit kabul etmektedir. Klasik ekonomi düşüncesine göre ise bir varlığın değeri kullanım/tüketimden sağladığı faydaya göre değişir (Unvan,2019:931).

Değer ve fiyat kavramları birbirinden farklı kavramlar olup karıştırılmaması gerekir. Değer bir varlığın özellikleri ve özellikler sonucu sahibine sağlayacağı yararlardan oluşmak olup objektif

ve sübjektif yönü bulunmaktadır. Fiyat ise piyasa koşullarından alıcı ve satıcı tarafından kabul edilen tutardır. Her zaman varlığın değeri piyasa fiyatı ile aynı olmayabilir. Bunun başlıca nedenleri; piyasanın etkin ve rekabetçi olmaması, piyasadaki belirsizlikler ve dalgalanmalardır(Öztürk,2008:4).

Değer kavramı farklı yaklaşımlar ve şekillerde değerlendirilmektedir. Çeşitli kavramlarına aşağıda yer verilmiştir (Çetiner vd. 2018:347).

- İşleyen Teşebbüs Değeri: Bir firmanın faal durumdayken satılması durumundaki değerdir. Bu değerinde firmanın maddi ve maddi olmayan tüm varlıkları yer almaktadır.
- Tasfiye Değeri: Şirketin varlıklarının açık artıma ile satılması durumunda elde edilen toplam değerden yükümlülüklerin düştükten sonraki kalan değerdir (Google).
- Nominal Değer: Bir varlığın üzerindeki yazılı olan değerdir. Her çeşit senet, tahvil, hisse senedi üzerindeki değerdir (Ekici, 2019:6).
- Makul Değer: Serbest piyasada baskı altında olmadan ilgili kurumlar ya da bilgili kişiler arasında bir varlığın el değiştirdiği değerdir.(Çetiner vd. 2018:347).
- Defter Değeri: Şirketin toplam varlıklarından toplam borçların çıkarılması durumunda elde kalan değerdir. Bir diğer ifade ile şirketin elindeki varlıkların tamamı ile borçların ödenmesi durumunda geriye kalan öz sermaye değeridir(Google).
- Gerçek Değer: Piyasadaki mevcut bilgilere göre bir varlığın olması gereken değerdir.
- Piyasa Değeri: Varlığın piyasa koşullarından arz ve talebine göre oluşan değeridir.

Şirket değerlemesi; şirketin geçmiş ve cari dönem bilgilerinden faydalanılarak gelecekte oluşturacağı değer en uygun tahminlerle belirlenmesidir. Şirket değerlemesindeki amaç şirketin makul ve uygun piyasa değerinin belirlenmesidir. Piyasa değeri ise piyasadaki şirketlerin değeri konusunda bilgi sahibi olan alıcı ve satıcıların söz konusu şirket için takdir ettikleri alım-satım değeridir (Ekici, 2019:20).

### **3.ŞİRKET DEĞERLEME YÖNTEMLERİ**

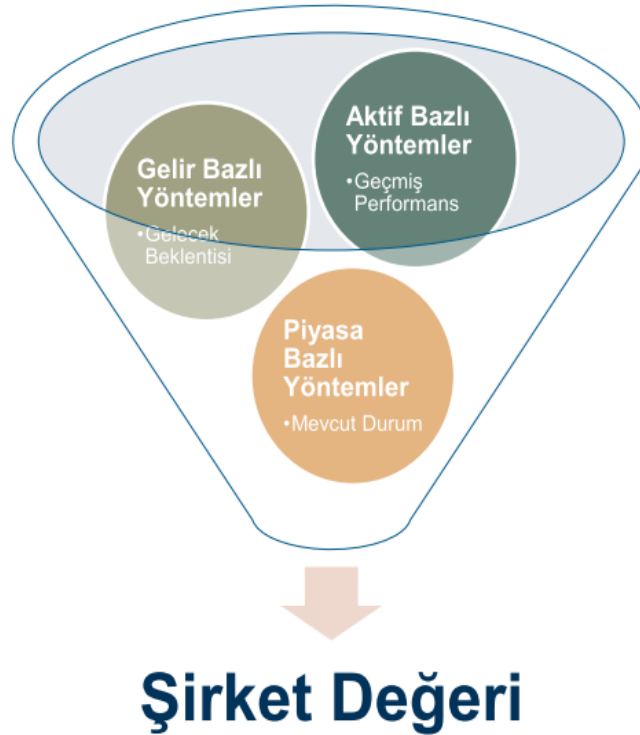
Şirket değerlemesi finans biliminin en önemli ve de uygulaması en zor konularından biridir. Şirket değerinin belirlenmesi ve de bu değer yönetimi oldukça önemlidir. Dünya’da ve de Türkiye’de son yıllarda yaşanan şirket birleşmeleri, bölünmeler, satın almalar, şirketlerin halka arzı ve özelleştirilmesi gibi durumlar şirket değerlemesinin önemini her geçen gün arttırmaktadır (Masun,2017:215).



Şirket değerlemesinin amacı, şirketin uygun ve makul bir piyasa değerinin belirlenmesidir. Alıcı bakış açısındaki amaç şirkete ödenebilecek en düşük değeri belirlemek iken satıcı bakış amacındaki amaç ise şirketi en yüksek değerden satmaktır (Ekici, 2019:20).

Şirket değerlemesinde genellikle alıcı ve satıcılar arasında makul bir değerde anlaşma sağlanmaktadır. Şirketin alıcıları yatırımlarını genel olarak şirketin geçmiş dönemde göstermiş olduğu performansa göre değil daha çok gelecek dönemlerde göstereceği performansa bakarak yapmaktadırlar. Bir diğer ifade ile gelecekte elde edeceği nakit girişlerini bugüne indirgeyerek değerlendirir. Bu nedenle temelde şirket değeri ağırlıklı olarak firmanın gelecekte sağlayacağı nakit girişi ile bu gelir akışının elde edilmesindeki risk derecesine bağlı olarak değişmektedir (Ekici, 2019:20).

Şirket değerinin belirlenmesine yönelik olarak geliştirilen yöntemler, aşağıdaki şekilde gösterilmiştir (Gorbon,2012:4).



**Şekil 1.** Şirket Değerleme Yöntemleri (Gorbon,2012:4).

**Aktif Bazlı Yöntemler;** Bir şirketin değerini muhasebe kayıtlardaki elde etme maliyeti ile dikkate alır. Söz konusu elde etme maliyet değerine eklemeler yapılarak şirketin değeri belirlenir. Bu şirket değerlendirme yöntemi kapsamında şirketin maddi ve de maddi olmayan varlıkları da değerlemeye dahil edilir. Geleneksel bir yaklaşım olarak varsayılan bu yöntemde

şirketin değeri muhasebe kayıtlarında gözükten değer olarak kabul edilir ve kişiye sabit bir tablo sunar. Yöntemin dezavantajı paranın zaman değerini ve de gelecekteki nakit akışlarını dikkate almamasıdır. Aktif bazlı yaklaşımlara aşağıdaki değerlendirme yöntemleri örnek verilebilir. (Gündoğmuş ve Öztanır, 2021:316; Ede, 2016:11).

- Defter Değeri,
- Piyasa Değeri,
- İşleyen Teşebbüs Değeri,
- Tasfiye Değeri,
- Yeniden Yapma Değeri,
- Gerçek Değer,
- Nominal Değer.

**Gelir Bazlı Yöntemler;** Bu şirket değerlendirme yöntemlerinde firmanın gelecek yıllarda elde edeceği gelirler dikkate almaktadır. Bu yöntemin temelini şirket faaliyetleri sonucu oluşan ve gelecek yıllarda elde etmesi beklenen serbest nakit akımları ile bu nakit akımlarını bugüne indirgemede kullanılan iskonto faktörü belirlemektedir. Şirketin yaratacağı gelirler şirketin büyüme ve riskine bağlı olarak değişmektedir. Şirketin varlık değerinden çok gelir getirici faaliyetlerinden ilgilenilmesinden dolayı bu yöntem yatırımcılar açısından önemlidir (Güler,2010:34). Gelir bazlı şirket değerlendirme yöntemleri;

- İndirgenmiş Kar Payları Yöntemi
- İndirgenmiş Nakit Akışları Yöntemi.

**Piyasa Bazlı Yöntemler;** Göreceli değerlendirme yaklaşımı olarak da bilinen piyasa bazlı yöntemler genel olarak piyasa tarafından önceden fiyatlandırılmış benzer varlık ya da firmaların değerleri ile karşılaştırma yaparak şirketin değerlemesini belirlemeye yönelik yaklaşımdır. Bir diğer ifade ile bu değerlendirme yönteminde, bir varlığın veya şirketin değeri benzer varlık, şirketlerin fiyatlandırılmasına bakılarak tahmin edilir. Bunun yapılabilmesi için fiyatların standart verilere dönüştürülmesi gerekmektedir. Bu yaklaşımın uygulama kolaylığı bulunmakla beraber eleştirilen yönleri de bulunmaktadır (Ekici,2019:38). Piyasa bazlı yaklaşımlar; (Ede, 2016:19).

- Fiyat Kazanç Oranı,
- FK/Büyüme Oranı,
- Piyasa Değeri/Defter Değeri Oranı,
- Piyasa Değeri/Satışlar Oranı,

- Firma Değeri/FOVÖK Oranı,
- Fiyat/Nakit Akım Oranı.

Çalışmamızda halka açık olmayan yazılım firmasının değeri Fiyat/Kazanç oranı yöntemine göre yapılacağından bu değerlendirme yöntemlerinden sadece Fiyat/Kazanç oranı yöntemi uygulama kısmında açıklanacaktır.

#### **4. ŞİRKET DEĞERLEMESİNDE FİYAT/KAZANÇ YÖNTEMİ: YAZILIM SEKTÖRÜNDE BİR UYGULAMA**

Göreceli değerlendirme yaklaşımları olarak bilinen piyasa bazlı şirket değerlendirme yöntemleri arasında Fiyat/Kazanç en çok kullanılan şirket değerlendirme yöntemidir. F/K çarpanı şirketin vergi sonrası 1 TL'lik hisse başına karına karşılık yatırımcıların kaç TL ödemeye razı olduklarını gösteren çarpanıdır. F/K hissenin piyasa değerinin toplam net kara bölünmesi ile bulunmaktadır. Bir diğer ifade ile bir hisse senedinin piyasa fiyatının hisse başına kara bölünmesi ile bulunur (Öztürk, 90:2017).

Fiyat/Kazanç oranı bir şirketin net karı ile hisse senetleri arasındaki toplam ilişkiyi kurmakta olup aşağıdaki formülle gösterilmektedir (Sezer vd, 2018:503).

$$\text{Fiyat/Kazanç Oranı} = \frac{\text{Hisse Senetlerinin Toplam Değeri}}{\text{Net Kar}}$$

veya,

$$\text{Fiyat/Kazanç Oranı} = \frac{\text{Hisse Senedi Fiyatı}}{\text{Hisse Başına Düşen Net Kar}}$$

Fiyat/Kazanç oranının mevcut ortaklar açısından yüksek, potansiyel yatırımcılar açısından ise düşük olması beklenir. Potansiyel yatırımcılar mevcut şirkete duyduğu güvene karşılık pay senedine ödeyeceği fiyatı yükseltebilir. F/K oranının yüksek olması hisse senetlerinin değerinin aşırı yükseldiğini ya da düşük bir oran ise hisse senetlerinin piyasada düşük değerlendirildiğini gösterebilmektedir. Bu nedenle söz konusu F/K oranının aynı sektörde yer alan diğer şirketlerin F/K oranları ile kıyaslanarak değerlendirilmesi gerekmektedir (Karadeniz ve Koşan, 2021:251). F/K oranı halka açık olmayan şirketlere uygulanabilmesinden dolayı şirket değerlemesinde kullanılabilen bir yöntemdir. Eğer şirketin hisse senetlerinin fiyatı belli değilse, şirketin

faaliyette bulunduğu sektörün F/K oranından yararlanılarak şirketin hisselerinin değeri tespit edilebilmektedir (Alkan ve Demireli, 2007:32).

Çalışmamızın uygulama kısmında halka açık olmayan bilişim firmasının değeri aynı sektörde faaliyet gösteren bilişim firmalarının ortalama F/K oranı çarpanından yararlanılarak tespit edilmiştir. Halka açık bilişim firmaları tabloda gösterilmiştir. Çalışmadaki bilişim firmalarının isimleri işyatırım.com adresinde sektörde yer alan firmaların F/K oranları ise halk yatırım web sayfasından alınmıştır.

**Tablo 1:** Halka Açık Bilişim Firmaları

NO	KOD	HİSSE ADI	SEKTÖR
1	LOGO	Logo Yazılım	Bilişim
2	ARDYZ	ARD Grup Bilişim	Bilişim
3	ATATP	ATP Bilgisayar	Bilişim
4	EDATA	E-Data Teknoloji	Bilişim
5	FONET	Fonet Bilgi Teknolojileri	Bilişim
6	KFEIN	Kafein Yazılım	Bilişim
7	LINK	Link Bilgisayar	Bilişim
8	MIATK	Mia Teknoloji	Bilişim
9	MTRKS	Matriks Bilgi Dağıtım	Bilişim
10	OBASE	Obase Bilgisayar Danışmanlık	Bilişim
11	PAPIL	Papilon Savunma	Bilişim
12	PKART	Plastikkart A.Ş	Bilişim
13	SMART	Smartiks Yazılım	Bilişim
14	VBTYZ	VBT Yazılım	Bilişim

Halka açık bilişim firmalarının 2021/12 ayına ait F/K oranları tabloda gösterilmiştir.

**Tablo 2: Halka Açık Bilişim Firmalarının F/K Oranları ve Ortalama Değeri**

YILLAR	KOD	HİSSE ADI	SEKTÖR	F/K ORANI	FD/FAVOK
2021	LOGO	Logo Yazılım	Bilişim	15,73	13,96
2021	ARDYZ	ARD Grup Bilişim	Bilişim	8,24	7,36
2021	ATATP	ATP Bilgisayar	Bilişim	34,46	53,96
2021	EDATA	E-Data Teknoloji	Bilişim	16,88	37,88
2021	FONET	Fonet Bilgi Teknolojileri	Bilişim	13,74	12,44
2021	KFEIN	Kafein Yazılım	Bilişim	50,83	5,27
2021	LINK	Link Bilgisayar	Bilişim	11,64	21,36
2021	MIATK	Mia Teknoloji	Bilişim	24,19	20,77
2021	MTRKS	Matriks Bilgi Dağıtım	Bilişim	21,11	14,7
2021	OBASE	Obase Bilgisayar Danışmanlık	Bilişim	0	0
2021	PAPIL	Papilon Savunma	Bilişim	21,19	0
2021	PKART	Plastikkart A.Ş.	Bilişim	24,04	12,05
2021	SMART	Smartiks Yazılım	Bilişim	46,7	8,58
2021	VBTYZ	VBT Yazılım	Bilişim	16,05	16,75
<b>ORTALAMA</b>				<b>21,77</b>	<b>16,08</b>

Halka açık bilişim firmalarının ortalama F/K oranı 21,77 olup halka açık olmayan bilişim firmasının ise 2021 yılına ait dönem net karı 43.167.250 TL'dir. Halka açık olmayan bilişim firmasının değeri F/K oranı çarpanına göre  $21,77 \times 43.167.250 = 939.751.032$  TL'dir.

## 5. SONUÇ

Şirketlerin değerlendirme tespitlerinde kullanılan birçok yöntem bulunmakta olup piyasa çarpanları içerisinde yer alan F/K oranı çarpanı ise bunlardan bir tanesidir. Piyasa çarpanları yöntemi hesaplamalarda tarihi verileri ele alması nedeniyle değerlendirme yapan kişilere ya da kurumlara büyük kolaylık sağlamaktadır. Uygulamasının diğer yöntemlere göre nispeten kolay olmasından dolayı Türkiye'de en çok kullanılan yöntemlerden birisidir.

Mevcut literatür ve uygulamalar ışığında şirketlerin değerlemesinde tek bir yöntem kullanılmamakta olup şirket değerinin doğru hesaplanmasında ve hatanın minimum seviye indirilmesi için bir çok yöntem karşılaştırmalı olarak kullanılmaktadır.

Bu çalışma kapsamında halka açık olmayan bilişim firmasının değeri F/K oranı çarpanı ile tespit edilmeye çalışılmıştır. Çalışmada halka açık olan bilişim firmalarının ortalama F/K oranı elde edilerek ilgili firmanın değeri yaklaşık olarak bulunmuştur. Çalışmada sadece piyasa çarpanları yöntemlerinden biri olan sadece F/K oranı çarpanı kullanılmıştır.

Mevcut yapılan çalışmadaki bulunan değer diğer piyasa çarpanları yöntemleri de kullanılarak karşılaştırma yapılabilir ya da diğer değerlendirme yöntemleri (gelir bazlı, aktif bazlı) yöntemler kullanılarak sonuçlar karşılaştırılabilir.

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**PRIMARY SCHOOLS, AND ORGANIZATIONS TRANSPARENTS, OPEN TO SOCIETY: ORGTRANSPARENTE.UNIOVI.ES/EN**

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**ABSTRACT**

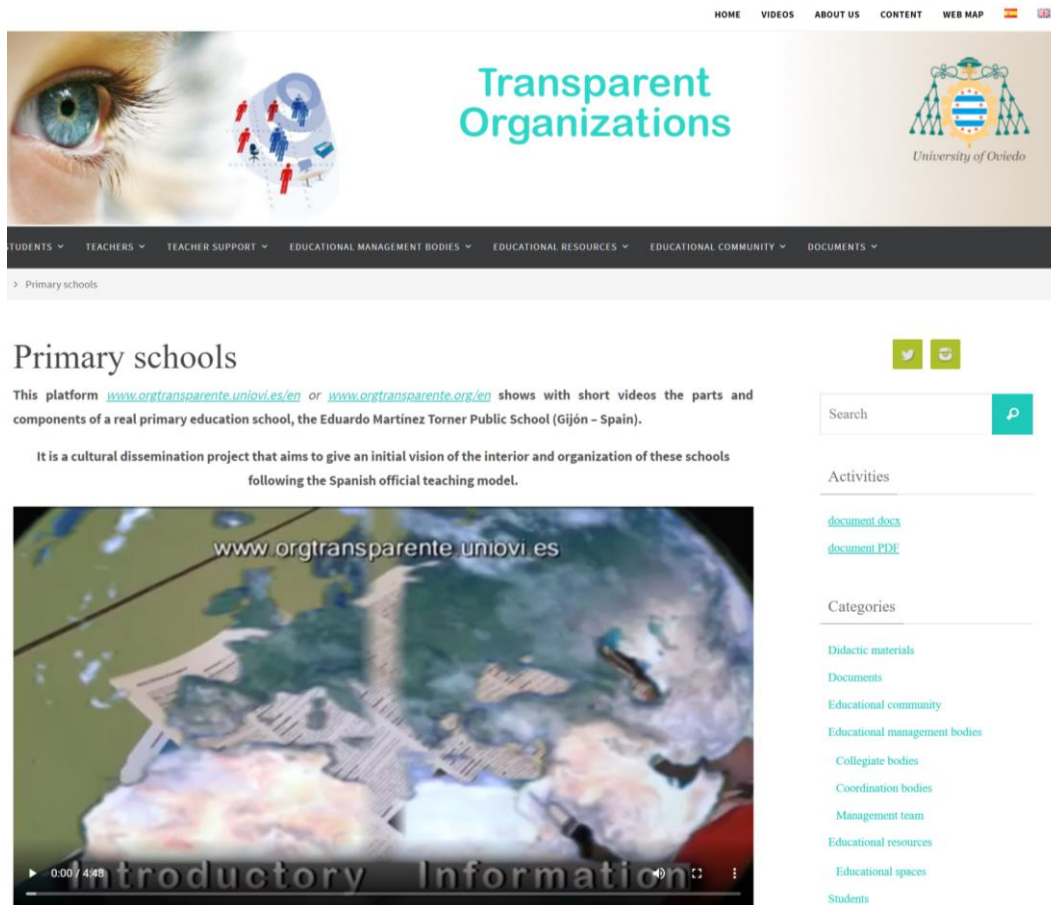
The world is in a special situation, war, migrations, a global pandemic... We are all obliged to collaborate in resolving these conflicts. More research is needed to open avenues for such international collaboration. Thus, from the University of Oviedo (Spain), we present a project to show our educational system to foreign students, and to any other person interested in learning about Spanish primary schools. This is the free platform <https://www.orgtransparente.uniovi.es/en> or [www.orgtransparente.org/en](http://www.orgtransparente.org/en). The platform helps people and students who come from outside of Spain, and who are unaware of our educational system. It is an open window, a transparent organization. In there we show the case of an elementary school through forty short videos. This project has been one of the 2 best educational innovation proposals of the University of Oviedo in the 2021 edition. This website is freely accessible and has no commercial or economic interests. There, in each interaction, users analyze the differences between the information in the videos and what is happening in their previous experience. That is, they comment on the similarities between their educational life in their country and the Spanish educational system. We want to contribute to social and educational progress through trust in institutions. Our strategy shows the operation of schools using visual communication techniques. We have followed the Web Content Accessibility Guidelines (WCAG) to make this platform as accessible as possible for people with disabilities. For example, the platform is accessible to people with hearing disabilities, since the contents are mainly visual. It is also accessible for blind people since the full written transcript availability of videos, and all graphics contents have their corresponding alternative textual descriptions. Although these guidelines cover a wide range of issues, they cannot address the needs of people with all types, degrees, and combinations of disabilities.

**Keywords:** primary school, Spanish education, educational website.

## INTRODUCTION

The project consists of offering a platform to publicize each of the parts of primary schools in Spain. This innovation project is based on four pillars: the specific training of the members, previous scientific research, professional experience in communication and training in international relations.

The free platform <https://www.orgtransparente.uniovi.es/en> or [www.orgtransparente.org/en](http://www.orgtransparente.org/en) (Figure 1) describes the Spanish educational system through forty short videos that analyze primary schools, showing the components, the parts, and the interior of a specific school. This project has been one of the 2 best educational innovation proposals of the University of Oviedo (Spain). The platform wants to support students who come from outside of Spain.



**Figure 1.** Screenshot of <https://www.orgtransparente.uniovi.es/en> or [www.orgtransparente.org/en](http://www.orgtransparente.org/en)

## **MATERIAL AND METHODS**

### **Objective**

The objective is to satisfy the need and absence of educational materials elaborated with the necessary rigor and prepared not only for the Spanish context, but also aimed at foreign users and from the English language support. Thus, international students who attend our Faculty, and Oviedo university in general, will have resources that "kindly" introduce them" to these contents, getting to know how a real school works through small videos that show each of its parts. Therefore, the purpose of the project is to launch a platform with video documents that illustrate the operation of a primary school in Spain open to everyone through the Internet and in English. This will mean changes in strategy: the transition from traditional classes and the written texts used until now, to the use of audiovisual materials and telematic support.

### **Method**

This is an educational innovation project. One of the main strengths is the profile of the work team, due to the interdisciplinary and balanced composition of its members, offering complementary and necessary characteristics for the project:

- Balance in the gender perspective.
- Proportionality of necessary profiles: professionals from the teaching field, IT managers and English language experts.
- Connection with professors outside the university, bringing this institution closer to other external experiences and people.
- The members have command of the English language, which is necessary in this job.
- Teachers who are experts in innovation and research projects together with recent graduated teachers in this field.
- The ages range from 30 to 50years. This indicator gives an idea of how experience with novelty can be shared and how innovation findings can be systematically implemented over many years.
- The group has a varied experience in innovation projects, trying to complement extensive training in innovation management with the first experiences of other participants.
- Members with outstanding activity in scientific dissemination and publication, together with other members who are starting out in this field.
- An attempt has been made to involve the people who coordinate Erasmus mobility, and this facilitates the incorporation of foreign students into the project.

- In addition to teachers, this project also includes technical staff, remembering that this community shares efforts from many perspectives.
- Finally, we wanted to incorporate the presence of students.

The materials were elaborated based on the visual narrative; this supposes a specific language in which things are seen in addition to being told verbally. The resources are necessary for specific foreign students, for bilingual students and for teachers who need to complement their traditional written resources, and society in general, which needs rigorous tools to validate the knowledge of the information. Let's not forget that Erasmus students are inserted in classrooms that are not specific for incoming students. The design of the videos shows basic contents of the educational system: what the management team does, what is done in a meeting of the faculty, or by the Pedagogical Coordination Commission, or how a didactic unit is made.

Fundamental and rigorous ideas are shown, seeking with this format the introduction to the operation of each of the components of a school, and seeking to reach people who are unfamiliar with this subject, who are approaching it for the first time, or who from different contexts want to have those references.

The project is open to collaboration and interaction with students and teachers from all over the world. Thus, we have written some questions to get user feedback (Figure 2).

We are teachers from de Univ. of Oviedo (Spain), we want to be useful especially for foreign students, and want to show the Spanish educational system, through a website with short videos about the components of a primary school [www.orgtransparente.uniovi.es/en](http://www.orgtransparente.uniovi.es/en) or [www.orgtransparente.org/en](http://www.orgtransparente.org/en)

It is very important for us. Please, we would like you to watch some of these 40 videos and answer the 3 questions below those videos. You can write in any language.



## Questions

Please answer the following questions in the space below. You can answer in any language and the questions you want.

 Educational community, families, generic, students, teacher.  Bookmark.

◀ Students Student group representative ▶



Join the discussion

Describe, in the box above, the usefulness of this video.

### Only if you are Spanish:

Is there anything you didn't know? If so, describe it.

Is there anything you didn't know? If so, describe it.

What information would you add on this topic?

What information would you add on this topic?

### Only if you are not Spanish:

What similarities do you find on this topic in your country?

What similarities do you find on this topic in your country?

What differences do you find on this topic in your country?

What differences do you find on this topic in your country?

### Data for statistics.

Name\*

@ Email (your email will remain hidden and will not be used for other purposes)\*

Age

Sex:

Male  Female

Country

Last academic level pass

Here you can comment whatever you want, for example, if you have another idea, ...or show your profile: teacher, parents, ...

Other information

Thank you very much!

Post Comment

**Figure 2.** Screenshot of the interaction space on the website <https://www.orgtransparente.uniovi.es/en>

## **LITERATURE REVIEW**

The project is part of a new scenario (Post-Pandemic, Tele-training, Globalization and internationalization) where change, improvement and innovation must be a response from the teaching staff and the university to the new demands of society (Corral and Fernández, 2021). These are some of the characteristics and the scenario in which the university and the teaching and learning processes must evolve, and not only from the field of the teachings of Education, but from all its fields.

Why do we use the name ORGTRANSPARENT? This denomination derives from a previous work where it was seen that it was necessary to transparently show the interior of public institutions, opening a window to the operation of schools, and other organizations such as hospitals, etc. This is a path towards the democratization of these organizations, and knowledge of them. Thus, it was shown that people ignore what happens inside many public organizations (Fombona, Pascual, Iribarren, Pando, 2011). On other cases, what is shown, and how it is shown, is loaded with commercial, ideological or other interests.

On the other hand, it is essential to highlight the impact of the Pandemic on human interactions. Technology was already setting the standard for new effective and efficient educational actions through the Internet. Now, the overwhelming and multidisciplinary irruption of telematics has established a new way of transmitting information and converting it into knowledge (Fombona, Pascual, Listopadzk, 2022).

The Faculty of Teacher Training and Education at the University of Oviedo is the educational context. It needed to use this platform [www.orgtransparente.uniovi.es/es](http://www.orgtransparente.uniovi.es/es) as a substitute resource given the impossibility of students going to their internship centers due to confinement. From the Dean of Practices and the Dean of the Faculty they recommended the use of this WEB. And so, it was used during the 2020-21 academic year.

The approach of using purely audiovisual tools has proven effective as complementary material to the traditional written text (Riccio-Anstacio, Molestina-Malta, Veliz-Ozaeta, 2017).

Specifically, this platform demonstrated its effectiveness as an open, rigorous and necessary educational resource. There, the operation of the schools in Spain-Asturias was shown through short videos.

Finally, it is necessary to indicate that there is a lack of educational resources on the subject of this project (Díaz, Caballero, 2014). And to a greater extent there is a need to offer materials that may have an interdisciplinary utility on education in Spain, and specifically on the

functioning of primary schools. On the other hand, there are hardly any materials of this type aimed at foreign students, nor at Spanish students in bilingual courses. Thus, Erasmus students have to assimilate the documents in Spanish used by the rest of the students (Fombona, Pascual, Iglesias, 2015).

In the analysis of the state of the question we detect:

- The need to create resources that respond to this new stage of telematic educational interaction.
- The scenario is global, and it is necessary to offer educational materials open to all of society, and not just Asturian and Spanish. English is the commonly accepted support, both for foreign students and users of this platform, as well as for those Spanish speakers who want to approach that language (Chand-Chávez, 2017).
- Increase in the international dimension of universities and this innovation contributes to creating a welcoming educational space.

## **DISCUSSION**

The pandemic prompted tele-training and the need to create rigorous materials that could, to a certain extent, replace face-to-face teaching in the classroom. In this scenario, students obtain information by means other than the traditional ones, that is, they follow the strategies of social networks. For this reason, this platform follows the approaches of YouTube, showing with short videos how a school works. The use of audiovisual strategies moves away from the speeches of the master classes. Purely audiovisual tools have proven their effectiveness as complementary material to traditional ones (Sangermán Jiménez, Ponce, Vázquez-Cano, 2021). Thus, the videos show real situations in a school, and can be useful for Internship subjects in which foreign students have to go to a Spanish school for the first time. However, the platform is open to all those who want to enter our educational system. Erasmus students are expected to use this resource, but also teaching teams to incorporate these resources as a complementary tool to their lessons. In addition to the academic impact on students and teachers, with this material we intend to get closer to society, with which we have a responsibility, opening ourselves up to experts, educators, families, educational administrations, and others interested in these contents and in what this University does.

The project, coordinated by professors Javier Fombona and Jorge Puente, has an interdisciplinary and complementary approach in profiles, ages, experience, etc. This is how professors from different faculties, but the administrative staff of the university, other regions

and international experts also wanted to open up. This sense of support for students goes beyond the use of a visual methodology and the use of the English language (García, Fombona, 2015), thus following integration and accessibility standards, so that everyone can both receive information (understand, navigate and interact with the Web site) and contribute to the Web with their comments in the forums (Figure 2). This accessibility benefits both people with and without disabilities, for example: people of different ages and knowledge on the subject; people with limitations due to their location; use of mobile phones, smart watches, smart TVs and others; using devices with small screens, different input modes, etc. In short, it is an innovation project framed in a new scenario of Post-Pandemic, Teletraining, Globalization and internationalization, where teachers face the challenges of change, improvement and innovation as a response and satisfaction to the new demands of the society.

## **CONCLUSION**

The use of Internet resources, and especially, the use of correctly prepared audiovisual media is very effective in the educational field (Del Valle-Ramón, García-Valcárcel, Gómez-Pablos, 2020.), in languages (Caja, 2009; Kurniawati, 2013), and other subjects (Mahasneh, Shoqirat, Singh, Hawks, 2021; Sangermán Jiménez, Ponce, Vázquez-Cano, 2021).

The research and actions of universities must have an international, collaborative and positive dimension for humanity. In this sense, we have to create tools, like this web site <https://www.orgtransparente.uniovi.es/en> or [www.orgtransparente.org/en](http://www.orgtransparente.org/en), that makes the mobility of students and teachers welcoming. In this case, this platform offers a friendly showcase of what is happening in the Spanish educational system.



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**MITIGATION OF PARACETAMOL-INDUCED HEPATOTOXICITY BY  
DICLIPTERA BUPLEUROIDES NEES' THROUGH OXIDATIVE STRESS  
MODULATION****Sana GHAYAS**Department of Pharmaceutical Sciences, Dow College of Pharmacy, Dow University of  
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**ABSTRACT**

***Introduction:*** Despite the advances in medical care, still there is no medication accessible that offers protection against hepatic cell damage. Therefore, it is a need of time to find out new drugs from natural sources for liver protection. The utilization of restorative plants has gained prime importance in developing countries due to their safety, cost-effectiveness and efficacy. The purpose of this study is to assess *Dicliptera bupleuroides* Nees' safety profile, hepatoprotective, and in-vivo antioxidant properties.

***Methodology*** Standard techniques were used to conduct toxicity tests on human RBCs and DNA. Albino rats were given all six fractions/extracts of *D. bupleuroides* 350 mg/kg/day for an acute hepatoprotective study. The hepatotoxicity was determined through blood tests including Alanine transaminase (ALT), Aspartate transaminase (AST), Alkaline phosphatase (ALP), and total bilirubin (TB). The n-hexane fraction (200 mg/kg/day) was found to have enough hepatoprotective effect and thus selected to be administered for further dosing and investigation (14 days). Hepatotoxicity was induced by paracetamol (350 mg/kg) and silymarin (50 mg/kg) was set to be the reference drug. After the procedure, liver function tests, liver peroxidation tests, and a histological examination were performed.

***Results*** In comparison with standard medicine, the hexane fraction exhibited a substantial drop in the levels of ALT (88.17.8), AST (93.87.6), ALP (136.38.4), and TB (0.60.03) ( $p > 0.05$ ). In comparison to the toxic group (paracetamol induced), the Malondialdehyde (MDA) and Glutathione (GSH) levels were 51.32.9 nmol/g and 73.64.0  $\mu$ mol/g respectively while the rats treated with ethyl acetate fraction demonstrated a decrease in MDA (42.80.7 nmol/g) and an increase in GSH levels (107.71.8  $\mu$ mol/g). All of the medication extracts reduced oxidative stress and helped to protect DNA from hydroxyl radicals.

**Conclusion** The phytochemicals found in the extracts are responsible for the DNA damage prevention activities in the Albino rats used for this study. Therefore, it is concluded that all drug fractions could be used to protect liver cells damage with higher safety. However, n-hexane drug fraction possessed enhanced antioxidant activity to inhibit paracetamol-induced liver damage.

**Keywords:** Dicliptera bupleuroides Nees, DNA protection assay, hepatoprotective, hemolysis, histopathology, in-vivo antioxidant.

**1. PROBLEM TO BE SOLVED:**

Medicinal plants are the rich wellspring of therapeutic components from natural origin with helpful availability and fewer aftereffects with frequent and adequate availability. The remedial aspects of restorative plants credit to phytochemicals like tannins, alkaloids, flavonoids, and phenolic compounds. These bioactive parts might have protective action against DNA damage. Therefore, to treat hepatotoxicity we used *Dicliptera bupleuroides* Nees a naturally available medicinal plant in our study.

**2. THE IDEA:**

Utilization of restorative plants has gained prime importance in developing countries due to their safety, cost effectiveness and efficacy. It is one of the earliest varieties of medical care for people that have ever been identified. More than half of the drugs now being tested in clinical trials are derived from medicinal plants. In the past two decades, around 40% of newly approved pharmaceuticals have come from natural sources. Not only do they contribute significantly to the development of drugs for the treatment of cancer and other infectious diseases, but they also help many nations, especially those with weak economies, generate income. The business in restorative plants in the United States is developing at a pace of 10% every year, and that's just the beginning as more individuals are becoming keen on utilizing herbal medicines. Restorative plant markets are at present overwhelmed by the United States, China, France, Japan, the United Kingdom, and Italy. Subsequently, the worldwide market for herbal and plant-determined drugs is anticipated to ascend at an 11.0 % yearly speed from \$19.5 billion in 2008 to \$32.9 billion in 2013. The yearly business in restorative plants is supposed to reach \$5 trillion by 2050 because of current extension. Luckily, Pakistan has huge and plentiful greenery with around 5700 species, with around 2000 of them being therapeutically important. Similarly, in this study *Dicliptera bupleuroides* Nees plant concentrates will be investigated for hepatoprotective and antioxidant action (Ali et al., 2019; Almazroo et al., 2017; Riaz et al., 2019).

**3. TARGET MARKET:**

Around 2 million people every year die from chronic liver disease. Chronic liver disease is caused by a variety of reasons, including viral infections, drug addiction, alcohol intake, autoimmune illnesses, and other conditions that cause hepatotoxicity. In chronic liver disease, Pakistan is also battling one of the highest HCV rates (13.5), according to the WHO. There are

several allopathic drugs in the market for treating conditions like fatty liver caused by alcoholism and as chemotherapy agents, such as Metadoxine (which has adverse effects including agitation, hair loss, abdominal discomfort, diarrhoea, etc.), and Ondansetron (which has side effects such as hallucination, agitation, hives, pain, constipation, weakness, etc.). They have a number of undesirable effects in addition to their therapeutic effectiveness, but *Dicliptera bupleuroides* has negligible side effects and can be employed as a hepatoprotective drug as a sole and/or adjuvant therapy (Xu et al., 2017; Del Rio et al., 2005).

#### **4. ADDITIONAL INFORMATION:**

Lipid peroxidation is a destructive, auto catalytic and free radical mediated process in cellular membrane that converts polyunsaturated fatty acids into lipid hydro peroxides (Pund et al., 2012). During this unsaturation process free radical are produced, responsible for formation of malondialdehyde. It is a reactive aldehyde capable of oxidative stress in different tissues and referred as advanced lipoxidation end product (Vurmaz et al., 2019). Production of this aldehyde is used as a biomarker level for oxidative stress in experimental animal (Del Rio et al., 2005). *Dicliptera* had strong antioxidant activity in *Chinensis* spp (Xu et al., 2017). While *D. bupleuroides* showed significant therapeutic values due to polyphenols (Riaz et al., 2019). Decrease level of MDA controls the oxidative stress and hepatic damage resulting in tissue health. Glutathione is one of the major tripeptides found in the liver tissue, its main function is to remove free radicals such as hydrogen peroxide, superoxide radical and maintenance of membrane protein thiols. It is a substrate for glutathione peroxidase, increase in level of GSH caused to decrease cellular stress and maintains the membranous health (Pawar and Abhang, 2017).

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**ENDONEZYA'DA SEÇİMLERDE SİYASİ DOLANDIRICILIK: İNSAN HAKLARI  
PERSPEKTİFİ**

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**ÖZET**

Bu çalışma, Endonezya'da demokrasinin hayati bir yönü olan Genel Seçimlere Siyasi Katılımdaki (PEMILU) yolsuzluğu analiz etmektedir. Seçimler, vatandaşların seçimlerde oy kullanmalarını sağlayan ve günlük hayatlarını yönlendiren kararları etkilemelerini sağlayan bir araçtır. Ancak Endonezya'da uygulama tersine dönmüş, seçilme ve oy kullanma hakları gasp edilmiş ve bu katılım hem Medeni ve Siyasi Haklar Sözleşmesi'nde hem de Genel Seçimler Yasası'nda düzenlenen asgari insan hakları standartlarını uygulamamaktadır. Yazar, güvenilir kaynaklardan elde edilen ikincil verileri kullanır ve verileri analiz ederken içerik yaklaşımı kullanır. Yazar, eşitlik ve insan hakları yasalarının seçim döneminde uygulanması ve işleme gerektğini söylüyor.

**Anahtar Kelimeler:** siyasi haklar; katılım; oy hakları.



**POLITICAL FRAUD OF ELECTION IN INDONESIA: A HUMAN RIGHTS  
PERSPECTIVE****ABSTRACT**

This study analyzes fraud in Political Participation in General Elections (PEMILU), which is a vital aspect of democracy in Indonesia. Elections are a means that enable citizens to cast their votes in elections and influence the decisions that govern their daily lives. However, the implementation is reversed in Indonesia, the rights to be elected and to vote are hijacked and frauded. Participation does not apply the minimum standards of human rights regulated both in the Convention on Civil and Political Rights and the Law on General Elections. The author uses secondary data from reliable sources, and uses a content approach in analyzing the data. The author says that equality and human rights laws must apply and operate during the election period.

**Keywords:** political rights; participation; voting rights

## **BACKGROUND**

The inclusion of national election in the basic Law crafted Indonesia, alongside the India and the United States among the most representative democracy nations in the world. This has already been indicated in each and every national election throughout Indonesia. Numerous independent oversight groups and foreign experts wish to see how Indonesia's national election, from the actors and procedures which may intensify democratic values, continues to unfold witnessed first hand. The Unitarist State of the Republic of Indonesia is indeed a nation with such a democratically elected government wherein "by people and for the people" is indeed a symbolic representation of Indonesia's democratic government. It is an universal right that protects people as well as other civic groups from marginalization and discrimination (Lee & Sun, 2018; United Nations High Commissioner for Human Rights, 2022).

In a democratic governance, general electoral fraud (PEMILU) has always been outlawed. This is due to its possibilities to denude citizens' right to vote and then provide misleading information in election results. Citizens do not participate in the democratic process by not voting in the election or by replacing voters with ghost voters.

Even though Indonesia claims among the largest democratic nations and made impressive democratic gain (Freedom House, 2022 ), such an accomplishment seems to be subject to debate since buying votes persists to tarnish its election system (Virananda, Dartarto & Wijaya, 2021; Al-Hamdi et al., 2021; Jaffrey, 2020; Muhtadi, 2019; Aspinall et al, 2017). Money politics and political fraud are still prevalent in Indonesian politics (Al-Hamdi, 2022; Kramer, 2022; Jannah et al., 2020; Berenschot, 2018). Political parties continue to rely on political donations to win an election (Hidayaturrahman, Ngarawula & Sadhana, 2022; Dinarto & Ng, 2021; Jannah et al., 2020).

Identity politics, populism, as well as polarization are also employed to undermine political opponents in order to gain votes in elections (Habibi, 2022; Prasetyawan, 2022; Kansong, Sunarwinadi & Triputra, 2022; Rakhmani & Saraswati, 2021; Afrimadona, 2021; Fossati, 2019; Hofmann et al., 2021). Another popular method for improving voting rolls in Indonesian election campaigns would be "ghost voter" politics (LIPI, 2013; Mildaniati, 2022). The ghost politics of casting a vote has been practiced by utilizing the identity of the dead person in the voting rolls to boost the voting rolls of particular candidates.

Based on the information provided above, this research focused on such new issue. Researchers are attempting to respond to two fundamental questions. Are Indonesian voting truly

democratic? Second, how does political scam affect voters' political representation as component of their civil rights? To the first issue, the writer states no, but that it is a pseudo-democracy. The second claim is that vote buying, populism, and ghost voters damage voters' democratic freedom since they are not conducted in accordance with the principle of direct, general, free, as well as confidential elections.. Despite this, Indonesia is a democratic country with limited legal access to the voting process, the use of a ghost ballot, and low levels of civic engagement. Indonesia's electoral system was either magnificent or tarnished by fraud.

## **LITERATURE REVIEW**

### ***Electoral system***

The electoral system is the representation of democratic governance, and it is crucial for the stability of a nation 's development (OCHCR, 2022). According to Huntington (1995), the Electorate must have 5 elements within the successful execution:

1. The embodiment of folk's autonomy is put into practice.
2. Serving as a way of creating as well as formulating representation in government.
3. To serve as a means for lawfully instituting a leadership change.
4. To function as a system that permits elected elites to gain credibility. Voting in an election gives the elected leaders a mandate from the people to run the "wheels of government.
5. To serve as a system of general civic engagement which vigorously defines general populace guideline.

Election process in Indonesia are ruled by Law Number 7 of 2017. The meaning of Voting is found in Article 1 number 1 of the Law. General Elections, also known as elections, are indeed a mechanism of exercising people's sovereign power by electing members of the People's Representative Council, members of the Regional Representatives Council, the President and Vice President, and members of the Regional People's Representative Council in the Unitary State of the Republic of Indonesia based on Pancasila and the 1945 Constitution.

### ***Political fraud***

Political fraud has long been a source of contention among academics (Virananda, Dartarto & Wijaya, 2021; Al-Hamdi et al., 2021; Jaffrey, 2020; Al-Hamdi, 2022; Kramer, 2022; Jannah et al., 2020; Berenschot, 2018; Muhtadi, 2019; Aspinall et al, 2017). Meanwhile, the characteristics of an ideal election cycle include that the voting process must be transparent, non-partisan, and free from political fraud from before the election to after the election results..

According to the Human Rights Office of the High Commissioner (2022), real polling places must meet certain criteria, such as openness, voting chance, full participation, informed comprehension, or schedule regulation. The above representative democracy pattern suggests widespread equality and equal and fair rights for any and all people in the voting sphere. Stokes (1999), the democratic process is characterized by a 'one person, one vote' scheme wherein people have the chance to choose any of the political elites trying to compete for ballots. Even though social networking may be an effective political device, it has the potential to raid liberty as well as decapitate democratic values.

According to Lee (2018), the era of technology (information) puts us within extremely distinct contexts, and people live in a time which is influenced by forgery instead of open mindedness. Lee (2018), tricksters propagandize as well as diminish major parties' or pols' legitimacy with in political sphere. Subterfuge promotions as well as foreign meddling mechanisms infrequently depend entirely on online advertisement; some who have employed deceiving front clusters, frauds social media platform records, internet search techniques, and automated tools to deceive conversations online, among numerous other techniques. Many roadblocks to a global network global ecosystem have been strongly intertwined, and lawmakers must respond to issues throughout a variety of actions. Those who had already created digital marketing devices to easily available functionality. Even before political operatives delegitimize promotional innovation, the few who employ it to identify weaknesses in which both individuals and organizations are the most susceptible to uses a specially will gain. Individual citizens' data is employed against eachother in these kind of situations, and it is employed to aid ideological advertising companies in positively influencing one's targets. Such democratic deception is a human rights infringement.

Political forgery in election process affects the degree of political turmoil because of practice of 'political unrest' is one of government's basic ideas. Political fraud is a form of electoral violence which includes attempting to alter the outcome and process of an electoral cycle, normally shortly before the election. For political analysts, the idea that politicians experience unpredictability as a result of data trickery is intriguing since attempting to manipulate dynamic generation its electoral discourse.

According to Reynolds (2002), voting processes seem to be institutional arrangements for political decisions wherein individuals have the prerogative to choose through a competition for people's voter base. The rise of perceived risks linked to significant political unrest can also

have two implications for investment plan. First, political uncertainty tends to raise the potential risk of foreign funds, resulting in a greater equity expense. Second, electoral unpredictable nature tends to increase management's impression of a fund's operating cash risk, because individual firms' cash flow seems to be vulnerable both to perplexing and aggregation mysteries. As a consequence, all through periods of intense political strife, there is an proclivity to perceive financial inadequacies and to push an outside market share, causing a higher equity cost..

### **Methodology**

This research employed a descriptive qualitative method to investigate interpersonal interactions, mechanisms, as well as activities whilst also used over data on the issue at hand. This article evaluates how well the Indonesian electoral system utilizes social media to control information. This research aims to collect further data and paint a more complex image of political fraud throughout Indonesia's polls. The author performed empirical research is based on vote data using a sequence of series of documentaries bibliography as well as appropriate documents. The writer eviscerated the problems using the other electoral deception through data processing and civil rights theories. In regards to theoretical as well as intellectually rigorous significant contribution, the said article offers a valuable comprehension of analysis of political fraud and also its implications both on contestants' as well as voters' casting a ballot liberties.

### **Analyses**

A powerful democratic clientelism connection between voting organizing committee, nominees, as well as constituents thru the cast a ballot choices becomes a form of electoral fraud in Indonesian voting. Clientelism is a special provision from accomplishment for self gratification or mutual assistance of power and sharing of relationships, as well as unfairness should be considered acceptable.

### ***Pork Barrel and Money Politics***

In the Indonesia electoral practice, cast a ballot tactics including such donating cash to constituents (money politics) and misappropriating government funds to purchase votes (Pork Barrel) seem to be prevalent (LIPI, 2010; Jati, 2013; Saragintan & Hidayat, 2016; Aspinall & Sukmajati, 2016; Broto et al., 2021; Tjahjoko, 2022). Vote buying and favoritism are two factors which commonly appear in Indonesian election process as they can impact voting choices to advantage candidates who use this strategy winning elections. Vote buying is one of

the greatest opponents of each and every democratic establishment in Indonesia, either national and local. Vote buying refers to the act of buying electors votes by election attendees as well as by the winning squad, regardless of whether representative or otherwise, typically before the vote. Voters forfeit his\her independency when this relates to selecting nominees for elected figures based on reasonable considerations including proven record, achievement, initiatives, and manifesto pledges when it relates to money politics. This form of vote buying has always been typically regulated by legislation, such as the Pilkada Law (Electoral Law).

Before the national election, propagandists, functionaries, and even political apparatchiks buy influence. This promotes the practice of vote buying through distributing cash, basic necessities, grains, oil, and sugar to the general populace in order to garner general support for the politicians of party concerned. Vote buying emerged as a consequence of fear and mistrust with in capacity of contestants as well as successful teams to win in a honest fashion. Troubles arise as a consequence of difficulties with in new recruits of elected figures. The said hiring process, which really is agnostic to ability and past record, generates incredibly quick nominees who are incapable of arouse electorate compassion or empathy.

A further method for influencing its voting process thru the transaction - oriented elections is to employ the corporation fund to purchase people to vote. According to figures released by the Corruption Eradication Commission (KPK), as cited by Widayati (2019), the KPK seized 400 thousand packets in 84 cartons totaling IDR 8 billion. Something allegedly planned to use the funds for election day attacks. 'BSP (initial) is suspected of accepting a bribe from A.W. (accused), Marketing Director of P.T. Humpuss Transportation Kimia (HTK company). The accused has been supposed to help P.T. HTK in negotiating a deal to utilize its ships for fertilizer allocation from P.T. Indonesian Logistics Fertiliser. Other money politics cases captured by the police during the 2019 electoral campaign include IDR 1,075 billion. in cash and property from one political group in Lamongan, East Java.

Regardless of the fact that purchasing and selling votes is widespread in Indonesia, its impact on electoral results seems to be negligible. That technique of purchasing and selling franchises tends to affect only around 11% of all total votes. Three of culprits, for example, conceded to distributing a cash to 2,400 people. The amount of cash to be dispersed is IDR 20,000 (US\$ 1 36) per individual. According to Kefer (2007), electors of IDR 20.000 have such a connection to poverty and their financial circumstance. Constituents of low-income practice cronyism and corruption as well as manipulate people to vote from these connections.

### ***Populism in Indonesian Politics***

Populism have been prevalent in recent Indonesian elections, both locally and nationally. Since the 2014 to 2019 election, the algorithmic campaign has indeed been uncommon in comparison to certain other centralized democratic nations. On voting days, populism is employed in order rally large numbers of potential voters. Moreover, populism regularly perpetuates religious doctrine strain through associating an electoral opposing player with such a minority. In addition, religious as well as ethnic background are commonly used as a cast a ballot generator for nominees. As a result, cross-cutting cleavages based on religion and place of origin can be very political. Furthermore, identities associated to religious divergences motivate and inspire larger groups into sensible coalitions with political figures. Such midriff trends influence the way individuals cast a ballot. The above polarizability could correspond to a corruption and nepotism platform, and yet identity coincides it (Habibi, 2022).

Populism is a concern in a state as diversified as Indonesia for three main reasons listed below. First, populism does have the potential to reduce or perhaps even completely remove those certain personas throughout societal structure (Jannah, Ikhwan & Maritza, 2020). Identities are much more complex and diverse in a collective of individuals within a community, a neighborhood, or even a nation. Politicians intentionally display an individuality which those who genuinely think would then convince people to vote for them during the election in order to advance his/her political goals. It guarantees to favor all who arrive from such an individuality in in addition to highlighting that individuality. People of multiple identities would not gain from such a strategy when he is voted into power and keeps his commitment.. Second, populism underscores the quality of the work plan debate. Voting is a platform for different factions to start competing for social influences through offering the best work strategy to help sectors of society that are still suffering from a lack. Third, populism splits instead of integrates civilization. People believe that about there individuality has been characterized by choice of a "greatest" masterpieces which will resolve issues in there own area. Finally, Populism seems to be widely misunderstood as a subset of real politics, or even an outlet of state politics. Undoubtedly, a members of the group become much more able to unite once those who have a common identity. Nevertheless, in the sense of a multiculturalism Indonesian national identity, trying to emphasize this same identity of such a dominant group could really represent a threat to the country's integrity and harmony. This illustrates the dividing line among racial politics and politics in general: it only aims to achieve an exclusive objectives of its particular group,

while the other aims to achieve encompassing targets for shared life whilst also trying to destroy those certain identities.

### ***The emergence of ghost voters***

The 'ghost voter' strategy is a means of vastly increased ballots by utilizing the identities of dead person as electors. Because of number of registered voters have to be massive, as well as because utilizing the deceased's identity in any name is illegal, political pilots are really not frightened to use the identity. Those who used data from Provincial and district to publicize the names of the deceased as voters. Given that there is a list of the names of people who died as voters and were not likely to vote in elections, this politics is also known as 'ghost voter' politics. The Indonesian Institute of Sciences "LIPI" (2013) published reliable data on ghost voters in Indonesia. According to the LIPI study, there is a significant rise with in Population Data of Potential Election Voters (DP4) as well as the Data of Permanent Voters (DPT), which is main reason for the large non - attendance rate. It thus implies that ghost voters are very much likely to contribute to the massive amount of crossbenchers. For example, as in West Java vote, the census inhabitants of West Java is 43 million, whilst statistics from General Election Commission (KPU) using data from the Population Aggregate List per District (DAK2) in West Java is 49 million. As a result, the population information stored by the Central Statistics Agency differs by approximately 6 million. Comparable disparities emerged in North Sumatra, at which DAK2 and BPS vary by 3 million people, and Central Java, where the difference is seven million. Ghost voters are predicted to rise in the general election in 2024 as inhabitants in certain regions have been preoccupied with death certificates (Mildaniati, 2022).

Utilizing dead people's information in elections is a serious crime of misrepresenting population information as well as population records. Falsification of residential documents, for instance, can indeed be punished by:

1. Article 93: Any resident who intentionally falsifies letters and/or documents to the Implementing Agency in reporting Population Events and Important Events faces up to 6 (six) years in prison and/or a fine of IDR. 50 million.
2. Article 94: Anyone who orders, facilitates, or manipulates Population Data and/or Population Data Elements as defined in Article 77 is subject to a maximum prison sentence of 6 (six) years and/or a maximum fine of IDR. 75,000,000. 00. (seventy five million rupiah).
3. Article 96A: Any person or legal entity who does not have the right to print, publish, and/or distribute the Population Documents referred to in Article 8 paragraph (1) letter c shall



be sentenced to ten (ten) years in prison and a fine of IDR. 1,000,000.000,00. (one billion rupiah).

Despite the framework which regulates the legal settlement of general election infringements, the police and prosecutor's office for criminal violations, and the General Election Supervisory Body (BAWASLU) for election disputes, there are numerous barriers in law enforcement. For example, the reporting deadline for a violation is indeed very short, 7 (seven) days after it was discovered. Furthermore, Bawaslu was granted so little time to act on the report, where it made collecting proof complicated.

Even though settlement time in Law 7 to cope with infringements of 7+7 is not in line with the settlement time in the Pilkada Law (Election of Regents, Mayors, and Governors), a further issue is the absence of General Election Supervisory Body (BAWASLU) authority to resurrect parties suspected of having committed crimes. If the matter desires to flee while in an investigation, there is nothing that could be done to halt the case since time runs out in the process of dealing with it, as well as other obstacles that keep recurring in its implementation. Law enforcement should indeed achieve a legal advancement in settling both criminal and administrative instances.

### **Political fraud and violations of human rights**

The voting rights has been institutionalized in many statutory provisions, including Convention On human Rights (UDHR), the International Covenant on Civil and Political Rights, the 1945 Basic law, and Human Rights Law No. 39 of 1999. The above four documents rule the country national elections in Indonesia, each of which authorize inclusion of political freedoms, fairness in electoral engagement, as well as cast a ballot confidentiality assurances.

Among the pillars of contemporary democratic governance is indeed the fundamental premise of global and equitable voting rights for any and all eligible voters. The significance of inclusion and diversity, pluralism, and inclusivity has been stressed through Article 25(b) of the International Covenant on Civil and Political Rights, that acknowledges every citizen's right to vote and be elected at genuine periodic elections by universal and equal suffrage.

Cronyism of Pork Barrels or money politics, ghost voters, and demagoguery make the election a breeding place for violations of human rights. The voices of the people is suppressed, and it becomes a bargaining chip. Since they have freely subverted one's rights for particular political desires, these strategies would then make it more difficult for electors should choose. The concept of holding direct, public, accessible, and confidential election process (LUBER) can

also be managed to negotiate, whether it's with cash or even other conditions that affect voting' freedom to choose his\her political choice.

Although Indonesia does have representative government, there have been a few downfalls in regards to basic freedoms. The country of participatory democracy and also the accomplishment of right to vote in Indonesia appears to somehow be catastrophic. Its political and legal battlegrounds' accessibility to discourse on human rights has had no genuine influence on community fundamental freedoms. Instead of actually implementing civil rights, all of this finally accepted them as a political tactic.

### **CONCLUSION**

Electoral forgery in Indonesian elections was indeed divided into three categories identity politics, pork barrel, as well as ghost voters. The three kinds of fraud have become an acts to influence individual potentials in elections as well as accomplish political motivation there next to election participation, which results in an infringement of political freedoms. Any such political platform increases the level of political turmoil and violates people's voting privileges. Acts of forgery have all been deemed infringements of political and civil rights since there are constraints on casting ballots for candidates or going to vote directly, publicly, freely, and confidentially, as endorsed by Indonesia's electoral doctrine. Political groups play a distinct role through achieving the nation's targets than nation's public positions. With their legitimate interests, instinctual preferences are employed to keep moving the tires of authorities. Particular preferences are indeed the main and quite often overlooked aspirations of people.

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**THE FOUNDATION NECESSITY OF BAKU BRANCH OF IMPERIAL RUSSIAN  
TECHNICAL SOCIETY**

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**ABSTRACT**

There are periods in the history of the Caucasus, as well as Azerbaijan, which are still in great need of extensive and comprehensive study. The end of the XIX and the beginning of the XX century is one of such periods. The article deals with the establishment, activities and goals of Baku Branch of Imperial Russian Technical Society, which operated in 1879-1929. It is stated that the activity of the Baku Branch was not only related to the oil industry. The activity of the department employees is remembered for the high efficiency of various discoveries and proposals in different areas of production. The leading role of well-known professors and scientists, engineers and technicians of the time in the activity of the Baku Branch also attracted attention. This was the main aspect of the activity of the department. Information, proposals and appeals of industrialists and entrepreneurs as L.Nobel, H.Z.Taghiyev, M.Naghiyev, S.Asadullayev, V.Ragozin, I.Hajinski on oil issues were the most common forms of this cooperation. Despite the serious inertia of all structures of the imperial government, the conservatism of officials who feared scientific innovations, the scientific discoveries and achievements of scientists, albeit slow but overcame obstacles and proved their effectiveness in practice. Thus, examining the main activities of the Baku Branch and the main results of its work, we can conclude that its activity, of course, primarily aimed at the formation of the oil industry, finding effective ways to produce oil products and improving forms and methods.

**Keywords:** Baku, Russia, department, association, industry

## **RUSYA İMPARATORLUĞU TEKNİK DERNEĞİ BAKÜ ŞUBESİNİN KURULUŞU İHTİYACI**

### **ÖZET**

Kafkasya'nın ve Azerbaycan'ın tarihinde hala kapsamlı çalışmalara büyük ihtiyaç duyulan dönemler vardır. XIX'in sonu ve XX yüzyılın başlangıcı bu dönemlerden biridir. Makale, 1879-1929 yıllarında faaliyet gösteren Rus İmparatorluk Teknik Cemiyeti Bakü Şubesinin kuruluşu, faaliyetleri ve amaçlarını ele almaktadır. Bakü Şubesinin faaliyetinin sadece petrol sektörüyle ilgili olmadığı belirtildi. Departman çalışanlarının etkinliği, farklı üretim alanlarında çeşitli keşiflerin ve önerilerin yüksek verimliliği ile hatırlanır. Bakü Şubesi'nin faaliyetlerinde dönemin tanınmış profesör ve bilim adamları, mühendis ve teknisyenlerinin öncü rolü de dikkat çekti. Bu, bölümün faaliyetinin ana yönüydü. L. Nobel, H.Z. Taghiyev, M. Naghiyev, S. Asadullayev, V. Ragozin, I. Hajinski gibi sanayici ve girişimcilerin petrol konularındaki bilgi, öneri ve çağruları bu işbirliğinin en yaygın biçimleriydi. Emperyal hükümetin tüm yapılarının ciddi ataletine rağmen, bilimsel yeniliklerden, bilim adamlarının bilimsel keşiflerinden ve başarılarından korkan yetkililerin muhafazakarlığı, yavaş da olsa engelleri aştı ve pratikte etkinliğini kanıtladı. Bu nedenle Bakü Şubesinin ana faaliyetlerini ve çalışmalarının ana sonuçlarını inceleyerek, faaliyetlerinin elbette öncelikle petrol endüstrisinin oluşumunu, petrol ürünleri üretmenin etkili yollarını bulmayı ve form ve yöntemleri iyileştirmeyi amaçladığı sonucuna varabiliriz. .

**Anahtar Kelimeler:** Bakü, Rusya, teknik, şübe, dernek, sanayi



## INTRODUCTION

**Main part:** Over the centuries, the obvious decline in the political, economic and cultural development of the Russian Empire as compared with the leading European countries, in connection with this the growing anxiety and panic of the ruling circles and even the emperor were intensified after the tragic defeat of the country in the Crimea war (1853-1856). At the same time there were the growing calls and tendencies in the society and among various segments of population about the need for the most ordinary reforms. In this respect, the foundation of Imperial Russian Technical Society on May 24, 1866, meant that the imperial government, though late but in any case was obliged to change his attitude towards science and culture.

In our research, by studying the reasons that led to the foundation of the Baku branch of IRTS, it is possible to see that the work done by the branch had really yielded significant economic benefits. The effective results of the society's activity had been repeatedly admitted in governmental circles.

As a result of an adequate assessment of the short-term activities of the society, the honorary title of "Imperial Society" given to it in 1874, confirms this idea (5).

Russian Imperial Technical Society had many branches in the major industrial cities of the empire. Baku Branch of Imperial Russian Technical Society was established on March 13, 1879 (1, p.6). From the first point of view, this may seem like an ordinary event or the foundation of a new institution, in fact, it could be seen as the next step in the colonial economic policy of Russian imperial government, or as another concession to the supreme governing bodies of the region, which were interested in maintaining the economic and cultural backwardness of the national outlying areas. In fact, on the one hand the establishment of this organization was not only a novelty in the course of all the reforms that the imperial government was forced to implement since the mid-nineteenth century, but also one of the real results of a pre-planned policy campaign. On the other hand, the emergence and development of new capitalist relations in the economy of the empire at that time made it necessary, among other things, to change the attitude to the achievements of technical sciences and to the best practices in the efficient use of the natural resources of the national outlying areas. Thus, the foundation of Baku Branch was not a coincidence, but served to bring the rich natural resources of Azerbaijan, especially the oil and other resources of the Absheron Peninsula, known as the land of oil fields, to a qualitatively new level.

The members of Baku Branch had different forms of activity. From the first days of its activity, the department carried out activities covering various directions and areas of production (5). It was widespread to hold various meetings and discussions, to organize exhibitions on various technical problems and issues, to give lectures by leading scientists at enterprises, and to establish incentive prizes. One of the highlights of Baku Branch's activities was its cooperation with industry representatives in obtaining the necessary financial support for the organization of scientific research and development, as well as the development of ready-made discoveries and proposals with high profit prospects. There is a lot of information about the work of Baku Branch in organizing exhibitions held in Baku in different years in order to promote scientific discoveries and technical innovations. It is concluded that the activities of the department, along with the development of industry, also had a significant impact on the development of the general cultural level of society. One of the multifaceted activities of the Technical Society and its local branches and divisions was the organization of journal and other publications under various names. Among the publications of Baku Branch, we should mention the most persistent issues of the journal "Works of Baku Branch of Russian Imperial Technical Society". The journal is considered to be the first example of a press conference on oil issues in Russia. It should be noted that the department plays a supporting role in the economy of Baku and other cities of Azerbaijan, including the city water supply, street lighting and the solution of many domestic problems. In general, in just a few decades, Baku Branch was able to do important work in various regions of the empire - in Azerbaijan, in the North Caucasus and in other areas - to study the economic and natural resources and use them effectively in the development of the imperial economy.

It was in the middle of the nineteenth century and especially in the second half, when bourgeois reforms began to be implemented in Russia, that the level of cultural development increased slightly, as well as the increase and dissemination of scientific knowledge, characterized by an increase in scientific discoveries and technical achievements that have found a direct path to various areas of newly formed and strengthened industrial production.

Thus, the establishment of Baku Branch of the IRTS was, first of all, a very important event in the economic and, to some extent, cultural life of the region. During its existence, Baku Branch has become a place for the implementation of discoveries and innovations that are both important and new for its time, as well as created conditions for the application of scientific and technical discoveries in Azerbaijan in various sectors of the economy. The principles of

operation of the various structures of Baku Branch were clearly stated in its charter. The department is governed by a general meeting held once a month, and in between meetings, the council meets at least twice a month to deal with day-to-day matters. The council consisted of a chairman, his deputy, a secretary and department heads. The working principles of the departments operating within the department were also clearly defined. They had to identify new books published in the country and abroad, and ensure that the museums and libraries within the department were enriched with new visual aids, objects and publications.

The departments held open meetings to listen and discuss reports and speeches on innovations related to the problems of oil, chemical, mining and other industries. Such technical conversations, as well as listening to reports on trips of employees of the department abroad, were considered to be important information on many discoveries and innovations of direct practical importance at that time, as well as innovations in petro chemistry, other sciences and technology.

The participation of entrepreneurs from oil and other industries in these meetings, on the one hand, allows them to get advice and recommendations that will help them to improve the production process and make significant investments, on the other hand, they also received practical advice on how to deal with harmful conditions in the workplace, sometimes leading to accidents and deaths.

Besides the monthly general meetings held in the department, technical talks were also organized between the departments in accordance with the rules of rotation. It was very common to hold these talks even with the participation of well-known businessmen and industrialists of the time **(2, p.56)**.

It should be noted that the organization of Baku Branch had not previously faced such serious difficulties due to the opening of several branches of society and experience in various regions of the empire. One of the founders of the society, professor of the Russian Forestry Institute E.Andreyev, who spoke at the first meeting of the society with the participation of representatives of Russian universities and scientific organizations, spoke in detail about the goals and principles of the society **(3, p.4)**.

At its first meeting, Baku Branch defined its immediate tasks and stated that the proper organization and development of the oil industry and oil production, as well as the search for other natural resources in Baku province and adjacent areas will be the main direction of its activities **(4, p.112)**.

The activity of Baku Branch consisted of full, honorary and corresponding members with different levels of participation in its work. In the first year of its activity, Baku Branch brought together 20 scientists and engineers. However, in a very short period of time, the first successful results of the department's staff ensured the expansion of its ranks and increase its sphere of influence. In just 3-5 years, the department has become one of the largest scientific organizations in the Russian Empire. In 1914, the number of members of the department was 140. From the very first days of the department's activity, the society carried out activities covering various directions and areas of production (5). Holding various meetings and discussions, organizing exhibitions on various technical problems and issues, giving lectures by leading scientists at enterprises, establishing and presenting incentive prizes were also widespread.

## **CONCLUSION**

Thus, the foundation of Baku Branch of Imperial Russian Technical Society (IRTS) was primarily due to the need to develop the backward imperial provinces from a social, economic, scientific and technical point of view. The main purpose of Baku Branch was to accelerate the development of the local oil industry. Admittedly, one of the main results of the department's activities in this direction was the reconstruction of the oil industry in Azerbaijan, the significant expansion and development of this sector. In the oil industry, the use of technical innovations and discoveries proposed and prepared by the employees of the department played a great role in achieving the results we have discussed. During its existence, Baku Branch was both a place of realization of discoveries and innovations that were important and new for its time, as well as created conditions for the application of scientific and technical discoveries in Azerbaijan in various sectors of the economy. However, the activities of the department are not limited to this, from opening schools and courses providing technical knowledge at low and medium levels, to providing effective practical and financial support for effective work in Baku city economy, city water supply, city lighting and other utilities has been extensive.

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**THE INFLUENCE OF PARAMETRIC VARIATIONS ON ENVIRONMENTAL SUSTAINABILITY OF DIFFERENT GAS TURBINE INLET COOLING SYSTEMS**

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**ABSTRACT**

An existing gas turbine from Afam power plant in Nigeria, powered with natural gas fuel was thermodynamically analyzed to identify the baseline practice in terms of environmental sustainability and efficient utilization of fossil power. Three (3) turbine air cooling methods (spray cooler and wetted media, fogging system technology and mechanical chiller system), energy and exergy models as well as exergy-economic models were employed for the system sustainability. Energy analysis was carried out for two gas turbine units (existing and modelled). With a developed program source code, results obtained indicated that the extent of sustainability depends directly on the amount of turbine inlet cooling system reduction according to the design requirements. The refrigeration method of cooling which achieved relatively lower inlet condition (15°C) had a sustainability index (SI) of 2.243 followed by spray cooling technique (2.17 SI), then fogging method (2.165 SI). The least was the base turbine system which had an SI value of 2.057. The SI decreased with increasing ambient temperatures. This was attributable to higher total exergetic destruction in the plant at comparatively high ambient temperatures. Accordingly, both the Enthalpy-Entropy Compensation (EEF) and Waste Exergy Ratio (WER) showed increasing trend in tandem with the ambient temperature since they are both functions of total exergetic destruction. Sensitivity analysis performed to check the effect of basic operating variables on the variation of ambient temperature for both energetic and exergetic efficiency of the plant demonstrated an overall decline in both efficiencies at increasing ambient temperatures which is attributable to higher compressor work requirements at increasing ambient temperatures. Based on the results, refrigeration cooling method which achieved relatively lower inlet conditions and SI of 2.243 is recommendation due to its least overall exergy destruction.

**Keywords:** Gas Turbine, Environmental sustainability, Cooling systems, Efficiency, Ambient temperature.

## 1. INTRODUCTION

Globally, gas turbines are used for power generation with varying performance according to a large spectrum of climatic conditions. During very hot periods, as it is the case in dry season, problems are experienced with the gas turbines because of increased demand for electric power. However, at such periods, the turbine performance decreases due to the effect of ambient temperature on the compression process of air. In fact, the gas turbines output are significantly affected by the ambient air temperature, and the output drops by 0.54% to about 0.90% for every degree rise in the ambient temperature (Perez *et al.*, 2007). Additionally, the increase in ambient air temperature causes significant corresponding increase in the gas turbine transfer heat rate with resultant operating cost rate (Chaker *et al.*; 2004). Thus, power reduction is expected in turbine operation when prolonged dry weather conditions are prevalent, and that is the case in Nigeria. An effective approach to overcome the loss of gas turbine power output during hot periods, and in areas with high ambient temperatures, is to cool the compressor inlet air.

Although, there are several inlet air cooling technologies available, high pressure inlet fogging has become increasingly popular over the past decade mainly due to its relatively lower cost and its effective power augmentation (Chaker *et al.*, 2006; Cataldi *et al.*, 2006). Fogging is defined as the cooling of the compressor inlet air by injection of de-materialized water at high pressure through atomizing nozzles. This method results in an increase in relative humidity of about 95% to 100% and a decrease in gas turbine inlet air temperature to very low temperatures without refrigeration systems. Several techniques and technologies for gas turbine power augmentation via inlet air cooling exist in the literature. The application of a particular technique may depend on location, economy and intensive properties of the environment. Fog inlet air cooling system can be directly used to cool down the air inlet temperature entering the compressor. Performance specifications of gas turbines show that reduction of inlet air temperature increases the capacity and reduces the heat rate. A decrease in compressor inlet air temperature leads to an increase in air density at constant pressure (Ikpe *et al.*, 2020). Therefore, the higher the mass flow rate, the higher the gas turbine output power. Increasing turbine capacity will result in smaller heat rates as the turbine power output increases without a corresponding increase in fuel input. Usually, fogging system increases air density and mass flow rate by adding water to dry air, and increase in specific heat ratio due to change in gas-

phase composition and it changes compressor process from adiabatic and liken it to the isothermal process.

In addition to catering for reduced power generation due to high ambient temperatures, the environmental sustainability and ecological efficiencies of energy generation systems is imperative. Large exergy destruction contributes to environmental degradation when not properly matched with the power output from such systems. To augment power production which will be environmentally friendly, the technologies of turbine inlet air cooling on sustainability and ecological efficiencies must be considered. In literature, several turbine air cooling systems have been studied extensively with concerted effort on application, evaluation of droplet size, and optimization (Kim *et al.*, 2012; Pascale *et al.*, 2014; Athari *et al.*, 2015). For instance, Kim *et al.* (2012) analyzed the inlet fogging process in a gas turbine system for different water injection ratios, where special attention was paid to modeling for evaporation of injected water droplets. Using carefully assumed conditions, a model was formulated where the time for complete or partial evaporation of the droplet phase was computed. Athari *et al.* (2015) proposed and analyzed a gas turbine cycle with fog cooling and steam injection, and integrated with biomass gasification using energy, exergy and exergoeconomic analyses. However, the sustainability and environmental impact of steam injection cooling was not considered.

In the absence of nuclear, magnetic, electrical, and surface tension effects, the exergy of a steady stream of fluid can be separated into four main components (Kotas, 1995). These include: Kinetic exergy ( $E_k$ ). The kinetic energy is related with the bulk velocity of a fluid. Under ideal situations, it is converted into mechanical work. The physical exergy is the maximum work obtained by taking the system by means of reversible physical processes, from its initial state to the state of restricted equilibrium with the environment, i.e.  $P_0, T_0$ . A restricted equilibrium is defined as a state in which the system is in thermal and mechanical equilibrium with the environment. Under these conditions, the temperature and the pressure of the system are the same with those of the environment.

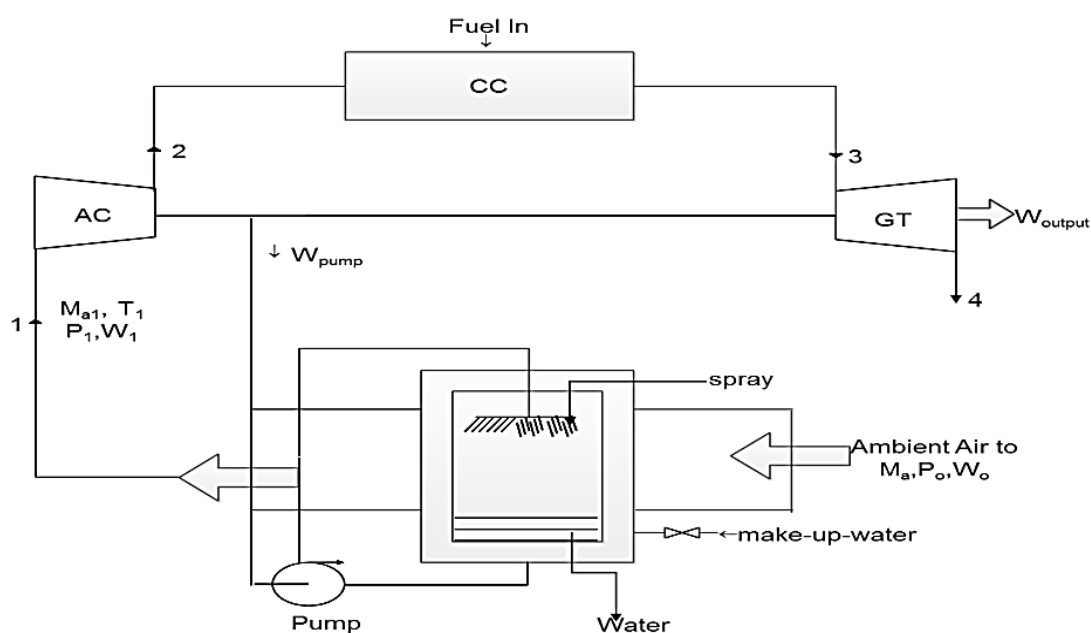
The system of a restricted equilibrium is kept separate from the environment by a physical boundary to avoid mixing and chemical interaction with the environment. With this, the composition of the environment is immaterial and the state of the environment is completely defined by its pressure and temperature. Hence, in a restricted equilibrium the environment can be regarded as an infinitely large reservoir of thermal energy of zero grade, since its value of exergy is zero. The analysis of different turbines air inlet cooling media to strike a balance



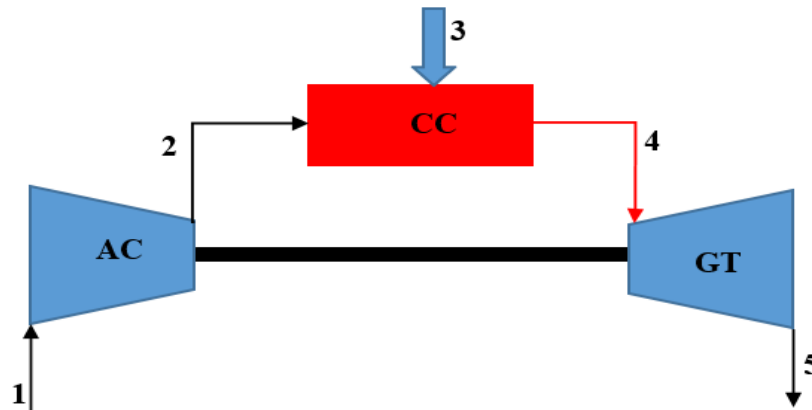
between environmental sustainability as well as the traditional power augmentation forms the problem statement for this research work. Hence, investigating the influence of parametric variations on environmental sustainability of different gas turbine inlet cooling systems

## 2. MATERIALS AND METHODS

The basic form of the schematic diagram of a simple gas turbine with an inlet fogging system is presented in the schematic of Figure 1, simple open type gas turbine configuration is shown in Figure 2 while the T-s diagram is shown in Figure 3. The temperature inlet condition to the compressor is reduced due to the fogging arrangement. The system comprises an air-compressor, 1-2 (AC), combustion chamber 2-3 (CC) and the turbine 3-4 (GT). Exergy stream from the ambient conditions in state 1  $T_0$  and  $P_0$  enters the GT system through the compressor. Exergy in the form of mechanical work is delivered to the compressor through the turbine shaft. Some of the exergy is lost in the compressor due to irreversibilities while part of the exergy in the AC is utilized during the compression process. The compressed air enters the CC at elevated pressure delivery exergy. The fuel and air mixed under high turbulence in the combustion chamber resulting to combustion and flow of exergy stream of hot gas at high pressure and temperature into the turbine. Part of the exergy is destroyed in the turbine due to irreversibilities and part is utilized in driving the compressor, while the rest becomes available as the network produced by the turbine (Bejan and Tsatsaronis, 1995):



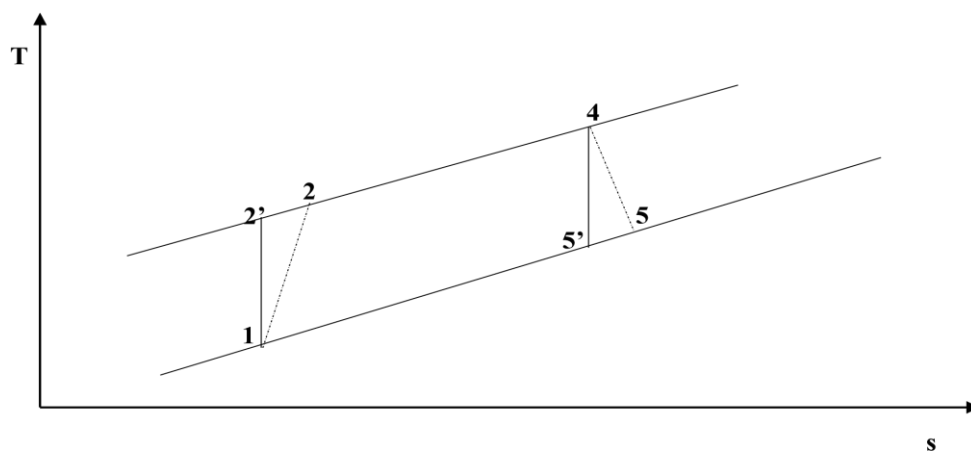
**Figure 1:** A simple gas turbine with an inlet fogging system



**Figure 2:** Simple open type gas turbine configuration

### 2.1. Gas Turbine with Fogged Cooling System

Figure 1 shows the gas turbine with the fogging system. Fresh water is drawn into the demineralized water plant where certain mineral deposits are removed, maintaining the pH of the water at 7.5 maximum. The demineralized water enters the storage facility and exits, from where the water is pumped to the position nozzles. The nozzles atomize the demineralized water into tiny water droplets (fog). Each droplet, by the nozzles design, is recommended to be less than 50 micron in size. Critical parameters of the fogger include droplets mean size, their distribution pattern and their extent of penetration into the air duct from the points of their production.



**Figure 3:** T-s diagram of a simple open type gas turbine configuration

## 2.2. ISO Operating Data for Gas Turbine Plant

The operating data used for this study was obtained from Afam gas turbine plant. The design data for the based load is depicted in Table 4.1. The plant uses natural gas as fuel with the composition: 88 % methane, 5 % ethane, 2 % propane, 0.6 % butane and 4.4 % carbon dioxide.

## 2.3. Thermodynamic Assumptions

- i. The following assumptions were made in the analysis of the gas turbine system
- ii. The ambient pressure and temperature were kept at 1.013 bars and 25<sup>0</sup>C respectively.
- iii. The gas turbine plant operates at steady state condition.
- iv. The pressure drop in the combustion chamber was considered negligible.
- v. The air after fogging at entry to the compressor is completely saturated adiabatically. That is, the relative humidity of the air is 100%.
- vi. All components have adiabatic boundaries.
- vii. Air and combustion gases are regarded as ideal gases possessing constant specific heats at prescribed temperatures.

## 2.4. Energy Analysis of the Gas Turbine Unit

### 2.4.1. Gas Turbine Energy Balance

Energy balance for the schematic diagrams of Figure 1 and 3 are earlier presented in this study. The difference between these two systems only lies in the alteration of compressor inlet temperature. The pressure values for the base turbine and that of the fogged system still have the same ambient values. In the model analysis, the effect of fogging is incorporated by virtue of the increase of fluid mass which in turn is a function of the specific humidity of the fogged air. The exergy at point 3 for the fogged system is obtained per kilogram of fluid in Equation 1 and 2. For the turbine, in consideration of the T-s diagram of Figure 3 and the general expression of Equation 3, the exergy balance in the gas turbine is:

$$E_{x3} = (C_{pa} + wC_{pv})T_0 \left[ \frac{T_3}{T_0} - 1 - \ln \left( \frac{T_3}{T_0} \right) \right] + (1 + 1.607w)R_a T_0 \ln \left( \frac{p_3}{p_0} \right) \quad (1)$$

$$E_{x3} = m_a(1 + w + f) \left\{ (C_{pa} + wC_{pv})T_0 \left[ \frac{T_3}{T_0} - 1 - \ln \left( \frac{T_3}{T_0} \right) \right] + (1 + 1.607w)R_a T_0 \ln \left( \frac{p_3}{p_0} \right) \right\} \quad (2)$$

$$E_{x3} = E_{x4} + E_w + E_D \quad (3)$$

The exergy at point 4 is computed with the relationship in Equation 4, using the temperature and pressure values of this point as well as its mass flow rate as:

$$E_{x4} = C_{pg}(T_4 - T_0) - T_0 \left\{ C_{pg} \ln \left( \frac{T_4}{T_0} \right) - R \ln \left( \frac{p_4}{p_0} \right) \right\} \quad (4)$$

The expression for the exergy of the fogged system is presented per kg of gas is given by Equation 5.

$$E_{x4} = (C_{pg} + C_{pv}w)T_0 \left( \frac{T_4}{T_0} - 1 - \ln \frac{T_4}{T_0} \right) + (1 + 1.607w)R_a T_0 \ln \left( \frac{P_4}{P_0} \right) \quad (5)$$

For the mass stream, Equation 5 is written as:

$$E_{x4} = \dot{m}_a(1 + w + f) \left\{ (C_{pg} + C_{pv}w)T_0 \left( \frac{T_4}{T_0} - 1 - \ln \frac{T_4}{T_0} \right) \right\} + (1 + 1.607w)R_a T_0 \ln \left( \frac{P_4}{P_0} \right) \quad (6)$$

The exergy of turbine work is same as the turbine work output. The exergetic efficiency for the gas turbine  $\psi_{GT}$  is expressed as (Bejan and Tsatsaronis, 1995; Kotas, 1995):

$$\Psi_{GT} = \frac{E_w}{E_{x3} - E_{x4}} \quad (7)$$

#### 2.4.2. The Air Compressor

The work input to the compressor increases the enthalpy and temperature of air from the ambient conditions to values which vary according to the compression rate. From Figures 1 and 3, the energy balance in the compressor is expressed by (Bassily, 2001) as:

$$C_{pair}T_1 + wac = C_{pair}T_{2a} \quad (8)$$

The actual compressor work is:

$$wac = C_{pair}(T_{2a} - T_1) \quad (9)$$

While the ideal specific compressor work is obtained as:

$$wac' = C_{pair}(T_2 - T_1) \quad (10)$$

By introducing isentropic relation in the compressor, the exit temperature of the compressor is obtained as (Ondrajs *et al.*, 1991):

$$\frac{T_2}{T_1} = \left( \frac{P_2}{P_1} \right)^{\frac{\alpha-1}{\alpha}} \quad (11)$$

$$T_2 = T_1 \left( \frac{P_2}{P_1} \right)^{\frac{\alpha-1}{\alpha}} \quad (12)$$

In the real case, the actual temperature,  $T_{2a}$ , after compression, is obtained using the relationship with isentropic efficiency. Thus:

$$\eta_{comp.} = \frac{Ideal\ work}{Actual\ work} \quad (13)$$

Equation (13) can be expressed as:

$$\eta_{comp.} = \frac{T_2 - T_1}{T_{2a} - T_1} \quad (14)$$

From where  $T_2$  is obtainable as:

$$T_2 = \eta_{comp.} (T_{2a} - T_1) + T_1 \quad (15)$$

Substituting  $T_2$  Equations (15) into (12):

$$\eta_{comp.} (T_{2a} - T_1) + T_1 = T_1 \left( \frac{P_2}{P_1} \right)^{\frac{\alpha-1}{\alpha}} \quad (16)$$

From Equation (16) the actual temperature after compression is obtained as:

$$T_{2a} = T_1 \left[ 1 + \frac{1}{\eta_{comp.}} \left( \left[ \frac{P_2}{P_1} \right]^{\frac{\alpha-1}{\alpha}} - 1 \right) \right] \quad (17)$$

The actual specific compressor work is given by Equation 18;

$$w_{AC} = C_{pair} \left\{ T_1 \left[ 1 + \frac{1}{\eta_{comp.}} \left( \left[ \frac{P_2}{P_1} \right]^{\frac{\alpha-1}{\alpha}} - 1 \right) \right] \right\} \quad (18)$$

Or

$$w_{AC} = C_{pair} \frac{T_1}{\eta_{comp.}} \left( \left[ \frac{P_2}{P_1} \right]^{\frac{\alpha-1}{\alpha}} - 1 \right) \quad (19)$$

Consequently for a given mass flow rate  $\dot{m}_a$ , the actual compressor work can be gotten from Equation (19),

$$w_{AC} = \frac{\dot{m}_a C_{pair}}{\eta_{comp.}} T_1 \left( \left[ \frac{P_2}{P_1} \right]^{\frac{\alpha-1}{\alpha}} - 1 \right) \quad (20)$$

Equation (20) is further simplified as:

$$w_{AC} = \dot{m}_a C_{pair} (T_{2a} - T_1) + \dot{m}_v (ig_2 - ig_1) \quad (21)$$

The mass of vapour,  $\dot{m}_v$  is related to the specific humidity (W) (Rajput, 2009),

$$W = \frac{\dot{m}_v}{\dot{m}_a} \quad (22)$$

Or

$$\dot{m}_v = W * \dot{m}_a \quad (23)$$

Substituting Equation (23) into Equation (21), the compressor work for the fogged system is obtained as:

$$w_{AC} = \dot{m}_a C_{pa} (T_{2a} - T_1) + W * \dot{m}_a (ig_2 - ig_1) \quad (24)$$

Or

$$w_{AC} = \dot{m} [ C_{pai} (T_{2a} - T_1) + W (ig_2 - ig_1) ] \quad (25)$$

Or

$$w_{AC} = \dot{m}_a \left\{ \frac{C_{pair} T_1}{\eta_{comp.}} \left( \left[ \frac{p_2}{p_1} \right]^{\frac{\alpha-1}{\alpha}} - 1 \right) + W (ig_2 - ig_1) \right\} \quad (26)$$

where  $i_{g2}$  and  $i_{g1}$  are the enthalpies of saturated water vapour at compressor exit and inlet respectively.

### 2.4.3. The Combustion Chamber

The energy balance for the combustion chamber for the base case is expressed in (Rajput, 2009) as:

$$\dot{m}_f C_{v,\eta comb.} + \dot{m}_a C_{p,air} T_{2a} = (m_a + m_f) g \cdot T_3 \quad (27)$$

Rearranging Equation (27) and substituting  $Q_{in} = \dot{m}_f C_{v,\eta comb.}$  into Equation (27) the following is obtained as:

$$Q_{in} = (m_a + m_f) C_{p,g} T_3 - \dot{m}_a C_{p,air} \left\{ T_1 \left[ 1 + \frac{1}{\eta_{comp.}} \left( \left[ \frac{p_2}{p_1} \right]^{\frac{\alpha-1}{\alpha}} - 1 \right) \right] \right\} \quad (28)$$

Hence, the energy balance for the combustion chamber for the fogged system is expressed as:

$$\dot{m}_f C_{v,\eta comb.} + \dot{m}_a C_{p,air} T_{2a} + \dot{m}_v h v_2 = (\dot{m}_a + \dot{m}_f) g \cdot T_3 + \dot{m}_v h v_3 \quad (29)$$

Or

$$Q_{in} = (\dot{m}_a + \dot{m}_f) C_{p,g} T_3 - \dot{m}_a C_{p,air} T_{2a} + \dot{m}_v (h v_3 - h v_2) \quad (30)$$

The term  $f$  is the ratio of air mass and fuel approximated according to the relationship in (Alhazmy *et al.*, 2006).

$$f = \frac{\dot{m}_f}{\dot{m}_a} = \frac{C_{p,g}(T_3-298) - C_{p,air}(T_2-298) + w(hv_3-hv_2)}{C_{v,\eta comb.} - C_{p,g}(T_3-298)} \quad (31)$$

### 2.4.4. The Turbine Unit

Energy balance for the turbine is presented in line with the schematic diagram and T-s diagram of Figures 1 and 3 respectively (Dossat, 1997).

$$C_{p,g} \cdot m_t T_3 = W_T + C_{p,g} m_t \cdot T_{4a} \quad (32)$$

where

$$m_t = \dot{m}_a + \dot{m}_v + \dot{m}_f = (1 + w + f) \quad (33)$$

Employing the isentropic expansion in the turbine, the exit temperature is related to the isentropic efficiency (Dossat, 1997).

$$T_{4a} = T_3 \left( 1 - \eta_T \left[ 1 - \frac{1}{(r_p)^{\frac{\alpha-1}{\alpha}}} \right] \right) \quad (34)$$

The turbine work can further be presented according to (Alhazmy *et al.*, 2006) as:

$$W_T = \dot{m}_a (1 + w + f) C_{p,g} \eta_t \cdot T_3 \left( 1 - \frac{1}{(r_p)^{\frac{\alpha-1}{\alpha}}} \right) \quad (35)$$

## 2.5. Exergetic Sustainability

Environmental sustainability indicators are exergy based indices which comparatively assesses the performance of energy conversion systems based on exergy efficiency, useful system output, and the environmental impact of such systems which must result due to large thermodynamic irreversibilities. These environmental sustainability indicators are expressed as follows:

### 2.5.1. Waste Exergy Ratio

The waste exergy ratio quantifies the degree of cumulative thermodynamic irreversibilities in a plant with respect to the available external exergy input to the system. For thermal power plants and boilers, the available external exergy input is the chemical exergy of the fuel used. The waste exergy ratio is obtained mathematically as the overall exergy waste (or destruction) for the system on the total exergy input. This is expressed as (Aydın *et al.*, 2013):

$$\dot{e}_{WR} = \frac{\dot{D}_{Total}}{\left[1 - \frac{T_0}{T_{CC}}\right] * \dot{m}_{Fuel\ oil} * LHV_{Fuel\ oil}} \quad (36)$$

### 2.5.2. Environmental Effect Factor

The environmental effect factor quantifies the degree of cumulative thermodynamic irreversibilities in a plant with respect to the plants net exergy efficiency. It also comparatively relates the extent to which a plants useful output is severely affected due to relatively high thermodynamic irreversibilities resulting in environmental concerns. The EEF is obtained as the ratio of the waste exergy ratio upon the exergy efficiency. This is expressed as (Aydın *et al.*, 2013):

$$EEF = \frac{\dot{e}_{WR}}{\psi} = \frac{\dot{D}_{Total}}{\sum_i x_i E_{xi}^{CH} + RT_0 \sum_i x_i \ln x_i} \quad (37)$$

### 2.5.3. Exergy efficiency

This is the general performance index of a plant based on the concept of availability. The exergy efficiency is the ratio of the exergy in product to the total exergy of fuel. This is expressed as (Cengel and Boles, 2007; Rajput, 2009):

$$\psi = \frac{\text{exergy in product}}{\sum_i x_i E_{xi}^{CH} + RT_0 \sum_i x_i \ln x_i} \quad (38)$$

### 2.5.4. Exergetic sustainability index

A system with exergy output far larger than the total destruction rate will have ‘sustainabilities’ greater than unity while systems with comparatively large destruction at par with the plant output are not sustainable. Appropriately, the reciprocal of the environmental effect factor is

termed the exergetic sustainability index given by Equation 39, and provides a platform for comparison between the environmental degradation due to exergetic output from each system (Aydin *et al.*, 2013):

$$SI = \frac{\text{Exergy of product}}{\text{Grand exergy destruction}} \quad (39)$$

### 3. RESULTS AND DISCUSSIONS

The simulation requires investigation of the effect of various turbine inlet cooling systems with respect to environmental sustainability indicators, the net power output, exergetic and energetic efficiencies as well as the effect of various operating parameters on the system. To effect these conditions on a dynamic level, the basic operating data of an existing power plant have been considered. Models have been written with respect to each component of the system, while program source code has been developed in engineering equation solver (EES) to assist in the simulation. The program is appended for evaluation of similar plant configuration using any combination of operating data. The operating data is summarized in Table 1.

**Table 1:** Gas turbine plant parameters

Component	Parameter	Unit	Value
Air Compressor	Inlet temp. ( $T_{in}$ )	K	298
	Outlet temp. ( $T_{out}$ )	K	644.7
	Inlet pressure ( $P_{in}$ )	Bar	1.013
	Outlet pressure ( $P_{out}$ )	Bar	10.47
	Air flow ( $\dot{m}_a$ )	kg/s	427
	Isent. Effi. ( $\eta_{Comp.}$ )	%	80
Combustion Chamber	Inlet temperature ( $T_{in}$ )	K	644.7
	Inlet gas flow ( $\dot{m}_f$ )	kg/s	7.039
	Inlet air flow ( $\dot{m}_a$ )	kg/s	427
	Outlet temp. ( $T_{out}$ )	K	1324
	Inlet pressure ( $P_{in}$ )	Bar	10.47
	Outlet pressure ( $P_{out}$ )	Bar	10.47
	Outlet mass flow ( $\dot{m}_{out}$ )	kg/s	434.04
Gas Turbine	Inlet mass flow	kg/s	434.04
	Outlet mass flow	kg/s	434.04
	Inlet temp.	K	1324
	Outlet temp.	K	834
	Inlet pressure	Bar	10.47
	Outlet pressure	Bar	1.013
	Isentropic effci.	%	85



The data presented in Table 1 is utilized to perform all the analysis which follows. This presentation is made possible after the utilization of all performance criteria of the gas turbine plant in consideration. These include: the isentropic efficiencies for the compressor and turbine, and the index of compression and expansion of air and burnt gasses respectively. However, the mass flow rates for the air and fuel have remained as they appear in Table 1. A compendium of the performance indices for the plant is shown in Table 2:

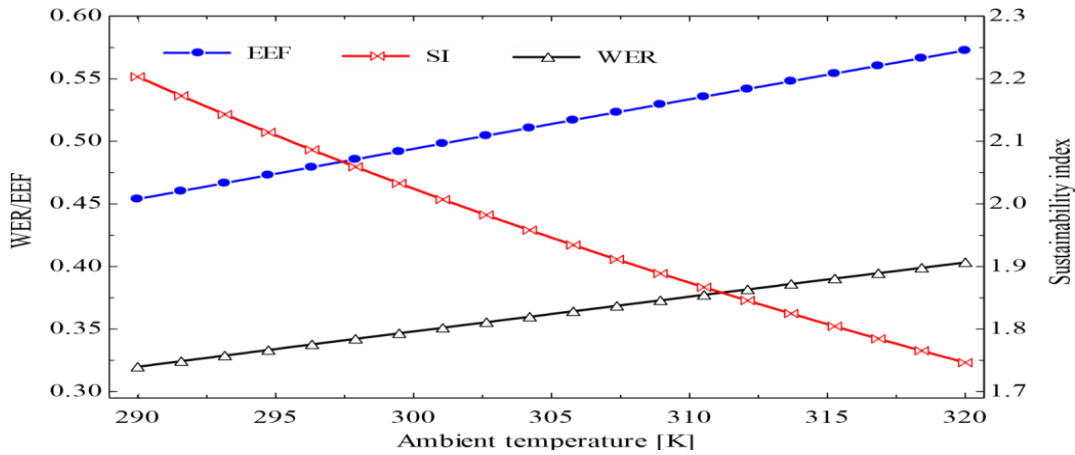
**Table 2:** Performance indices for the gas turbine plant at base condition

Parameter	Value	Unit
Compressor Work	148.775	MW
Turbine Work	244.474	MW
Net Turbine Output	95.7	MW
Energy Efficiency	28.69	%
Exergy Efficiency	27.58	%
Waste Exergy Ratio	0.3425	Dimensionless
Environmental Effect Factor	0.486	Dimensionless
Sustainability Index	2.057	Dimensionless

Performance evaluation of the system is shown in Table 2. As much as 95.7 MW of power is generated in the system, although 4.3 MW short of the rated 100 MW in the plant. The sustainability index which relates the ratio of useful output to the total exergetic destruction is shown to be 2.057 indicating that the turbine output exceeds the total destruction by up to 2.1 times. The compressor work is obtained as 148.775 MW, conspicuously larger due to the high compression ratio, while the turbine output is obtained as 244.474 MW.

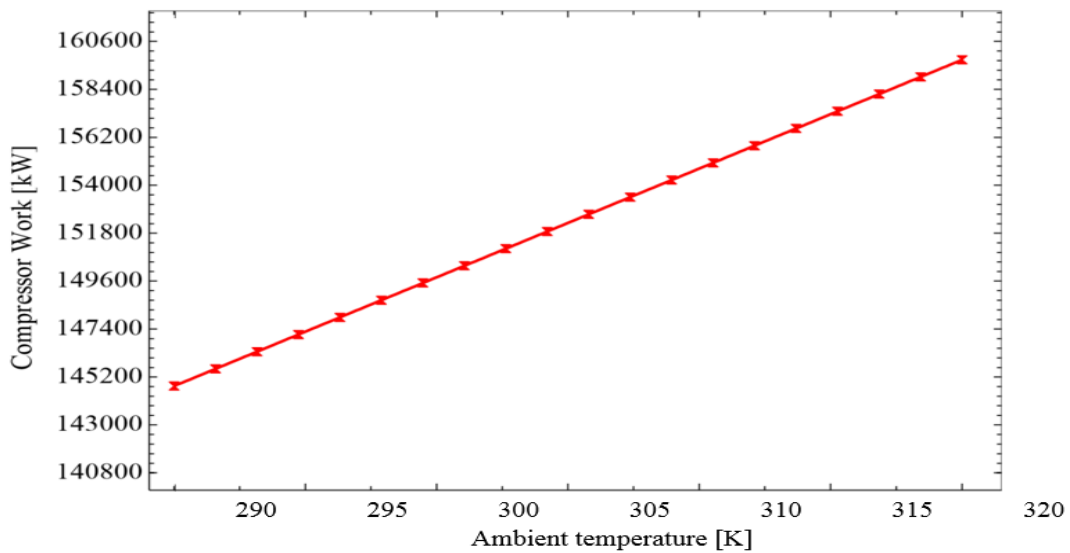
### 3.1. Parametric Variation of Basic Operating Parameters

The influence of parametric variation of basic operating parameters was considered under the following: Parametric variation of ambient temperature on sustainability indicators of the plant is shown in Table 2. With an increase in the ambient temperature from 290 K to 230 K, the system performance was significantly affected. For instance, the sustainability index decreases for increasing ambient temperatures. This is attributable to higher total exergetic destruction in the plant at comparatively high ambient temperatures. Accordingly, both the EEF and WER recorded increasing trend in tandem with the ambient temperature since they both are functions of total exergetic destruction. The results points to significant increase in the sustainability of the system by employing different turbine inlet cooling as shown in Figure 4.



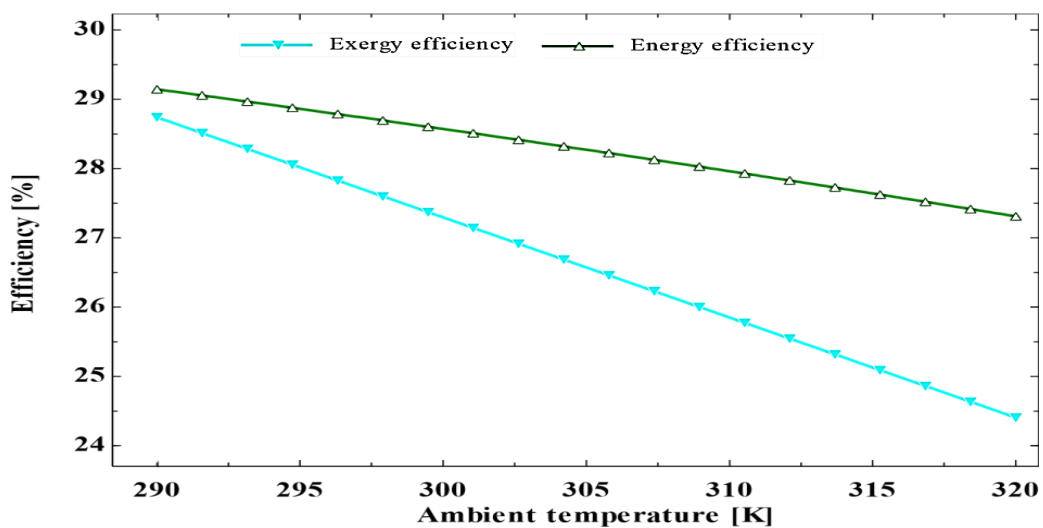
**Figure 4:** Effect of ambient temperature on exergetic sustainability indices

The compressor work is grossly affected by the magnitude of the ambient temperature. The results of Figure 5 showed that an increase in the ambient temperature results in larger compressor work requirements which results in reduced net output and reduced exergetic sustainability. At higher ambient temperatures entering the compressor, the mass flow of air is significantly improved. However, increasing the air temperature reduces the air density causing an increase in pressure drop. Consequently, the compressor work improves accordingly, resulting in relatively high compressor work requirements which severely cause exergetic destruction in the system.

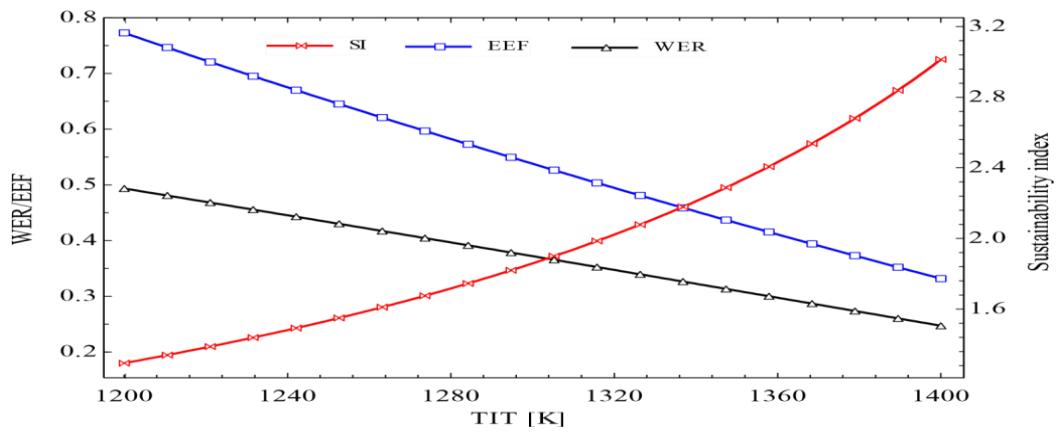


**Figure 5:** Effect of ambient temperature on compressor work

Figure 6 shows the variation of ambient temperature on both energetic and exergetic efficiency in the plant. The results demonstrate an overall decline in both energetic and exergetic efficiencies at increased ambient temperatures. This is attributable to higher compressor work requirements at increasing ambient temperatures. Performance analysis of the system with respect to turbine inlet temperature on exergetic sustainability indicators is shown in Figure 7. This variation is performed at constant ambient temperature of 25 °C. The turbine inlet was varied between 1200 and 1400 K. The results indicate an increasing trend in values of the exergetic sustainability index along increasing turbine inlet temperatures. Fittingly, there is less environmental degradation from the results as the TIT values increase. Therefore, high values of WER and EEF decreased from 0.4936 to 0.2472, and 0.7728 to 0.3318 respectively. Within the same range, the sustainability index increased significantly from 1.294 to 3.014. The increase in SI results from increasing work output at constant values of other operating parameters, especially before the turbine.

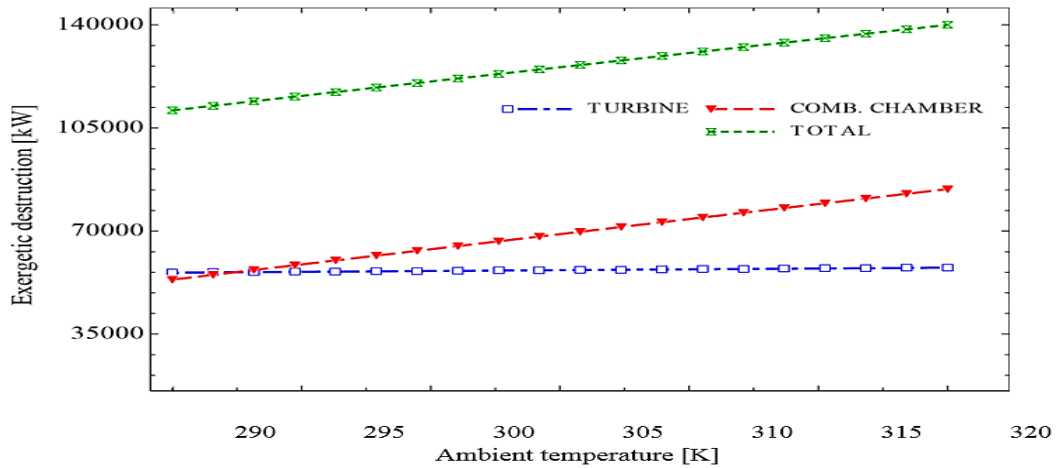


**Figure 6:** Effect of ambient temperature on energetic and exergetic efficiency

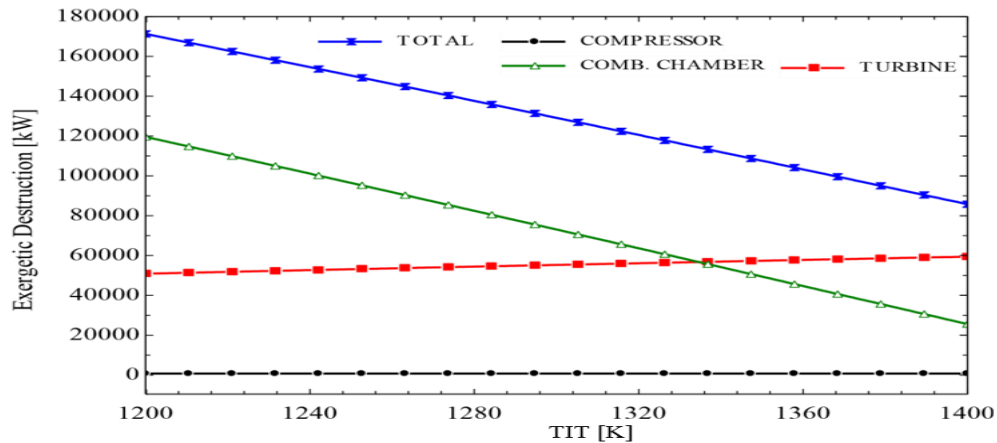


**Figure 7:** Effect of ambient temperature on exergetic sustainability indicators

Ambient temperature effect was also investigated on the system regarding exergetic destruction. The results of this evaluation are shown in Figure 8. It indicated an increasing exergetic destruction in the entire system, especially in the combustion chamber where large variation in temperature between the compressed air and natural gas. This variation results in large temperature gradient between the two fluids resulting in large exergetic destruction in this component. Effect of turbine inlet temperature (TIT) on exergy destruction is shown in Figure 9.

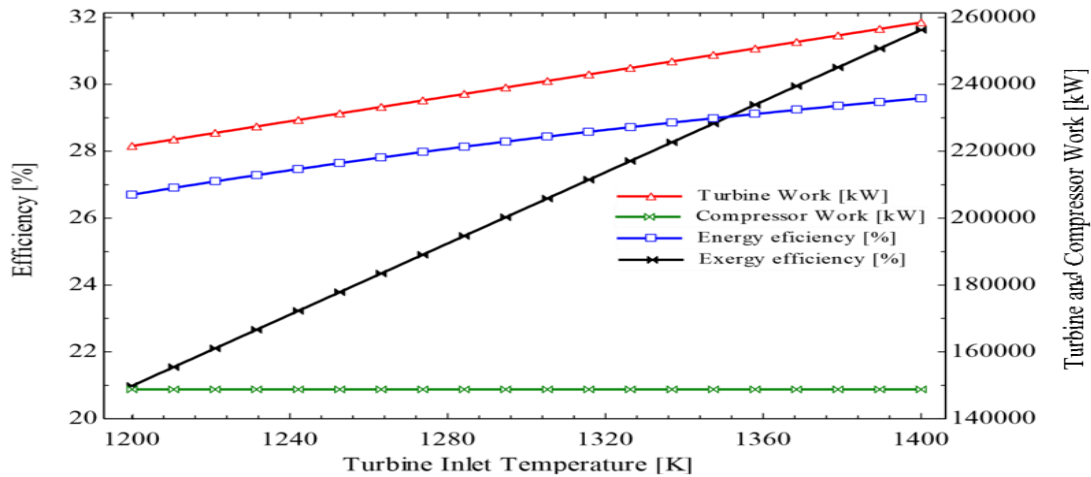


**Figure 8:** Effect of ambient temperature on exergy destruction



**Figure 9:** Effect of turbine inlet temperature (TIT) on exergy destruction

In Figure 9, turbine inlet temperature variation on component as well as total exergy destruction is shown. The TIT values were varied between 1200 and 1400 K at constant ambient temperature of 298 K. Within this TIT range, exergetic destruction within the compressor is constant at 772 kW. However, exergetic variation was observed in the turbine and combustion chamber. In the combustion chamber, there was a sharp fall in exergetic destruction at increasing TIT as expected. The combustion chamber product results as fuel to the turbine. Therefore, at higher turbine inlet temperatures, there is relatively high performance of the combustion chamber using constant supply of fuel at ambient parameters. Accordingly, exergetic destruction drops from 119576 to 25577 kW. The turbine recorded comparatively increased exergetic destruction at increased TIT since the expansion ratio was kept constant resulting in fixed turbine back pressure. Interestingly, in totality, the exergy destruction reduces as TIT values increased. The turbine inlet temperature variation on both energetic and exergetic effect as well as turbine and compressor work is shown in Figure 10.



**Figure 10:** Effect of turbine inlet temperature on energy/exergy efficiency and turbine/compressor work

When the TIT was varied between 1200 and 1400 K, an increase in both energy and exergy efficiency was noticed since higher TIT resulted in higher turbine output as shown in Figure 10. Within this range, the turbine output increased from 221578 to 258507 kW accounting for about 16.67 % increase. The compressor work remained constant for this variation since this component is independent of the turbine inlet temperatures.

#### 4. CONCLUSION AND RECOMMENDATIONS

Turbine inlet air cooling is an effective method for reducing the decrease in gas turbine performance during hot and humid summer periods when electrical power demands are peaked. To augment power production which is environmentally friendly, the technologies of turbine inlet air cooling on sustainability and ecological efficiencies must be considered. In literature, several turbine air cooling systems have been studied extensively with concerted effort on application, evaluation of sustainability index. Accordingly, this study investigated the influence of parametric variations on environmental sustainability of different gas turbine inlet cooling systems. The following conclusions and recommendations were made:

- i. The simple gas turbine plant is generally sustainable to a certain degree since its value is more than unity. However, the results suggest much improved sustainability values by employing turbine inlet cooling.

- ii. The extent of sustainability depends directly on the amount of turbine inlet reduction achievable in consonance with the design requirements. For instance, the refrigerative method of cooling which achieves relatively lower inlet conditions (15 °C) has 2.243 SI followed by sprayed cooling technique (2.17 SI) and fogging (2.165). The least is the base turbine system which has an SI value of 2.057.
- iii. Ambient temperature effects was also investigated on the system regarding exergetic destruction. It indicated an increasing exergetic destruction in the entire system, especially in the combustion chamber where large variation in temperature between the compressed air and natural gas. This variation results in large temperature gradient between the two fluids resulting in large exergetic destruction in this component.
- iv. The variation of ambient temperature on both energetic and exergetic efficiency in the plant demonstrates an overall decline in both energetic and exergetic efficiencies at increased ambient temperatures which is attributable to higher compressor work requirements at increasing ambient temperatures.
- v. The sustainability index decreases for increasing ambient temperatures. This is attributable to higher total exergetic destruction in the plant at comparatively high ambient temperatures. Accordingly, both the EEF and WER recorded increasing trend in tandem with the ambient temperature since they both are functions of total exergetic destruction. The results points to significant increase in the sustainability of the system by employing different turbine inlet cooling as shown in the following results.

It is recommended that different turbine inlet technologies are cost effective. A comparative cost evaluation which employs specific exergy costing including the equipment for cooling and the turbine as one unit will present broader front for determination of the best cooling methods that will be exergetically sustainable and cost effective.

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**FACTORS AFFECTING DECISION TO PARTICIPATE THE LIFE INSURANCE IN  
THE EMERGING MARKET: AN EVIDENCE FROM CUSTOMERS IN SOC TRANG  
PROVINCE, VIETNAM**

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**ABSTRACT**

This study aimed to examine the factors affecting the decision to participate in life insurance of people in the emerging market based on the evidences from Soc Trang provincial city. The study conducted a survey of people in Soc Trang city in May 2021 by applying a random sampling method. Out of 180 survey questionnaires, there were 165 valid responses that can be used for data analysis. The binary logistic regression method was employed to analyze the influence of factors on the decision to buy life insurance. Research results showed that demographic determinants (age and gender), socioeconomic determinants (homeownership and peer group effects), and psychological determinants (risk attitude) affect life insurance purchase decisions. Based on the empirical findings, two managerial implications are suggested in the article: (1) Improving the post-purchase customer care system; (2) Building and developing an official customer data system to provide “personalized” products.

**Keywords:** decision to participate; life insurance; risk attitude; binary logistic regression; Soc Trang province, Vietnam

## **1. INTRODUCTION**

The occurrences of risks and uncertainty conditions have resulted of the damages in finance and livelihoods on individuals and their families. Life insurance plays as a tool to help the individuals for the sharing and transfer the risks through the products provided by insurance companies. Life insurance companies, thus, play as the financial institutions to call for the long-term capital flows from the private sector, and utilize them to invest in the public and private sectors (Catalan et al., 2000).

In 2019, the total revenue of life insurance companies in the world reached 2,916,267 million USD, contributing 3.35% to global GDP. In Asia, life insurance premiums reached 39,598 million USD, contributing 2.15% to the GDP of this area. Even the COVID-19 pandemic occurred and also negatively affected to the insurance market, including the life insurance companies in Asia. The life insurance premiums in emerging Asian markets (excluding China) averagely increased by 3.4% in 2020 and 2021. The demands for life insurance are estimated to continuously because the awareness of uncertainty and risks conditions increased, and the benefits of the participation to the life insurance are considered (Daniel et al., 2020).

Vietnam is a country with a population of 96.2 million in 2019 (Vietnam General Statistics Office, 2020). From 2015 to 2018, the total premium of life insurance averagely increased 31.2%. The development of distribution channel of the life insurance companies also increase the accesability of the insurance products. On the other hand, the Vietnamese Government has issued tax incentives for the participants of life insurance such as interest of life insurance contract and compensation of life insurance are incomes exempt from personal income tax. The potential of the life insurance market has attracted many foreign investors. Between 2015-2018, the number of life insurance companies increased from 7 to 18 (of which, 17 are joint ventures and 100% foreign owned insurance companies). The participation of foreign investors has contributed to the development and diversification of insurance products; promoting the development of traditional and modern distribution channels including insurance distribution channels via banks (bancassurance) and e-commerce.

However, it is fact that the growth rate in operation scale is not proportional to the potential advantages of the life insurance market in Vietnam. For details, the participation rate to the life insurance of Vietnamese people is still lower than that of other countries in the Asia region. In 2018, the density of life insurance market reached 39.7 USD, lower than Thailand's 278.6 USD, and Malaysia's 266.0 USD. The life insurance market in Vietnam has a better growth rate than

1.56% of GDP but still has a lower penetration density - Indonesia 44.2 USD and the Philippines 40.7 USD, compared to Indonesia (1.31% of GDP) and the Philippines (1.14% of GDP) (World Bank, 2020). Therefore, the reasons why the penetration rate of life insurance market in Vietnam is low while the life insurance market has many favorable conditions, and the life insurance companies have introduced various distribution channels are questioned. The aims of this study are to investigate the factors affecting the decision to participate in life insurance of customers based on the evidences from Soc Trang city, Vietnam. The research results are expected to provide a scientific basis to develop the life insurance market for the Vietnamese market and other markets in the world.

## **2.METHODOLOGY**

### **2.1. Research model**

#### 2.1.1 Theoretical conceptual

##### ***2.1.1.1 Asymmetric Information Theory***

Asymmetric information is a situation in which one party has more information than the other in a transaction, and thereby gains more from “information supremacy”. In the insurance market, the individual is the person who knows his or her own risk best. This implies that risk-loving individuals and well aware of the loss they have to bear will tend to participate in life insurance to prevent risks (Ben, 2017).

Under the condition of information asymmetry, Cooper and Rege (2008) have shown that individual decisions, especially decisions about saving and investment, are more influenced by information from familiar groups. Individuals are influenced by social interactions and tend to act because others have acted. In the context that Vietnam is a country that values a collectivist culture - where individual freedom may be restricted and individuals must integrate into groups and the wider community. Therefore, individual decisions will be influenced by reference groups (relatives, friends, ...). Therefore, the influences of the peer-groups, such as friends, relatives, etc. is included in the model, and is expected to have a positive effect on the decision to participate in life insurance.

##### ***2.1.1.2. Social Selection Theory***

The theory of social selection suggests that as people get older and perceive themselves as having less time, they will prioritize maximizing emotional experiences. This leads them to appreciate the benefits that life insurance brings – financial security when there are risks and

mental safety during the time of participating in the insurance policy. On the other hand, when prioritizing the goal of optimizing emotional experience for a complex decision, older adults tended to focus more on positive information and/or less attention on information. negative news (Carstensen et al., 2003). From there, they appreciate the value of protection that the insurance policy brings compared to the cost of insurance. Indeed, many studies such as Loke and Goh's (2012); Dash (2018) has shown that age has a positive impact on the need to participate in life insurance. Therefore, the age variable should be included in the research model and is expected to have a positive correlation with the need for life insurance.

### ***2.1.1.3. Theory of Demand for Life Insurance of Lewis***

Lewis (1989) developed a life insurance demand model based on the assumption that individuals purchase life insurance to maximize the beneficiary's expected utility. Assuming that all family members have a level of risk aversion, the total ownership of life insurance is expressed as follows:

$$(1-Lp)F = \max \left\{ \left[ \frac{1-Lp}{L(1-p)} \right]^{1/\delta} TC - W, 0 \right\} \text{ (Equation 1)}$$

where:

*L*: initial premium of life insurance contract

*p*: probability death of the breadwinner

*F*: total sum insured of the contract

$\delta$ : level of risk tolerance of the insured person

*TC*: present value of total household's expenditures

*W*: net value of household's assets

Lewis's (1989) model also shows that the present value of total household expenditure when the breadwinner is still alive has a positive impact on the need to participate in life insurance. This implies that disposable income, number of dependents and education level positively influence the demand for life insurance. On the other hand, the demand for life insurance will increase when the beneficiary's risk aversion ( $\delta$ ) is low.

Lewis (1989) also showed that the premiums are inversely related to the probability of taking up life insurance. Specifically, women tend to participate more in life insurance than men because women participate in life insurance at lower costs thanks to a longer life expectancy, and less risk of disease than men. Age is also a factor that increases the surcharge. In the same vein, Daniel (2021) has shown that older individuals are expected to be less likely to participate in life insurance than younger individuals due to higher surcharges for older adults.

Lewis (1989) model also implies that family net worth will negatively affect the demand for life insurance. However, the reality is that home owners, who have more net assets than renters (Di et al., 2007), tend to participate in life insurance more (Baek and Devaney, 2005; Li, 2008). The reason is that, when owning a house, households will begin to save more resources to develop family finances such as building a financial reserve for loss of income, preparing for future plans, etc (Lersch and Dewilde, 2018). In addition, home ownership often comes with a loan, thus increasing the need for life insurance to pay off part of the loan and protect the family's finances in the event of a mishap (Li, 2008). The marital status variable that affects the decision to participate in life insurance because it is correlated with the number of dependents should also be included in the model as a control variable (Baek and Devaney, 2005).

#### 2.1.2. Literature review

##### *a) Demography characteristics*

The previous study of Baek and Devaney (2005); Li (2008) showed a nonlinear relationship between needs and age. As age increases, individuals are better aware of the role of life insurance, and have more financial capacity and number of dependents. Therefore, individuals tends to participate to life insurance. However, the need for life insurance of an individual decreased when their children have matured and are less dependent on their sponsorship. In the case of Vietnam, Ta Thi Mai Trang (2012) have indicated that the demand for life insurance of the respondents decreased since the age increases because the younger respondents tends to pay less attentions for the risks. However, the elder respondents have a higher responsibility to protect family finances, prepare for retirement, etc., so they have a higher ability to buy life insurance.

Gender has an influence on the cost of joining life insurance, so it will have an impact on the decision to buy life insurance. Vo Thi Thanh Loan (2005); He (2020) shows that women tend to participate in life insurance more than men because they can participate in life insurance at a lower cost than men. At the same time, women often show interest in the future life through savings rather than risky investments. One of the most important reasons to buy life insurance is to protect your dependents against financial hardship when something goes wrong with the breadwinner of the family. Therefore, marital status and number of dependents are believed to have a positive impact on the need to participate in life insurance. Baek and Devaney (2005); Li (2008); Loke and Goh (2012) both said that married individuals tend to participate in life insurance more than individuals in other cases.

Similarly, the desire to protect dependents against financial difficulties at times of risk is the driving force behind demand for life insurance. Therefore, the number of dependents is expected to have a positive impact on the decision to participate in life insurance. Research by Beck and Webb (2003); Li et al. (2007) showed that the proportion of dependents by age (measured as the ratio of dependents under 15 years old and over 64 years old to the total number of people of working age between 15 and 64 years old) has a positive effect. positive impact on life insurance demand. Research by He (2020) in China also shows a similar trend - the proportion of young dependents (the proportion of children aged 14 and under) has a positive influence on the demand for life insurance. The reason is that parents are worried about their children's life and schooling if an accident happens, so they will buy life insurance as a backup for risky situations.

A high level of education can increase risk aversion and awareness of the need for products. Therefore, education level is said to be positively correlated with the decision to participate in life insurance. This positive correlation has been demonstrated in the study of Beck and Webb (2003); Li et al (2007); Li (2008); Shiferaw (2017). However, research by Loke and Goh (2012) in Malaysia shows that people with high education are less likely to participate in life insurance products. The author explains in the context that the Malaysian financial market is developing with many attractive products, highly educated individuals will choose asset management and highly profitable assets for financial management and create an inheritance for beneficiaries instead of life insurance. In the context of Vietnam's financial market, investment products, asset management, etc. are not diversified and popular, highly educated people are expected to participate more in life insurance than those with less education.

***b) Determinants of social economics***

Many empirical studies by Browne and Kim (1993); Beck and Webb (2003); Li et al (2007) have shown a strong correlation between income and demand for life insurance. Higher-income helps increase access to and purchase of life insurance products. At the same time, when the individual has a high income, the opportunity cost of that person's risk is also greater. Therefore, in order to maintain the living standard of dependents, individuals with higher incomes will participate more in life insurance. Research in developing countries such as Langat et al (2017) in Kenya; Ta Thi Mai Trang (2012) and Vuong Quoc Duy (2016) in Vietnam also show a positive correlation between income and demand for life insurance.

Homeownership is expected to have a positive impact on the decision to participate in life insurance. Once home ownership, individuals will tend to be more concerned with other financial goals including savings and hedging. On the other hand, home ownership often comes with a loan, which increases the need for a financial reserve to cover the loan in the event of a disaster (Baek and Devaney, 2005; Li, 2008). Although this is an important factor that positively affects the demand for life insurance, very few studies consider the effect of this factor in the Vietnam life insurance market.

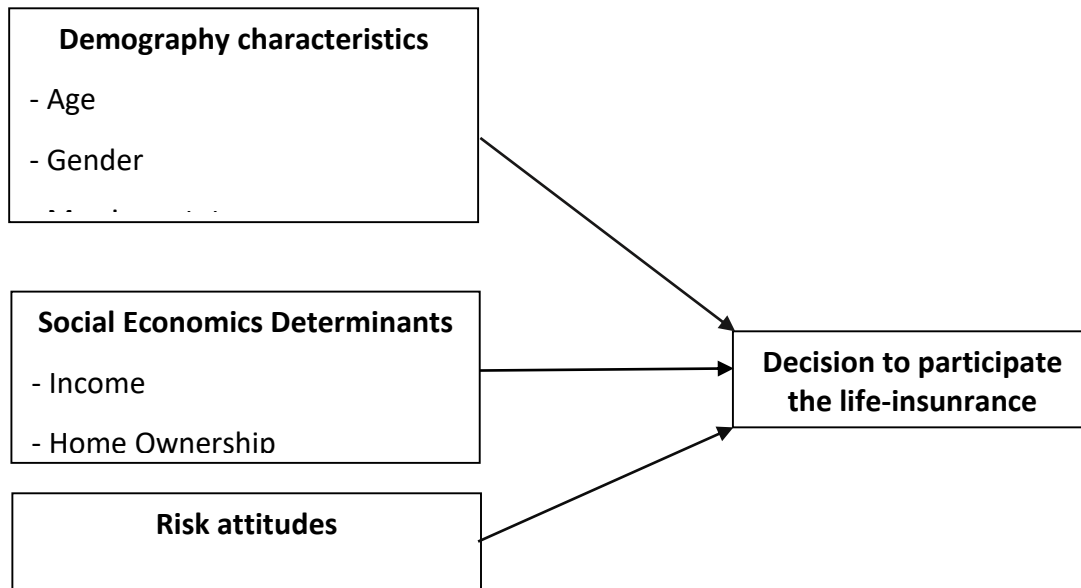
Vuong Quoc Duy (2016); Huynh Truong Huy et al. (2020) show that in the life insurance market in Vietnam, the information of relatives has a positive impact on the decision to buy life insurance. The recommendation of relatives and friends will help individuals feel confident in life insurance products. At the same time, individuals, influenced by collective culture, tend to participate in life insurance because relatives and friends have participated.

***c) Risk attitudes***

Attitude towards risk is a factor that strongly influences the decision to participate in life insurance. However, this factor acts in different directions. Loke and Goh (2012); Tran Thi My Han (2017) have shown that individuals with an aversion to risks are more likely to participate in life insurance as a way to ensure financial security for themselves and their families when risks occur. However, research by He (2020) in China shows that risk aversion will reduce the demand for life insurance. The author explains that when families have a risk-averse lifestyle, they will feel more secure when they keep a lot of cash in the family, thereby reducing the need to buy life insurance.

On the basis of theory, previous empirical studies on the factors affecting the decision to participate in life insurance, and the current situation of the life insurance market in Vietnam, the author proposes a research model on the relationship between the decision to participate in life insurance decision to buy life insurance with related factors are presented in Figure 1.





**Figure 1.** Factor affecting decision to participate the life-insurance of customers  
*(Source: summarized from the theoretical conceptual and literature reviews)*

## 2.2. Data collection

An interview survey has been conducted in Soc Trang city from May to September 2021. Total of 180 respondents, who are living in Soc Trang province, participated to the survey. Each respondent was asked to answer the structured questionnaire, including four parts: (1) demographic information; (2) socio-economic information; (3) attitude towards risk; (4) needs and attitudes towards life insurance.

There was 165/180 questionnaires have fully filled the necessary information, and therefore, the sample size is explored to analyze in the next parts will be included 165 observations. Of which, there was 77 respondents have participated to the life insurance contracts and 88 respondents did not participate.

## 2.3. Data analysis

Binary logistic regression model is applied to examine the factors influencing the decision to participate life insurance (Hoang Trong and Chu Nguyen Mong Ngoc, 2008). The basic function is presented as follows:

$$\text{Logit}(p) = \log_e \left[ \frac{P_i}{1-P_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon_i \quad (\text{Equation 2})$$

where:

$P_i$ : probability to participate life-insurance of the respondents

$X_{1...k}$ : independent variables, represent the factors influencing decision to participate the life-insurance of respondents.

$\beta_{1...k}$ : coefficients

$\beta_0$ : intercept

The details of independent variables are presented in Table 1.

**Table 1.** Description of variabes included in the binary logistic regression model

Code	Description	Mean	S.D	Source
<b>Dependent variable</b>				
Y	<b>Decision to participate the life-insurance</b> 1= Participated the life-insurance contract; 0 = otherwise	0.47	0.5	
<b>Independent variables</b>				
X <sub>1</sub>	Age of the respondents	34.55	8.68	Baek & Devaney (2005); Lewis (1989); Ta Thi Mai Trang (2012)
X <sub>2</sub>	Gender (1 = male; 0 = female)	0.52	0.50	Vo Thi Thanh Loan (2005); He (2020)
X <sub>3</sub>	Marriage status 1 = married; 0 = otherwise	0.61	0.49	Li (2008); Loke & Goh (2012)
X <sub>4</sub>	Number of dependents	1.01	1.04	Beck & Webb (2003); He (2020)
X <sub>5</sub>	Education 1 = had tertiary education and above; 0 = otherwise	0.73	0.45	Beck & Webb (2003); Li et al. (2007); Shiferaw (2017)
X <sub>6</sub>	Average income per capita month (million dong)	9.12	8.02	Beck & Webb (2003); Vuong Quoc Duy (2016)
X <sub>7</sub>	Home ownership 1 = owned a house ; 0 = otherwise	0.56	0.50	Baek & Devaney (2005); Li (2008)
X <sub>8</sub>	Peer-group affected: 1 = affected by peer group ; 0 = otherwise	0.62	0.49	Vuong Quoc Duy (2016); Tran Thi My Han (2017); Huynh Truong Huy et al. (2020)
X <sub>9</sub>	Risk attitudes 1 = Risk lovers; 0 = Risk averses	0.36	0.48	Loke & Goh (2012); Tran Thi My Han (2017); He (2020)

### 3. RESULTS AND DISCUSSION

#### 3.1. Results

As can be seen in Table 2, the estimated results of the binary logistic regression model showed a significant level at 1%. This means the independent variables included in the model can be explained for the changes of probability to participate the life insurance ( $P < 0.01$ ).

**Table 2.** The estimated results of Binary logistic regression

Variables	Coefficients	P-value
X <sub>1</sub>	0,091	0,012
X <sub>2</sub>	-0,688	0,087
X <sub>3</sub>	0,319	0,577
X <sub>4</sub>	0,339	0,122
X <sub>5</sub>	-0,074	0,509
X <sub>6</sub>	-0,013	0,554
X <sub>7</sub>	0,904	0,045
X <sub>8</sub>	0,964	0,023
X <sub>9</sub>	0,837	0,048
Intercept	-3,849	0,056
Number of observation		154
-2 Log likelihood		164,119
P-value		0,000
Classification		70,1

The estimated results in Table 2 show that the group of demographic factors including age and sex have an influence on the decision to buy life insurance ( $P < 0.05$ ). Age has a positive effect on the decision to buy life insurance, which implies that the older an individual is, the more likely they are to participate in life insurance. Meanwhile, gender has a negative effect at the significance level of 10%, which implies that women will tend to participate in life insurance more than men.

Social economics determinants also played an important role in the decision to participate in life insurance ( $P < 0.05$ ). In which, the factor of home ownership and the influence of relatives have a positive impact on the decision to buy life insurance.

On the other hand, the attitude towards risk has a positive impact on the decision to buy life insurance at the 5% significance level. Accordingly, the individuals are risk lovers tended to buy life insurance more than risk-averse individuals ( $P < 0.05$ ). This result is similar to the study of He (2020) in China, risk-averse individuals prefer to save cash or participate in high-liquidity assets instead of participating in the life insurance.

### 3.2. Discussion

Demographic factors including gender and age affect the decision to buy life insurance. Accordingly, gender has a negative effect, implying that women will participate in life insurance more than men. This is because women can participate in life insurance at a lower

cost than men thanks to lower morbidity rates and higher life expectancy. This result is similar to the study of Vo Thi Thanh Loan (2005); He (2020).

The older the age, the higher the membership fee for life insurance, and therefore age is expected to have a negative impact on the decision to participate in life insurance (Lewis, 1989). However, the results of this study showed that with increasing age, individuals will tend to participate in life insurance more. This is consistent with the theory of social selection. From a behavioral perspective, as people get older and realize they have less time, they will prioritize maximizing emotional experiences. This leads them to appreciate the benefits that life insurance brings – financial security in the event of risks and mental safety during the policy period. Therefore, older people tend to participate in life insurance more than young people. On the other hand, from a financial perspective, young people are often unmarried and have no dependents, so there is little need for financial backup against risks. Conversely, people tend to demand a higher financial provision when they are elder to ensure financial stability for themselves and their families. In addition, life insurance is also a tool to help individuals accumulate assets to prepare for retirement. Therefore, individuals might prefer to participate the life insurance eventhough the cost of participation might be higher. This suggests that life insurance companies should contribute the new products to meet the needs of the elderly population, such as comprehensive health care by-products.

However, the results of this study could not find the effects of marital status and number of dependents on the decision to buy life insurance ( $P < 0.1$ ). This might be because an individual has married and has children, household spending might be increase faster than increases in income. Therefore, individuals might skip the participants to life insurance. This correspondents with the results from interview survey since 48.3% of respondents indicated that income is the most barrier of decision to participate the life insurance. This implies that life insurers need to develop some products with lower participation fees with flexible payment terms and some support programs if customers encounter unexpected financial difficulties (e.g. financial difficulties).

Education is expected to positively affect the decision to buy life insurance. However, the study did not find the effect of this variable at the 10% significance level. Life insurance is a complex financial product and is tailored to individual needs. Therefore, to understand life insurance well, individuals need to have specific knowledge and this knowledge is not compulsorily

taught in universities. Therefore, high education does not affect the decision to buy life insurance.

Regarding the group of socio-economic factors, owning a house plays an important role in an individual's decision to buy life insurance. Individuals who own their own houses will tend to participate in life insurance more than individuals who rent houses or other circumstances (such as living at home with family, relatives, ...). The reason is that when owning a home, individuals will begin to save more resources to develop family finances such as building a financial backup in case of loss of income, saving for future plans, etc. (Lersch and Dewilde, 2018). In addition, home ownership often comes with home mortgage debt, which increases the need for financial insurance over the life of the mortgage. Therefore, homeowners will tend to participate in life insurance more than tenants or people living with their families, etc. as a way to protect family finances when there is a risk to themselves. The results of this analysis are quite similar to those of Li (2008) in the US. Homeowners, on the other hand, will want to diversify their portfolios so that they can offset potential losses in the housing market (Lersch and Dewilde, 2018). Therefore, they will have a greater need to participate in life insurance than renters who do not face the same risks.

The influence of relatives and friends has a positive impact on the decision to buy life insurance. As can be seen in Table 2, individuals who have known life insurance through relatives and friends will tend to participate in life insurance more than individuals who do not access life insurance through this reference channel. This result is similar to the study of Huynh Truong Huy et al. (2020). Life insurance is a product to prevent risks in uncertain conditions, so the experience of the familiar group will have a strong impact on the decision to participate in life insurance. On the other hand, life insurance is an intangible product with a relatively long participation time, so the opinion of the familiar group will positively affect the individual's belief in the product, promoting the purchase decision. This implies that it is necessary to improve and develop the post-purchase customer care system, to increase customer loyalty, and to encourage existing customers to share their experiences with potential customers.

Risk attitude has a positive impact on the decision to participate in life insurance, that is, risk-loving people have a higher probability of participating in life insurance than risk-averse people. This result is similar to the study He (2020) in China because risk-averse individuals will tend to choose highly liquid assets (such as cash) as a backup for unfortunate situations. since then there is less need to buy life insurance. Conversely, risk-loving individuals will tend to

participate in higher-risk assets with better returns. These assets are often illiquid and are rarely used as a hedge against unexpected financial losses. Therefore, risk-loving individuals will tend to participate in life insurance as a financial backup tool than risk-averse individuals. On the other hand, information asymmetry theory has shown that individuals are the ones who best understand their own risk. Therefore, individuals who love risks and are well aware of their own losses when risks occur will have a higher demand for life insurance than risk-averse individuals. The survey results conducted in this study also show that the most common reason for participating in life insurance of the respondents (69.2%) was to protect family finances in a risky situation. Meanwhile, in addition to income barriers, the reason for not participating in life insurance is not understanding the benefits and not having confidence in life insurance (40.2%). This result implies that life insurers need to invest in developing customer databases to ensure the insurance products are suitable for customers' risk tolerance. At the same time, the data system and forecasting tools will help make information more transparent about insurance products to ensure the rights and interests of customers when participating in insurance.

#### **4. CONCLUSION**

The binary logistic regression model was explored to identify the factors influencing to decision to participate the life insurance based on the sample size of 165 respondents in Soc Trang city, Vietnam. It was concluded that age, owning a home, influence from relatives and risk preference attitude is positively correlated with the probability of participating in life insurance. Respondents are that women are more likely to buy life insurance than men.

Research results suggest that life insurance companies need to improve their post-purchase customer care systems to increase customer loyalty and encourage existing customer groups to share their experiences with potential customers. Customer opinions will help build trust and positively influence a potential customer group's decision to join. In addition, building and developing a formal customer data system to provide personalized products based on customer characteristics. In addition, the data system will help transparent information about insurance products to ensure the rights and interests of the parties involved in the insurance contract.

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**OVERALL EQUIPMENT EFFECTIVENESS (OEE) ANALYSIS WITH TOTAL PRODUCTIVE MAINTENANCE. A CASE STUDY OF A BREWERY****Akpan, Immaculata SYLVESTA**

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**ABSTRACT**

The problem of waste and losses has been identified as contributing to poor performance of local industries in Nigeria. It is asserted that industries have sought to improve their performance by using some modern manufacturing concepts and methods. Total Productive Maintenance (TPM) is one such concept being used by both small and medium-scale enterprises to identify and reduce waste both on the shop floor and at the enterprise level. The measure of effectiveness of TPM implementation is the Overall Equipment Effectiveness (OEE). OEE is a function of Performance Efficiency (PE), Plant Availability (A) and Quality Rate (Qr). This study uses Champion Breweries where TPM is being implemented as a case study. It is known that the success of TPM implementation is determined by the implementation strategies adopted by individual firms, which takes into account variables such as the firm's size measured in terms of the number and the quality of its employees. Results show that in order to overcome the problem of limited resources, TPM can be implemented using the Hybrid Pillar model being adopted by Champion Breweries. The analysis of OEE of the beer packaging line for a 3-month performance period showed improvement in OEE; it increased from 56.4% to 71.7%. This value shows that there is still room for improvement which can be achieved by a number of action plans stated in the recommendation section of this paper. This is as a result of the existing focused monitoring and improvement measures being adopted.

**Keywords:** Keywords: Overall Equipment Effectiveness, Performance, Losses

## **INTRODUCTION**

### **1.1 Background of Study**

With the huge population of Nigeria estimated at 190 million people, there is the potential for the country to become an industrial hub in view of ready market for goods and services as well as ample availability of labour. Ironically these favourable factors are hardly exploited to the nation's advantage as over 80% of consumer goods as well as construction materials are imported either from European countries or fellow African countries, as reported by the immediate past Director General of Standards Organization of Nigeria, SON, Dr. Joseph Odumudu, (dailypostngr, October 31<sup>st</sup>).

The potential profits of going into manufacturing by indigenous companies have been appreciated and several have ventured into it but the result most often is a backlog of debts to workers and suppliers and finally going into bankruptcy. The latest of such cases is the Honeywell Group; their bankers, Eco Bank Plc, declared the company bankrupt on 16<sup>th</sup> December, 2013 on account of a debt base of ₦4.1 billion owed as at August 6, 2015, (The Nations News October 6<sup>th</sup>, 2013).

This poor industrial performance is attributable to the huge losses/wastes which occur in the manufacturing shop floor and others, (Wilson, 2020). These losses occur in the areas of operations, maintenance, personnel, and process. Examples include tooling problems and non-availability of components in time. Other forms of waste include idle machines, idle manpower, breakdown of machines, and rejected parts, (Oga, 2022).

TPM creates a corporate culture which constantly strives to eliminate losses through overlapping small group activities within the site, (McQueen, 1999). When properly implemented it creates the environment to achieve the three Zs of TPM namely Zero Defects, Zero Breakdown, and Zero Accident, (Nakajima, 1988).

The process industries in Nigeria such as brewing industry contribute significantly to the Gross Domestic Product of the country. Therefore, any performance improvement in this sector will impact positively on the economy of the country. The author is not aware of any study on TPM implementation in the brewery industry and this study is therefore intended to fill this gap.

### **1.2 Statement of the Research Problem**

The purpose of this research is to study the implementation of TPM at the brewery plant with the aim to understand how its benefits are being achieved, how it could possibly be enhanced

and how the gains made by the brewing company could be replicated in similar companies in the industry in order to reduce losses and improve productivity.

The main objective of this research is to study and assess the method of implementing Total Productive Maintenance (TPM) at a local brewery. The specific objectives include to:

- i. Assess the effectiveness of TPM implementation at the local brewery. With respect to some performance matrices and to make recommendations for improvement.

### **2.1 Total Productive Maintenance**

The concept of TPM originated in Japan's manufacturing industries, initially with the aim of eliminating production losses due to limitations in the Just in time (JIT) process for production operations, (Lee, 2002). Seichi Nakajima is credited with defining the fundamental concepts of TPM and seeing the procedure implemented in hundreds of plants in Japan; the key concept being autonomous plant maintenance, (Shingo, 1991).

TPM is a major departure from the "you operate, I maintain" philosophy. It is the implementation of productive maintenance by all associated personnel (whether machine operators or members of the management team), based on the involvement of all in the continual improvement of performance, (Tsang, 2000). TPM endeavours to eliminate the root causes of problems, through team-based decisions and their implementation, (Ljungberg, 1998).

A means of assessing the effectiveness of TPM implantation is the determination of the production lines Overall Equipment Effectiveness, OEE.

## **METHODOLOGY**

The procedures for this study have been chosen to meet each of the project objectives. Although there are 8 pillars of TPM, the pillar which is more related directly to production, quality and maintenance are the AM and PM pillar, (Shirose, 1989). This is because these pillars deals with equipment maintenance which is solely responsible for equipment uptime, production volume and quality. Hence, this research has focused on the AM and PM pillars of TPM at the brewery.

### **3.1 Methods**

The methods used in the research were:

- i. Studying and/ application of relevant theories and models.
- ii. Data collection from maintenance and production log books at the local brewery.
- iii. Data analysis and results.

### **3.2 Studying and Application of Relevant Theories and Models**

The literature search was made in order to understand the philosophy behind TPM, including the underlying theories and models used in TPM. The results obtained here assisted in gaining some basic understanding in order to carry out further enquiries.

### **3.4 Collection of Data from Maintenance and Production Log Books at the Brewery**

Data regarding equipment maintenance, production at the local brewery were consulted. These included charts and templates as follows:

- Loss deployment Charts.
- Equipment evaluation and ranking template.
- Quality output.
- Maintenance calendar.
- Planned Maintenance Calendars.
- PM Day audit sheets.
- Maintenance Check lists and Task lists.

### **3.5 Data analysis and results.**

The data collected from charts, tables and interviews were summarized and analysed in line with the study objectives.

#### **3.5.1 Performance Measurement in TPM**

Performance measures in TPM are used in determining the effectiveness of the implementation of the programme, (Levitt, 1996). Below is a breakdown of these measures.

#### **3.5.2 Overall Equipment Efficiency (OEE)**

Overall Equipment Effectiveness (OEE) is one of the key measures of TPM which indicates how effectively the machinery and equipment is being run. It combines measures of machine Availability, Performance and Quality. The simplest way to calculate OEE is as the ratio of Fully Productive Time to Planned Production Time, (Kaplan, 2002). Fully Productive Time is just another way of saying manufacturing only Good Parts as fast as possible (Ideal Cycle Time) with no Stop Time. Hence the calculation is:

$$\text{OEE} = (\text{Good Count} \times \text{Ideal Cycle Time}) / \text{Planned Production Time} \quad (2.1)$$

Although this is an entirely valid calculation of OEE, it does not provide information about the three loss-related factors: Availability, Performance, and Quality. For that we use the preferred calculation.

The preferred OEE calculation is based on the three OEE Factors: Availability, Performance, and Quality, defined as follows:

### 3.5.3 Availability

Availability takes into account all events that stop planned production long enough where it makes sense to track a reason for being down (typically several minutes), (Bekkers, 2002).

Availability is calculated as the ratio of Run Time to Planned Production Time:

$$\text{Availability (A)} = \frac{(\text{Total Time} - \text{Total downtime}) \times 100}{\text{Total time}} \quad (2.2)$$

Where Total Time refers to planned production time and total down time refers to summation of all losses incurred during production. They include breakdown time, planned stoppages, break time and planned maintenance time.

### 3.5.4 Performance Efficiency (PE)

Performance takes into account anything that causes the manufacturing process to run at less than the maximum possible speed when it is running, (Robert, 2002).

It is calculated as:

$$\text{Performance Efficiency (PE)} = \frac{(\text{Target Production} - \text{Actual Production}) * 100}{\text{Target Production}} \quad (2.3)$$

Target production refers to the projected production output for a period of time and actual production is the production volume produced for a particular period of time. Performance should never be greater than 100%. If it is, that usually indicates that Ideal Cycle Time is set incorrectly (it is too high).

### 3.5.5 Quality Rate (Qr)

Quality takes into account manufactured parts that do not meet quality standards, including parts that need rework. Remember, OEE Quality is similar to First Pass Yield, in that it defines Good Parts as parts that successfully pass through the manufacturing process the first time without needing any rework, (Robert, 2002).

Quality is calculated as:

$$\text{Quality Rate (Qr)} = \frac{(\text{Processed Quality} - \text{Defective Quality}) * 100}{\text{Processed Quality}} \quad (2.4)$$

Where, the quality defects mean the amount of products which are below the quality standards that is, the rejected items after the production process. This formula is very helpful to calculate the quality problem in the production process (Ahuja, 2008).

### **3.5.6 Preferred Calculation of (OEE)**

OEE takes into account all losses, resulting in a measure of truly productive manufacturing time, [2]. It is calculated as:

$$\text{OEE} = \text{Availability} \times \text{Performance} \times \text{Quality} \quad (2.5)$$

### **4.2 Overview of TPM Implementation at the local brewery.**

Champion Breweries implements the TPM Alternative Roadmap Master plan from Heineken who own about 70% equity in the establishment.

The method of TPM implementation at the brewery is unique as it uses hybrid pillar teams which are tasked to implement more than one pillar. This is as a result of the following constraints:

- (i) It is a brewery producing a volume lower than 420,000hl per annum
- (ii) It has a relatively low amount of full time staff (FTS)
- (iii) It has a highly complex production system
- (iv) The relatively low level of educated man power in the establishment

The implementation process is carried out by the TPM Coordinator (TPMC) and overseen by the Brewery Manager (B.Mgr.). The Alternative TPM roadmap is given below.

### **4.11 Analysis of OEE at the packaging line of the brewery via maintenance and production Data**

For every maintenance task, data is captured which is used in positioning the plant in terms of productivity and efficiency. Analysis was done specifically at the packaging line of the brewery where calculations were made to know the true state of the line in terms of plant availability (A), performance efficiency (PE), quality rate (Qr) and overall equipment effectiveness (OEE).

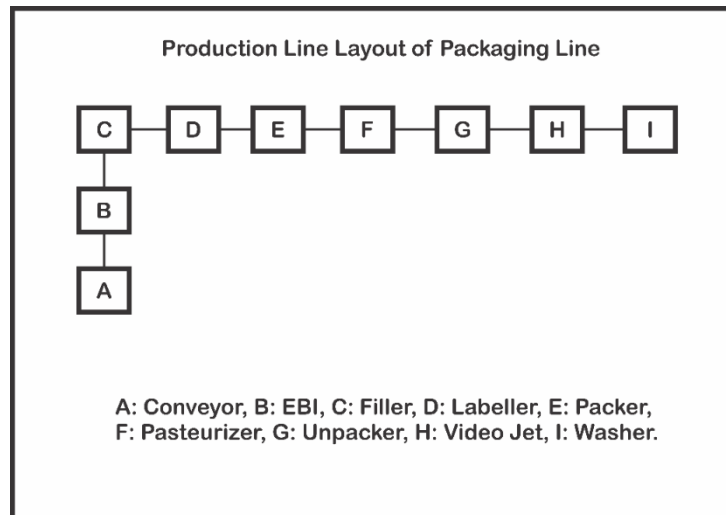
In assessing the packaging line of the brewery the following maintenance as well as production data were consulted.

- (i) The Production Line Layout of the Packaging Line.
- (ii) Loss deployment data.
- (iii) Production data.
- (iv) Quality output data.

In calculating the OEE, the packaging line was seen as a machine. This is because, all equipment on the line are linked together as the breakdown of one will cause a halt in the lines functionality.

Analysis was done on production data over a period of three (3) months.

The production line layout which is the distribution of equipment on the job floor is shown below.



**Figure 4.10 :** Production line layout

**(i) Production data**

This shows the amount of brew produced in terms of hectolitres for a given time frame. It also gives the target output for the given time frame. This is used in evaluating the performance efficiency (PE) of a production run.

**(ii) Quality Output data**

This shows the amount of output which conformed to specification and the amount that was within the boundary of conformance. This is used in evaluating the quality rate (Qr) of a production run.

**(iii) Loss Deployment data**

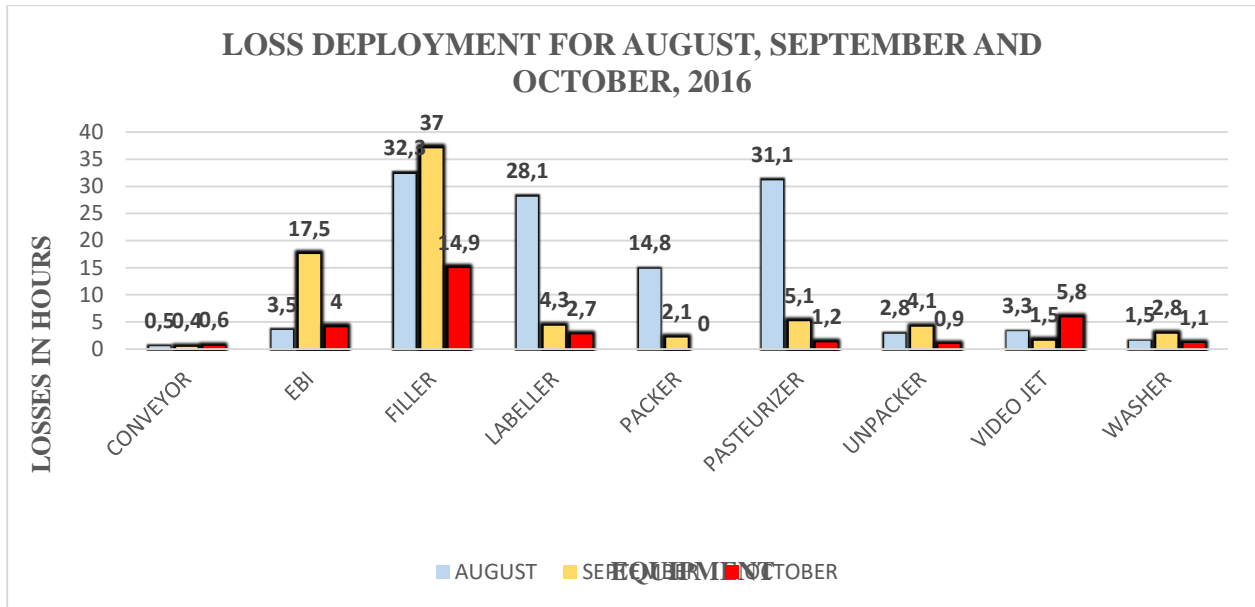
This shows the number in hour's equipment spends in down time before they are put back into service. Loss deployment is done daily and is used in calculating the Availability (A) of equipment in the plant. Considering the loss deployment data for August, September and October 2016, we see the following:



**Table 4.5:** Analysis of time losses for August, September and October, 2016

EQUIPMENT	ANALYSIS OF TIME LOSSES FOR 3 MONTH														
	AUGUST					SEPTEMBER					OCTOBER				
	BD T (hr s)	M S (hr s)	ES (hr s)	CO T (hr s)	PD T (hr s)	BD T (hr s)	M S (hr s)	ES (hr s)	CO T (hr s)	PD T (hr s)	BD T (hr s)	M S (hr s)	ES (hr s)	CO T (hr s)	PD T (hr s)
CONVEYOR	0.5	-	-	-	-	0.4	-	-	-	-	0.6	-	-	-	-
EBI	0.5	3.0	-	-	-	4.7	12.8	-	-	-	-	4.0	-	-	-
FILLER	14.4	-	9.9	2.3	5.7	2.1	0.1	19.2	15.6	-	0.7	-	12.2	-	2.0
LABELLER	28.1	-	-	-	-	4.3	-	-	-	-	2.7	-	-	-	-
PACKER	14.8	-	-	-	-	2.1	-	-	-	-	-	-	-	-	-
PASTEURIZER	30.4	-	0.7	-	-	5.1	-	-	-	-	1.2	-	-	-	-
UNPACKER	2.8	-	-	-	-	4.1	-	-	-	-	0.9	-	-	-	-
VIDEO JET	3.3	-	-	-	-	1.3	-	0.2	-	-	5.8	-	-	-	-
WASHER	-	-	1.5	-	-	1.1	-	1.2	-	0.5	0.6	-	0.5	-	-
<b>SUM OF LOSSES PER MONTH (hrs)</b>	117.9 hrs					107.8 hrs					31.2 hrs				

KEY	
ABBREVIATION	FULL MEANING
<b>BDT</b>	Breakdown Time
<b>MS</b>	Minor Stops
<b>ES</b>	External Stops
<b>COT</b>	Change Over Time
<b>PDT</b>	Planned Downtime



**Figure 4.11:** Loss deployment Chart for Equipment at Packaging Line for August, September and October, 2016

**Table 4.6:** Analysis of OEE factors using production and quality output data

AVAILABILITY (A)	MONTH	TOTAL PRODUCTION TIME (hrs)	BREAKDOWN TIME (hrs)	FORMULA $A = \frac{\text{Total Production Time} - \text{Total Downtime}}{\text{Total Production Time}} \times 100$	VALUE (%)
	AUGUST	672	117.9	$A = \frac{672-117.9}{672} \times 100$	74.7%
	SEPTEMBER	672	107.8	$A = \frac{672-107.8}{672} \times 100$	77.5%
	OCTOBER	672	31.2	$A = \frac{672-31.2}{672} \times 100$	87.6%
PERFORMANCE EFFICIENCY (PE)	MONTH	TARGET PRODUCTION VOLUME (hl)	ACTUAL PRODUCTION VOLUME (hl)	FORMULA $PE = \frac{\text{Actual Production Volume}}{\text{Target Production Volume}} \times 100$	VALUE (%)
	AUGUST	40,000	32,000	$PE = \frac{40000-32000}{40000} \times 100$	80.0%
	SEPTEMBER	40,000	31,000	$PE = \frac{40000-31000}{40000} \times 100$	77.5%
	OCTOBER	40,000	33,000	$PE = \frac{40000-33000}{40000} \times 100$	82.5%
QUALITY RATE (Qr)	MONTH	PRODUCED QUANTITY (bottles)	DEFECTIVE QUANTITY (bottles)	FORMULA $Qr = \frac{\text{Produced Quantity} - \text{Defective Quantity}}{\text{Produced Quantity}} \times 100$	VALUE (%)
	AUGUST	35000	1200	$Qr = \frac{35000-1200}{35000} \times 100$	97.0%
	SEPTEMBER	35000	900	$Qr = \frac{35000-900}{35000} \times 100$	97.4%

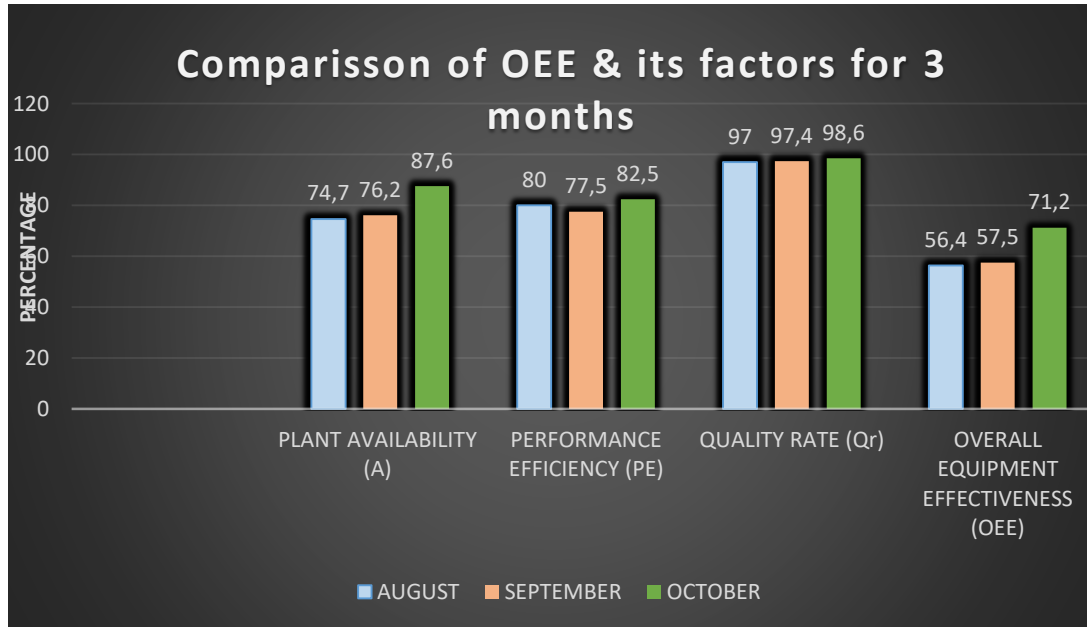
**Table 4.7:** Analysis of OEE for 3 months.

MONTH	PARAMETER			OEE	OEE VALUE (%)
	AVAILABILITY (A) (%)	PEFORMANCE EFFICIENCY (PE) (%)	QUALITY RATE (Qr) (%)	$OEE = A \times PE \times Qr$	
AUGUST	74.7	80.0	97.0	$OEE = 74.7 \times 77.5 \times 97.0$	<b>56.4 %</b>
SEPTEMBER	77.5	77.5	97.4	$OEE = 77.5 \times 77.5 \times 97.4$	<b>57.5 %</b>
OCTOBER	87.6	82.5	98.6	$OEE = 87.6 \times 82.5 \times 98.6$	<b>71.2 %</b>

Summary of OEE data generated for the 3 months is given in the table below.

Table 4.14: Comparison of OEE Factors for 3 months.

**Table 4.8:** OEE Comparison for 3 months.



#### 4.12 DISCURSION OF RESULTS

From the analysis done and by inspecting the trends generated in the charts we see that for the month of August, plant availability was 74.7%, performance efficiency was 80%, quality rate was 97% and OEE was 56.4%.

For the month of September, plant availability increased to 76.2%, performance efficiency reduced to 77.5%, Quality rate increased to 97.4% and OEE increased to 57.4%.

For the month of October, plant availability increased to 87.6%, performance efficiency increased to 82.5%, quality rate increased to 98.6% and OEE increased to 71.2%.

It is seen that OEE is increasing from August to October and after proper study of the loss deployment chats, the reasons for this increment are due to the use of the following AM/PM tools.

**(i) The use of loss deployment chat**

This chat assists in identifying equipment responsible for the generation of losses in the production line. The deployment chats also show reasons for the failure of equipment and this makes it very easy for maintenance personnel to spot and thoroughly eliminate the cause of failure. This act prevents the fault from reoccurring.

**(ii) The use of Root Cause of Failure Analysis (RCFA)**

Whenever problems occur on equipment, a generalised approach is followed in solving the issue. This process is already discussed in chapter 4 of this research.

**(iii) The use of Focused Improvement (FI)**

FI involves setting up a dedicated maintenance team to tackle a specific issue that has reoccurred over a period of time.

From the loss deployment charts for the packaging line it is seen that the bottleneck equipment for the first month, August was the Labeller. It had a breakdown time totalling 30.4 hours. But for the next month September, its breakdown time was reduced to 4.3 hours and finally it reduced to 2.7 hours in October. Here we see the effect of FI teams in reducing the breakdown frequency.

In the second month, the filler had the highest breakdown time of 28.3 hours, this was reduced to 12.2 hours in the next month.

In general, it is almost impossible to know when equipment will malfunction but what we have learnt from the study of the loss deployment chats is that whenever an equipment resulted in high breakdown, the fault was identified and thoroughly dealt with by the maintenance team and its breakdown time greatly reduced in the month that followed its failure.

**(iv) The Use of effective Cleaning Lubricating Inspection and Tightening (CLIT) standards**

These activities are done mainly by machine operators on equipment before production begins. The thorough application of these processes greatly reduces equipment failure and cut down planned maintenance time.

**(v) The use of Maintenance schedules and task lists**

As discussed above in this write up, PM Days are pre planned maintenance days set aside for carrying out pre-planned maintenance of all equipment in a functional area. On this day, maintenance task lists which contain detailed tasks which each maintenance staff is mandated to perform on specific equipment is used. Hence every part of an equipment is addressed

properly ensuring a good maintenance activity. It is also the use of these practices that have led to increment in OEE at the line.

**(vi) Training and retraining of Machine operators**

Maintenance staff and machine operators are trained within the company and some sent to other breweries also owned by Heineken for training. This has contributed in capacity building of staff which has affected the production process positively.

**CONCLUSION**

From the research we see that overall equipment effectiveness (OEE) at the packaging line of Champion Brewery Plc increased from 56.40% in August, 2016 to 57.5 % in September, 2016 and to 71.2 % in October, 2016. We also see from data analysis that equipment availability at the packaging line of the Brewery increased from 74.7 % in August to 76.2 % in September and then to 87.6 % in October. This goes to show that the AM/PM hybrid team maintenance management technique has been effective but room for improvement still exists.

The paper shows that OEE determination serves as a monitoring parameter for assessing a facilities present state of effectiveness and can be used as an indices for futuristic planning.

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**PREDICTION THE WELDABILITY OF JOINING MATERIALS BY SHIELD  
METAL ARC WELDING USING ARTIFICIAL NEURAL NETWORK****Ziad Shakeeb Al SARRAF**Department of Mechanical Engineering, Faculty of Engineering,  
University of Mosul, Mosul, IRAQ**ABSTRACT**

The need for welding are incessantly required in many fields and different sectors, such as in industries and manufacturing. Based on high quality and reliability, one of the most efficient methods for joining metals is Shielded metal arc welding (SMAW). In this presented work, an attempt has been successfully taken to develop a model to predict the effect of input parameters on weld bead geometry of submerged arc welding process with the help of neural network technique and analysis of various process control variables and important of weld bead parameters in submerged arc welding. The complexity non-linear relationships of input / output variables for any computational models can be addressed by using artificial neural networks (ANN). Today, ANN represents a powerful modeling techniques, that depend on statistical approach, presently practiced in many fields of engineering for modeling complex relationships that other physical models can not be explained it easily. A welding process with automatic or semiautomatic is required to complete the weld through using tubular electrode with consumable flux. Parameters such as welding current, welding speed and voltage are influenced on the quality of the joints. The work conducts many experiments; these are basically depends on many factors and levels. A selection of 2205 duplex stainless steel is carried out in this study to conduct three factors and five levels of central composite design. Neural network model structure having number of neurons layers such as (3 input layers, 1 hidden layers and 3 output layers) with back propagation algorithm has been successfully applied to extract weld bead geometry from predicting the effect of input parameters. Good agreement was obtained between predicted and experiment results, however process parameters such as speed shows opposite effect on all weld parameters. It was seen that weld height and width are proportional to the amount of input current. The prediction of the neural network model showed excellent agreement with the actual results, which indicate that the neural network is viable means for predicting of not only weld bead geometry, but also other parameters such as polarity, current type and flux geometry. This recommends setting the neural network to be applicable for real time work.

**Keywords:** ANN, Back propagation, Welding, Input process parameters, Bead Geometry.

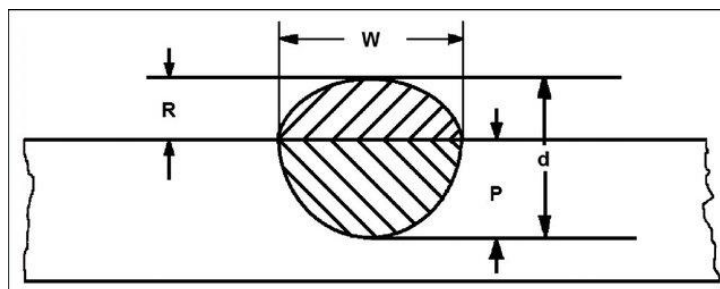
## 1. INTRODUCTION

One of the most important processes that are always considered to be a main demand in manufacturing industries is welding. Therefore, selection of welding process such as Submerged Arc Welding (SAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), and flux cored arc welding (FCAW) ...etc is depended practically on the suitable environment of doing process. In industry for example, a fusions welding process, Flux cored arc welding developed from gas metal arc welding process to improve arc effect, metal transfer deposition and both properties and appearance of weld metal. FCAW has been specified as popular process due to good consistency and high quality weld deposition, metal deposition can be controlled accurately, ability to weld in all position due to smooth characteristics, low spatters and minimum cost for shielding gas, high deposition rate which lead to maximize productivity [1]. Selection of appropriate welding technique is very important to obtain good quality of weld bead [2]. For many applications of welding processes, a flux-cored wire performs better and faster. FCAW is suitable for low, mild and high alloy steels as well as stainless steels [3]. In industry, submerged arc welding is considered to be one of the most joining processes that are used to obtain weld quality, due to its ability to predict and monitoring of weld parameters in order to produce weld consistency. Many researches have been focused on SAW technique, first to establish the process and second to study the effect of welding variables on joint area (weld bead weld width and weld size) [Apps, et al., 1963]. Start in 1986, (Gupta and Parmar) predict the weld bead dimension of SAW by using fractional factorial technique. After that a mathematical models are presented by (Revaandra & Parmar, 1987) to reveal the geometry of flux cored weld process. A study on weld bead width in GMAW processes were studied by (Kim, et al., 1996) to examine the effect of input parameters on weld process. Later many studies on weld bead were carried out through using different analyses such as multiple regression analysis (Tarng, et al., 1998; Lee & Rhee 2000; Lee & Um 2000; Jeongick & Kiwoan, 2000) to predict the influence of process parameters on weld for the GMAW. Artificial Neural Networks (Nagesh & Datta, 2002; Kim, et al., 2002) were used to predict the weld bead geometry and penetration in shielded metal-arc welding. The extraction data of multiple regression technique are used in artificial neural network to determine shear wave velocity of carbonate reservoir (Eskandari, et al., 2004). In industry, stainless steels are commonly used as a selection material due to its corrosion resistance. Classification of stainless steel types are varied between ferritic, austenitic, martensitic, precipitation-hardening and duplex stainless steels. These steels are identified based on their micro structure and major

crystal phase. It possesses potential properties such as high mechanical properties, high fatigue strength, good weld ability, low coefficient of thermal expansion and withstand corrosion [4]. These properties allow steel to be applied in different areas such as cargo tanks, pipe systems in chemical tankers, bridges, pressure vessels and heat exchangers. Generally, welding parameters can be chosen according to the previous experience or by trial and error method decided by welders. After conducting trial the welds, the welds are inspected whether it meets the joint requirement or not. The above constraints have been overcome by design of experiment technique. It develops correlation between input process variables and output. Optimization of welding process is essential to achieve desired bead quality [5]. A stainless steel clad quality is used by (Kannan and Murugan) [6] to study the effect of flux cored arc welding process on weld bead quality, through analyzing the input parameters. Among the input weld parameters such as current, speed and voltage were considered as significant parameters in SMAW and the parameters of weld geometry such as width, height and total area were taken as output values.

## 2. Welding Parameters

The welding process variables are totally affected on weld quality [7]. Therefore, obtaining weld bead geometry of high strength and good quality will depend on how to match between input parameters [8]. Arc welding as many welding processes, uses most of these common variables such as AC or DC current, speed, voltage, electrode dimensions, type and dimension of flux layer and polarity as input variables. The extent of base metal fusion is directly influenced by welding current, while both shape depth of penetration are affected by the type of electrode diameter. As shown in Figure 1, the diameter of the weld bead consisting of bead width ( $W$ ) and reinforcement height ( $H$ ). The weld exhibits more brittleness compared with the parent materials, so it is necessary that the weld bead be large enough so that a distance which is measured from the root to outside weld is shortest through the parent materials not through the weld bead. However, minimum bead width is recommended due to reducing wastage of the weld electrode and thereby consuming more time.



**Figure 1** Weld bead (width and Height)

### **3. The Technique of Artificial Neural Network**

Nowadays, artificial neural network (ANN) is considered to be one of the most adaptable intelligent techniques consisting of simple elements operating in parallel, which are specifically adapted by human nervous systems trained to perform a sub particular function by adjusting the values of the weights to be connected between elements and then create a complex input/output relationship. In addition to linearity, this technique has ability to create nonlinear mapping and then performing continuous nonlinear functions, which can be used to model welding process. Traditional linear models are simply inadequate when it comes to modeling data that contains non-linear characteristics. In artificial neural network, several techniques can be performed to model welding process such as multilayer perception (MLP), radial basis function (RBF), and self-organizing map (SOM), however the most common is the multilayer perception (MLP) [9]. The last technique of ANN requires proper output values in order to learn, which allow this technique to be a supervised network. With back propagation algorithm, MPL is widely used because of its simplicity and great forecast ability in the weld modeling [10]. The goal for this type of network is to create a model based on historical data to continuously correct maps and to produce the desired unknown values. The final adjustments of weight parameters can be identified by ANN through iterative training of theses parameters. Many artificial intelligence methods can be efficiently performed as a key technique for monitoring and controlling of welding process, such as ANN, fuzzy logic ...etc. Examining weld strength due to pulsed metal inert gas welding have carried out by Sukhomay Pal et al. [10], which the process parameters with the root mean square (RMS) measurements of welding current and voltage, were used as input variables of the model and the ultimate tensile strength of the weldment plate was considered as the output value. A multilayer neural network was developed to estimate the ultimate tensile strength in weld plates. They compared the output obtained from multiple regression analysis with the developed artificial neural networks models and concluded the powerful of ANN model against multiple regression analysis. Another work to study the weld bead geometry and penetration through considering current, voltage, speed and electrode dimensions as process parameters was done by using ANN model in order to study the influence factors for electric arc welding [11].

Finally, solving complex and difficulty issues can be overcome by the capability of ANN, as this approach apply successfully to investigate the weld geometry of titanium alloy [12]. A

study which adopted multiple regression analysis with back propagation was done through modeling of bead height for metal arc welding process. The result indicate that the back propagation neural network considerable more accurate than multiple regression [13]. On the other hand, most of studies are reported that artificial networks are efficient technique which can be performed for analysis and modeling of weld bead geometry, penetration in arc welding [14], [15]. In present work, ANN models have been used by many researchers to understand and predict their targeted information [14, 15]. In the presented work, artificial neural network (ANN) was selected to develop and predict of the weld bead geometry in Shielded metal arc welding (SMAW) for welding of 2205 duplex stainless steel. A neural network algorithm linked with back propagation has been preformed effectively to associate the input parameters with the weld bead geometry.

#### 4. Preparation and Set-up of Weld Process

First, the samples were prepared to be conducted for experiments, which are selected from 2205 duplex stainless steel and were cut by means of electrical wire cut machine, which it shapes and dimensions should match the general standardization of preparing pieces. The dimensions are 150 mm length and 50 mm width, while thickness of piece is 6 mm. The cutting process of the desired length is obtained with the help of oxy-acetylene flame. After proper cut, the pieces were leaved to cool for a couple of hours, then the pieces were put in the position to be weld in pairs so that they remain together during the experiment. By the end of arc weld, the joint parts were welded have V- groove form. The actual range of weld parameters were proposed based on focus external observation of the weld bead. This was carried out by using visual inspection to observe bead smoothness, absence of porosity, undercut, HAZ, penetration etc. The upper and lower limits (1.68 and -1.68) of variables were specified by coding their values, while the intermediate values were determined based on selected suitable equation  $X_i = 1.68 [2X - (X_{max} + X_{min})] / (X_{max} - X_{min})$ , where  $X_i$  is the coded value of the variable of X, which X is considered as a mid value between maximum and minimum values of X [13]. Table 1 shows levels of process parameters.

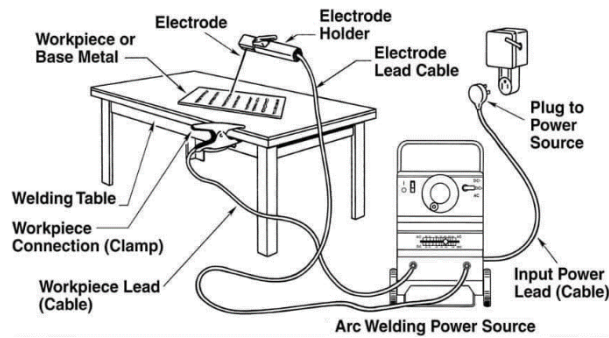
**Table 1** Selected process parameters in SAW

Factor Levels	Welding Process Parameters (units)		
	Welding Current (I) (Amp)	Welding Speed (S) (cm/min)	Voltage (V) (Volts)
-1.68	170	25	28
-1	182	27	30
0	200	31	32
1	218	35	34
1.68	230	37	36

In the present work, 2205 duplex stainless steel plates were joined successfully by SAW process, through using filler wire. The experiments were conducted by set three factors with five levels central composite rotatable design. The data of weld were recorded in the form of a design matrix as shown in Table 2. A full replication of factorial design was applied with six centre and starting points at a distance of 1.68 units measured from the centre point. This result indicates that 10 rows were match up the factorial portion, while 11-18 rows were matched to the axial portion, and the remaining 12 rows corresponds to the central portion. Hence, the experimental design consists of 30 successful trials however few numbers were repeated or neglected. In order to develop mathematical models, many attempts were conducted relating to the relationship between process parameters and weld bead geometry. Response surface method was also conducted to design five levels of experiments, which the effect of process (input) parameters on weld bead geometry was clearly identified. Also, a 30 number of experiments allow to study and explore the effect of butt weld process on weld bead geometry, and permit the values to be used as an input command to the artificial network model of weld process. This paper presents a neural network model in order to predict weld bead geometry for input process parameters in 2205 duplex stainless steel butt weld deposited by SMAW. The selected input parameters were welding current, welding speed and circuit voltage. The chosen output parameters were weld bead width, reinforcement and total area. The design simulation of weld was done after developed of forward neural network trained by back propagation algorithm.

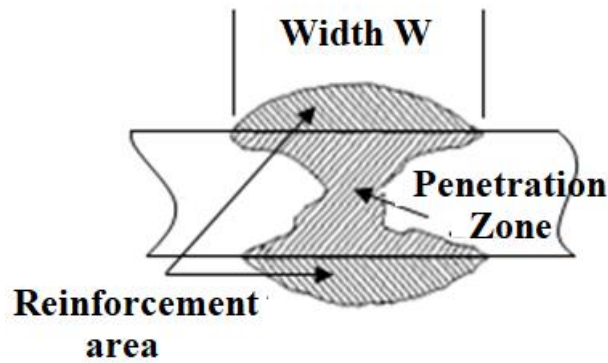
## **5. Experiment Work**

As shown in Figure 2, the experimental part was setup which consists of a power source of MEMCO 600 MMR semiautomatic welding equipment with constant voltage rectifier, filler wire feeding unit with shielding gas flow control, welding gun and a manipulator which guides to deposit the filler metal on the selected area. The work table which is equipped by two independent controllers of two axes is connected in order to help for locating the right position of welding region.



**Figure 2** Sketch of welding machine and their equipments

A total of 30 experimental trials follow with 5 factors, 3 levels, 1 center point design of experiments were performed in order to establish the effects of arc welding parameters on weld bead geometries. The size of each plate was  $150 \times 50 \times 6 \text{ mm}^3$ , which these plates were joined using butt weld with a root gap of 2 mm using flux cored 2205 duplex stainless steel wire of 1.2 mm diameter. Shielding gas containing 75 % Argon, 2 % Oxygen plus 23 %  $\text{CO}_2$  with a gas flow rate of 20 per minute was maintained. Plates were welded on both sides keeping electrode-to-work angle as  $90^\circ$ . The temperature at inside weld was maintained at  $150^\circ \text{C}$  and it was measured by infrared non contact digital thermometer. To reduce systematic error that can be expected to set up into the system, a random welding trial was conducted relating to the design matrix. All experiments (30 trials) were cross-section cut at their mid-point and specimen of size  $10 \times 10 \times 6 \text{ mm}^3$  was obtained from each welded plate. A typical cross sectional view of a weld bead is shown in Figure 3. During tests, the process parameters of weld were seen regularly to avoid any change could be happened during test. After end of weld process and prior to cool state, the slag was removed to leave weld in pure condition. Weld width and reinforcement height were measured using accurate caliper of least count 0.02 mm, then total area of designed matrix was calculated by using a stop watch and weighting machine, the metal deposition rate was also calculated.



**Figure 3** Weld bead cross-sections

## **6. Proposed Artificial Neural Network Model**

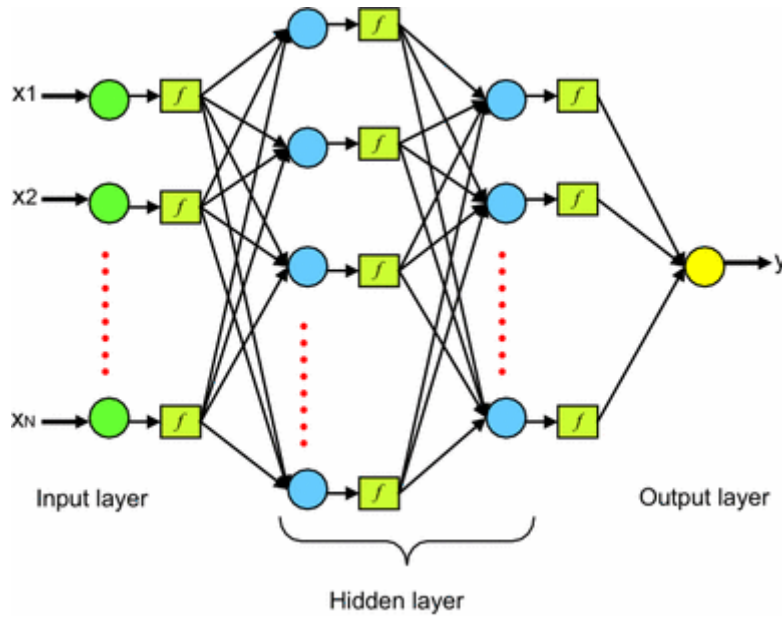
As mentioned before, a neural network model is used to build a map and set of input patterns to a corresponding set of output patterns by the concept of learn, based on previous input/output data examples related to each other. In industrial and manufacturing fields, traditional linear models are found to be inadequate when it performed modeling data contains non linear characteristics. Therefore, using neural network is a key solution to have ability to represents both linear and non linear relationships, also has capability to learn these relationships directly from data being modeled. This gives advantage to the ANN technique to be simple, low cost effective and high ability to learn from many industrial applications. In general purpose, the developed model by ANN should includes a collection of database, pre-process and post process of input/output data, simulation and train of neural system for prediction demand [16]. One of the issues faced by neural network model is how to choose optimum network architecture. This can be overcome by makes proper arrangement of neurons into layer and connect pattern between these layers, as the network structure consist of input, hidden and output layers. Input layers receive weld process parameters and the output layers obtaining and providing the values of bead geometry, while hidden layers between the input and output is considered as block box [17]. Designing an architecture structure with a no of hidden layers having neurons inside these layers will reflect the performance of the neural network. Hence, optimal design structure can be confirmed due to many attempts that carried out based on the number of hidden layers. To accommodate the convergence error, trial and error method was used to conduct the required hidden layers and neurons of the design model and then to get an appropriate structure of the weld bead geometry [13, 22]. The feed forward neural network structure was modelled, which include three neurons in the input layer, one hidden layer and three neurons in output layer using



MATLAB Neural network toolbox [18, 19, and 23]. With the aid of back propagation (BP) algorithm, the model was trained to represent an approximation of regression non linearity. It is important to know here, that most researches are implemented their models by using (BP) in order to predict weld parameters of neural network processes. It was trained with help of back propagation (BP) algorithm. BP is essentially stochastic approximation to nonlinear regression. Several researchers were used BP to model welding processes and to predict welding parameters using neural network (NN). Based on MATLAB simulation, the developing models and training of networks were successfully completed. The train is essential to obtain balancing for process parameters to become more feasible neurons and then to reach normalized condition. Under pre processing and to get more feasible, the parameters were normalized and transformed within a specified range varied from 0 to 1 [20, 21]. Since, the normalized value for each raw input/output data set were converted using the following equation as follows:

$$X_n = \frac{[X - X_{\min}]}{[X_{\max} - X_{\min}]} \quad (1)$$

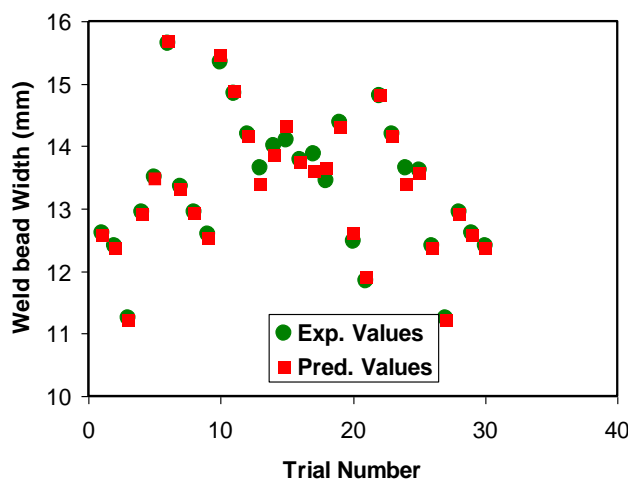
Where  $X_n$  is denoted by normalize value and  $X$  is referred to input/output value, while  $X_{\min}$  and  $X_{\max}$  are minimum and maximum values of input and output respectively. The design model of neural networks structure was addressed to compose of 3 neurons input layer, 5 neurons in hidden layer and 3 neurons output layer. Figure 4 shows a proposed feed forward architecture model that was simulated by neural network. The difficulty prediction for operating process parameters of a non-linear model has some obstacle and may not be able to indicate the reality in determining values, while the use of neural network technique will help to predict the non-linear models due to its high efficient tool [20]. With learning rate of 0.6, the developed models of neural network were trained based on back propagation algorithm that successfully applied to set 25 data, and with up to 10000 iterations. The trained network was necessary in order to reduce the percentage error. The network is trained for 10000 iterations and the developed was tested out of testing dataset. As listed in Table 2; the percentage error was also calculated between the experimental and predicted value. The results indicate that the percentage error is ranging between  $\pm 2.62$ . At the end of this training process, it was concludes that the developed neural network model, have high accuracy and more reliability for predicting of weld bead geometry.



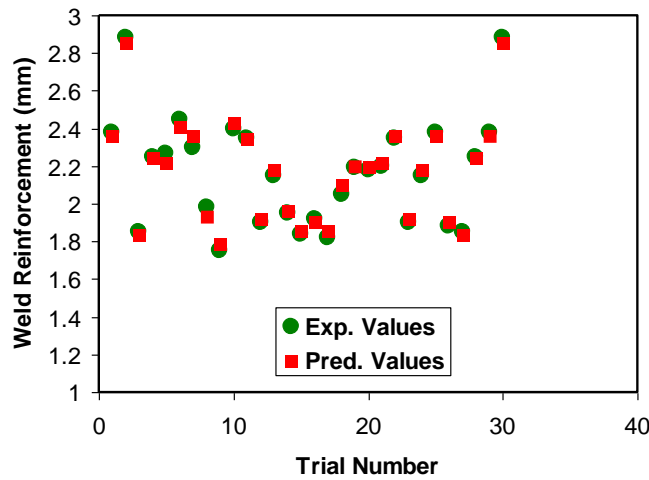
**Figure 4** Predicting of weld bead geometry by proposed neural network architecture

## 7. RESULTS AND DISCUSSION

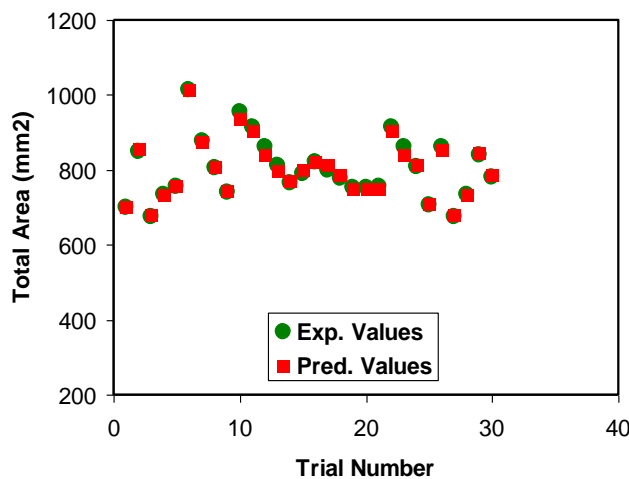
Study the effect of parameters on weld bead geometry was investigated experimentally and plotted on the following figures. Figure 6, 7 and 8 shows the measured weld bead width, reinforcement and total area from the experiment and then predicted output values using ANN in the form of feed forward neural network model with back propagation algorithm. The results were predicted from the best architecture of neural network, so the predicted values were very close to experimental values. It can be observed from the convergence between predict and experiment values that the percentage errors determined between them are low and within acceptable condition as listed in Table 2, hence the ANN was able to predict the weld bead geometry with good accuracy.



**Figure 6** Comparison between predicted and experimental weld bead width versus the number of trials network model



**Figure 7** Comparison between predicted and experimental weld bead reinforcement versus the number of trials network model



**Figure 8** Comparison between predicted and experimental weld bead areas versus the number of trials network model

## 8. CONCLUSION

The simulation model of the welding process of Shielded metal arc welding (SMAW) was carried out based on feed forward artificial neural network structure (3-5-3) to extract weld bead geometry from predicting the effect of input parameters. A multiple sets of data were used to train the network in order to predict the geometry of weld, minimize the percentage error that can be initiated during tests and to benefit from artificial neural network to predict the quality of weld. In general, the predicted results and the results from experiments are compared, which show good agreement. However, process parameters such as speed have opposite effect on all weld parameters. In experiments, increasing speed substantially reduce heat, lower burn off rate

and minimum the deposition at weld joint so affect weld bead parameters. It was seen that weld height and width are proportional to the amount of input current, which means that input high current leads to increase in height but decrease in width. Also, it was observed that the weld bead become wider as received high amount of voltage. At end this work shows that it is possible to use neural network in order to predict the weld bead geometry. The proposed neural network has the modeling competence with average accordance ratio of 93.5 %, which allow the ANN to have powerful and alternate technique to predict weld bead geometry, and hence permit it to include other parameters such as polarity, type of current and flux geometry. Furthermore, it was recommended to set the neural network as a technique used for real time work.

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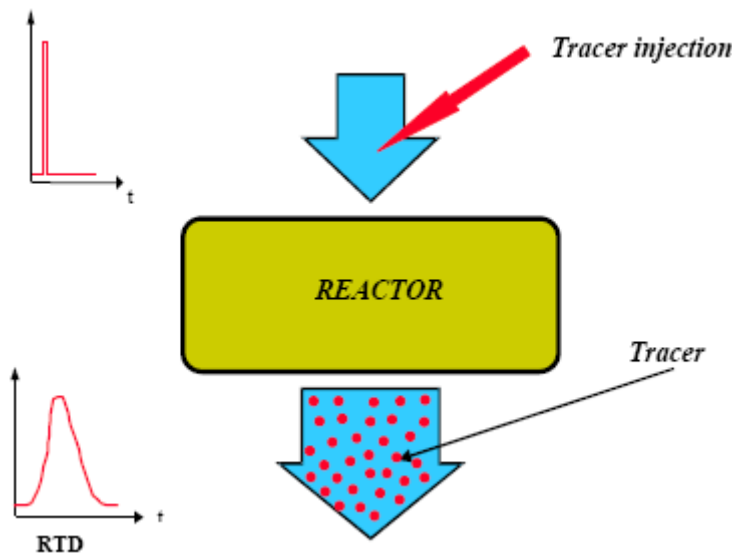
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**DIAGNOSIS OF RADIOTRACER PROCESSES****Çiçek ABBASOVA**

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**INTRODUCTION**

A tracer is any substance whose atomic or nuclear, physical, chemical, or biological properties provide for the identification, observation and following of the behavior of various physical, chemical or biological processes (dispersion, mixing, kinetics and dynamics), which occur either instantaneously or in a given lapse of time (Fig. 1). There are many kinds of tracers. The radioactive tracers are mostly used for online diagnosis of industrial reactors. For conducting a radiotracer investigation, various requirements need to be met before starting the actual test. The most important of all the requirements is the “*Radiotracer*” itself. It is of fundamental importance that the radiotracer compound should behave in the same way as the material to be traced. Therefore, the selection of an appropriate tracer is crucial to success of a tracer study. For reliable and meaningful results, an industrial radiotracer must meet the basic requirements such as suitable half-life and energy of radiation, physical and chemical stability, easy and unambiguous detection. It is often difficult to meet all the requirements of an ideal tracer and certain compromises have to be made. Even if a radiotracer meets the required criteria, it may not be available to tracer groups in developing countries.



**FIG. 1.** Tracer principle

The behavior of tracer under conditions of the system (physical & chemical conditions) is very important. One must know, before injecting a tracer, how it will behave in the system. In certain circumstances, the tracer injected into a system may undergo decomposition, phase change, undesirable absorption and adsorption, chemical interaction with system constituents leading to incorrect results. For example, para-dibromobenzene when used at high temperature is adsorbed on the surfaces or packing inside the reactor vessel and does not follow, faithfully, the organic liquid phase.

While tracing fluid movement in oilfield (inter-well tracing), the reservoir physical and geochemical conditions pose constraints and an undesirable tracer-loss or delay occurs. Sometimes, tracers found to behave properly in one reservoir, may not behave satisfactorily in another reservoir. While tracing aqueous phase (in a liquid/solid phase system like, waste water treatment plant, oil reservoirs, etc), cationic tracers, with certain exceptions, may lead to problem of sorption and ion exchange with host material. Leaching and flotation are main processes for enrichment of ore minerals, in particular for gold and copper ores. They are hydrodynamic processes and their efficiencies are directly related to the time raw materials spend in the processing vessels (leaching tanks or flotation machines). To fully diagnose these processes the distribution of the time it takes for the material to process from the inlet to the outlet has to be known. RTD function provides the necessary parameters to diagnose the process or to design a proper unit. The comparison of the measured MRT with the expected MRT, as



well as the RTD model obtained from the RTD experimental curve, give the most useful and valid information about the mixing properties and process efficiency.

RTD method was applied in a gold enrichment plant. The most important part of the gold processing plant is the leaching process, which is being carried out in eight processing tanks of the leaching line (Fig.2). The gold slurry (after grinding process) is overflowing from cyclone to the first tank and after it is going through all tanks where gold ore leaching taken place. The overall flow rate through tanks was 100 m<sup>3</sup>/h. Taking into account the importance of the leaching process in final gold recovery the RTD method was applied to diagnose the process functioning throughout the processing tanks. The main objectives of the radiotracer investigation were:

- to measure the slurry retention time of tanks 1 (volume 500 m<sup>3</sup>), 7 and 8 (volume 250 m<sup>3</sup> eachone), as the most important tanks in leaching process,
- to judge about macromixing of slurry within these tanks,
- to locate possible malfunctions inside the processing tanks.

Potassium bromide K<sup>82</sup>Br liquid radiotracer was used to investigate the leaching tanks in the plant. The radiotracer was prepared at the nuclear reactor. The activity of radiotracer injected in the tank 1 was 100 mCi at the injection time, while the activity of radiotracer injected to the inlet of tank 7 to diagnose both tanks 7 and 8 was 130 mCi.



**FIG.2.** Tracer experiment in gold leaching tanks

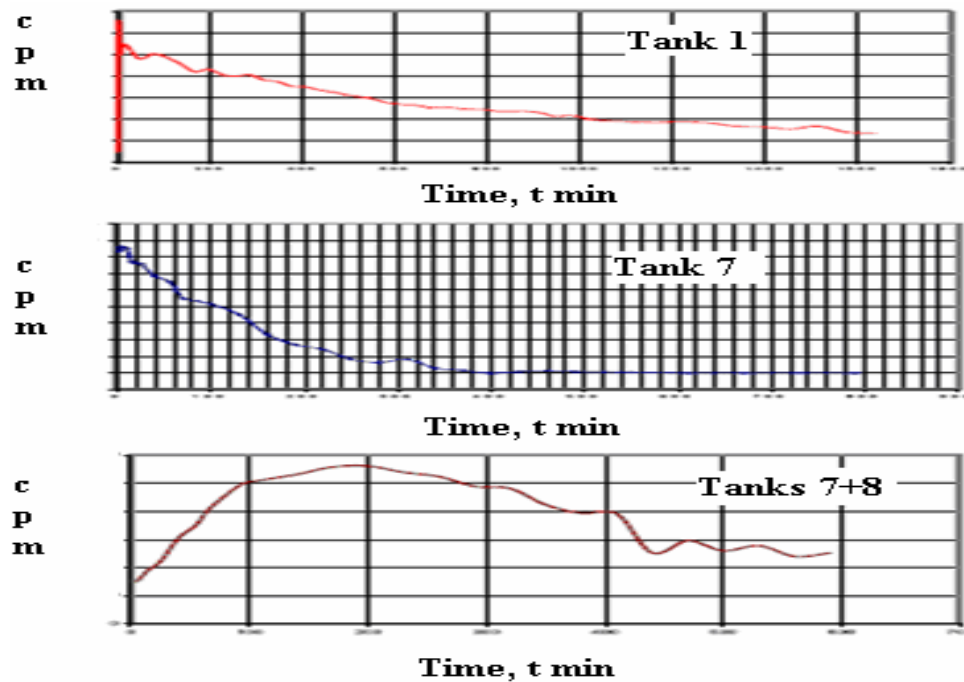
<sup>82</sup>Br as potassium bromide is a good tracer of water phase. In fact the tracer is following the water phase, but it is quite representative of slurry flow as well because it is already proofed that fine solid grains of less than 100  $\mu\text{m}$  are moving in the same way like water. <sup>82</sup>Br has a lifetime of 36 hours, so the samples should be measured along the experiment run.

Immediately after injection the sampling process started collecting 2L of slurry and taking water phase for off-line radiotracer activity measurement with a portable NaI(Tl) detection system installed near by (Fig.2).

### ***Results of radiotracer tests***

The sampling interval was selected according to the expected mean residence time distributions in these tanks. Just after radiotracer injection, the sampling interval was 1 minute for 10 minutes; after that an interval of 10 minutes was kept for around 850 minutes that lasted the test 1 (tank1), and for around 600 minutes during the next day test in tanks 7+8. All the count rates were corrected for radioactive decay and background, and were presented in counts per minutes(cpm).

The experimental curves obtained in tanks 1, 7 and 8 are presented below (Fig.3). The experimental curves for tank 1 and tank 7 represent the RTD curves for these tanks respectively, while the third experimental curve shown in fig. 70 is the response of both tanks 7 and 8. The mean residence time for tank 8 was calculated as difference of MRTs of two last curves.



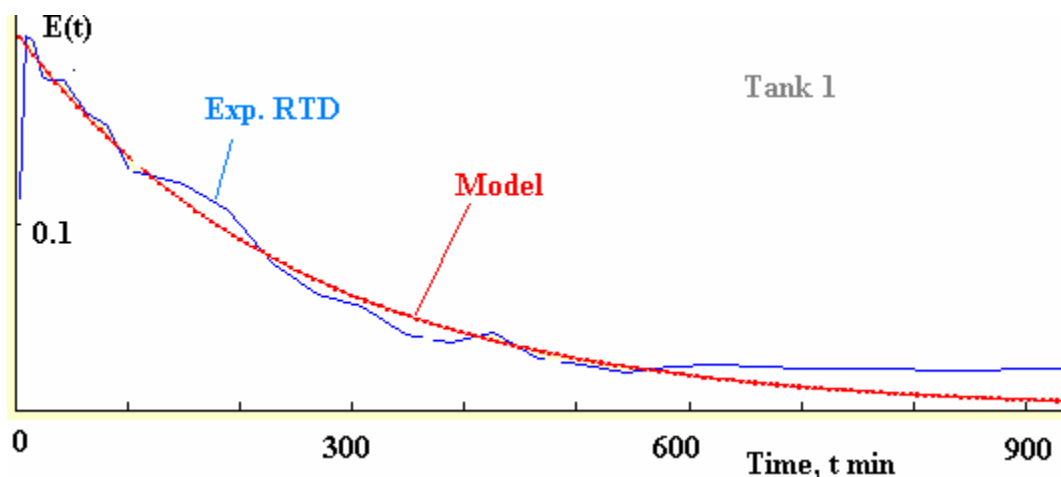
**FIG. 3.** Experimental RTD curves obtained in tanks 1, 7 and 8.

## DISCUSSION OF RESULTS

The higher narrow peak at the beginning of the experimental RTD curves, just few minutes after the radiotracer was injected, shows the by-pass or short-circuit that happen in the tank 1 and 7, that means reflect transport of slurry from entry to exit very quickly by surface flow mechanism without any mixing inside tanks. This surface flow is more evident in tank 1.

The general common characteristics of two first experimental curves (for tanks 1 and 7, fig.2) are the exponential decreasing of the main part of the curve with a relatively long tailing, which does not follow the main exponential decreasing. The main exponential curve represents the main flow of slurry inside the tanks and shows a perfect mixing process that occurs only in one part of them. In tank 1 the mixing is perfect in 87 % of the total volume, in tank 7 in only 70 %, and in tank 8 in 73 % of the total volume. The long tail of experimental curves shows clearly the stagnant volume where radiotracer (and slurry) is staying longer being released at a lower rate than the bulk slurry from the tank. This is an anomaly of the tank performance, which is more problematic in tanks 7 and 8 (nearly 30% of total volume is almost dead, and might be blocked by the solidified material (slag) as well).

Modeling of complex flow in leaching tank 1 was performed using a combined model of perfect mixer with exchange and surface flow (by-pass). RTD software was applied and the result of modeling is shown in figure 4. It seems that the model fits well with the experimental RTD curve.



**FIG. 4.** RTD model for tank 1: perfect mixer + exchange with stagnant zone + surface flow

From the model it was estimated that the surface flow consists of 3-5 percent of total flow rate in tank 1. The modeling of tank 7 gave the surface flow rate of and 1-2 % of the main flow.

## CONCLUSIONS

Radiotracer provided all parameters needed to diagnose the functioning of leaching process. Tanks were mixing the slurry well but not in all their designed physical space, some dead zones were found, which were estimated to around 13 % for tank 1, and 27-30 % for each tank 7 and 8. A surface flow transporting overflow slurry from inlet directly to outlet without mixing and processing it within the tank was observed. This surface flow rate is relatively small and more evident in the first tank (3-5%), in tanks 7 and 8 the surface flow rate was smaller 1-2 % of the main flow. The dead volume and surface flow are influencing negatively in gold recovery rate, keeping it lower than designed. These anomalies can be eliminated or at least reduced modifying the mechanical design of tanks to mix better slurry in all physical volume; extension of stirrers down towards tank bottom was recommended. From observations and results it is evident that the downcomer pipe (150 mm in diameter and 20 cm below surface of material) is not sufficient. It is recommended that downcomer diameter be increased to at least 250 mm and extent to approximately 2-3 m from the bottom of the tank. This will reduce also the by pass flow. Another additional way to reduce by pass is construction of baffle between inlet and outlet.

**DRIVING FORCES AND BARRIERS IN THE IMPLEMENTATION OF GREEN  
ADAPTION STRATEGIES OF ACCOMMODATIONS: THE CASE OF CAN THO,  
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**ABSTRACT**

The objective of the article is to evaluate driving forces and barriers in the application of environmental friendly policies and the implementation of green adaptation strategies of accommodations in Can Tho City. Based on data collected from a survey of 134 senior managers of accommodations in Can Tho, the research results show that: (1) There is a huge difference in the number of green adaptation strategies in the group of small and large-size accommodations; (2) Accommodations are most concerned about investment costs when implementing green adaptation strategies, but according to practical assessment, low-cost strategies have not been focused.

**Keywords:** Green adaptation strategy, driving force, barriers, size of accommodation facilities, senior management.

## **1. INTRODUCTION**

Many experts acknowledge that implementing a formal environmental policy or environmental management system (EMS) is an effective green adaptation strategy. EMS is a management system that aims to encourage an organization to control its environmental impacts and reduce them on an ongoing basis. Research shows that some of the main reasons for hotels to adopt EMS include environmental concerns, economic reasons and to gain a positive image (Chan, 2008). Brown (2010) also argues that hotels with formal environmental policies or EMS tend to achieve better environmental performance.

Several subsequent studies continue to support the urgent need to adopt greener practices in the hospitality industry (Han, 2015). This is because more and more consumers accept the idea of using environmentally friendly products and services in the context of hotel operations (Kim & Han, 2010). This up-and-coming market has encouraged leading hotels to adopt greener approaches to gain a competitive advantage.

However, to be successful, an accommodation may need to consider barriers to green practices before committing to green practices. Chan (2008) highlighted a number of pressing issues including lack of skills or knowledge to go green, lack of facilities, increasing costs and unstable outcomes.

The study was conducted with the aim of assessing the driving forces and barriers in the adoption of eco-friendly policies and the implementation of green adaptation strategies of accommodation establishments in Vietnam. Can Tho, Vietnam

## **2. DEFINITION OF GREEN ADAPTATION STRATEGY**

With increasing awareness of the environmental burden created by hotels, green adaptation strategies in the hotel industry have begun to receive much research attention. There are different definitions of the term “green adaptation strategy” or “environmental strategy”. Carmona-Moreno et al. (2004) view green adaptation strategy as the strategic direction that a company gives to environmental questions and how they use them as a competitive tool. Latan et al. (2018) consider a green adaptation strategy as a set of initiatives that can reduce the impact of activities on the natural environment through corporate products, processes and policies such as reduce energy consumption and waste, use green resources sustainably and implement an environmental management system. Based on these definitions, this study defines a green adaptation strategy as a strategy adopted by an organization to reduce or minimize the environmental impacts of its activities on the natural environment. Course

### 3. RESEARCH METHODS

By method of expert interview, senior managers of high-ranking hotels in Can Tho were asked to assess the relevance of the set of criteria on green adaptation strategy. The criteria after being approved on the suitability for the study area will be continued to be used to conduct a survey of 134 managers belonging to 134 different accommodation establishments in Can Tho. The subjects interviewed for the study were the hotel managers/owners. Sample was collected mainly in Ninh Kieu district, some participants came from Cai Rang, Binh Thuy and Phong Dien. The survey was conducted in November 2021.

Descriptive statistics method is applied in this paper to summarize data on driving forces, barriers in adopting environmentally friendly policies and implementation of adaptation strategies. green of accommodation establishments in Can Tho

### 4. RESEARCH RESULTS AND DISCUSSION

#### 4.1 Reasons to motivate accommodations to adopt eco-friendly policies

Driving forces can be divided into external and internal forces. External forces include those generated outside the company; such as from the macro environment: political, economic, social, technological, legal and environmental (PESTLE analysis) (Kew & Stredwick, 2005) as well as from the microenvironment: suppliers, competitors, customers, marketing intermediaries and the public. Internal forces refers to the forces inside the company. Some potential drivers are discussed below.

**Table 1.** Statistics of driving forces for accommodations to apply environmental friendly policies

N <sup>o</sup>	Reason	Frequency	%
1	Law regulations	80	59.7
2	Promotion of the accommodation's green image	101	75.4
3	The hotel's governance system promotes the hotel's CSR implementation	45	33.6
4	Attitudes and perceptions of leaders on environmental issues	96	71.6
5	Environmental pressure from customers and business partners	35	26.1

Source: Survey 2021

From the results of Table 1, it can be seen that the reason "Promotion of the hotel's green image" is the most chosen reason, consistent with the study of Chan (2013) indicating that some hotel companies consider compliance with environmental laws is simply an opportunity to promote their green certification.

Next is the reason "Leadership's attitude and awareness on environmental issues" is recognized as an important motivation to apply an environmentally friendly policy, ranked second with 96/134 votes. Therefore, top management's attitude and the importance of environmental strategy will significantly influence their strategic priorities.

Next is the reason "Regulation of the law" with 80 choices. The lowest is 2 reasons: "The hotel's management system promotes the implementation of CSR of the hotel" and "Environmental pressure from customers and partners" with 45 and 35 choices respectively.

#### **4.2 Barriers in implementing eco-friendly accommodation policies**

However, to be successful, a hotel may need to consider barriers to green practices before committing to green practices. Chan (2008) highlighted a number of pressing issues including lack of skills or knowledge to go green, lack of facilities, increasing costs and unstable outcomes.

**Table 2.** Statistics of barriers in implementing eco-friendly accommodation policies

<b>N<sup>o</sup></b>	<b>Barriers</b>	<b>Frequency</b>	<b>%</b>
1	Initial investment costs for systems and equipment	103	76.9
2	Cost of operating and maintaining systems and equipment	63	47.0
3	Lack of advice from experts and management organizations	72	53.7
4	Lack of knowledge and skills on system operation	57	42.5
5	Lack of resources to operate systems and equipment	48	35.8
6	High cost of certification	43	32.1
7	Uncertainty of outcome, efficiency	34	25.4

**Source:** Survey 2021

The biggest barrier in the implementation of environmentally friendly policies of accommodation establishments, which is easily seen from the analysis results of Table 27, is the element "Initial investment costs for systems and equipment". " accounting for 76.9%, this is especially evident with accommodation establishments with small size and low classification rank.

Next is the factor "Lack of expert advice, management organization" accounting for 47%. It shows that in order for accommodation businesses to implement favorable environment-friendly policies, it is necessary to receive support from relevant state agencies and environmental organizations.

Besides, internal barriers such as: "Operation and maintenance costs"; "Knowledge, skills" and "resources" account for the death rate 35.8% - 47%. This suggests that these factors play an



important role in hindering progress when considering the formal EMS. The factors "High cost of certification" and "Uncertainty of results, effectiveness" have the lowest frequency of selection.

#### **4.3 Current status of green adaptation strategy**

In Can Tho, accommodation facilities are currently applying 5 environmental standards. In which, two standards TCVN 4391:2015 are required requirements for star hotels and Decree 40/2019/ND-CP (29/2011/ND-CP, 35/2014/ND-CP, 18/2015/ND-CP) for accommodation establishments with 50 rooms or more. The remaining 3 standards: Asean green label certification, Green Lotus certification and ISO 14000 standard system are the standards that are recommended to apply but not required for accommodation facilities.

Although different certification systems focus on different environmental issues, there are some basic criteria that are addressed by most certification systems. A total of 21 green adaptation strategies are synthesized from a review of previous research papers and from 5 applicable environmental standards. These strategies are further categorized into 14 key areas: water, energy, transport, waste, amenities, hazardous substances, living room, design and building materials, shopping, food service drinks, outdoor environment, corporate social responsibility, guest information, management and employees.

Then, using the expert interview method, 5 experts who are senior managers from high-ranking hotels in Can Tho were asked to assess the relevance of the set of strategic criteria. green adaptation. As a result, 3 criteria were excluded because they were deemed unsuitable for evaluation of accommodation facilities in Can Tho. These are: (1) Using indoor thermostat control system; (2) Use electric boats and (3) Introduce "eco-friendly room packages" (e.g. special room rates for rooms without disposable items). The remaining 45 criteria continued to be used to interview 134 managers from 134 different accommodation establishments in Can Tho. The statistical results on the number of strategies implemented by accommodation facility size are shown in the following table:

**Table 3.** Green Adaptation Strategy by Accommodation Size

Size of accommodations	Green adaptation strategy		
	Frequency	Mean	Standard deviation
Small size (Below 50 rooms)	113	6.63	3.694
Large size (From 50 rooms or more)	21	18.86	10.664
Total	134	8.54	6.965

Source: Survey 2021

Thus, on average, each accommodation implements about 8 green adaptation strategies. For medium-sized accommodations, about 6 green strategies are implemented, and for large-scale accommodations, this number is about 18 green strategies. At the same time, there is a very high standard deviation in the group of large-scale accommodation establishments (10,664). The reason for these differences is that large-scale accommodation establishments (equivalent to 3-star standards) will be subject to more stringent environmental regulatory pressures that require specialized departments to monitor. hotel activities are related to the environment and require the use of environmentally friendly products. Particularly for 5-star hotels, it is required to have a staff specialized in environmental protection management

## 5. CONCLUSION

It can be seen that "Initial investment cost" is the biggest concern hindering the green practice of accommodation establishments. However, the survey results on the implementation of green adaptation strategies indicate that low-cost environmental tactics have received little attention, as evidenced by the frequency of these tactics. accommodation facilities are very low. Thus, it can be seen that if managers realize and take advantage of these activities, it will not cost too much but can increase efficiency in the implementation of green strategies of the accommodation.

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**THEY AND WE – TESTIMONIES SIGNIFICANT FOR HISTORICAL  
GEOGRAPHY OF SERBIA**

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**ABSTRACT**

Irregular migrants (they) have been present in Serbia for more than a decade. They have appeared in groups and communicated in languages unknown to the local population (we). They have consisted of Asian and African peoples. They have leaved the homeland because of wars, economic reasons and search better quality of life. In common is that they are in "passing through Serbia". Their target destinations have located in Western or Northern Europe. In Serbia, they were detained by the COVID-19 pandemic and changes in the European Union's attitude towards migrants. The significance of the paper is for historical geography because it provides information about irregular migrants, which are almost non-existent in the scientific literature of Serbia. Irregular migrants are almost invisible in all statistics, because they refuse to be classified as asylum seekers. They have arrived in irregular ways, therefore it is impossible to state their exact number. The work was created on the basis of facts collected since 2018. Information about irregular migrants was obtained in communication with the population that is in close contact with them or from electronic and written media. Volunteers who have engaged to communicate with irregular migrants have also given precious information. The work showed that the attitudes of the local population differ greatly depending on whether they had direct contact with irregular migrants or not. The local population has both positive and unpleasant experiences. Those who have not had direct contact base their views on prejudice. Therefore, there is a need to devote part of the media space of the public service to these ethnic groups.

**Keywords:** Serbia, irregular migrants, local population, historical geography

## **INTRODUCTION**

Many works deal with refugees, asylum seekers and migrants who have passed through the territory of Serbia during the previous decades. However, there are almost no papers that talk only about irregular migrants and their impact on the population of the Republic of Serbia. This is one of the reasons why it is important to leave evidence of their presence in the historical geography of Serbia. Irregular migrants have been walking around Serbia for more than a decade.

Serbia, like other countries in the Balkan region, is a transit country and a temporary destination, or unplanned waiting room (Bobić, Šantić, 2019). Irregular migration is any movement of the population from one state to another, which is not in accordance with the applicable legislation of the country of origin and the country of destination, as well as residence in a particular country contrary to applicable laws of that country. An irregular migrant is a person who has entered the country illegally without citizenship (Government 2018). As irregular migrants are a special category of the population on the territory of Serbia that "found itself in transit" there, so there are no data on them in any official statistics. There have been sporadic traces of their presence for more than a decade. AS (2012b) states that in 2011, the Ministry of the Interior of Serbia discovered about 10,000 immigrants on the Serbian-Macedonian border. They tried to enter and enter Serbia by train, highway or through the "green" border zone. Some of the immigrants discovered at the border crossing, in an attempt to enter illegally, were returned to Macedonia. Some of them asked for asylum, and with the appropriate certificates, they were sent to asylum centers (in the settlements of Banja Koviljača and Bogovađa). As some did not show up, it means that they abused their right to asylum and continued their illegal journey to rich EU countries. In 2011, about 1,100 illegal migrants were returned to Serbia from Hungary. The turning point happened in March 2016, when the borders and passages to the European Union were suspended for these people. Everyone was offered asylum. Some accepted it and some did not because they hoped to open the borders.

The presence of irregular migrants affects life in Serbia both directly and indirectly. Irregular migrants are mostly talked about by those who have been in contact with them, followed by the media, and are less frequently sporadically mentioned in scientific papers. The population in whose local environment the reception centers are located had the most contacts with them. Some information can be obtained from those who are in direct contact with them, such as volunteers, government officials, members of non-governmental

organizations, security guards, soldiers, doctors and others. That is why this paper seeks to leave a testimony of their presence.

It is not possible to say with certainty how long they will be on the territory of Serbia. The only thing that can be understood is how their presence affects the local environments in which they live. The Covid 19 pandemic has attracted so much media attention that monitoring the presence of this population group in Serbia has been minimized. The idea of the work came from the stories of the population living near the border or the reception centers where irregular migrants are accommodated. Their presence affects the quality of life of the domicile population. Time will tell what consequences it can cause. It is indisputable that leaving a written trace about this group of people can gain significance in the future.

## **METHODS**

Generally known facts about irregular migrants were taken from the Office for Migrants and literature sources. Part of the research refers to the facts found in the media, obtained from the volunteers of the Center for Protection and Assistance to Asylum Seekers, and part consists of those obtained in communication with the population living near the reception centers. It was noticed that the population is reluctant to talk about migrants, but also about the reasons why this is so. The answer was most easily obtained from people who were in some way damaged by their presence.

Several direct semi structured interviews were done. The facts were collected between 2018 and 2022. Some respondents spoke from memory about events that happened even 5 years ago. All participants are inhabited in Serbia. Participants are divided in two groups. Respondents from the first group had contact with migrants, while the second group of respondents had those who had no contact with migrants. Respondents' profiles are given in brackets, so that the first data are gender (male or female f), age, location where the respondent lives, last two digits of the year when the statement was taken, contact (c - had contact or w - no contact).

### **Who are irregular migrants?**

AS (2012b) writes that it all started in 2009 when there was a big conflict between immigrants, police and the local population in the Greek port of Patras. Through Patras, immigrants illegally entered trucks that were transported by ferry to Italy, traveling to the West. There were no border controls because both countries are members of the Schengen

Agreement. Tighter controls when boarding ships have resulted in illegal migration changing to a route from Greece via Serbia to the West. ‘Arab spring’ (Bayat, 2013; Ribas Mateos, 2016; Bani Salameh 2019) has certainly significantly contributed to the mass migration of people from Southwest Asia and North Africa to Europe.

Back in April 2009, it was stated that the largest number of illegal migrants and asylum seekers enter the Republic of Serbia on the border with Macedonia and through the administrative border with Kosovo and Metohija. They have been observed at legal as well as illegal border crossings (AS, 2010). Irregular migrants are young men, often minors, or men in their thirties, and rarely people over the age of sixty. Among them is a family with small children and pregnant women. According to Mijatović, Nedeljković (2013), juvenile irregular migrants were also ordered. Drašković et al. (2019) talking about the position of particularly vulnerable categories in transit, testifying to the presence of unaccompanied minors, girls and women, and psychiatric users among irregular migrants. AS (2012) states that some of them seek asylum, while the vast majority only transit through the Republic of Serbia. They reside in the suburbs of settlements, abandoned hangars, and closed buildings or near abandoned factories and landfills. Some have money and rent apartments or small rooms to shelter from harsh weather conditions and people. For that reason, it was said for a whole decade (2009-2019) that the number of this group of people was constantly changing.

Lukić (2016) called all migrants on the Balkan route irregular, referring primarily to those who stopped to rest or renew contacts. According to Šelo Šabić (2017), 800,000 migrants passed through the territory of Serbia in 2015 and 2016. They used different means of transportation. According to Denda (2014), they are grouped into three categories: economic reasons (the Maghreb countries), fleeing from war, oppression, disagreements with the political regime (Syria, Eritrea, Afghanistan, Sudan) and combined reasons that are seen through danger from armed conflicts and the need for a better life, education (Somalia, Nigeria). During the research, in addition to the mentioned countries, the respondents stated that they also met with people from Iran and Pakistan. According to Beta (2013), immigrants from Algeria and other North African countries were also noticed, and the APC (2015) also mentions those from Morocco, Sri Lanka and Bangladesh. In the 2018 Strategy, the government states the structure of identified irregular migrants in 2016. That year, the majority were Afghans (38%), followed by Iraqis (32%), Syrians (11%) and Pakistanis (6%).

Solarević & Božić (2018) wrote that residents feel some fear and discomfort due to the arrival of migrants and refugees, which can be associated with a strong perception of their behavior, as well as religion, language, culture and hygiene, that is, cultural and behavioral patterns that are unknown to many people and are very different from those in Serbia. Laloš (2012) writes that cameras have been set up on the border between Hungary and Serbia. They catch even the slightest movement for miles around, and patrol helicopters and patrol boats stand ready at the ready if anyone just tries to get through the European ramparts. Until the construction of the "wall" on the Hungarian border (Székely & Kotosz, 2018), in September 2015 (Silaški & Đurović, 2019), there were illegal crossings. However, the "wall" kept some in Serbia. Fence along the border is 174 km long (Šantić et al, 2017). This closure caused redirecting the refugees towards Croatia and Slovenia. In November, the first joint restrictive measures were adopted by Croatia, FYR Macedonia, and Serbia as a result of Slovenia's request to redirect migrants from non-war torn countries back to Croatia (Šelo-Šabić & Borić, 2016). On March 2016, most of the countries on the Balkan Route have announced that their borders were definitely closed to irregular migrants (Commissariat for Refugees and Migration, 2016). However, irregular migrants, especially families with children, were released in small numbers every day until 2019, ie until the outbreak of the Kovid 19 pandemic (Babić & Majer, 2020). During 2020, a fence was erected between Serbia and Northern Macedonia (Đukić Pejić, 2021), and it is noticed that in 2021, irregular migrants from Afghanistan and Syria arrive from the territory of Kosovo and Metohija, the Kosovska Mitrovica - Raška railway, across the administrative border at Jarinje.

If irregular migrants are mentioned somewhere (in statistical reports), their number also refers to refugees, asylum seekers, and migrants. Irregular migrants are not visible in the legal system. They did not express their intention to seek asylum, and it is believed that they will migrate further. Serbia offers them asylum, with which they get an identity and certain rights, for example, to manage the money they have in their bank accounts. But, according to the Executive Director of the Center for Protection and Assistance to Asylum Seekers (2019), they refuse.

According Galijaš (2019) even if a report is filed, those responsible for the violence go unpunished, precisely because they have no legal status. If individuals are charged with a criminal offence or are caught at an illegal border crossing, the law stipulates that they should be deported from the country. But this measure is futile both in Serbia and in the



rest of Europe, because there is nowhere the refugees can be deported to: it is impossible to send anyone back to Syria or to parts of Iraq. So, those who break the law continue to live in Serbia, and keep trying to enter the EU.

Todorović (2011) mentions that irregular migrants seek asylum only to avoid penalties for illegal border crossing. The asylum procedure consists of two phases and lasts about five months. With the submitted request, an ID card was obtained with which one can move freely and free medical assistance was provided. Economic refugees cannot get asylum. This is best illustrated by the data received by the BBC (2021) from the Ministry of the Interior, UNHCR and the Belgrade Center for Human Rights, according to which a total of 647,512 irregular migrants expressed their intention to seek asylum by entering Serbia from 2008 to the end of March 2020. (Which does not necessarily mean that they really did), and in the same period only 173 of them were approved.

### **Reception Centers**

According to the Commissariat for Refugees (2021), there are asylum centers at six locations. There are people in them who have expressed their intention to stay in Serbia. In that way, they entered the appropriate procedure at the State Asylum Office. Unlike them, there are irregular migrants in the reception centers. Reception centers are considered transit centers.

At the beginning of the migrant crisis in Serbia, there was one pre-reception center for migrants and three reception centers. The pre-reception was located in the village of Miratovac on the border between Serbia and Macedonia. The first reception centers were organized in Preševo on the border with Macedonia, Kanjiža on the border of Serbia with Hungary and Principovac on the border with Croatia near Šid. As their capacities were not sufficient, others were established.

The Government (2018) announced that in February 2017, there were 12 reception rooms with a total capacity of 6,900 beds. Of that, 5,600 seats are in solid buildings and 1,300 in slave halls. The installation of slave halls in locations closer to the northern borders was a response to the increased needs in the conditions of mass influx of migrants in order to urgently accept and take care of them. After the formal closure of the Western Balkan route (March 2016), between 200 and 400 migrants stayed in the centers. In May 2017, there were 13 operational reception centers) with 6,165 people accommodated. These numbers include irregular migrants, but also asylum seekers.

The latest data that could be obtained show that there are fourteen reception centers in Serbia (Figure). Capacities, depending on the data source, range between 4758-5050 bearings (Table). Data from the beginning of 2019 show that for most, eight out of fourteen, reception centers are not available. The available data at the time numbered 2,338 irregular migrants, which accounted for about half of the projected capacity.

According to research, some reception centers will be closed if there are fewer irregular migrants due to rationalization. Irregular migrants are transferred to other reception centers. In the reception centers, irregular migrants have the right to temporary accommodation, food and water, medical and any other assistance.

**Table** Receptions centers of Serbia

Location	Region	Founded	Capacity	Number of migrants (January 2019) <sup>2</sup>
Subotica	Vojvodina	2015	150	No data
Šid	Vojvodina	2015	600 <sup>1</sup> -210 <sup>2</sup>	173
Principovac	Vojvodina	2015	250	373
Adaševci	Vojvodina	2015	750	715
Sombor	Vojvodina	2016	120	No data
Banatska Topola	Vojvodina	2017	140 <sup>1</sup> - 240 <sup>2</sup>	No data
Preševo	E and SE Serbia <sup>3</sup>	2015	1200 <sup>1</sup>	No data
Dimitrovgrad	E and SE Serbia	2016	250 <sup>1</sup> -86 <sup>2</sup>	No data
Bujanovac	E and SE Serbia	2016	250 <sup>1</sup> -220 <sup>2</sup>	203
Bosilegrad	E and SE Serbia	2016	50 <sup>1</sup> -60 <sup>2</sup>	No data
Pirot	E and SE Serbia	2016	250 <sup>1</sup> -192 <sup>2</sup>	173
Divljana near Bela Palanka	E and SE Serbia	2016	150 <sup>1</sup> -280 <sup>2</sup>	No data
Vranje	E and SE Serbia	2017	140 <sup>1</sup> -250 <sup>2</sup>	No data
Obrenovac	Beograde region	2017	750 <sup>1</sup>	701
Total			5050 <sup>1</sup> -4758 <sup>2</sup>	2338

Source: <https://www.azilsrbija.rs/zastita-i-prihvat><sup>1</sup>

<https://kirs.gov.rs/lat/azil/centri-za-azil-i-prihvatni-centri><sup>2</sup>

<sup>3</sup>E and SE Serbia means East and Southeast Serbia

Galijaš (2019) writes that in practical terms, building refugee centres in Sjenica and Tutin was not an economical solution for the state, as the centres are at about 1,000 and 760 metres above sea level, with snowfall between October and March, making them expensive locations to keep heated. Their physical distance from Belgrade also complicates efficient management. The only excuse for this is that ‘Muslims have it easier in Muslim environments.’

According to Đurović (2019), the conditions in Serbia are different. Conditions in asylum centers are far more decent than those in transit centers. For example, in the transit center in



Adasevci, there are no conditions for a normal life, there is no drinking water. That place is isolated and far from the city center. Single men and orphans are most often accommodated in Obrenovac near Belgrade. Many of them do not have a bed. Migrants and refugees complain about the terrible conditions in which they live, the violence that reigns there, and often the behavior of officials from the Commissariat for Refugees.

Tanjug (2019) writes that the Center for Protection and Assistance to Asylum Seekers (CZA) believes that the existing centers for the accommodation of minors are not adequate and appeals for the opening of a special center for the reception of these children. In July 2019, 300 to 600 migrant children stayed in Serbia without their parents. They were assigned a guardian, provided accommodation, psychosocial support. The most numerous are teenagers between the ages of 14 and 17, and the growth of younger children is also noticeable. Marinković (2020) writes that in April 2020, about 8,800 people were accommodated in 20 reception and asylum centers, of which more than 1,100 were children.

Figure Receptions centers of Serbia



Source: <https://www.azilsrbija.rs/zastita-i-prihvat/>

## RESULTS AND DISCUSSION

There are few scientific papers on irregular migrants in Serbia. The inspiring research of Petrović and Pešić (2017) deserves the greatest attention, but even after it, irregular migrants

continued to move through Serbia. Irregular migrants who are not in the reception centers are known from the media or from the stories of the population. For example, Jevtović and Bajić (2018) analyzed the image of migrants provided by the daily press. Laloš (2012) writes that irregular migrants were visited by some political parties and the Red Cross. The non-governmental organization Eastern European Mission provides great assistance.

Volunteers are the most in contact with irregular migrants. People who apply to volunteer are of different profiles. There are many young people among the volunteers, but there are also older citizens. Volunteers work in different professions and have acquired different levels of education. They are of different property and other status. The motives for their engagement are always a strong need and awareness to help people in need. By their actions, volunteers awaken solidarity. They trigger a wave of change in interpersonal relationships. Volunteers say it would be best for local communities and society as a whole to be based on the principles of solidarity, humanity and respect for human rights. In addition to domestic volunteers, some of the volunteers are young foreign students who are doing professional student internships at the Center for Protection and Assistance to Asylum Seekers (APC / CZA). Pavlović (2016) found that most citizens are compassionate and respectful to migrants, as long as it remains implicit that they will continue their journey.

Krasić et al testify about the integration of people found on the territory of Serbia (2017). They write that around 400 teachers in nine school catchment areas near the asylum and reception centres had received specific training and thorough instruction on how to put the Ministry's 'Guideline' into practice. Special IT-based applications have helped children learn the Serbian language in a separate group, while they have widened their knowledge of all other school subjects through an integrated curriculum which they share with the Serbian children.

According Galijaš (2019) irregular migrants relate how the Hungarian police and military pushed them back to Serbia. She found that there is no prevention of human trafficking or smuggling. Refugees often choose the route through Serbia because they believe it is a safe passage posing little risk to life, and without extensive pushbacks or serious and systematic police maltreatment, they nevertheless have to survive without any institutional or legal protection.

According to the Center for Protection and Assistance to Asylum Seekers, more than 16,000 migrants and refugees entered Serbia in the first half of 2019. More than 37% of them were women and children. At any given time, there are more than 5,000 migrants in Serbia, of which

about 3,000 are housed in state centers. The rest are housed in alternative accommodation, in the open along the borders, in urban cores. In the period from January 1, 2019 to August 31, 2019, 7,396 people expressed their intention to seek asylum, and 14 refugee protections and 15 subsidiary protections were granted. Every day, hundreds of migrants enter Serbia from the direction of Northern Macedonia, Kosovo, Montenegro, while hundreds of them try to leave Serbia every day in the direction of Croatia, Bosnia, Hungary, and even Romania (KzZPiPPM, 2019). According to Galijaš (2019), following the closure of the Balkan route, Serbia began receiving financial support from the EU to cover the migrants' basic needs at the collective centres: health services, clothing, food, water, child-friendly spaces, and informal education in things like sewing or learning the language, and so on. Indeed, between the beginning of the refugee crisis and July 2018, the EU allocated more than 25 million euros in humanitarian aid to Serbia specifically to assist refugees and migrants.

The Government (2018) adopted the Strategy for Combating Irregular Migration in the Republic of Serbia for the period from 2018 to 2020. Savanović (2021) quotes the words of the President of Serbia, who says that 38,226 illegal border crossings were prevented in 2020, which is an increase of 89% compared to 2019. In June 2021, there were 3,977 migrants from Syria, Afghanistan, Bangladesh and Pakistan. That is why Serbia signed an agreement with the EU worth 11 million euros for the needs of migration management. Irregular migrants do not want to stay in Serbia, but they are there until further notice. According to Đurić et al. (2014), based on the 2011 Census and the size of ethnic groups in Serbia, it can be said that there are more irregular migrants than Egyptians, Jews, Armenians, Russians, Turks, Cincars, Czechs and others. People in Serbia know how much the mentioned ethnic groups have left their mark in the cultural, scientific, etc. life of Serbia. The obtained research results will be divided into those found in various media and those obtained by interviewing the population.

Selected facts about irregular migrants taken from the Serbian media

Irregular migrants are most often mentioned in the electronic media. The Center for Protection and Assistance to Asylum Seekers has existed since the end of 2007. The first mention of migrants who did not seek asylum dates back to the beginning of 2012, when they were given help due to frostbite. At that time, due to snow and strong wind in the north of Serbia, in Subotica, about a hundred people were taken care of. A fifth had health problems and frostbite (APC, 2012). The media wrote about the locations of irregular migrants. Laloš (2012) stated that some managed to settle in private houses, while most, while waiting for the opportunity to

cross the well-guarded Schengen border, found temporary accommodation in the city dump. Thus, AS (2012) states that since mid-2011 there has been a ‘Jungle’. She was just one of the stops for hungry, tired and scared irregular migrants. It is located under cardboard and plastic roofs near Subotica, in the north of Serbia. Migrants from Pakistan, Afghanistan, India and Somalia gather and temporarily stay in it. They went to the settlements to buy food and medicine. They were afraid of being arrested by the police or harassed. Places such as ‘Jungle’ were visited by members of the Center for Protection and Assistance to Asylum Seekers and the Eastern European Mission, a local humanitarian organization. They helped irregular migrants to survive, to realize their legal position and existing legal alternatives in the Republic of Serbia. According to the AS (2012a), Pakistanis and Afghans clashed in the illegal settlement of Jungla. One person lost his life. Illegal migrants from Somalia were among them at the time. Rujević (2015) wrote about thousands of irregular migrants waiting at the border between Serbia and Croatia to board a train to Zagreb. Politika (2015) wrote about irregular migrants at the beginning of the most massive crossings through Serbia. She stated that migrants gathered in parks in residential areas, landfills or cemeteries. The media also write about conflicts among migrants. According Sovilj (2017) Serbia showed that negative attitudes towards migrants arose due to security concerns. While many Serbian citizens donated food and equipment, they showed a lower level of readiness to initiate any closer interaction. Beta (2019) quoted the representatives of the Center for Protection and Assistance to Asylum Seekers, according to which irregular migrants from the territory of Croatia return to Serbia every day. Irregular migrants who crossed the border in 2016 were returning from the territory of Hungary. Đurović (2019a) said that it was estimated that migrants who legally wanted to move to Hungary waited for about three years, and during that time lived in Serbia. They were employed in deficient occupations in Serbia and were not in competition with the domestic labor force. Maričić (2020) wrote that migrants from Syria and Iran, by making masks, contributed to the fight against the Covid 19 pandemic. In addition, they assisted the local population in other matters. They were accommodated in the reception center in Bujanovac. Marinković (2020) noted that migrants from Principovac (western Serbia) did not respect the measures of distance and gathering in groups during the Covid 19 pandemic. The Telegraph (2020) pointed out that migrants, in the absence of money, engage in robberies, divide into clans, and clash. According to the portal Subotica.com (2020), problems were registered in Kelebija, Ljutov, Čikerija, Bački Vinogradi. But, according to Lalic (2020), migrants were also

‘targets of attacks’ by the local population. RTV (2021) broadcasts the news of Tanjug that the residents of Gornji and Donji Tavankut and Ljutovo (northern Serbia) received greater security protection from the state. They submitted a petition with 2,000 signatures due to the large number of migrants in their settlements. Subotica police have increased the number of patrols. They include members of the traffic, border police and other police departments. The BBC (2021) reports that 1.5 million migrants have been smuggled along the Balkan route since 2015. It divides smugglers, based on the work they have, into three types. Then, it reveals the prices of movement across the territory of the Balkans, but also across international borders. Đukić Pejić (2021) states that there are traces (food waste produced outside the territory of the Republic of Serbia) of the presence of irregular migrants at the administrative crossing Jarinje. During 2021, more than 68,000 people passed through reception centers in Serbia (RSE, 2022). Islam (2022) writes that officials in Serbia say that in the last few months, more and more migrants from India have joined migrants from other South Asian countries in order to arrive in the European Union on an irregular basis. According to (Mitrović, Maričić, 2021, DW, 2022), citizens of Tunisia and India do not need a visa to enter Serbia, Albania and Bosna and Herzegovina. About 100 Indian migrants live in the Kikinda reception center (northern Serbia) after they were denied entry into the European Union. As RSE (2022) learned from the Commissariat, 4,350 people are staying in 13 active camps in Serbia. Most refugees and migrants in the camps are from Afghanistan (about 35%) and Syria (about 22%). Đurović (2022) also mentions migrants who came from the Maghreb, Somalia, Pakistan, Bangladesh and others. The increased number of people coming to Serbia from Burundi, where they are fleeing due to ethnic and political persecution, is also mentioned. So migrants are present. The latest news tells about their conflicts (Pavkov, 2022), about their self-initiated camps near the border (Ostojić, 2022) and about how concerned the local population is for their own safety. Smugglers are armed (ENS, 2022). Knives, machetes, sabers and boxers, as well as 182 pieces of ammunition of different calibers, were found with irregular migrants (Pavkov, 2022a). Irregular migrants are no longer in the focus of the media. They are mentioned sporadically. However, the population of Serbia, which is not in a position to be in direct contact with them, can only find out through the media that they still exist in Serbia. Residents who were in contact provide their perspective on the story.

### **Survey**



Between answers there are found difference. Generally, more positive responses are obtained from people who had no contact with migrants. The main findings are:

1) What are your experiences with irregular migrants?

Different answers were received to this question. Some are negative (further negative attitudes), such as: 'They rob cottages, steal crops, kill cattle, cause fires' (m, 65, Bogovođa, 18, c); 'My field was in their way, so a trace of their passage was seen in the form of trampled plants' (m, 35, Subotica, 18, c); 'They picked my orchard' (f, 65, Subotica, 18, c); 'The neighbors' laundry disappeared from the dryer that was standing in the yard.' (f, 57, Šid, 18, c); 'There are irregular migrants who are not in reception centers, but are located in settlements that are very close to the borders with Hungary and Croatia' (m, 44, Kelebija, 19, c); 'I heard that they are located in weekend houses near the Majdan water reservoir. They are mostly abandoned during the colder part of the year' (f, 62, Horgoš, 20, c);

Some of the respondents also mentioned positive attitudes (further positive attitudes). 'Back in 2012, we collected clothes, shoes and medicines for these people' (f, 51, Subotica, 20, c); 'I taught asylum seekers to sew and weave. We agreed with our hands and feet' (f, 70, Bogovođa, 19, c); 'They came to help after the flood. I remember they said they came from Algeria, Syria, Senegal, Tunisia, Niger, Congo and Afghanistan. I heard that they also helped in Obrenovac' (m, 68, Krupanj, 18, c); 'A Syrian told me that there is no going back and there will never be again and that with this knowledge he continues to go through life' (m, 28, Presevo, 18, c); 'I will never forget their stories about the war, suffering and fear in the cities they come from, about the torments and problems they faced until they reached Serbia and about the uncertainty in which they live, trying to continue their journey as soon as possible' (m, 28, Adasevci, 19, c); 'I remember when in March 2016, the changed rules border crossing caused so much despair, fear, uncertainty, problems to those who found themselves in Serbia, and their final destination was far northwest of it' (m, 41, Belgrade, 18, c); 'I remember counting about a hundred irregular migrants in the parks around the bus station in April. I heard that they are from Afghanistan, Iraq and Somalia and that they arrived on foot, and that some of them have injuries from the hard road' (m, 29, Belgrade, 19, c); 'I heard that there are about 100 Pakistanis in the forest, including many children. They have problems with food, warm clothes and are exhausted' (m, 52, Sombor, 18, c); 'Irregular migrants are staying in Grafosrem (which is an abandoned factory) trying to cross the border with Croatia. Others come here to get food from an organization that provides them with humanitarian aid every day. It is estimated that there

are about 100 of them around the border, originally from Afghanistan, Algeria and Tunisia' (m, 33, Sid, 18, c); 'I saw them being brought back from Hungary barefoot. Maybe it's up to the authorities, and maybe for some reason they took off their shoes' (f, 24, Subotica, 19, c); 'Even after the blizzard, they tried to cross. I am sorry to hear that they survived the violence before returning to Serbia' (m, 25, Subotica, 2022, c).

This question was not asked to respondents who did not have direct contact with irregular migrants. This may be an explanation for why no answers were identified that could be classified as indifferent.

2) How do you look at migrants?

Negative attitudes - 'I see them as a workforce, with which we are very deficient in some activities.' (m, 55, Belgrade, 18, c) 'When I hear them fighting, killing and dying, they make me angry.' (f, 48, Subotica, 20, c); 'He could be a good neighbor, but not a son-in-law.' (f, 69, Kikinda, 20, c); 'I'm intimidated. One day, about 500 of them crossed the railway (Photo). They went in groups of 10-15 people' (m, 54, Raška, 21, c) 'Ever since I heard about the shootings and read about them being armed, I'm afraid' (f, 70, Subotica, 22, w)

Positive attitude - 'I think that, as Tanja Fajon says, it is inappropriate to raise barriers in the Schengen era and restrict their movement.' (f, 35, Novi Sad, 18, c); 'Human rights and freedoms of movement are endangered, which is one of the basic principles of the European Union' (f, 33, Novi Sad, 18, c); 'I took them food on the route of the road they were passing through and wished them a happy journey. They did not want to stay. We need to help people get where they are going'. (m, 42, Sombor, 18, c); 'I look at people who are willing to do anything to get to their desired destination. Women take off hijabs, children give European names...' (f, 39, Sid, 20, c) 'Irregular migrants have different life circumstances. As they pass through Serbia, some give birth, lose and find family members...' (f, 42, Sid, 18, c); 'Life happens to these people in its positive and negative manifestations' (m, 48, Novi Sad, 22, c)

Indifferent - 'I watch them pass through the city every day, in small or large groups. They don't mind. They act exotic and attract my attention personally' (f, 45, Novi Sad, 21, c); 'I never saw them. I have no opinion.' (m, 31, Negotin, 19, w). They set off on their own. I read somewhere that they got paid for it. It is not clear to me, why didn't they fly over, but walk and pay the smugglers? (m, 26, Belgrade, 18, w).



Photo Migrants in Vladičin Han, Serbia (Dejanović, 2019; photo: Flickr, Freedom House)

3) Do you feel xenophobic?

Positive attitudes - 'I didn't. I see in migrants a new ethnic group in our Vojvodina that can enrich it with its experience, culture, diversity'. (f, 38, Novi Sad, 20, w)

Negative attitudes - 'Yes. I don't like when someone doesn't speak the language I understand. (f, 70, Subotica, 18, c); "Yes, especially when I hear something bad about their behavior." (f, 56, Subotica, 22, w); 'Yes, I do. I doubt that he will leave Serbia. Not because it's their will, but because they fail (m, 34, Horgoš, 20, c). We have few children and they have many. To put it mildly, we will disappear in an instant '(m, 66, Kraljevo, 18, w)

Indifferent - 'Why would I be? I have not met any migrants. I'm not interested in them. (m, 50, Novi Sad area, 22, w)

4) Do you think that migrants have changed something in the life of Serbia?

From the part of the answers received, it can be concluded that the respondents saw some good aspects in the presence of irregular migrants.

Positive attitudes - 'Yes, as one of the volunteers, I had the opportunity to listen to different life stories, to observe difficult and uncertain moments in their lives and thus realize how happy I am to be able to provide them with psychological support and to live in a country where peace

reigns.’ (m, 24, Preševo, 18, c); ‘I know that it changed the life of my friend who is an artist who was strongly inspired by the migrant crisis.’ (f, 29, Belgrade, 19, w); ‘For now, a little, but we could build a museum for them in Vojvodina, an ethno house, and tourism could take on another dimension because of them’ (f, 36, Kikinda, 19, w). ‘Migrants can help with labor shortages’. (m, 72, Preševo, 18, c) ‘They can affect greater road controls. As a taxi driver, I had offers to help migrants, but I refused due to frequent police checks’ (m, 33, Belgrade, 18, c)

Negative attitudes - In 2015, the migrant crisis has closed the Subotica-Szeged railway’. (f, 30, Subotica, 19, w); My neighbors are scared of stories of bad behavior towards the domicile population (m, 38, Šid, 20, w); ‘I think that workers and investors are most afraid of migrants’. (m, 54, Belgrade, 18, c)

Indifferent - ‘Yes. The feeling of their presence. I saw them for the first time in 2015. They pass. They are different. This year there are more of them again. The border is obviously not impermeable.’ (m, 46, Subotica, 22, c) ‘They are not in mine, but I am sure that there are people in their lives who live in settlements where there are reception centers’ (f, 35, Novi Sad, 18, w); ‘I read in the newspapers that some migrant children will go to Serbian schools, and I know that this will change the lives of the children in whose classes they find themselves.’ (f, 32, Loznica, 20, w) ‘It depends on their number, the behavior of the authorities, but also their way of life’. (f, 24, Preševo, 18, w) ‘They certainly bring a new experience to anyone who has any verbal contact with them’. (f, 49, Subotica, 20, c)

5) What do you think, how much the attitude towards immigrants depends on the origin of the inhabitants?

Positive attitudes – ‘I also fled the war and I understand people who simply do not want to live in conflicts in the affected areas’ (f, 67, Bačka Palanka, 21, w) ‘It depends very much, according to the popular one ‘The full does not trust the hungry’’ (m, 69, Šid, 21, c)

Negative attitudes on this issue were not recognized.

Indifferent - ‘It depends. People in Vojvodina who came from somewhere better understand newcomers.’ (f, 54, Subotica, 22, c)

6) Do you expect that the next census will show the presence of migrants on the territory of Serbia?

Positive attitudes – ‘You never know in Serbia’ (m, 36, Belgrade, 19, w) ‘Probably not, because I don't have the impression that there are a lot of them’. (f, 24, Smederevo, 18, w)

Negative attitudes - 'I notice that young and reproductive people are migrating. I would not be surprised if there are as many as are needed to be seen as a separate ethnic group in the census.' (m, 49, Belgrade, 22, c) 'I don't know, only those who organize them know that' (f, 44, Loznica, 18, c)

Indifferent - 'I don't think anyone now knows how the story of these "stuck" people in the passage will end.' (m, 40, Šid, 18, c) 'No, they just want to leave. They are fleeing from one misery and they do not need another'. (m, 30, Subotica, 18, c) 'It depends on who it is. In 2017, we saw them as one group, and they are made up of dozens of different groups.' (f, 45, Novi Sad, 18, c)

Irregular migrants are usually unwilling to communicate. They often do not want to communicate with women researchers. They like to talk to volunteers. They like the presence of a psychologist, because it means the understanding, advice and kindness they receive from people in the profession. That is why the opinion of irregular migrants was obtained through volunteers.

1) Your perception of life in Serbia?

'They don't beat us, they don't break our phones and they don't let dogs on us like in Hungary.' (m, 22, Kelebija, 20); 'Thank you Serbia, may Allah help you.' (m, 30, Preševo, 19); 'Serbia is trying to take care of us. I received the vaccine.' (m, 24, Belgrade, 21); 'We meet basic needs, but our spiritual life is unfulfilled' (m, 19, Šid, 18); 'It is peaceful in Serbia, but rarely does anyone care about us' (m, 32, Subotica, 18); 'I would like to help, to work, just so that there is no war' (m, 26, Loznica, 19)

2) Are you planning to seek asylum?

'No, I don't want to stay here' (m, 23, Sombor, 19); 'No, I want to go to the Netherlands, Germany, France... because I have relatives, friends, compatriots there'. (m, 44, Krnjača, 19); 'Yes, just to make life easier until I move on' (f, 35, Bogovađa, 20); 'I've been looking for it and I've been waiting for it for a month' (f, 22, Tutin, 20).

## **CONCLUSION**

Irregular migrants have been passing through Serbia for more than a decade. They are satisfied with the hospitality, but they do not want to seek asylum. Their desired destinations are further north and west of Serbia. Since 2019, with the onset of the pandemic, the borders of the European Union, which they aspire to, have been closed for them. If they manage to cross



them, they must be returned to Serbia. Their intentions to continue the journey are clear, but the chances of that happening are minimal for now. Every new irregular migrant starts waiting for his luck or chance. Some decide to ask for asylum because it makes their life easier (it provides accommodation, food, medical and psychological protection), but there are also optimists who believe that one day they will reach their desired destination. With a volume of almost 4,000, according to the latest data found, it can be said that they are more numerous than some ethnic groups that have existed on the territory of Serbia for centuries and influence the characteristics of life in it.

It was easier to find interlocutors on this topic in the border areas than anywhere else. The conducted research on the perception of irregular migrants among the population of Serbia gave great differences in the answers. They are most influenced by the experiences the interviewees had with irregular migrants. A large part of the population of Serbia had no contact with migrants and was informed about them exclusively through the media. This part is full of compassion, understanding or completely indifferent. A smaller part of Serbian residents, who were in contact with them, have positive and negative emotions. The positive ones arose as a result of the help that migrants provided to the local population in different ways. Volunteers who help irregular migrants find their way have a positive attitude. These are the most knowledgeable residents of Serbia who understand that all life situations happen to migrants 'in transit'. The offenses of irregular migrants are interpreted as an effort to survive. Negative emotions were observed only among those residents of Serbia who had or still have material damages from irregular migrants or are afraid of them due to various prejudices.

Considering that irregular migrants pass through Serbia and exist more illegally than legally and that they are members of numerous African and Asian countries, this work represents an important testimony for the historical geography of Serbia. At the same time, this paper is a note about the space, time and conditions in which irregular migrants moved through Serbia. De facto, these people leave different traces (cultural, demographic, economic and etc) in different segments of the life of the local population. Differences among irregular migrants were also observed, considering the country of origin. One day, when everyone will be able to move freely again, it will be possible to make a detailed analysis of how many of these people remain on the territory of the Republic of Serbia and how they will demographically affect its future.



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**CRAFT DASH**

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**ABSTRACT**

The goal of this application is to help people, working in teams to collaborate over things like a product idea, event planning, designing, development, etc. Users can come up with creative solutions or ideas and add them to an existing node of ideas or sub-ideas. The users are viewed as nodes contributing to the main objective or idea. The ideas/notes of the users are viewed as sub-nodes with different branches and sub-branches consisting of text, images, and links. The ideas/notes are drag able and can be placed anywhere and can be linked to other ideas/notes. The notes/ideas can be linked and unlinked with other notes/ideas according to the user's wish.

## 1. INTRODUCTION

Craft Dash provides an online platform for the people working in teams to collaborate in real-time with interactive drag and drop idea nodes with emojis, with video and text chatting functionalities. The main objective of this project is to provide a mind-mapping platform where users can collaborate with their team members in real-time. The project will be in the form of a web application.

## 2 EXISTING SYSTEM

Mind mapping software (also called concept mapping software) is a brainstorming tool that enables you to create visual diagrams of your ideas. Using a mind map maker, you can create an idea map, a conceptual map that illustrates the hierarchy and connections between different ideas.

- **MindMeister** is a beautifully designed, cloud-based mind mapping tool that lets you visually capture, develop, and share ideas. Used alone or with a team, MindMeister allows you to easily collaborate, share, and present from anywhere in the world.
- **Milanote** is an easy-to-use concept map maker to organize your ideas and projects into visual boards. Far from a basic mind map maker, Milanote allows you to add rich media to your boards when you create a conceptual map (images, videos, links), and create as many levels of hierarchy as you wish to go deeper into topics.
- **Microsoft Visio** is a visual diagramming tool that works well for mind mapping as well as creating many other graphical representations.

### 2.2 LIMITATIONS OF EXISTING SYSTEMS:

- Many of the existing systems don't have a robust online collaboration feature in them
- They don't have an easy to use interface. Basically, the learning curve is quite steep.
- Online mind mapping softwares are quite expensive.
- They lack features like user feedback and online polling of ideas e.g. upvotes and downvotes

### 2.3 PROPOSED SYSTEM:

Craft Dash is a web application which allows the user to create sessions and host meetings so that the users working in a team of four, can share their ideas about the project. Craft Dash is made to mind map and brainstorm about the ideas for the user's project. Note creation, polling

and task planning are some task performed by the application. Real time group chat and video call is provided so that the users can communicate while working.

#### **2.4 BENEFITS OF THE PROPOSED SYSTEM:**

Craft Dash provides features that emphasize and promote user friendliness. Some of the advantages of our proposed system are:

- Provides real-time chat for communication
- Provides mind mapping platform
- Allows multiple users to work simultaneously
- Video chatting between users
- Free of cost

Craft Dash is an online web application that helps the users working in a team, collaborate seamlessly with each other, helping them with instant feedback and real-time interaction with ideas focusing on the main topic/agenda. The users are viewed as nodes contributing to the main objective or idea. The ideas/notes of the users are viewed as sub-nodes with different branches and sub-branches consisting of text, images, and links. The ideas/notes are draggable and can be placed anywhere and can be linked to other ideas/notes.





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**THE NEWEST COMPLIANCE RULES IN THE UNITED STATES AND HOW  
THEY ARE IMPLEMENTED IN A COMPANY**

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**ABSTRACT**

Compliance is a growing area increasingly recognized as a key component of all business activities. This analysis introduces the key elements of effective organizational compliance by reviewing concepts, considerations, and strategies for assessing risk and managing the compliance function. Learn the basic principles of effective compliance, what constitutes an effective compliance program, and their application. It also explores his two compliance areas of greatest importance in today's business environment: data protection compliance and anti-corruption. The insights in this article can be applied to many types of organizations, from private companies to non-profit organizations. This article will help develop a strategy for implementing technology, policies, monitoring, and training to build an effective privacy compliance program.

**Keywords:** Compliance – Compliance programs – Privacy – Corruption

**JEL:** G18 – G20 – G28

## **1.INTRODUCTION**

This article introduces the key elements of effective organizational compliance by reviewing concepts, considerations, and strategies for assessing risk and managing the compliance function. Compliance is more than just preventing problems and making sure everyone is complying with laws, rules, and regulations. It also mentions the positive impact a robust and ethical compliance program can have on a company or organization. This article focuses on human psychology, a key factor in building a positive compliance culture. Identify drivers, attention grabbers, distractions, and how all these factors contribute to building a strong belief in a corporate culture of compliance. Formal compliance programs are reviewed and the nuances of practical application are addressed. Technologies, workflows, policies, monitoring, and training are explored to create a toolkit for designing effective compliance programs. It explains the complex landscape of data protection requirements. A better understanding of data protection laws and data protection will protect the organization and its members who rely on it for the protection of their personal information.

First, this article examines the historical background of laws, best practices, and other standards for protecting personal data. Where in the United States are there privacy laws and which areas are not regulated? Various models are being considered to promote the security of personal data. Describe strategies for improving overall data protection. Second, it examines the unique and important role of international law, state law, and the Federal Trade Commission in protecting privacy. Finally, define what actual corruption is. Where does corruption exist, how does it exist, its impact and the emergence of today's anti-corruption laws? Practical strategies are presented for creating compliance policies and procedures to combat and prevent corruption. Various laws have been put forward, such as the US Foreign Corrupt Practices Act, the UK Bribery Act, and many other anti-corruption laws. Practical ways to prevent corruption within an organization and warning signals and other mechanisms for detecting corruption are presented.

## **2.COMPLIANCE DEFINITIONS**

### **2.1 Defining compliance**

Compliance, at its simplest level, means the following; Compliance generally refers to laws, rules, regulations, or other standards that tell you what to do or what to do. It describes programs within an organization or company that identify specific rules that apply. The

International Compliance Association defines compliance as the ability to act by orders, rules, or demands. For financial services firms, compliance takes place on two levels. Level 1 compliance refers to external rules imposed on the entire organization. At level 2, compliance describes the system of internal controls imposed to achieve compliance with externally imposed regulations. (please refer to the 2022 definition by the International compliance association). Sometimes it is helpful to understand compliance through a simple example.

### ***EXAMPLE***

Take the transportation of dangerous goods as an example. First and foremost, you need to know the proper packaging for materials that meet the definition of dangerous goods, proper documentation, and where to ship the materials. You must obtain proper packaging, obtain proper documentation, obtain proper documentation, and provide your employees with a list of prohibited destination countries. Employees need to know when the rule is triggered and when the rule is not. What have you done to mitigate the additional risk you are currently taking? How do you show them your plans and successes? You can show them your policies and systems for storing shipping documents. But can you prove to them and yourself that they used it? What kind of monitoring and reporting, and what kind of testing, if any, is in place? These are essential tools for the modern compliance professional.

### **2.2 Literature overview of the most recent compliance literature**

In this short overview, a comprehensive introduction to the most recent literature on compliance is given. In their article Sutinen and Kuperan (1999) describe how the basic deterrence model is extended above to allow an individual's behavior to be driven by both intrinsic and extrinsic motivations. Their model integrates economic theory with theories from psychology and sociology to account for moral obligation and social influence.

The English literature is very detailed. According to Chayes (1993) "On compliance", compliance problems often do not reflect a deliberate decision to violate an international undertaking based on a calculation of interests. A variety of other reasons are proposed why states may deviate from treaty obligations and why these reasons are accepted by the parties as justifying such departures. In conferences all over the world best practices and strategies for success are discussed (Compliance and ethics institute 2008). Biegelman (2008) provides clear guidance for those charged with protecting their companies from financial and reputational

risk. Risk in compliance is a worldwide phenomenon. Even the *Shariah* mentions compliance risk (Delorenzo 2006). Bamberger (2010) evaluates risk and regulation in the digital age.

Good insights in privacy can be found in the article of Huberman, Adar, and Fine (2005), in which they describe the valuation of privacy. The analysis of their results shows that a trait's desirability with the group played a key role in the amount people demanded to publicize private information. Kokolakis (2015) gives a review of current research on the privacy paradox phenomenon. A very good article on reforming the US approach to data protection is also available on the web by the council on foreign relations.

Nissim and Wood (2018) in their paper "Is privacy privacy?" describe different technical and normative conceptions of privacy that have evolved in parallel and describe the practical challenges that these divergent approaches pose. German Stirnimann (2021) "Der Mensch als Risikofaktor bei Wirtschaftskriminalität" concludes that the topics of non-compliance, white-collar crime, and in particular Cybercrime continue to be significant in the international economy's role-play. The world is not necessarily becoming more criminal, but the possibilities and patterns have changed and will change due to new technologies continuing to change. Criminal Compliance, according to Rosch (2012), is further proof that we must say goodbye to the idea that there is a unitary and homogeneous criminal law capable of solving each and every one of the problems of modern societies. Nagin and Telep (2017) show that citizen perceptions of procedurally just treatment are closely tied to perceptions of police legitimacy.

Very nicely Losiewicz-Dniestrzanskaa (2015) remembers one effect of passing through the world financial crisis by paying closer attention to compliance with the regulations of business by banks and other financial institutions. Martin and Murphy (2017) capture the current state of privacy scholarship in marketing and related disciplines. In their working paper Racz, Weippl, and Seufert (2010) design a process model for integrated IT governance, risk, and compliance management. They exemplarily explained how the processes of the separate disciplines of IT governance, IT risk management, and IT compliance relate and how they can be integrated. In their working paper Al-Karablieh, Koumanakos, and Stantcheva (2021) "Clearing the bar: Improving tax compliance for small firms through target setting" study a voluntary tax compliance program for small firms. Here they found that the firms that take up the program report significantly larger taxable profits than non-eligible firms.

Also, the German literature on compliance has interesting findings. Some detailed books are presented by lawyers. E.g. in their book “Corporate compliance” Hauschka, Moosmayer, and Lösler (2010) give an excellent overview of the German law which determines compliance issues. Möhrle and Weinen (2021) describe different methods to communicate compliance within an enterprise. Berwanger and Hahn (2020) evaluate how internal audit and compliance interact. Bethke and Bach (2020) describe in detail how to implement compliance and to communicate it. In his book, Vollmann (2029) “Compliance in der öffentlichen Verwaltung” prove that compliance management systems offer advantages since they allow an external view of the measures taken and their assessment creates and, if necessary, indicates a need for improvement. Zenke, Schäfer and Brocke (2020) in their book “Corporate governance” state that compliance is a management expression in a holistic governance and risk management organization. Modern corporate governance requires comprehensively adapted areas, in which the derivations of corporate governance are implemented. Möhrle and Weinen (2021) “Professionelle Compliance-Kommunikation” require that for compliance communication all participating actors, areas and those responsible for a consistent and coordinated procedure are prepared. Such forward-looking, active compliance communication has long been part of any risk management that deserves its name.

Lutzenberger (2022) “The Future of Europe Subnational Authorities and the European Union Compliance in a Multilevel Implementation System” concludes compliance depends to a large extent on the goodwill and expertise of local politicians and administrations in the municipalities. Baer (2009) finds out that “policymakers should consider New Governance’s administrative stance instead of the more punitive, “war-driven” approach that adjudication usually encourages. Holm (1993) argues “that we should perhaps not talk so much about the non-compliant patient, but instead shift the focus towards the noncompliant doctor.”

### **2.3 The different theories of compliance**

How can you get people on board? Get some idea of these 10 theories. Also, you may be able to come up with other theories and variations that are more appropriate for your particular organization.

**Table 1:** The different theories of compliance (adapted from Andrew Kandel (2022))

<b>Nudge theory</b>	Ensuring employee compliance can be a very effective and important tool for compliance officers. Part of this theory is to keep the topic on people's minds in any way possible. That includes all kinds of indirect encouragement and gentle nudges in the right direction. An effective compliance program includes a large amount of subliminal messages. It takes skill to communicate subliminally and convey a message of conformity.
<b>The punishment or scare them theory of compliance</b>	Actual penalties for violations of compliance policies and procedures by these individuals Including Ethics and Code of Conduct. a punishment system in which someone gets what a reprimand or censure and a fine. Very effective. In general, people who have paid fines for non-compliance are unlikely to repeat non-compliance. Use examples of government or criminal behavior to scare people. The main deterrent is to show people the consequences of non-compliance at other companies.
<b>Rules theory</b>	Some want to be clear about what they can and cannot do. You can be inspired by many things. Someone who has a very large contract of employment and does not want to give anyone a reason to be fired for good reason. When giving people rules and guidelines, you want to avoid loopholes. It can be difficult to define all the rules people have to follow.
<b>Ubiquity theory of compliance</b>	Create a program where employees believe that compliance is everywhere
<b>Reward Me Theory of compliance</b>	Employees who want to be known as being compliant. The reward comes with a nice prize like tickets to something, and it might be well-received at the firm.
<b>Quid pro quo theory</b>	Compliance should be part of the company's normal operations. You can tell them that they will get a gift for completing a compliance survey.
<b>the habit theory</b>	People will comply if they are accustomed to comply and are comfortable with a particular compliance policy or procedure. Continue this behaviour. It's easier to prevent bad habits than to stop them.
<b>Broken windows theory of compliance</b>	People are forced to be compliant by directing attention to even minor compliance violations and not letting them build up. It contributes to creating the proper compliance culture. If people believe that small, inconsequential compliance breaches are okay, then it might lead to slightly bigger violations, until you have a real problem
<b>Target theory</b>	Target individuals who are more vulnerable to violations of compliance policies and procedures and attempt to prevent recurrence. A list of employees who can demonstrate that they have not filed a complaint is created. This group will be monitored more closely than the others until it no longer needs to be included in this target group.
<b>One size does not fit all theory</b>	Compliance officers know when to scare people by talking about recent law enforcement actions against other companies and reward them for compliance. But incorporating all of these techniques into her compliance arsenal can take your compliance program to a new dynamic and robust level.

***EXAMPLES OF THESE THEORIES*****Example 1 The Lack of Recognition Theory**

“Some call it gratuities, some call them questionable payments, some call it extortion . . . I looked at these payments as necessary to sell a product.”

**Example 2 The Lack of Self-Control Theory**

“I really should not be doing this,” but he did it anyway.

**Example 3 The Psychological Aberration or Deviation Theory**

“Mr. Madoff’s crimes were extraordinarily evil.” –Judge Denny Chin

**3.COMPLIANCE LAW**

The public compliance clarification was a response to federal sentencing guidelines for foreign official bribery and corporate misconduct. These guidelines describe the elements of an organization's compliance and ethics program required to receive reduced penalties. There should be accountability. No delegation to known bad employees. All organizations must investigate who is breaking the rules. We must take action against those who break the law and remove them from the workplace.

In the United States, the NCAA has numerous rules and regulations that must be followed. Federal law requires certain disclosures to appear in all advertisements for loans. The SEC says compliance policies and procedures should consider each advisor's practices and risks. The SEC regularly issues risk alerts discussing compliance issues. The Dodd-Frank Wall Street Reform and Consumer Protection Act certainly implies the importance of relationships in many of its 16 sections. From a compliance perspective, the key is getting everyone in your organization to think differently about risk and compliance. If your company conducts background checks in the United States, it must comply with Fair Credit Reporting Act requirements. When it comes to salaries, companies must pay their employees a minimum wage, comply with overtime and child labor standards and comply with the Fair Labor Standards Act. The Equal Pay Act stipulates that male and female employees of the same function must receive equal pay. The IRS federal tax code requires companies to pay a portion of their employees' wages to the federal government. In addition, it is necessary to comply with the Disabled Persons Act and the Age Discrimination Act. The Occupational Safety and Health Act requires a safe working environment. Employers must provide family and medical leave



under the Family Medical Leave Act and health insurance options under the Affordable Medical Care Act. Unemployment insurance must be paid per employee. A company must comply with applicable fee requirements and applicable FCC electronic safety standards. In summary, there are 12 different laws that may apply to your company. The FDIC and the Federal Reserve Board and other financial regulators in the United States conduct audits of the safety and soundness of financial institutions and their compliance activities. In healthcare, the Joint Commission, a regulatory oversight program, announces general timeframes that may arrive to conduct assessments of various compliance standards at hospitals.

#### **4.COMPLIANCE PROGRAMS**

A compliance program needs to establish what the rules of conduct are, whether in policies, a code of conduct or guidelines. There must be an individual who is responsible: Every compliance program must have a component that looks for inappropriate behaviour. (please refer to Epifanio and Fiorenzano (2022)).

For violent behavior, you can use monitoring or auditing tools. A hotline should be established that individuals can contact if they believe there is something wrong that needs investigation. Standards must be enforced through discipline. Finding violations is not enough. Steps should be taken to deal with individuals involved in this fraudulent activity. Organizations must learn from their mistakes.

A compliance program must address essential fundamentals. A compliance program requires recognition, acceptance, empowerment, and independence. Trust must always evolve. A compliance program establishes a framework or strategy to ensure that an organization complies with applicable regulations. Every company has to deal with compliance. Each employer's specific regulations may include tax requirements, fair labor standards for workers, etc. Requirements are often industry-specific and may come from industry standards rather than specific rules. Doctors, nurses, accountants, soccer players, astronauts, fashion managers, and many other professions all need to know and follow some rules. A good compliance program can give you a competitive edge in the market. If your compliance program addresses privacy, data protection, business continuity, and cybersecurity, you're more attractive than those that don't. If your compliance program regularly reviews and updates its policies and procedures to comply with new or proposed banking regulations, more customers will be willing to lend you money than otherwise. .

#### **4.1 Integration of compliance throughout the organisation**

A modern and effective compliance program must be agile and opportunistic. It should include industry best practices and a proven foundation. New compliance challenges that exist in a rapidly changing world must be considered and addressed. From Bitcoin and cryptocurrencies (see Scharfman 2021), social media and deep learning (including the use of big data and artificial intelligence) to self-driving cars, drones, ESG, environmental, social and governance topics (and ESG compliance). Good explanation found at Moro Visconti 2022)

#### **4.2 Organisation of compliance**

Compliance departments must ensure that new systems do not violate the law. As part of the industry and corporate best practices, we are beginning to consider including compliance in all aspects of our business. Corporate governance, culture, and compliance have been integrated. See Griffith's excellent 2016 review, *Corporate Governance in the Age of Compliance*. A strong compliance program can be seen as an indicator of a truly mature organization. Compliance means knowing the rules that apply and developing a strategy to comply with them.

#### **4.3 Reasons to implement compliance**

There are many reasons why all companies should be aware of the importance of compliance. Today's world operates in a highly regulated environment. There are currently over 400 financial regulators worldwide. Some deal in securities, some in commodities, some in banking, some in insurance. In the United States, each state has a different insurance-focused regulatory agency and another banking-focused regulatory agency. Each state has a securities regulator, in addition to a separate attorney general. The US SEC requires certain companies to have a compliance program and, among other things, a chief compliance officer. SEC Rule 206(4)-7 proposes that a registered investment advisor's failure to implement appropriate compliance policies and procedures constitutes a violation of that rule, regardless of other securities law violations. In healthcare, there are regulatory topics related to billing, personal protection, data protection, infection control, and more.

#### **4.4 Significant monetary policies**

Regulators enforcing compliance rules can be costly. Most regulators have the power to impose fines and penalties. Under the European Union's new General Data Protection Regulation (GDPR), the harshest administrative penalty could amount to up to €20 million, or 4% of a company's global annual turnover. Performance of Settlement Agreement. The actual cost of

non-compliance is not the only driver for improving a company's compliance practices. Many settlement and court-ordered agreements not only include civil penalty clauses, but also many other requirements with accountability for onerous activities and implementation costs. and other stressful activities.

### ***EXAMPLE***

#### **Google's 2011 settlement with the FTC**

After Google was sued for violating its privacy promises to consumers about the implementation of its social media feature, Google had to comply with many conditions, including setting up and implementing a complete security program. This comprehensive security program has been sensibly designed to address privacy risks and protect the privacy of personal information. Google had to appoint a coordinator for this program and identify the risks and remediate them. Google had to train all of its employees on privacy and manage product design development. Google was required to receive privacy assessments from an independent, qualified third-party expert using generally accepted standards within six months of order. Google had to expand the record-keeping requirements of all the statements it makes about privacy. She has to keep consumer complaints and records showing disobeying orders. All records must be considered during the preparation of the confidentiality assessment.

## **5. C U L T U R E**

### **5.1 Positive Value of Compliance**

Compliance can have real demonstrative positive value. Many regulators recognize this positive value. In implementing Rule 206(4)-7, the SEC said, "We expect our fund investors' advisory clients, funds, and advisors to benefit from the new rule" and promised to reduce costs and provide significant investor protection. Deliver profits and increase efficiency for funds and advisors."

### **5.2 Compliance culture**

The right culture can only be established by the right tone of the top, but it is impossible without it. The top tone represents leadership's belief in an ethical culture and literally says everything about the company. It actually comes from the world of accounting, which is probably not surprising. This includes ethical conduct, identification and management of conflicts of interest, and strong internal controls. This is not just financial management, it's all internal

management. A good compliance culture cannot exist without the right tone at the top, but it's not just about having the right tone at the top. At its core, compliance is about creating an environment where people feel a real sense of responsibility and respect and support compliance. It is necessary to create an environment in which a strong sense of personal responsibility is felt. Employees need to understand their own culture, the culture of the organization and the compliance expectations that come with it. You should understand that violations of the Code of Ethics or violations of laws, rules and regulations must be reported through appropriate channels. When everyone in the organization understands the culture and expectations, and when they really feel and appreciate their personal responsibility. You understand that you must report violations of the Code of Ethics or any law, rule, or regulation.

### **5.3 Building a compliance culture**

A good compliance culture limits potential liability, whether for intentional or negligent violations. A good compliance program drives good business. Compliance strengthens the discipline and accountability that help bring an organization closer to its goals. Employees feel more comfortable working for a company that is recognized as being compliant. However, empirically, creating such a positive atmosphere can lead to lower employee turnover. As policies are created, reviewed and updated, people are allowed to reconsider. Helps spot inefficiencies and opportunities. Companies with subpar compliance policies and procedures, or subpar overall compliance programs, cannot function well. This impacts the quality, creativity and efficiency of nearly every employee. Achieving corporate goals is becoming increasingly difficult.

## **6. THE COMPLIANCE PROFESSION**

### **6.1 The different layers of the compliance profession**

Over the past 20 years, compliance professionals in the United States have grown to more than 200,000 compliance officers in 2016. A chief compliance officer can be both a generalist and a specialist. By ensuring compliance in specific areas by these professionals, hospitals can, for example: Stay compliant with important state, federal, and industry regulations. However, there is a broader need to foster a compliance-conscious environment and culture. A single person should oversee the organization's overall compliance program and identify the infrastructure needed to support the various areas of regulatory compliance. Generalists work to build the right culture and foundation for a compliant organization. Overall, it helps foster a culture of

compliance that minimizes corporate governance errors. Compliance generalists and specialists are key to helping organizations of all sizes manage compliance. (For “Cultures of compliance” please see Langevoort (2017))

**Table 2:** Comparison of compliance generalist and compliance specialist (own presentation)

<b>Compliance generalist</b>	<b>Compliance specialist</b>
Creation of a compliance hotline and anti-retaliation policies	Creation of best practices manual to be used by hospital staff responsible for disposing of hazardous materials
Allocation of compliance staff/resources to meet hospital privacy, security and hygiene policies.	Procurement of new medical records software to be used throughout the entire hospital by staff and doctors

## 6.2 Compliance Officer

Because compliance concerns arise in all industries, jobs for skilled compliance officers are plentiful, and unemployment in this area tends to be low. The compliance officer must be independent, empowered and provided with adequate resources. The Chief Compliance Officer and the entire compliance department need to be independent of any business unit. There needs to be a reporting structure that ensures this independence which will help empower the compliance team. This means having a reporting line to the board of directors. The Chief Compliance Officer can report to a committee (risk management committee) and you might see a hybrid reporting mechanism where the Chief Compliance Officer has dual reporting lines to the CEO as well as to such a committee. Therefore, the compliance officer should have a position of sufficient seniority and authority within the organization to compel others to adhere to the compliance policies and procedures. The commission needs capable and honest CCOs to help protect investors and the integrity of the capital markets. Part of the independence and empowerment that feeds into the compliance culture of an organization also involves how comfortable employees are in reporting a violation, or reporting even a concern, or a potential conflict or a problem, or a worry.

There must be a direct correlation between comfort and compliance. The more comfortable employees are in reporting issues, the more compliant the workplace becomes. Take potential conflicts of interest. They exist in every organization and every industry. There is more potential conflict of interest in the financial services industry than in many others. The more companies deny that they have conflicts of interest or even minimize or downplay them, the more likely they are to have problems down the road. Companies should embrace the fact that

potential conflicts of interest exist and problems can exist. They need to be de-mystified. Every potential conflict of interest can be managed, every problem and issue can similarly be dealt with. As a result, compliance needs to create a method, a safe method for escalating and addressing them. After all, there's no compliance issue, no potential conflict of interest and no violation that gets better over time if it is not addressed as soon as possible. Chief compliance officers and their staff need to be approachable. There need to be several paths for people at companies to raise issues. Finally, you need to establish an ethics hotline. Lastly, there's a question of resources. A compliance officer must properly define the goals and budget for them so that they could obtain the right number of people, the proper technology. And other support necessary to carry out strategically important compliance initiatives. Compliance works best when the chief compliance officer is part of the senior management of an organization.

The Chief Compliance Officer does not necessarily have to be involved in all decisions. However, they should have a voice and be consulted on important decisions that affect the organization. The more influence the chief compliance officer has, the more likely they are to manage or direct resources. The SEC and CFTC require some registrants to have their CCO, but not all highly regulated companies are required by law. Understaffed compliance programs should be avoided at all costs, but overstaffed compliance programs can pose unique challenges, including B. Resource depletion and workforce dissatisfaction.

### **6.3 Board of directors has a special duty**

Compliance is important due to internal and external requirements. There are many different types of companies, with different types of boards and other governing bodies. The board of directors must guide the organization. They comprehensively monitor both the strategic objectives of the organization and the necessary and necessary policies. The board must ensure proper financial oversight and accountability. Public companies' directors are elected by the company's shareholders, while private companies typically appoint directors. Directors are bound by law as trustees of the shareholders. Directors must always act in the best interests of shareholders. This means that directors must always put the interests of shareholders and the company ahead of their interests, unless there is a conflict. This includes a duty of care, a duty of loyalty, and a duty of good faith. If a director fails to meet these obligations, she will be liable for shareholder lawsuits. How to ensure that an exemplary compliance program is in place.

The Sarbanes-Oxley Act of 2002 expanded the responsibilities of public company boards. Investors needed protection from fraudulent corporate accounting practices. This was a direct response to corporate accounting fraud at Enron, Tyco, WorldCom, and others. There are 11 sections of the Sarbanes-Oxley Act. Establishment of the Public Company Accounting Oversight Board and Auditor Independence it analyses conflicts and improves penalties for white collar crime. Under Sarbanes-Oxley, US corporate boards are required to have audit committees composed entirely of directors independent of management. The Audit Committee, rather than management, is directly responsible for the appointment, compensation and oversight of the work of the external auditors. Sarbanes-Oxley also assigns specific financial and tax reporting responsibilities to certain corporate executives, such as the CFO and CEO. The report must be notarized and signed. There are specific forfeiture penalties and penalties for violations. If you cheat, you go to jail. A non-compliance scandal in the media can seriously damage a company's reputation and economy.

#### ***Example***

After hackers stole personal information from 57 million user accounts in 2016, Uber's chief security officer allegedly paid them \$100,000 in ransom to erase the data and keep it quiet. Fearing it could hurt its \$70 billion business, Uber hasn't made the data breach public for more than a year. Uber faces multiple class-action lawsuits, state investigations and the possibility of FTC enforcement. On the face of it, Uber has indeed placed a heavy price on reputational damage, paying hackers in hopes of avoiding a backlash over its non-compliance. Uber suffered severe damage to its reputation and business. The scandal is a reminder of how much reputational damage non-compliance can cause.

#### **6.4 Compliance training**

Effective training and awareness should be put in place. Individuals and organizations need to know the rules to comply with them. A code of conduct is where an organization announces its values, priorities, and commitment to ethical behaviour. Some companies call it the Code of Ethics and Professional Conduct, or the Code of Ethics and Professional Practice. A code of ethics or conduct should form the basis of any compliance program. The code should be comprehensive, yet concise, easy to understand, and serve as a general guide to everyday life. It should be mentioned regularly in meetings. In the financial services industry, the SEC requires the creation, maintenance and enforcement of a written code of ethics. Rule 204A-(1) describes certain minimum requirements that must be included in the Investment Advisor's

Code of Ethics, and violations must be reported to the Chief Compliance Officer. Under Sarbanes-Oxley, all publicly traded companies are required to disclose their annual reports. Companies must also publish their ethics codes.

### **6.5 How can good training be achieved?**

Each new employee is welcomed as soon as they join the company. At the compliance briefing, the history of the firm, the current state of the firm, and the future of the firm is explained. A regulatory environment and specific policies and procedures are put in place for each new hire. What is the understanding of compliance and what compliance is based on many factors, including previous work experience, previous education? Everyone in the organization must understand compliance like everyone else. In fact, compliance training for new hires is a critical time to get everyone on the same page, set the right tone, and manage compliance expectations. It is also a time to review key policies and procedures and, just as importantly, to answer questions. Organizing departmental compliance trainings to address specific issues and answer specific questions is a great benefit. The Compliance Officer is responsible for initiating strategy and receiving executive support for that strategy. Training and policies and procedures can and should go hand in hand. The best lessons learned from compliance training are when employees learn that policies actually exist to address specific situations and issues.

Employee training is not the only information critical to compliance. Employees should be familiar with the financial health controls in place. It may be helpful to report the completion rate of required training. The board should be aware of the number of compliance concerns that have been reported and investigated. Employees are afraid to report problems because they believe it may lead to retaliation. A strong compliance program wants to be able to hear about incidents and problems, address them, learn from them, and strengthen the organization. Incidents should always be viewed not only as problems, but as warnings, opportunities to delve into the business environment and critical risks, and necessary to minimize the risk of significant harm. Communication with board members and other senior their leaders leads to increased engagement and support to reach a better place.

### **6.6 Compliance and branding**

Companies involved in fraud, ethics violations, cybersecurity breaches, corruption, and other public affairs put their brand at risk. Compliance helps to strengthen the image of the company. If a company's PR strategy can easily promote the company's strengths, culture, corporate governance and credibility, it can pave the way for growth and prosperity. However, branding



and public communications can come with restrictions related to compliance. Special rules apply to advertising in the financial services industry. It prohibits misrepresentation of material facts or otherwise misleading. If you want to run ads that let you know how well you or your business is investing, or if you want to list real-world performance, or if you want to add testimonials, you need to know the regulations and rules. These materials require a compliance mechanism to verify before submitting a request or claim.

The CCO would love to hear about compliance incidents. Doing so will help you address compliance incidents, optimize your organization's compliance program, and avoid them in the future. Senior management should be notified of compliance issues that have a significant impact on people and the business, but should not be reported on an incident-by-incident basis. Companies that deal with compliance violations can, in some cases, come up with more robust compliance programs than this business relationship. Providers must convince companies that they meet strict technical, administrative, and physical security standards. You must convince your company that you comply with state, federal, and international data protection laws. Companies can increase headcount, pay more attention to financial data and other controls, and increase overall accountability. Some companies can effectively communicate their experiences and their overall stronger position as credible companies.

## **7. MONITORING**

There are many areas to monitor. Some are specific to the nature of a company's business and activities. Some may be required under certain rules or regulations. In some industries, such as the financial services industry, email monitoring is a must. You can apply email best practices, catch problems early, and give your compliance team a better overview of what's happening in your organization. Finally, it also prevents potential problems from becoming real problems. Personal transactions by employees should also be monitored. Again, monitoring face-to-face transactions is a regulatory requirement in some industries. SEC Rules 204A-1(a) and 1(a).b specifically require reporting and verification of certain employees' personal securities transactions.

Some kind of expense monitoring should be done in almost every company. At a minimum, this should be done to ensure that expense policies and procedures are followed. Fraud can be monitored. Abusing company travel and expense policies can lead to theft in some

circumstances. Make sure this is consistent with your company's policies and procedures regarding gifts and entertainment. Social media monitoring was just added to this list, but it's becoming more and more important. Monitoring social media is critical for compliance. It helps protect a company's reputation and anticipate unforeseen legal issues. Ensure the safety of the company and its employees. It's an entirely different matter when company names, identities, trademarks and even employee identities are used to perpetuate fraud. There is also brand misuse, appropriation, and misrepresentation of non-existent overseas subsidiaries and affiliates. Lobbying and monitoring political activity. Put in place appropriate policies and procedures and some form of oversight in these areas.

### **7.1 Monitoring and reporting**

Compliance programs must monitor employees and operations to ensure that applicable regulations are being followed. Audits identify standards that are regularly agreed upon by the International Organization for Standardization or ISO and other authoritative bodies. Auditors employ a common benchmarking approach to identify common risks and appropriate responses to them. Audit professionals combined with these evolving standards can provide superior solutions for compliance monitoring. SEC rules require public companies to prepare and file audited financial statements annually in accordance with Rule 205(4)-7. Registered organizations must review the adequacy of the policies and procedures established under this section and the effectiveness of their implementation at least annually. The growth and deployment of artificial intelligence and other data mining and analysis tools are enabling organizations to significantly increase their monitoring efforts. Monitoring using new technologies, audits, and other approaches is powerful and should be considered an important part of your compliance program.

### **7.2 Behavioral monitoring.**

Therefore, some compliance programs may monitor employee behaviour. Monitoring behavioural activity and patterns can help identify and prevent compliance issues. It is convenient to use technical tools such as big data and artificial intelligence. We must monitor for violations, violations of laws, rules or regulations, and violations of internal policies and procedures, including our Code of Ethics. Monitor red flags, anomalies, and outliers. A significant part of oversight and supervision is specifically established by federal sentencing guidelines. Promoting confidentiality is another way to encourage employees and others in the community to report potential compliance issues. Absolute confidentiality promises are always

difficult to keep and should be avoided. Finally, the organization must have a well-publicized and credible non-retaliation policy so that those who work there are aware of it. No dismissals, no promotions, no actions of any kind that adversely affect reporters. A complete compliance program must be more than training, monitoring, auditing, and reporting, as well as the laws, rules, and regulations behind these policies and procedures. The compliance program is really about getting people to follow these policies and procedures and act in an appropriate and ethical manner. It should include aspects of philosophy, criminology, sociology, political science, history, comedy and entertainment, the science of social behavior and impact, and psychology. To understand how people become compliant. The FBI lists 23 common fraud schemes.

The different theories about why people commit financial crimes:

**Table 3:** Theories why people commit financial crime (modified from Andrew Kandel)

Privileged or Entitled	People feel like they fall into a different category than others. They are often wealthy because they owe something in some way, so they engage in illegal activities. In the financial services industry, some highly successful brokers and investment professionals believe that the usual rules don't always apply to them.
Excessive Greed or Excessive Ambition	Excessive greed and ambition can make a person do bad things. There are many examples of people craving fancy cars, apartments, jewelry, yachts, and many other things.
Cost-benefit or Risk Reward	Some people are very adept at this cost-benefit analysis, weighing the potential reward against the risk of getting caught and deciding if the risk is worth it.
Lack of Recognition	Some people are unaware that they are actually breaking laws, rules, or regulations. In such situations, harm is often seen as a side effect of their actions. Damage and casualties are remote or undefined.
Psychological Aberration or Deviation	These criminals disregard other people and societal norms, and commit crimes solely to benefit themselves, without any concern for report cautions.
"I Could Have Done it Another Way"	To some extent, businesses work with numbers to plan budgets and document forecasts. This can be a problem when operations are performed to reach a given result. Lump-sum payments and the use of off-balance sheet statements are not permitted. People who engage in this kind of behavior consider themselves justified in that way just because they could have done it otherwise.
the No Harm theory	People commit white-collar crime because they believe that what they are doing does no harm. This is the basis many insider his traders use in violating securities laws.
Stress and Pressure	Stress and pressure can certainly cause people to do bad things or ignore policies and procedures. According to the theory of stress and pressure, these people believe that if something goes wrong, they cannot share their problems with others at work. This could be due to pride or the work environment.

Lack of Self-control	People with weak self-control find it difficult to resist temptation.
Everyone is Doing it" or the Virus	If you see other people doing the same bad thing, it's probably okay Or at least in your own head. Things usually start small and grow into bigger and bigger frauds and non-compliances.

### 7.3 Dealing with non-compliance

Being prepared for non-compliance situations is just as important as putting controls in place to prevent them. Instead, an effective compliance professional should prepare for non-compliance by implementing strategies to minimize, not necessarily prevent, non-compliance. Designate a point contact: An individual lead may be the point contact. Or that the person responsible for complaints about this regulation at the head office is the point of contact. Once the incident her manager is identified, that manager will define and oversee the deployment of the action plan. A predefined incident response playbook can be used as a starting point.

Here is a step-by-step approach in a somewhat generalized form:

- Identify immediate emergency and/or security needs.
- Investigate the incident.
- Determine what happened based on interviews, system analysis, report reviews, and other information.
- Contain the incident and consult with people, processes and technology savvy people to try to contain the current impact.
- Evaluate the impact of what happened and any necessary or desired next steps.
- Clean up and contain the problem. -People soberly and very thoroughly judge the extent of possible adverse effects of the incident.
- Identify strategies for dealing with them.

## 8. RISK

### 8.1 RISK and Compliance

The concepts of compliance and risk management are intertwined. Those working in either field should be well aware of both important roles. Companies are always in their official risk management office. Poor organization budgeting, forecasting, reporting and control can lead to substantial losses. For publicly traded companies, this can affect profits and share prices. In private companies, this can also affect profits. The business success depends on your bottom line. This is the so-called financial risk. Managers regularly focus on managing financial risks. If machine safety and functionality are not checked or information is not available,

performance can suffer. This creates an operational risk that the organization cannot function properly. If your computer system fails and you don't have a good backup plan, your business can cease to function until the problem is identified and fixed. Reputational risk may be what business leaders fear most. Businesses can survive bad quarters. The reputational risks can last longer and affect your business in invisible ways. This type of risk can reduce a company's stability and credibility and reduce trust in the company. This reduces consumer interest in buying from them and strategic partners willing to work with them. The power of the press is far more effective than financial and operational setbacks. Compliance risks can lead to other problems. Failure to comply will result in fines or more embarrassing surgery. It hurts media coverage. Compliance officers should champion this very line of thinking and ensure that employees at all levels and functions are aware of the critical role of compliance and the overall health of the organization.

- Determine what happened based on interviews, system analysis, report reviews, and other information.
- Contain the incident and consult with people, processes and technology savvy people to try to contain the current impact.
- Evaluate the impact of what happened and any necessary or desired next steps.
- Clean up and contain the problem.
- People soberly and very thoroughly judge the extent of possible adverse effects of the incident.
- Identify strategies for dealing with them.

### **8.2 Risk Assessment**

Organizations should regularly ask questions such as: Should all employees be trained? If not, how high are some and which are the least risky? How should this oversight be done? At what level of detail? Do all rules guarantee the same compliance solution? Which requirements are the riskiest? Which are the most important? Which are the most active contributors to the organization? Which regulators are the most active? Compliance obligations and the extent to which compliance adheres to unintended consequences. Compliance professionals need to consider all the different issues that affect compliance requirements. For risks to be properly addressed, they must be associated with those risks using specific compliance policies and procedures. Compliance should be built into every element, strategy, and function of your organization. The need to create and maintain a safe workplace is one of the key examples of

how HR and compliance must work together. Compliance should become part of the lexicon for all specialists and managers in your organization.

### **8.3 Risk tolerance**

Some organizations are more willing to take risks than others. One of the most difficult aspects of the compliance role is understanding your organization's risk tolerance. Organizations can focus on innovation. When it comes to risk, the role of compliance is simple. Compliance must identify risks. Present the risks to the appropriate parties and ensure they fully understand the risks. Compliance is a risk interpreter and a risk navigator. At the same time, compliance must ensure that laws, rules or regulations are not violated or ethical standards are violated. Compliance is what keeps a company on track.

### **8.4 Outsourcing risk and compliance**

Outsourcing is becoming more and more important. That means hiring another company to improve company's functions. It can be risky as it can also pose a compliance risk if not properly understood and managed. Suppose you hire another company to perform debt collection services for your company. What if the company continues to provide inaccurate information? This is bad for your company. Debt collection agencies are subject to compliance obligations under the Fair Debt Collection Practices Act. Violations of this law by hired debt collectors can be enforced by the Federal Trade Commission. The company can be at risk by using the service without properly checking how it works. However, before outsourcing to manage compliance risk, Organizations should conduct due diligence not only on the company's financial data, but also to determine whether it is sound. They also need to manage the various compliance requirements that exist in this ROI area.

### **8.5 Insurance to manage risk**

Insurers can also address another risk, compliance risk. One of the policies related to corporate governance is directors' liability insurance, often referred to as D and O. Liability insurance for the failure of directors to fulfill their fiduciary duties. They may have misused company assets to enrich themselves at the company's expense. Insurance may not cover fines or penalties, but it may cover legal and related costs. It rarely covers illegal activities such as fraud or theft. Insurance coverage is much broader than in the past, both in terms of the range of actions it protects and when they occur. An insurance policy may include coverage where no formal claim has been filed. This Trading Risk Coverage Insurance also includes representations and warranties. Another type of insurance relates to potential tax liability.

Contingency insurance can cover potential exposure to a variety of risks. There are various risks, such as litigation, environmental risks, and labour disputes. Businesses concerned about privacy and data breaches affecting sensitive customer information can purchase insurance to cover it. Companies that fear sanctions from the Environmental Protection Agency can actually purchase environmental liability insurance. We now have cybersecurity insurance. This type of insurance is designed to cover cyber incidents such as hacks, data breaches, business interruptions, and damage to networks as a result of these incidents. These insurance products protect your business from the costs that non-compliance can impose on your business. It can be insured against almost any potential risk and, of course, it can also be used as a certain kind of compliance tool. Insurance can't always improve bad deals and eliminate compliance risks, but if it can cover unknown events, it can improve bad deals.

### **8.6 Enforcement agencies**

Almost all companies operate in highly regulated environments. After a major scandal, regulatory focus is generally stronger. Regulators may not pay enough attention to whistleblower complaints and allegations, and worse, may overlook fraud in the many investigations they conduct. This increased the number of audits and increased verification during audits.

*As a result of all of that, we've seen increased regulation, increased examinations, increased number of investigations, increased number of enforcement proceedings, and increased number of indictments, arrests, trials and convictions, and record amounts of time that people have spent in prison.*

*Andrew Kandel on compliance and regulation (The Wharton School 2022)*

## **9 DATA BREACH REPOSE**

### **9.1 Senior response team**

Another aspect of aggressive enforcement can be found in the Federal Trade Commission. The FTC, a relatively small independent agency responsible for broad consumer protection, also has a history of aggressive enforcement, in areas such as consumer fraud, fraud, unfair collection practices and disclosure issues, Green Guide, Leather Guide, Textile Rules, and many more. In addition to all these agencies, the FTC receives millions of complaints each year.

### **9.2 Reporting of data breach**

A key role of the senior response team is to direct necessary and desirable communications. As to required notices, you may have an obligation to notify state, local, federal, or international authorities in the event of a non-compliance. Regulators expect low impact incidents to be few, but high impact incidents to be significant. You can expect a detailed explanation of what happened. What is the company's investigation and remediation plan? I want to see details such as changed processes, system personnel, etc. Fellmann and Zasada (2016) provide an overview of state-of-the-art business process compliance approaches in their book. Another source of information on formalizing and applying compliance templates for business process compliance is Elgammal, Turetken, van den Heuvel, and Papazoglou (2016). Compliance culture is typically strengthened, and senior-level commitment can be strengthened. Improving compliance and showing regulators how to improve compliance has all the right benefits. Compliance officers can handle 'minor' compliance incidents themselves, rather than assigning a senior response team to investigate and resolve the issue. The Data Breach Notification Act first appeared in 2003, when the state of California, often a trendsetter on privacy and other issues, required companies inside and outside of California to disclose their computer data to California residents. Violated personal data breaches must be notified to the data subject. There are many and wide variations in security breach reporting laws at the state, federal, and international levels.

### **9.3 Imposing discipline**

Think about absenteeism, tardiness, failure to perform routine duties, unprofessionalism, fraud, and other crimes. It is easy to impose discipline. Those who commit fraud are usually dismissed. People intent on engaging in non-compliant acts that enforce their intentions can cause serious compliance issues. To hold these individuals accountable, compliance must be adequately briefed on the dos and don'ts of her program and ensured that they receive regular training. For critical requirements, periodic refresher training may be required. Better instruction using new educational technology tools, intermittent quizzes, interactive games, real-life scenarios, and role-plays to convey messages about what behaviours to comply with or avoid. Over time, we may be suspended, terminated, or fined based on other significant factors. Companies themselves must actively monitor to detect violations. An increase in the number of requests combined with the need for proactive and regular monitoring can lead to a significant increase in violations. For some organizations, the growing number of rules that



must be followed, combined with the need for proactive monitoring, has led to cultural shifts and inadvertent compliance violations. Taking regulatory reporting seriously has several advantages. It helps you avoid costly enforcement actions in the future and strengthen your organization's culture of compliance. Admins can enforce compliance.

### ***Example***

At Company X, two employees inadvertently violate a minor compliance rule. The company's compliance training program was somewhat effective, but this breach made the CCO aware of the potential for further clarification. CCO is implementing new technology tools to support education. If the compliance program's recommendations and prohibitions are properly communicated to employees, even unintentional violations should have consequences.

### ***Example Root Cause analysis***

We recommend using existing tools to perform root cause analysis. We recommend the following steps: Describe your existing problem and collect the necessary data related to your problem. Identify possible causes. Identify causes that need to be addressed to prevent recurrence Find solutions, implement changes, and observe changes. Who can contribute most to these steps? Are your system settings correct? Are there workflows that are too risky to change? Are there bad actors causing problems that should be removed from the workforce? For serious violations, of course, a causal analysis should be performed.

## **9.4 Learning from compliance failures**

A tabletop exercise is a meeting to discuss simulated emergencies. The obvious goal is to be prepared for different scenarios that may arise. Bring together senior members of IT, HR, Facilities, Legal and Operations. Scenarios should be realistic. Involving feature experts in the discussion can be effective. They identify weaknesses and strengths, develop plans, and design training to address the issues raised.

## **10. CORRUPTION**

Corruption in some form has existed for thousands of years and is found in all societies. This is a generally illegal activity carried out by authorized persons for illegal gains. Police officers, teachers, judges, and other government officials, politicians, and business representatives may be involved. Primarily bribery, but bribery has many nuances. Corruption has many names. It can be called fraud, theft, bribery, kickbacks, and many others. This may include client, which is a form of exchange of goods and services for political support of some kind. Whatever form

corruption takes, it is always bad for the communities, countries and regions where it occurs. It is anti-competitive and, like infrastructure investment, often hinders community growth. Corruption also creates an environment of distrust in which citizens cannot be trusted or may lose trust

Trust in their judicial and political systems and infrastructure. Penalties are severe everywhere. Criminal and civil penalties, disciplinary action, and, of course, reputation are greatly affected. Not only were companies fined hefty, but some company employees, consultants, and other employees themselves paid hefty fines and ended up in jail. Many countries have multiple laws that deal directly with corruption. The United States has a similar number of laws against corruption. An important law that affects all US citizens, residents, and virtually anyone associated with the US or a US company is called the Foreign Corrupt Practices Act, or FCPA (1977). This was the first law applied abroad to criminalize corruption outside the country in which it was enacted. The UK Bribery Act, passed in 2010, is very similar to the FCPA. The UK Bribery Act considers it a crime in itself for a company to have or fail to implement an effective anti-corruption compliance program. The FCPA does not include lack of a compliance program as a violation of law. The UK Bribery Act prohibits bribery payments currently permitted by the FCPA. UN Convention against Corruption with over 140 signatories and 165 Parties

### **10.1 How to protect against corruption - Training**

Clear, complete and thoughtful policies and procedures are essential in all areas of compliance. Policies and procedures will not truly work or provide the value they need unless they are communicated in the right way to the right people. All key elements of an anti-corruption compliance program should include training. Employees must be aware of the corruption-related issues most commonly experienced by individuals working in a particular industry or geography and be provided with the necessary knowledge to effectively address them when they arise. When anti-corruption training is done correctly, employees know they have the power to ask questions and, most importantly, to escalate issues without fear of reprisal. Supervisory staff should be familiar with the rules of what is and should not be approved or approved. You should also know how to respond and what actions to take if you become aware of a violation of the Anti-Corruption Policy the Company. Incidents with really relevant details should be described in concrete, colourful language.

## **10.2 How to protect against corruption - Preventative measures**

Businesses must eliminate incentives to pay bribes. Across the workforce, incentives to pay bribes are against the profit with whom the company does business. The company must have a culture that makes it clear from the outset that the company will not tolerate the involvement of employees or third parties acting on behalf of the company. Illegal or unethical business practices. You must ensure that there are no financial incentives to pay bribes. Precautionary measures should also be included in the actual contract with the third party and should always be stated in the contract or specific third party certification. Third parties must agree and acknowledge compliance with certain laws, rules and regulations, in particular those relating to anti-corruption. It outlines the actual jurisdiction in which the business is conducted. A contract may contain a provision that the contract may be terminated in the event of the negligence of a third party. Proper monitoring and auditing is another way to prevent corruption, or at least catch some problems early. Therefore, regularly review all payments to third parties that pose a higher risk to the Company. Review invoices for third-party payments to ensure they comply with the terms of any agreements you have entered into and are properly paid. Email monitoring is also a very important additional precaution that should be taken. Supervisors should act as a second eye and signal compliance if they see or hear anything.

## **11.PRIVACY LAW AND DATA PROTECTION**

### **11.1 Legal basics**

In the United States, some judges and magistrates have interpreted the right to privacy through constitutional provisions, but the concept of privacy specifically does not exist in the United States Constitution. The right to respect for private and family life is specifically cited in Section 8 of the European Convention on Human Rights. What is your biggest privacy concern? This may include identity theft, online tracking and targeting, government surveillance of phone and internet records, and profiling. Surveillance and profiling in the private sector, misuse of biometric information. Face recognition, location tracking, genetic identification. Privacy issues can arise from cameras and other types of surveillance, and are perhaps examples of other modern privacy issues as well. Privacy is not just a collection of modern issues. It is a value that has been recognized for centuries and has evolved into the legal principles and legal requirements we live by today.

### **11.2 The origins of privacy protection**

Privacy concerns exist as long as information dissemination exists. The law must provide some remedy to individuals when the actions of others interfere with their right to rest. Computers are the new privacy threat! In the 1960s, with the rise of mainframe computers, a different kind of privacy concern emerged. It is the one that leads to the principles and to principled rules that we live by today. Computers can often solve privacy problems through biometrics, security roles and systems, encryption, and more. Computerized records can raise new privacy concerns. First, with the new computerized collection of personal information, unknown databases may contain information about you. Second, computer-assisted editing has made it possible to collect large amounts of information in a cost-effective manner. Third, computers make it easy to give personal information to so many people. Fourth, computers were so cheap that it became easier to collect other kinds of information than before. Fifth, the information collected by computers was used differently than before.

### **11.3 Fast information principles**

The purpose of the Records, Computers, and Civil Rights Report was to analyse the harmful consequences that could result from automated systems of personal data. Develop safeguard recommendations that can protect individuals from potentially harmful consequences and provide compensation for any harm. There should be no system of recording personal data whose existence remains confidential. Second, there must be a way for people to know what information is available about them. It's on record and how it's used. There needs to be a way to prevent information obtained about an individual for a specific purpose from being used or made available for other purposes without their consent. There must be some way for a person to modify or alter records of identifiable information about him or her. Organizations that create, maintain, use, or distribute records of identifiable personal information must take reasonable precautions to ensure the reliability of the data for its intended use and to prevent misuse of the data. .

How we collect, use, share and protect data is a challenge in itself. Second, organizations creating information policy statements should go through a process of self-reflection to gain a deep understanding of how they are actually handling personal data. Third, organizations that make public commitments must comply with the law. This should avoid the liability of companies to make misleading advertisements in order to deliver on their promises. This information has tremendous implications for all of us. False and negative information can make

the difference between getting a job or being rejected (for compliance processes please see Ghose, Aditya, and George Koliadis 2007), enabling people to see information and dispute incorrect information with duties to investigate for the people who supplied and have that data:

- Minimize the amount of information collected, used, and shared
- Downstream assurances, from vendors and other third parties with whom one is sharing personal information
- Mitigate any privacy harm that occurs.

### **11.5 The Statutory Landscape in the U.S. in 2022**

Data protection laws were enacted in the late 1960s. The federal government and credit bureaus had amassed data from millions of people. The Data Protection Act governs personal information collected by federal agencies, and the Fair Credit Reporting Act governs information collected by consumer reporting agencies, commonly known as credit bureaus. FERPA (Family and Educational Rights and Privacy Act) protects the privacy of educational records. Other privacy laws include the Video Privacy Protection Act and the Driver Privacy Protection Act. The Health Insurance Portability and Accountability Act ensures insurance portability and standardizes and facilitates electronic communications in standard formats between providers and payers. The Gramm-Leach-Bliley Act was created to break down barriers, corporate affiliations and proprietary rights and pave the way for commercial banks, investment banks and insurance companies to share information about their customers. Data protection laws have been developed in response to concerns about certain harms.

The Children's Online Privacy Protection Act (COPPA) protects against collecting information online from a child without verifiable parental consent if the child is under the age of 13. The Genetic Information Nondiscrimination Act (GINA) protects against employment and insurance discrimination based on genetic information. While the United States relies on a "patchwork" of privacy laws to protect an individual's personal information, Europe has enacted comprehensive legislation to protect explicit "privacy rights." I'm here. Affiliates must adequately inform patients of their data collection uses and privacy practices. Training as a strategy to ensure all enrollment staff are aware of the changes and requirements of this process. Finally, technology can be added to record in the system that the patient has confirmed receipt. Workflow changes, training, and documentation in proper systems can bring reporting requirements closer to this standard. Disclosure is permitted in emergencies to deal with crime

on the spot, medical examiners and coroners, organ procurement organizations, secret services for protective purposes, and a few other cases specifically described in the regulations.

### **11.5 Training privacy**

Privacy professionals seeking to implement use and disclosure rules may choose to educate everyone on what is generally permitted and briefly discuss specific scenarios. Different compliance policies may apply. One is called bare minimum. Essentially, affected organizations are forced to take steps to limit the scope of potential privacy vulnerabilities. Affected facilities should implement procedures to limit staff access to patient information to that reasonably necessary for their role. Similarly, covered Entities must limit the amount of information they disclose to that which is reasonably necessary for the purpose.

#### **How can make this compliant??**

- Configure role-based access in information systems
- Monitoring proper or improper access.
- Manually review records of who has access, or
- Provide software that can detect instances of system access that appears suspicious.
- Use a gatekeeper for certain kinds of high volume requests.
- Educate people about what sensitive data is or which patients may be in the most sensitive situations.
- Strictly adhere to access and disclosure rules.

### **11.6 Introduction to data security**

There have been privacy issues due to security breaches and vice versa. Security is for privacy. Information security is broadly defined as a program for protecting the confidentiality, integrity and availability of personal or other sensitive data. Making data available to those who should have access is confidentiality. It's privacy. Standards organizations such as the International Organization for Standardization (ISO), the National Institute of Standards and Technology (NIST), and COBIT have developed complementary frameworks that information security professionals rely on on a regular basis. In the field of data protection, the protection of personal data is necessary. We care about security, but we also care about the security of proprietary data. The Security Rules define confidentiality as close to privacy as possible, meaning that ePHI cannot be used or disclosed to unauthorized persons, and also support the Privacy Rules' prohibition against misuse and disclosure of PHI. The second category, physical security measures, includes facility access and controls, and workplace and equipment security. Finally,

there are technical safeguards such as access controls, automation controls, integrity controls and transmission security. In addition, identify reasonably foreseeable internal and external risks to the security, confidentiality and integrity of Customer Information that could lead to unauthorized disclosure, misuse, alteration, destruction or other compromise of information. Risk assessments include employee training and management; information systems, including network and software design; information processing, storage, transmission and disposal; and detection, prevention, and response to attacks, intrusions, or other system failures. This should include risk considerations in specific areas of Information security safeguards are developed and implemented to control the risks identified by the risk assessment and to periodically test or monitor the effectiveness of these safeguards. Compliance or security professionals bring together stakeholders, gather information, and scan internal and external environments. Compliance or security professionals in the field assess risks, raise significant risks, and allocate large budgets to oversight boards.

### **11.7 Information Security and compliance**

Many privacy experts report simply complying with the strictest applicable laws. These laws, despite this challenge, have changed the game. The threat of security breaches being made public quickly underscored the importance of strong security. Security professionals and standards bodies have developed a rigorous and critical framework for creating and maintaining an effective information security program. Therefore, the goal of privacy or compliance professionals working in this field is not only to minimize incidents, but also to respond to those incidents appropriately and appropriately. Building effective information security and being prepared to handle errors responsibly is the cornerstone of this field. Applying the principles of compliance outlined here will help you position yourself most effectively in this dynamic and challenging environment.

## **12. SUMMARY AND ACTION HINTS**

In this article, we have fully understood what compliance means in an industrial environment. In many ways Risk and compliance are related and ways to address or manage risk are considered. It identifies the reasons why industries, companies and organizations should address compliance. Compliance is critical to supporting the financial, reputational, and functional aspects of an industry, business, or organization. Next, the basic components of a compliance program were presented. Various strategies for building a culture of compliance

within an organization were presented, and learned psychological theories were presented to explain compliance management techniques and methods and their effectiveness. Various techniques and methods are employed to apply technology and workflows to support an effective compliance system. Strategies for addressing compliance violations and responding to incidents are being considered. Anti-corruption laws and their impact were reviewed. The relationship between anti-corruption efforts and organizational culture and compliance programs were explained. Various strategies for avoiding corruption problems and strategies for building a comprehensive anti-corruption program that can prevent and/or mitigate corruption within an organization are presented. Certain ways of protecting privacy through the Fair Information Principle can be achieved. In the area of data protection, you learned the laws and regulations regarding data protection. Data protection obligations that may apply to complex organizations were examined. Day-to-day compliance decisions an organization must make in relation to privacy laws and data protection were recognized.

Finally, a company's future action plan is presented.

- Ensure that the policy is circulated and reviewed by various departments before it is formally adopted.
- Ensure the public knows where to report ethics and compliance violations. Comply with pay-to-play laws that prohibit donations to certain campaigns
- Review and report on the personal securities transactions of certain employees.
- A code of conduct should set the tone for employee behavior and form the basis of your compliance program.



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**APPLICATION OF MACHINE LEARNING TECHNIQUE FOR PREDICTION OF  
PHISHING ON ANDROID**

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**ABSTRACT**

Phishing is a proliferating cybercrime in which a target or targets are contacted through emails, spoofed URL or text message by someone posing as a legitimate company to trap individuals into providing sensitive data such as personal information, banking details, credit card details and passwords. As we live in an era of smartphones, this anti-phishing methodology aim is to enlighten a user that whether the website they're visiting is legitimate or not. Phishing techniques are propagating with time, with the help of machine learning (ML) we build an application which is able to determine whether the URL is leading to correct parent website or not, based on certain datasets and patterns.

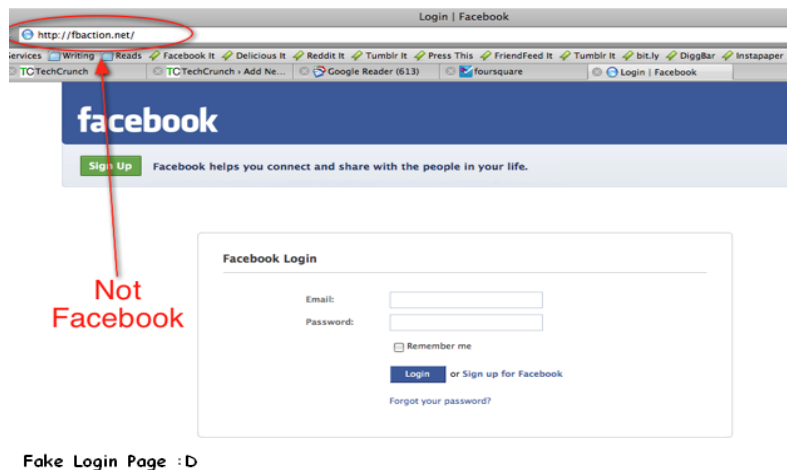
**Keywords:** Phishing emails, Facebook, Malicious, Fraud, Spoofed url

**1. INTRODUCTION**

In this section, I discussed about phishing and non-phishing with some social media example such as facebook in which Phishing is a form of fraud in which an attacker masquerades as a reputable entity or person through e-mails and malicious URL’s. Phishing is a type of social engineering attacks [1] [2] [3]. An attack can have devastating results. For individuals ,this include unauthorised purchases, the stealing of funds , or identities theft [4]. Anti-Phishing software, a computer programs that attempt to identify phishing content contained in websites, e-mail, or other forms used to accessing data and block the content, usually with a warning to the user [5] [6]. It is often integrated with web browsers and email clients as a toolbar that displays the real domain name for the website the viewer is visiting, in an attempt to prevent fraudulent websites from masquerading as other legitimate websites [7]. Most popular web browsers comes with built-in anti-phishing and anti-malware protection services, but almost none of the alternate web browsers have such protections [8] [9]. Password managers can also be used to help defend against phishing, as can some mutual authentication techniques [10].



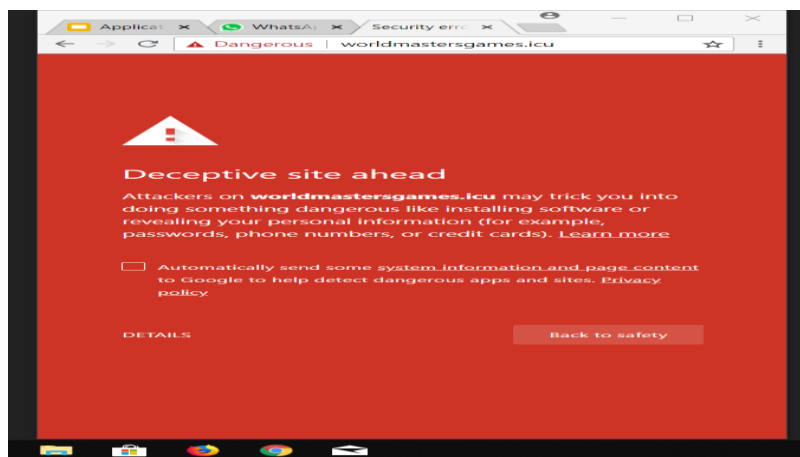
**Figure 1:** Legitimate Website of Facebook i.e., it is an secured website and data can’t be tampered



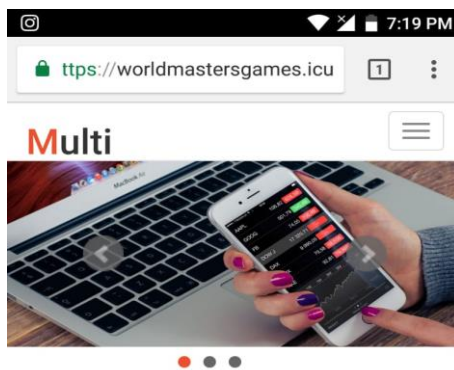
**Figure 2:** A Facebook page with malicious URL, which can steal user’s personal details.

**2. Existing System:**

“There is no single fool-proof way to avoid phishing attacks”. Even in the presence of numerous tools on anti-phishing we still become prey for phished url’s.As technology becomes more advanced, the cybercriminals techniques being used are also advancing. Recently there has been an outrage on ransomware-phishing which locks downs a system just by the click of “URL”.The major drawback in the existing system is that there isn’t a standalone android application which is able to detect phished url through machine learning technique.



**Figure 3:** Web Application: Malicious URL has been detected and access has been denied.



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**Figure 4:** ANDROID: Malicious URL has been opened without any alert.

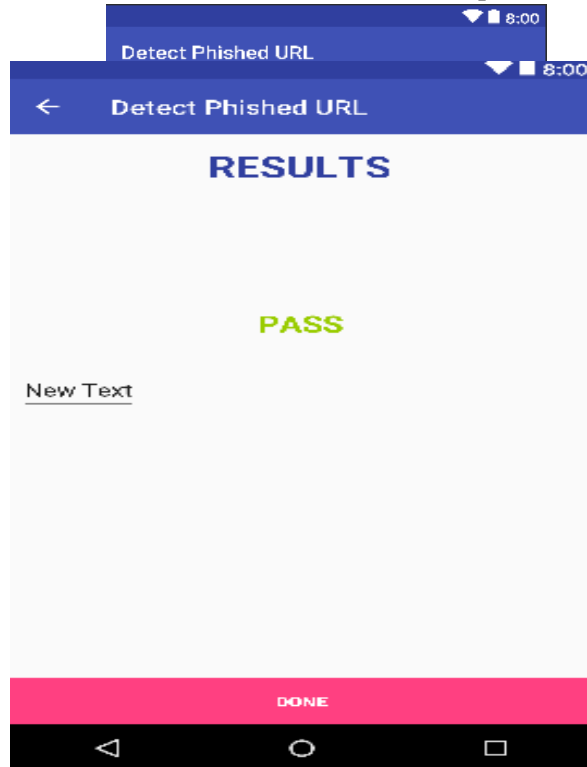
### **3. Proposed System:**

This application is designed in such a way that it is able to detect the legitimacy of the url and avoid users from any repercussions and herald a user regarding phished url's. The approach towards detection of this algorithm is simple, we give the machine(ML-technique) pre-determined datasets of phished websites and with the combination of supervised and unsupervised learning strategies we come with an outcome to determine non-phished and phished url's. We use python as programming language to implement the ML algorithm to verify and detect phished url's. Later this python application is packaged into an android application and deployed on android, where it detects and overlays a message on screen by just copying the url to the clipboard. The whole processing of detection is done in the background for feasible usage.

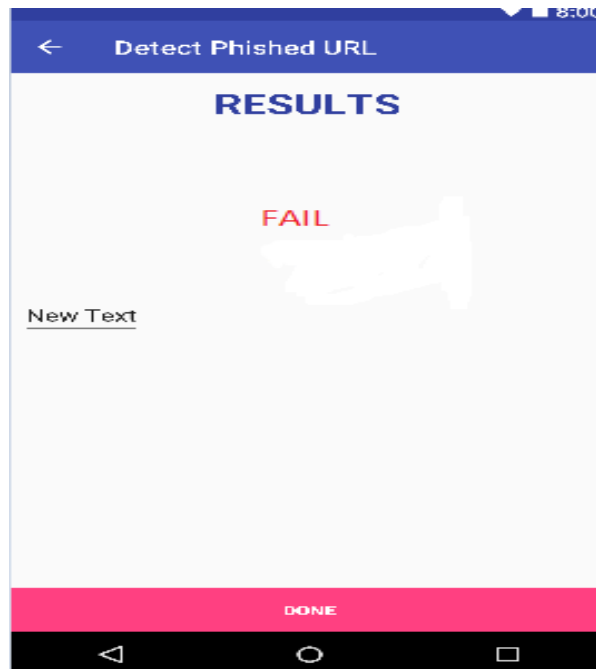
### **4. RESULTS AND DISCUSSIONS:**

In this research as we know malicious website or Malicious URL is a common and very serious threat to information security and cyber security. Malicious URLs host unwanted content such as spam, phishing, drive-by downloads, etc. and trap innocent users to become victims of scams and cause theft of private information, monetary loss. To avoid such threat we have applied the machine learning technique to protect from such fraud and result can be seen in the form of snapshot (see snapshot 5 through 7).

**Figure 5:** URL is entered here to check whether it is a phished or non-phished URL



**Figure 6:** Result is displayed. PASS represents URL is non-phished



**Figure 7:** FAIL represents URL is phished





**Concluding Remarks:**

As we know attackers are using most common technique such as phishing to break security and steal confidential and private information. In this section Malicious URL detection plays a serious role for many cyber security applications. An effective and efficient way to protect against phishing is to use an add-on filter. In the last few years, automated detection of malicious URLs using machine learning becomes a very exciting vulnerable problem. In this paper we have applied the machine learning technique to protect from malicious URL and emails.

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**A COMPARATIVE STUDY OF KEY QUALITY PERFORMANCE INDICATORS IN  
ANAESTHESIA AND SURGERY IN OPERATION THEATRE AT A TERTIARY  
CARE HOSPITAL**

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**BACKGROUND**

A key performance indicator (KPI) is a measurement that assesses the success of an organisation or a specific activity in which the organisation is involved; success is defined as the repeated periodic achievement of some operational goal or as progress toward strategic goals determined by the organisation. Because perioperative care is both an investment of the hospital budget and a source of revenue, optimizing the utilisation and efficiency of the operation theatres (OT) is clearly in the best interests of the hospital and the populations it caters. As a result, it is critical that all KPIs used to assess OT performance are in sync with national and international accrediting authorities, both medically and financially.

**AIM AND OBJECTIVES**

The current study aimed to assess existing anaesthetic and surgical services at a tertiary level healthcare centre in accordance with the National Accreditation Board for Hospitals and Health Care Providers standards. Retrospective research for key quality indicators (CQI-NABH) relating anaesthesia and surgical services was undertaken at a tertiary care hospital.

## **METHODOLOGY**

The study was carried out at a tertiary care hospital's Department of Anaesthesiology, and data were analysed retrospectively from October 1st, 2019, to November 30th, 2020. During the study period, all patients receiving elective or emergency surgical procedures under supervised anaesthetic care, regional or general anaesthesia, were considered. A retrospective analysis of key quality performance indicators (CQI-NABH) for anaesthesia and surgical services at a tertiary care hospital was carried out. It was in accordance with the NABH 4th edition 2015 standards of COP 13, COP 14, and COP 15. Six quality indicators were studied: OT utilisation rate (hours), percentage of anaesthesia plan modification, percentage of adverse anaesthesia events, percentage of anaesthesia related mortality, percentage of cases where the organization's procedure to prevent adverse events such as wrong site, wrong patient, and wrong surgery was followed, and percentage of cases who received appropriate prophylactic antibiotics within the specified time frame. We also wanted to identify gaps and offer suggestions in Anaesthesia and Surgical Services, as well as to observe any changes in quality indicators throughout the 2020 Corona Virus illness (COVID) pandemic. For exploratory analysis, an Excel spreadsheet was employed.

## **OBSERVATIONS**

The regular caseload in OTs was in the 1000-1500 range, but due to the pandemic situation, there was a drop in cases from March 2020 onwards, compared to a defined benchmark of 1000 cases per month. The benchmark was generated by averaging the number of cases operated in OR over a 6-month period prior to the implementation of COVID 19. The percentage of anaesthetic plan modifications on the day of operation ranged between 0-3.34%, compared to a predefined benchmark of 1%. The number of adverse anaesthetic events ranged from 0 to 2.1 percent, with the most common causes of AAE being cardiovascular, respiratory, and airway-related reasons, compared to a benchmark of 1%. Over the course of a year, there was no documented fatality attributable to the administration of anaesthetic. There has been a considerable improvement in antibiotic and WHO surgical safety check list compliance in the operating room, which is now close to 98 percent -100 percent. In the pre-covid period, the department of Orthopaedics handled the most patients (18.76 percent), followed by Obstetrics and Gynaecology (12.84 percent), and Neurosurgery (12.84 percent). However, during the covid era, the department of Obstetrics performed the greatest number of procedures.



Recommendations, as well as corrective and preventive actions, have been discussed with the relevant key performance indicators.

### **CONCLUDING REMARKS**

To summarise, monitoring, evaluating, and comparing healthcare performance metrics, or KPI, in hospitals is critical for providing the best care while ensuring the best use of available resources. These quality indicators offer one a "bird's-eye view" of the efficiency of hospital's services and assist management in developing key process improvement strategies. These quality indicators aid in the key areas: improving the patient treatment and patients' overall satisfaction, improving healthcare quality, reducing medical costs, and ensuring the best use of available resources. Such audits should be done on yearly basis to maintain proper records and to check effective utilization of Operation theatre.

**INTRODUCTION OF ADDITIONAL NAME-NODE FOR CACHE MECHANISM  
FOR FAST READ OPERATIONS IN HDFS**

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**ABSTRACT**

Hadoop applications primarily employ HDFS (Hadoop Distributed File System) as their primary storage solution. The open-source framework functions by sending data quickly between nodes. Companies that need to manage and store large amount of data frequently employ it. Files are divided into blocks by HDFS, and each block is kept on a DataNode. The NameNode, the cluster's master node is connected to numerous DataNodes. Replicas of these data blocks are dispersed throughout the cluster by the master node. Users can designate paths that HDFS should cache using the centralized cache management feature of HDFS. In order to advise DataNodes that have the desired blocks on disc to cache them in off-heap cache, The NameNode will communicate with them. In this proposal, we propose an introduction of additional Name-Node for cache mechanism for fast read operations in HDFS which will store frequent request records for handy access instead of performing lookup across DataNodes. This will drastically reduce the latency in accessing records in HDFS.

**Keywords:** HDFS, NameNode, DataNode, Cache.

## 1. INTRODUCTION:

Big data is a collection of large data sets that cannot be processed using traditional computing techniques. It is not a single technique or a tool. Rather it has become a complete subject, which involves various tools, techniques and frameworks. The primary purpose of NameNode is to manage all the metadata. As we know that data is stored in the framework of blocks in a Hadoop cluster. So, on which data node or on which location that block of the file is stored is in metadata. NameNode is the master node in Apache Hadoop HDFS architecture that maintains and manages the block, very high available server that manages the file system name and controls access to files by clients. In computing, a cache is a high-speed data storage layer which stores a subset of data, typically transience in nature. So future request for that data is secured up faster than is possible by accessing the data primary storage location.

## 2. LITERATURE SURVEY:

As part of literature study, we tried to provide all the latest and their corresponding future trends, following table highlights the contribution, limitations and future enhancements.

Sl.no	Reference paper	Contributions	Limitations	Future Enhancements
01	Debajyothi Mukhopadhyaya Et al.	Presented a way to reduce the NameNode memory consumption thus increasing the capacity of a Hadoop cluster.	This way the Hadoop cluster will not reach the stage where the namenode because irresponsive due to excessive jvm garbage collection as the HDFS will not be heavily loaded.	Namenode will only store relatively more frequently used data the operations carried on the cluster will be faster and more efficient.
02	Eric Newberry	Demonstrated the benefits that in network caching can provide to big data applications running on two of the Hadoop distributed file system by reducing the total amount of traffic sent over cluster networks	This includes the ability to implicitly retrieve data from multiple sources and over multiple paths as well as a stateful forwarding plane that can detect failures and discover alternative paths.	They have conducted their evaluations using the 2Q, ARC, LIRS, LRU, and MQ cache replacement policies. However, this is only a subset of the many replacement policies in existence. This would increase the breadth of the evolution.

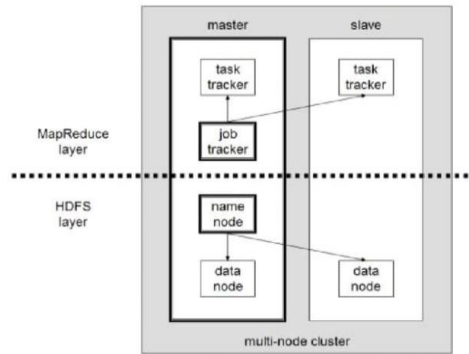
03	Dr. Chandrakant Naikodi	Big data analytics examines large and varied data sets. We use advanced analytics techniques against the large data to uncover the hidden patterns unknown correlations market trends, customer preferences and other useful information.	Code is very lengthy and more development efforts are required but the code efficiency is high as compared to live	Describes all advances, methods and techniques, leading research areas, research motivational areas of big data analytics.
04	Rotsnarani sethy	Conducted a survey on Hadoop framework for big data processing. Different features of Hadoop map reduce are discussed to deal with the problems of scalability and complexity for processing big data	Today, data is generated from various different sources and can arrive in the system at various rates. To process these large amounts of data is a big issue today.	Hadoop components which are used to support the processing of large data sets in distributed computing environment in future we can use some clustering techniques and check the performance by implementing it in Hadoop.
05	Revathi veluswamy	Hadoop has emerged as a popular tool for big data to analyse these data using map-reduce to get the desired output with the help of programs the design purpose of it is to perform millions of data in a single executive a server.	There is a huge amount of data lying in the industry, but there is no tool to wield it and Hadoop can implement on low-cost hardware and can be used by a large set of audience large number of datasets.	Many techniques are used to make efficient plan but the map reduce .so, that it can speed up the system data retrieval techniques like Quincy asynchronous processing, job awareness, delay scheduling had made the schedule effective for faster processing.

### **HADOOP ARCHITECTURE:**

The basic Hadoop architecture consists of two primary components viz.

1. Hadoop distributed file system (HDFS) and 2.map reduce





### Hadoop Distributed File System (HDFS Layer)

Hadoop Distributed File System is a fault -tolerant distributed file system designed to run on “off-the-shelf” hardware. It has been optimized for streaming reads on large files whereas I/o throughput is favoured over low latency. In addition, HDFS uses a simple model for data consistency where files can only be return to once. HDFS assumes this failure as an eventuality and uses a concept called black replication to replicate data across nodes in the cluster. HDFS uses a much larger block size when compared to desktop file system.

### METHODOLOGIES

An HDFS cluster as two types of nodes operating in a master-worker pattern:

A NameNode (the master) and a number of DataNodes (workers).

#### A) **Namenode:**

The NameNode manages the file system namespace. It maintains file system tree and the metadata for all the files and directories in the tree. This information is stored persistently on the local disk in the form of two files. The namespace image and the edit log. The NameNode also knows the DataNodes on which all the blocks for a given file are located. However, It does not store block locations persistently, Because this information is reconstructed from data nodes when the system starts. A client accesses the file system on behalf of the user by communicating with name node and DataNode.

#### B) **DataNode:**

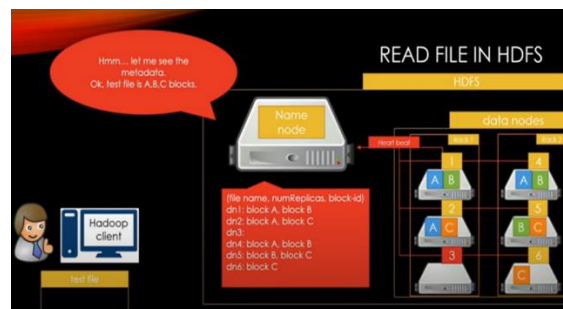
Data nodes are the workers of the file system. DataNode performs creation, deletion and copy of block under the ‘Name Nodes command’. They stored and retrieve blocks when they are told to by clients are the Name Nodes, and they report back to the name node periodically with

lists of blocks that they are storing each block replica on a data node is represented by two files in the local hosts native file system. The first file contains the data itself and the second file is blocks meta data including checksums for the block data and the blocks generation stamps.

### READOPERATION WITH CACHE:

Read operation starts with a lookup operation and has a partial overlap between the lookup and data read operation

- If there is cache it, then cache returns the value to the processor or the higher-level cache.
- If there is a cache miss, then we need to cancel the data. read operation and send a request to the lower-level cache
- The lower-level cache will perform the same sequence of accesses and return the entire cache block.
- The cache controller can then extract the requested data from the data and send it to the processor.
- Simultaneously, the cache controller invokes the insert operation to insert the block into the cache.



### 3. CONCLUSION

The Hadoop distributed file system is a reliable distributed file system to stores large files across big data clusters. The namenode is the centrepiece of a Hadoop distributed file system it keeps the directory tree of all files in the system caching reduces latency in the round-trip time by retrieving the content much faster.

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**INVESTIGATING PHASE CHANGE MATERIALS, THEIR PERFORMANCE AND TYPES WITH THE APPROACH OF SUSTAINABILITY AND REDUCING ENERGY CONSUMPTION**

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**ABSTRACT**

Recently, the increase in population and expansion of construction has caused a significant increase in energy consumption. This issue has caused many concerns about the depletion of energy sources and the increase in pollution caused by its use. For this reason, attention has been paid to new sustainable solutions to supply the energy needed by humans and also to prevent its waste in recent years. Thermal energy storage (TES) refers to the temporary storage of energy in the form of cooling or heating for later use, and is considered a technology in the field of using renewable energy, and can help create balance between energy demand and resources by storing excess energy and returning it when needed. Phase change materials (PCMs) can store thermal energy of the surrounding environment when they reach the phase change temperature (melting or freezing point), based on the latent heat of melting and freezing. The purpose of this article is to study phase change materials, how they work and their types. we try to find the weak and strong points of using these materials by reviewing the studies done in this field, and we can express the areas needed for future research. Different types of PCMs are Organic, Inorganic and Eutectic. methods of PCM incorporation are macro and micro encapsulation as direct ways of installing them in buildings or using them in combination with different heating and cooling systems. Although this material has shown reasonable success in the field of energy consumption reduction in most cases, however, other factors must be considered to determine the cost-effectiveness of using such a system. So Economic and life cycle analysis of phase change materials are of great importance in future studies.

**Keywords:** Phase Change Materials, Thermal Energy Storage, Latent Heat, Sustainable Solutions, Energy Consumption

## 1. INTRODUCTION

The increase in population and the expansion of construction have caused an increase in energy consumption, and this issue has caused many concerns about the depletion of energy resources and the increase in pollution. For this reason, in recent years, there has been a significant increase in attention to new solutions to supply the energy needed by humans and also to prevent its waste. It is predicted that due to growing number of population and economic growth, the amount of demand for energy will double the current amount by 2050 [1]. Nowadays, reducing the amount of fossil energy consumption through finding design potentials and using renewable energy has become one of the main goals of architects. We are currently witnessing a new generation of buildings. Buildings that have completely ecological behavior and are able to react to direct and indirect changes around them and adapt to the conditions by intelligently using appropriate and new materials and using new technology. Thermal energy storage in general, and phase change materials in particular, has been the subject of some researches over the past 20 years. The contents of this field deal with energy saving, efficient and rational use of existing resources and optimal use of renewable energy. Thermal energy storage (TES) refers to the temporary storage of energy in the form of cooling or heating for later use, and is considered a technology in the field of using renewable energy, and can be used by storing excess energy and restoring it when needed. this can provide many solutions to important issues related to energy consumption, such as [2]:

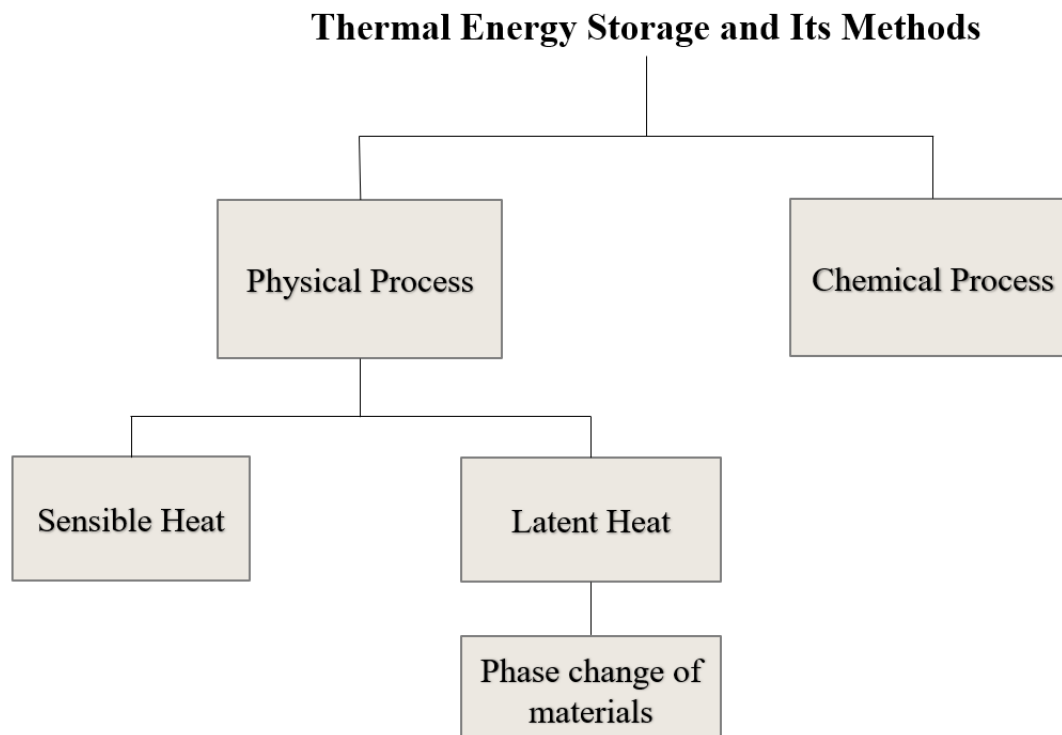
- Time delay and transmission between the production or availability of energy and its consumption in energy receiving systems.
- Providing energy in special places such as hospitals, computer centers, etc.
- Creating thermal inertia

For example, due to the difference in day and night temperature, the energy demand can be balanced during the day and night, by saving energy summer heat can be used for solar collectors in winter, and the cold obtained from winter air can also be used to provide air conditioning systems in summer.

The most common way to store energy is to use the sensible heat of materials. In this method, thermal energy is absorbed by the material and causes its temperature to rise, and for this reason, this storage method is called using sensible temperature. In fact, the material acts like a battery and stores energy, and because of this, its temperature rises. If necessary, the object returns the

absorbed energy to the environment and its temperature reaches its initial temperature again [3].

using sensible heat is suitable for storing a limited amount of energy, and if we need to store more energy, a very large amount of material must be provided. For a better understanding, we can say that in the example of a battery, we need a large number of batteries to store energy, which is usually not possible. A better solution is to use a larger battery that can store the large amount of energy required [3]. This idea has been realized in the method of energy storage using latent heat. The heat transfer that occurs when a substance changes from one phase to another is called latent heat. The amount of energy stored in latent heat is usually much more than sensible heat at a certain temperature, which of course depends on the specific heat of the material. If a suitable material is chosen, the solid-liquid phase change (melting and freezing of materials) can store a large amount of energy. All materials experience phase change, so in fact all materials can be considered phase change materials (PCM). Of course, only a number of materials in which phase change occurs in a certain temperature range (the operational temperature range of building residents) are actually called phase change materials (PCM)[4].



**Figure 1.** Thermal Energy Storage and Its Methods

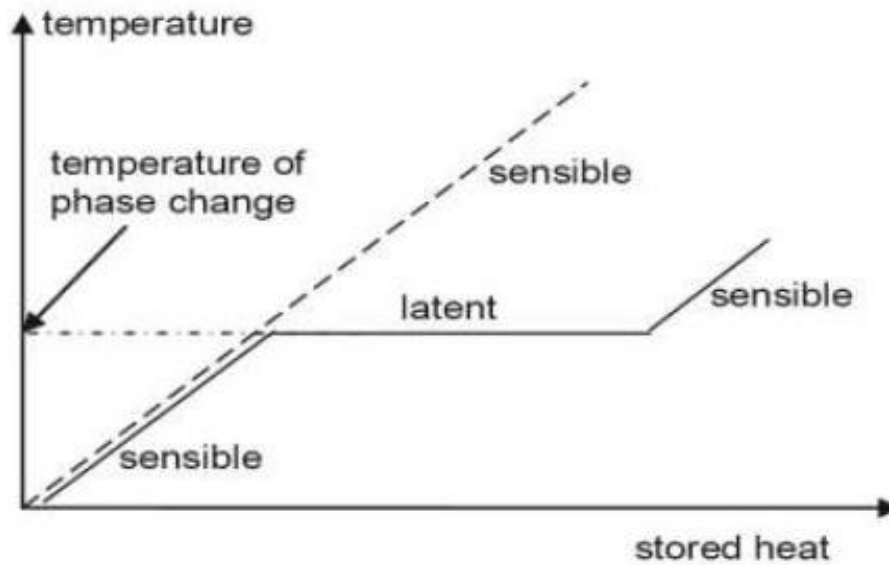


Figure 2. latent heat storage

An article in 2020 showed that The eutectic mixture of capric acid and palmitic acid had the highest performance score when using in trombe wall, this implies that integrating a Trombe wall with this PCM will yield the optimum performance for the system [5]. An experimental study has been conducted on building wall fragments containing phase change material (PCM) to investigate the impact of PCM on the heat transfer in a building wall and the effectiveness of PCM in improving the indoor thermal comfort of a building. The placement of the PCM layer shows that PCM closer to the heat source gives a low-temperature gain of the cold water bath (indoor state) relative to the PCM near to the heat sink [6]. Another study in 2014 shows the results of the corresponding building energy simulations indicate that the incorporation of 0.9 kg/m<sup>2</sup> floor area of PCM with a melt temperature of 25 °C is capable of reducing the zone hours overheated by about 50%. The simulations indicate that reducing the melt temperature of the PCM below 25 °C may have an adverse effect on thermal comfort. Finally, changing the location of the PCM from behind the drywall to the interior wall surface resulted in a reduction of zone hours overheated by more than 60% compared with a building with no PCM [7]. In another study, The potential of PCM in reducing the building energy consumption at different climate zones of Australia and influence of several factors on the effectiveness of PCM have been investigated using building simulation software EnergyPlus. Five different melting ranges PCM have been used to identify the optimum PCM melting range for each city. Conclusions that have been reached: PCM has the potential to reduce the building energy consumption in Australian cities under cold temperate, mild temperate and warm temperate zones. The

integration of PCM has very minor effect on the energy consumption of houses which are in hot and humid climate zone. Effectiveness of a PCM depends on local climate, thermostat range, PCM layer thickness, surface area and location of application in buildings [8].

The purpose of this article is to research on phase change materials, how they work and their types. Then, we try to find the weak and strong points of using these materials by examining the studies done in this field, so we can express the areas needed for future research.

## **2. RESEARCH AND FINDINGS**

Phase change materials are materials that store the thermal energy of the surrounding environment when they reach the phase change temperature (melting or freezing point), based on the latent heat of melting and freezing, and return it to the environment when needed. By doing this, they force their surrounding environment to remain at a certain temperature. PCMs can store 5 to 14 times more energy per unit volume than sensible storage materials (water, masonry, or rock).

### **2.1 Types of Phase Change Materials**

*2.1.1 Organic Phase change Materials.* They are divided into two categories: paraffins and non-paraffins.

The most important advantages of using paraffins in energy storage systems are: high latent heat of melting, low volume change during melting, low vapor pressure in molten state, non-corrosive and relatively cheap. The disadvantages of this group of materials are: low thermal conductivity, relatively flammable.

Organic non-paraffins, which are better known as fatty acids, are the most abundant phase change materials with very variable properties, and unlike paraffins, which have similar properties, each of these materials has its own unique characteristics. Including: high latent heat of melting, flammability, low thermal conductivity, low flash point, variable toxicity level, imbalance at high temperatures. The main problem of these materials is their cost, which is two to two and a half times that of commercial paraffins. In addition, these acids are relatively corrosive [9].

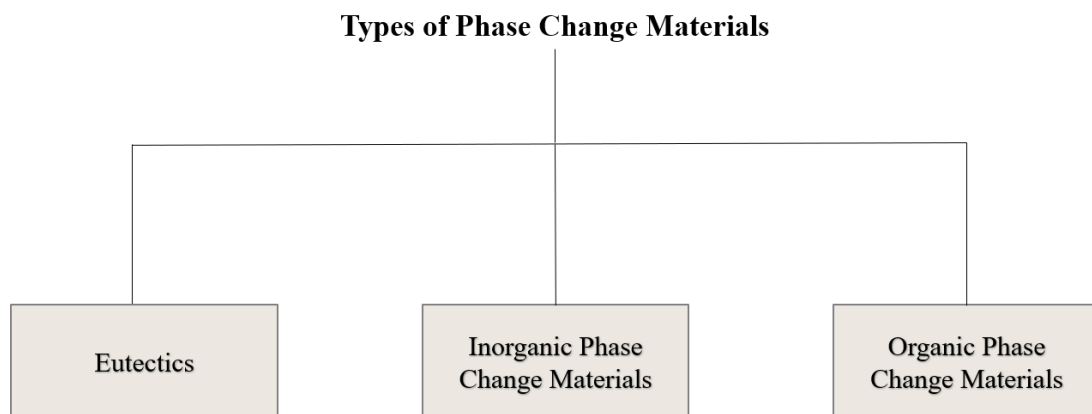
*2.1.2 Inorganic Phase change Materials.* They are classified under two groups of salt hydrates and metals. The most attractive properties of salt hydrates are: high latent heat of melting per unit volume, relatively high thermal conductivity (almost twice that of paraffins), low volume change during melting. These salts are not very corrosive and compatible with plastic. Many hydrate salts are cheap enough to use in storage. The main problems salt hydrates are: non-



uniform melting, the spontaneous reduction of the number of water moles of the hydrate salts during the discharge process and the fact that they are only slightly toxic.

Metal phase change materials include metals and metal alloys with low melting points. Currently, this group of metal materials is not used much as phase change materials due to its heavy weight. However, when volume is involved, these materials are suitable due to their high latent heat per volume unit. Among the properties of metal phase change materials, the following can be mentioned: low heat of melting per unit weight, high heat of melting per unit volume, high thermal conductivity, low specific heat, relatively low vapor pressure [10].

**2.1.3 Eutectics.** Eutectic or alloy materials are a combination of two or more components with a minimum difference in melting point, each of which melts or freezes equally and forms a mixture of crystals related to each component during crystallization. Since alloys freeze as a mixture of very close crystals, their melting and freezing almost always takes place without separation. In other words, during freezing or melting, both components become solid or liquid at the same time. Alloy materials have a higher volume storage density than organic compounds. Eutectics can be a mixture of inorganic and/or inorganic (organic -organic, organic–inorganic, inorganic - inorganic) [10].



**Figure 3.** Types of phase change materials

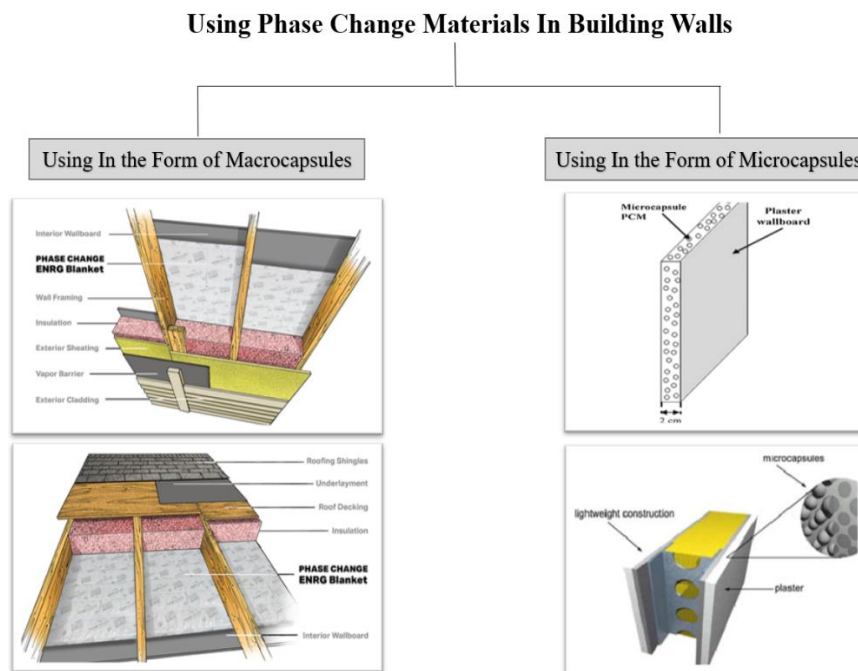
## **2.2 Conditions of Using Phase Change Materials**

Phase change materials must have certain properties in order to achieve the expected performance. For using in buildings, it is necessary to use materials that have a small volume change during the phase change, otherwise the performance of these materials in construction applications will be disturbed and limited. Another feature is that phase change materials, while having a high heat capacity, must also have an acceptable heat transfer coefficient so that they can transfer the stored heat to the desired spaces easily and without disturbance. For the full

performance of these materials, PCMs must be used in which the phase change process is stable and the physical characteristics of them do not change in long cycles. Another thing is that in choosing phase change materials, special attention should be paid to the melting temperature of these materials; For example, when using in the building walls, if the selected material has a melting temperature in the temperature range of the same area around noon, the phase change process occurs during the day, around noon when the ambient temperature reaches its maximum [11].

### 2.3 Methods of using phase change materials

**2.3.1 Using in building directly.** These materials should be placed in containers and used to prevent them from flowing and wasting in the liquid phase. There are three types of phase change materials available in the market for building use: microcapsules containing these materials, plastic macrocapsule envelopes, and hard panels made of high-density polyethylene. The simplest, most practical, and cost-effective method is direct incorporation, in which the PCM is integrated with the construction material. Among the cases of use in this way, we can mention the use in concrete of walls and ceilings or gypsum boards containing these materials [10].



**Figure 4.** Using phase change materials in buildings directly

**2.3.2 Using in building indirectly.** Phase change materials can be used in combination with other components and systems in the building to increase their efficiency. They can be used in: electric heating system, solar heat pump, solar water heaters, refrigeration systems, use as

transparent insulation on windowa, use in solar systems and combination with Trombe wall [11].

### **3. CONCLUSION**

In this article, we introduced phase change materials, their types, how they are used in buildings and their benefits. But efficiency is an important factor that determines whether something is worth using or not. Although PCMs show promising results in most cases, other factors need to be examined to determine the cost-benefit of using such a system. For example, if the system shows a high performance but is costs more than it saves, overall system performance is not acceptable. It is recommended that in future studies, the cost-benefit analysis of using these materials through building life-cycle be considered and also determining how they impact embodied energy and carbon emission is another important issue in the field of sustainability.

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**COMMUNITY PERCEPTIONS IN PEATLAND RESTORATION EFFORT**

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**ABSTRACT**

The existence of peatlands in Southeast Asia reaches 12% of the area of Southeast Asia or about 24 million hectares. Peatlands in Indonesia are among the largest ecosystems in Southeast Asia. The three largest islands in Indonesia have a fairly extensive peat ecosystem of around 14 million hectares. The spread of this peatland area is also followed by widespread peat damage. Damage to peatlands disrupts the sustainability of peatland functions as carbon sinks, water buffers, habitats for various flora and fauna and sources of community income. The method used in writing this paper is to use secondary data. Secondary data is used to find information related to the writing of this paper through journals, papers and other literature. Peat ecosystems are included in a vulnerable ecosystem. The vulnerability of this ecosystem makes the peat ecosystem easy to damage. The existence of the damaged and degraded peat ecosystem makes the peat ecosystem in a state of concern. Efforts to restore peatland for the better are needed to maintain the integrity of the peat ecosystem. In this case, the existence of the community is very important in supporting the success of maintaining and improving. Communities living around peat ecosystems will be the first to be affected when they are damaged. The knowledge gained by the community while living around peatlands and the knowledge passed down from generation to generation can help in efforts to restore the function of peatlands.

**Keywords:** Ecology, Peatland, Perception

## **INTRODUCTION**

The existence of peatlands in Southeast Asia reaches 12% of Southeast Asia's area or around 24 million hectares (Ramadan, 2018). Peatlands in Indonesia are included in the widest ecosystem in Southeast Asia. These peatlands are spread across the three largest islands, namely Papua (8 million Ha), Sumatra (7.2 million Ha) and Kalimantan (5.8 million Ha). (Rais, 2011). The spread of this peatland area is also followed by widespread peat damage. Damage to peatlands disrupts the sustainable function of peatlands as carbon absorption, water buffers, habitat for various flora and fauna and a source of community income. (Ramadan, 2018).

One of the causes of damage to peatlands is land fires. Peatland fires are indeed a very complex matter because they occur with various background issues, one of which is the issue of land ownership related to the management and use of peatlands. (Arifudin et al., 2019). The use of this peatland contributes to the income of farmer households through farming activities of various agricultural commodities.

Agriculture on peatlands cannot be separated from its role in utilizing the land. The use of land by humans for farming can be a turning point for restoration. The success of this recovery depends on the community managing the land. Communities living around the peat area always encounter peat every day. The community can have knowledge about the condition and management of peat. This knowledge is used to manage agricultural land. So the purpose of writing this paper is to find out the perception of public knowledge about peatlands towards the restoration of peat ecosystems.

## **METHOD**

The method used in writing this paper is to use secondary data. Secondary data is used to find information related to the writing of this paper through journals, papers and other literature.

## **RESULT AND DISSCUSION**

Peat ecosystems are included in vulnerable ecosystems (Tamin et al., 2019). The vulnerability of this ecosystem makes the peat ecosystem easily damaged. The existence of peat ecosystems that are damaged and degraded makes peat ecosystems in a state of concern. Peat soils are classified as marginal soils and are prone to disturbance, so that efforts to increase land productivity must be followed by efforts to prevent damage to ecosystems at considerable cost (Erlina et al., 2021). Damage to peatlands is mainly due to tree felling and forest conversion to other uses, fires and reclamation (Wibowo, 2009).

Changes in forest land use are changing the benefits of forest into non-forest land such as settlements, agricultural areas and plantations. the use of forest land to become oil palm plantations, this is because each community party is loaded with their own interests(Acin et al., 2021). The use of peatlands for agriculture has been carried out for a long time and is a source of life for farming families. However, the utilization of peatlands has environmental risks, because peat is very susceptible to degradation(Barlandi, 2020).

Land use is actually a human effort in its interaction with the physical resources of the land in order to meet their needs. Changes in the structure of land use are not merely a physical phenomenon of reducing the area of certain land and increasing land use for other uses, but has a close relationship with changes in the economic, social, cultural and political orientation of society.(Arifudin et al., 2019). Likewise with peatlands, as marginal lands are used because there is a need for plantation development development, both by corporations and the community

Efforts to restore better peatlands are needed to maintain the integrity of the peat ecosystem. The existing perception in the community underlies the attitude and participation of the community towards efforts to prevent peatland fires. The existence of a positive perception from the community can be used as an indicator that the activities carried out to prevent peatland fires have received support from the community in the form of participation or participation from the community in carrying out their activities, because efforts to prevent peatland fires cannot be achieved without community participation(Tampubolon et al., 2018).In this case, the existence of the community is very important in supporting the success of maintaining and improving. Communities living around peat ecosystems will be the first to be affected when they are damaged. The knowledge gained by the community while living around peatlands and the knowledge they have passed down from generation to generation can assist in efforts to restore the function of peatlands.

Communities who have knowledge of how to manage these peatlands can have a positive impact on land restoration activities. Recovery can take place when people understand how important land is and how to manage it. Good management can be done by not burning the land intentionally and massively. Maintenance of canal blockings and maintaining the water level are also commonly carried out by the community because the community has important knowledge regarding how to keep the peat wet.

## **CONCLUSION**

The conclusion of this paper is that people's perceptions about peatland knowledge can be a factor in supporting the successful restoration of damaged peatlands. Damage can be overcome with the knowledge possessed by the community combined with information from outside.



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**ON THE NON-EXTENDIBILITY OF D(2) TRIPLES DETERMINED  
WITH THE HELP OF SPECIAL TYPE D(2) PAIRS****Assoc. Prof.Dr. Özen ÖZER**Department of Mathematics, Faculty of Science and Arts, Kırklareli University,  
Kırklareli,, 39100, Türkiye**ÖZET**

Diyofant küme teorisi, bazı koşullara sahip bir tür Diyofant denklemdir. Bu popüler konu, sayılar teorisi/matematikte doğrudan olduğu kadar dolaylı olarak diğer bilimlerdeki etkili uygulamalarda da birçok önemli role sahiptir. Konu antik çağda Diyofantus tarafından keşfedilmiş olsa da günümüzde hala sınıflandırma sorunu bulunmaktadır. Bu çalışmada,  $x'$  in pozitif tamsayılar cinsinden yazıldığı özel D(2) Diyofant çifti  $\{1, x\}$  hakkında birkaç yeni sonuç ve yaklaşım elde edilmiştir. Çalışmanın başında bu tür çiftlerin sayısal olarak iterasyonu belirlenir. Daha sonra düzenli D(2) üçlüsüne genişletilebilirlikleri elde edilmiş ve Diyofant denklemleri teorisi kullanılarak D(2) Diyofant 4-lülerine genişletilemeyecekleri kanıtlanmıştır. Hesaplama sonuçları da elde ettiğimiz sonuçları desteklemekte ve bir sonraki çalışmamızda bu çalışmayı genelleştirmek için genel sonuçlar elde etmemizi sağlamaktadır.

**Anahtar Kelimeler:** Diyofantusun Küme Teorisi, Diyofant Denklemleri, Pell Denklemleri, Pozitif Tamsayılar, D(n) Diyofant Üçlülere için Düzenlilik Koşulu. İterasyon, Asal Sayılar, Belirsiz İkili Kuadratik Form, Denklik Sınıfları, Temel Çözüm.

**ON THE NON-EXTENDIBILITY OF D(2) TRIPLES DETERMINED WITH THE  
HELP OF SPECIAL TYPE D(2) PAIRS****ABSTRACT**

Diophantine set theory is a kind of Diophantine equations with some conditions. This popular topic has many significant role in number theory/ mathematics as directly as well as effective applications in other sciences indirectly. Even the topic was found out by Diophantus in the ancient time, it still has classification problem at the present time. In this paper, several new results and approximations on the specific kind of D(2) Diophantine pair  $(1, x)$  such that  $x$  is written in the terms of the positive integers) are obtained. In the beginning of the work, it is determined iteration of the such type of pairs as numerically. Then, it is obtained their extendibility to regular D(2) triple and proved that they can not be extended to D(2) Diophantine 4-tuples by using theory of Diophantine equations. Computational results are also lend countenance to our acquired results and, they give us to get general results to generalize this work in our next work.

**Keywords:** Diophantus' Set Theory, Diophantine Equations, Pell Equations, Positive Integers, Regularity condition for D(n) Diophantine Triples, Repeating, Prime Numbers, indefinite binary quadratic form, equivalence class, fundamental solution

## INTRODUCTION

Diophantus (Father of Algebra) lived in Alexandria, Egypt between 200 AD and 214 to 284 or 298 AD and little is known about the life of him. He knows with his many theories and Diophantine set theory (given in the preliminaries section) is considered in this work.

One of the famous Diophantine sets is Fermat set known as  $\{1, 3, 8, 120\}$  in the set of integers. They can be determined in the terms of rational numbers, Gaussian number so on... They are a kind of Diophantine equations and it is directly related with solutions of the Pell equations. Even some of the properties and definitions are given in the preliminaries section, readers can find more information on the Diophantine set theory and Pell equations in the references.

The aim of this work is to remind some fundamental notations firstly. Then, we deal with a type of Diophantine  $D(2)$  pairs started with number one (1) and ongoing with positive integers such as  $\{1, 2\}$ ,  $\{1, 7\}$ ,  $\{1, 14\}$  ...so on...

it is demonstrated that a special type of Diophantine  $D(2)$  pairs ( $\{1, x\}$  where  $x$  is a suitable positive integer) can extendable to Diophantine  $D(2)$  regular triples but they can not be finding primitive fundamental solutions of the Pell equations.

## PRELIMINARIES AND METHODS OF THE PAPER

### Definition 1. (Dujella's papers)

Assume that  $k$  be an integer.  $P_k$ -set of size  $r$  or  $D(k)$  set (with size  $r$ ) is defined (called as or the Diophantine  $r$ -tuple with property  $D(k)$ ) by a set  $\Gamma = \{t_1, t_2, t_3, \dots, t_r\}$  of distinct positive integers where  $t_i t_j + r$  is the square of an integer for each  $i \neq j$ .  $D(k)$ -set  $\Gamma$  can be extended to a new  $D(k)$ -set for size  $r+1$ , if there exists a positive integer  $u \notin \Gamma$  such that  $\Gamma \cup \{u\}$  is again a  $D(k)$ -set.

### Definition 2. (Dujella's papers, Regularity Condition for Triples and Quadruples)

(i) A Diophantine  $D(k)$  triple  $\Gamma = \{t_1, t_2, t_3\}$  in set of the positive integers is called as regular if  $(t_3 - t_2 - t_1)^2 = 4 \cdot (t_1 t_2 + k)$ .

(ii) A Diophantine  $D(k)$  quadruple  $\Gamma = \{t_1, t_2, t_3, t_4\}$  in set of the positive integers is defined as regular if  $k \cdot (t_4 + t_3 - t_2 - t_1)^2 = 4 \cdot (t_1 t_2 + k)(t_3 t_4 + k)$ .

In order to find the solutions of the Pell equations we obtained in this study by using the theory and methods expressed in Matthew's and Stolt's articles, the following information can be given briefly. (Since the techniques of Stolt's papers and Matthew's papers are different from each others and their effectives are changeable for different methods while finding primitive fundamental solutions):

Matthew paid regard to the integer solutions  $(u, v)$  of the equation/binary quadratic form  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$ , for integers  $\mathcal{A}, \mathcal{B}, \mathcal{C}, \mathcal{N}$  such that  $\mathcal{A} > 0, \mathcal{N} \neq 0$  and  $\mathcal{D} = \mathcal{B}^2 - 4\mathcal{A}\mathcal{C} > 0$  is non-square. He gave following results:

Let us consider  $(r, s)$  be an integer solution of  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$  and also  $(r_1, s_1)$  is defined as follows:

$$r_1 = \frac{r(u - \mathcal{B}v)}{2} - \mathcal{C}sv, \quad s_1 = \frac{s(u + \mathcal{B}v)}{2} - \mathcal{A}rv$$

where  $(u, v)$  holds Pell's equation  $u^2 - \mathcal{D}v^2 = 4$ .

Then,  $(r_1, s_1)$  also becomes an integer solution of  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$ . From the equations  $r_1 = \frac{r(u - \mathcal{B}v)}{2} - \mathcal{C}sv$   $s_1 = \frac{s(u + \mathcal{B}v)}{2} - \mathcal{A}rv$  it is obtained that

$$2\mathcal{A}r_1 + \mathcal{B}s_1 + s_1\sqrt{\mathcal{D}} = \frac{u + v\sqrt{\mathcal{D}}}{2} (2\mathcal{A}r + \mathcal{B}s + s\sqrt{\mathcal{D}})$$

which is an equivalence relation on the set of integer solutions of  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$ .

**Definition 3. (Matthew's papers)**

Assume that  $(u_1, v_1)$  is the solution of the Pell equation (1.3) with least positive  $u$  and  $v$ . Then

$$(R, S) = \begin{cases} \left( \sqrt{\frac{\mathcal{A}\mathcal{N}(u_1 - 2)}{\mathcal{D}}}, \sqrt{\frac{\mathcal{A}\mathcal{N}(u_1 + 2)}{\mathcal{D}}} \right) & \text{if } \mathcal{N} > 0 \\ \left( \sqrt{\frac{\mathcal{A}\mathcal{N}(u_1 + 2)}{\mathcal{D}}}, \sqrt{\frac{\mathcal{A}\mathcal{N}(u_1 - 2)}{\mathcal{D}}} \right) & \text{if } \mathcal{N} < 0 \end{cases}$$

Stolt determined the following needed requirement for  $(r, s)$  to be a fundamental solution.

**Proposition 1. (Stolt's papers)**

Supposing that  $(r, s)$  be a fundamental solution of the Diophantine equation  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$ . Then  $0 \leq s \leq S$ .

This was a generalization of the theorem in Nagell's paper (He tried hard for the solutions of the equation  $r^2 - ds^2 = \mathcal{N}$  by using the classical Pell equation's  $u^2 - dv^2 = 1$  solutions.)

**Theorem 1. (Taken from Matthews' papers to get a refinement of the Stolt bounds which completely characterizes the fundamental solutions.)**

(a) Assuming that  $(u_1, v_1)$  be the least positive solution of Pell's equation  $u^2 - \mathcal{D}v^2 = 4$  and  $\mathcal{N} > 0$ . So, an integer pair  $(r, s)$  satisfying  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$  is a fundamental solution iff one of the following statements are satisfied:

(i)  $0 < s < S$ .

(ii)  $s = 0$  and  $r = \sqrt{\mathcal{N}/\mathcal{A}}$

(iii)  $s = S$  and  $r = (R - \mathcal{B}S)/(2\mathcal{A})$ .

(b) Supposing that  $(u_1, v_1)$  be the least positive solution of Pell's equation  $u^2 - \mathcal{D}v^2 = 4$  and  $\mathcal{N} < 0$ . So, an integer pair  $(r, s)$  satisfying  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$  is a fundamental solution iff one of followings are satisfied:

(i)  $\sqrt{4\mathcal{A}|\mathcal{N}|/\mathcal{D}} \leq s < S$ .

(ii)  $s = S$  and  $r = (R - \mathcal{B}S)/(2\mathcal{A})$ .

So, it is noted that  $R$  becomes an integer if  $S$  is an integer.

**On the equation  $r^2 - \mathcal{d}s^2 = \mathcal{N}$**

Matthew was occupied in doing the special case of equation/binary quadratic form  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$  and considered following Pell equation  $r^2 - \mathcal{d}s^2 = \mathcal{N}$ .

In  $\mathcal{A}r^2 + \mathcal{B}rs + \mathcal{C}s^2 = \mathcal{N}$ , he took into consideration  $\mathcal{A} = 1$ ,  $\mathcal{B} = 0$  and  $\mathcal{C} = -\mathcal{d}$ , where  $\mathcal{d} > 0$  is not a perfect square and  $\mathcal{N}$  is nonzero. Then  $\mathcal{D} = 4\mathcal{d}$ , and the equivalence relation  $r_1 = \frac{r(u-\mathcal{B}v)}{2} - \mathcal{C}sv$ ,  $s_1 = \frac{s(u+\mathcal{B}v)}{2} - \mathcal{A}rv$  between two integer solutions  $(r, s), (r_1, s_1)$  of equation  $r^2 - \mathcal{d}s^2 = \mathcal{N}$  makes modest to  $r_1 + s_1\sqrt{\mathcal{d}} = (r + s\sqrt{\mathcal{d}})(u + v\sqrt{\mathcal{d}})$  where  $(u, v)$  holds Classical Pell's equation  $u^2 - \mathcal{d}v^2 = 1$ .

He simplified to Theorem 1 as follows:

**Theorem 2. (From Matthew's papers)**

(a) Assuming that  $(u_0, v_0)$  be the least positive solution of Pell's equation  $u^2 - \mathcal{d}v^2 = 1$  and  $\mathcal{N} > 1$ . Hence, an integer pair  $(r, s)$  holding  $r^2 - \mathcal{d}s^2 = \mathcal{N}$  is a fundamental solution iff one of the followings is satisfied:

(i)  $0 < s < v_0\sqrt{\mathcal{N}/(2u_0 + 2)}$ .

(ii)  $s = 0$  and  $r = \sqrt{\mathcal{N}}$ .

(iii)  $s = v_0\sqrt{\mathcal{N}/(2u_0 + 2)}$  and  $r = \sqrt{\mathcal{N}(u_0 + 1)/2}$ .

(b) Supposing that  $(u_0, v_0)$  be the least positive solution of Pell's equation  $u^2 - \mathcal{d}v^2 = 1$  and  $\mathcal{N} < 0$ . So, an integer pair  $(r, s)$  holding  $r^2 - \mathcal{d}s^2 = \mathcal{N}$  is a fundamental solution iff the following holds:

(i)  $\sqrt{|\mathcal{N}|/\mathcal{D}} \leq s < v_0\sqrt{\mathcal{N}/(2u_0 + 2)}$ .

(ii)  $s = v_0\sqrt{|\mathcal{N}|/(2u_0 + 2)}$  and  $r = \sqrt{|\mathcal{N}|(u_0 + 1)/2}$

*To see how these results are used in the numerical examples, followings can be given from the references as illustrates.*

**Instance 1. (From Stolt's paper)**

Let us consider binary quadratic form as  $209r^2 + 29rs + s^2 = 31$ . So, it is obtained that  $\mathcal{D} = 5$ ,  $(u_1, v_1) = (3, 1)$ ,  $\sqrt{\mathcal{N}/\mathcal{A}} = \sqrt{31/209} = 0.38 \dots$  and  $S = 35.99 \dots$ . Thus, the fundamental solutions are on the range  $1 \leq s \leq 35$  and solutions are obtained as  $(-2, 23)$  and  $(-2, 35)$ .

**Instance 2. (From Frattini's paper)**

From the Pell equation  $r^2 - 96s^2 = 4$  it is easily seen that  $\mathcal{d} = 96$ ,  $(u_0, v_0) = (49, 5)$ ,  $\sqrt{\mathcal{N}} = 2$ ,  $S_0 = 1$ ,  $R_0 = 10$ , and  $(\sqrt{\mathcal{N}}, 0) = (2, 0)$  and  $(R_0, S_0) = (10, 1)$  are the fundamental solutions.

**Instance 3. (From Matthew's paper)**

Consider Pell equation  $s^2 - 96r^2 = -96$ . Then, it is obtained that  $\mathcal{d} = 96$ ,  $(u_0, v_0) = (49, 5)$ ,  $\sqrt{|\mathcal{N}|/\mathcal{d}} = 1$ ,  $R_0 = 5$ ,  $S_0 = 48$  and  $(0, \sqrt{|\mathcal{N}|/\mathcal{d}}) = (0, 1)$  and  $(S_0, R_0) = (48, 5)$  are the fundamental solutions. No more solutions are on the range  $1 \leq s \leq 4$ .

**3.MAIN RESULTS**

By using method of Matthews et al. work on the fundamental units of binary quadratic forms, following theorems are proved for Diophantine D(2) sets (size three) and demonstrated that they can not be extended to Diophantine D(2) quadruples.

From the paper of ICOM 2022 conference, it has been known that some positive integers such as 3 or any multiple of 3, 4 or any multiple of 4, 5 or any multiple of 5 ... etc can not be in the Diophantine D(2) sets with arbitrary size (Theorem 1).

Now, it is demonstrated that  $\{1, 2\}$ ,  $\{1, 7\}$ ,  $\{1, 14\}$ , ... are Diophantine D(2) pairs. Then, such sets are extended to Diophantine D(2) triples by adding suitable smallest positive integer but they can not be extended to Diophantine D(2) quadruples using method of the Matthews (fundamental unit of the binary quadratic forms).

**Theorem 1.**  $\{1, 7\}$  is a Diophantine D(2) pair and also, it is extendable to a Diophantine D(2) triple by positive integer 14 and more.

**Proof.** In the beginning it has to be proved that  $\{1, 7\}$  is Diophantine D(2) 2-tuple. Using definition of the Diophantine D(2) set from preliminaries section ( Definition 1), then it is

obtained that  $1.7 + 2 = (\pm 3)^2$ . This gives us, the set  $\{1, 7\}$  satisfies Diophantine D(2) pair's definition.

Let us consider  $\alpha$  be a smallest positive integer such that  $\{1, 7, \alpha\}$  Diophantine D(2) triple. Hence, followings are satisfied for some  $X, Y$  integers.

$$\alpha + 2 = X^2 \text{ and } 7\alpha + 2 = Y^2$$

At this stage, it is calculated that  $\alpha = 14$  is the smallest positive integer and also, Diophantine D(2) pair  $\{1, 7\}$  is extended to Diophantine D(2) triple as  $\{1, 7, 14\}$ .

**Theorem 2.**  $\{1, 7, 14\}$  is regular Diophantine D(2) 3-tuple but it is not extended to Diophantine D(2) 4-tuple.

**Proof.** In the Definition 2, it has been defined regularity conditions for Diophantine D(k) triples and Diophantine D(k) quadruples. From the Definition 2,  $\{1, 7, 14\}$  satisfies regularity condition. So,  $\{1, 7, 14\}$  is a Diophantine D(2) regular triple.

Assume that  $\{1, 7, 14\}$  is extended for suitable positive integer  $\theta$  such that  $\{1, 7, 14, \theta\}$  is a Diophantine D(2) 4-tuple. From the definition of Diophantine D(2) quadruple, we have  $u, v, w$  integers such that followings are satisfied;

$$\theta + 2 = u^2$$

$$7\theta + 2 = v^2$$

$$14\theta + 2 = w^2$$

If these equations are simplified, then following Diophantine equations are obtained;

$$7u^2 - v^2 = 12$$

$$14u^2 - w^2 = 26$$

$$2v^2 - w^2 = 2.$$

Using method of the Matthews (given in the prelimineries section with details), we obtain following results:

For  $7u^2 - v^2 = 12$ , we get  $\mathcal{D} = 28$ . Also, Pell equation  $x^2 - 28y^2 = 4$  has the least positive solution as  $(x_0, y_0) = (16, 3)$  and,  $\sqrt{\mathcal{N}/\mathcal{A}} = \sqrt{12/7} = 1.30930$  as well as  $R = 6.48074$  are not integers. Then, any remaining solutions are obtained on the range for  $1 \leq s \leq 6$  as  $(2, 4)$  and  $(-2, 4)$ . So,  $7u^2 - v^2 = 12$  has two fundamental solutions.

Similarly;



For  $14u^2 - w^2 = 26$ , we have  $\mathcal{D} = 56$ . Additionally, Pell equation  $x^2 - 56y^2 = 4$  has the least positive solution as  $(x_0, y_0) = (30, 4)$  but neither  $\sqrt{\mathcal{N}/\mathcal{A}} = \sqrt{26/14} = 1.36276$  nor  $R = 13.49073$  are integers. Hence, any remaining solutions are attained on the range for  $1 \leq s \leq 13$  as  $(3, 10)$  with  $(-3, 10)$  and  $14u^2 - w^2 = 26$  has two fundamental solutions.

For  $2v^2 - w^2 = 2$ , we have obtain  $\mathcal{D} = 8$ . Moreover, Pell equation  $x^2 - 8y^2 = 4$  has the least positive solution as  $(x_0, y_0) = (6, 2)$  and  $\sqrt{\mathcal{N}/\mathcal{A}} = \sqrt{2/2} = 1$  is an integer but  $R = 1.41421$  is not integer. Thus, any remaining solutions are achieved on the range for  $1 \leq s \leq 1$  as  $(1, 0)$  and  $2v^2 - w^2 = 2$  has just one fundamental solution.

If it is considered the above solutions, it is seen that there isn't any common solution that makes  $u, v, w$  be integers at the same time.

So, any positive integer  $\theta$  can not be obtained to makes  $\{1, 7, 14, \theta\}$  as Diophantine  $D(2)$  4-tuple  $\{1, 7, 14, \theta\}$  is not extended to Diophantine  $D(2)$  4-tuple.

**Theorem 3.**  $\{1, 14\}$  is a Diophantine  $D(2)$  pair. Further, it is extended to a Diophantine  $D(2)$  triple by adding positive integer 23.

**Proof.** Firstly, it has to be proven whether or not  $\{1, 14\}$  is a Diophantine  $D(2)$  2-tuple? Using Definition 1 on the  $\{1, 14\}$ , it is obtained  $1 \cdot 14 + 2 = (\pm 4)^2$ . It implies that  $\{1, 14\}$  is a Diophantine  $D(2)$  pair.

It is assumed  $\beta$  be the smallest positive integer such that  $\{1, 14, \beta\}$  be a Diophantine  $D(2)$  triple. So, following equations are satisfied

$$\beta + 2 = M^2 \text{ and } 14\beta + 2 = N^2$$

for some  $M, N$  integers.

It is seen that  $\beta = 23$  is the smallest positive integer makes Diophantine  $\{1, 14\}$  to Diophantine  $D(2)$  triple as  $\{1, 14, 23\}$ .

**Theorem 4.**  $\{1, 14, 23\}$  is a regular Diophantine  $D(2)$  triple although it can not extendable to Diophantine  $D(2)$  quadruple.

**Proof.** Using the regularity condition mentioned in the Definition 2 (previous section), it is easily seen that that  $\{1, 14, 23\}$  is a Diophantine  $D(2)$  regular triple.

Suppose that  $\{1, 14, 23\}$  can be extended for suitable positive integer  $\mu$  so that  $\{1, 14, 23, \mu\}$  is a  $D(2)$  Diophantine 4-tuple. So, following equations are satisfied for  $u_1, v_1, w_1$ ;

$$\mu + 2 = u_1^2$$

$$14\mu + 2 = v_1^2$$

$$23\mu + 2 = w_1^2$$

Followings are obtained by abbreviation  $\mu$ ;

$$14u_1^2 - v_1^2 = 26$$

$$23u_1^2 - w_1^2 = 44$$

$$23v_1^2 - 14w_1^2 = 18$$

In the similar way of the proof of Theorem 2 and Maththews' method, following results are obtained:

We have calculated there are two fundamental solutions as  $(3, 10)$  with  $(-3, 10)$  for  $14u_1^2 - v_1^2 = 26$  from the previous theorem.

For  $23u_1^2 - w_1^2 = 44$ , we have  $\mathcal{D} = 92$  and Pell equation  $x_1^2 - 92y_1^2 = 4$  has the least positive solution as  $(x_0, y_0) = (48, 5)$ . Furthermore, both  $\sqrt{\mathcal{N}/\mathcal{A}} = \sqrt{44/23} = 1.38312$  and  $R_1 = 22.49444$  are not integers. In the present case, any remaining solutions are obtained on the range for  $1 \leq s_1 \leq 22$  as  $(4, 18)$  and  $(-4, 18)$ . So,  $23u_1^2 - w_1^2 = 44$  has two fundamental solutions.

For  $23v_1^2 - 14w_1^2 = 18$ , we obtain  $\mathcal{D} = 1288$  and Pell equation  $x_1^2 - 1288y_1^2 = 4$  has the least positive solution as  $(x_0, y_0) = (646, 18)$ . Addedly,  $\sqrt{\mathcal{N}/\mathcal{A}} = \sqrt{18/23} = 0.88464$  and  $R_1 = 14.38749$  are not integers. In the circumstances, any remaining solutions are got on the range for  $1 \leq s_1 \leq 14$  as  $(4, 5)$  and  $(-4, 5)$ . Thus,  $23v_1^2 - 14w_1^2 = 18$  has two fundamental solutions.

From the solutions calculated as above, it is obtained that there is no common solution for Pell equations. It implies that there is no suitable positive integer  $\mu$  to makes  $\{1, 14, 23, \mu\}$  as Diophantine D(2) four-tuple.

Therefore,  $\{1, 14, 23\}$  can not extendable to Diophantine D(2) quadruple.

**Theorem 5.** The following statements are performed and can be resumed.

- (i) A set  $\{1, 23\}$  is a diophantine D(2) pair and it can be extendable to a Diophantine D(2) triple by  $\{1, 23, 34\}$ .

(ii) A set  $\{1, 34, 47\}$  is a diophantine D(2) pair and it is extended to a Diophantine D(2) triple  
by  $\{1, 23, 34\}$  .

(iii)...

**Proof.** In the same vein of the demonstrations of Theorem 1 or Theorem 3, it can be got result easily. Hence, demonstration is left for readers.

**Theorem 6.** The following executions are provided and can be continued as follows:

(i) The set  $\{1, 23, 34\}$  is a regular Diophantine D(2) triple although it is not extendable to Diophantine D(2) quadruple.

(ii) The set  $\{1, 34, 47\}$  is a regular Diophantine D(2) triple although it is not extendable to Diophantine D(2) quadruple.

(iii)...

**Proof.** From the proofs as mentioned above, demonstration of the Theorem 6 is easily got by readers. Thus, proof is left for readers.

## CONCLUSION

In this study, it is demonstrated that a specific type of Diophantine D(2) pairs ( i.e.  $\{1, x\}$  for  $x$  positive integer) are extendable to Diophantine D(2) regular 3-tuple but they can not extendable Diophantine D(2) 4-tuple. This work and previous one imply that there is an especial iteration for Diophantine D(2) pairs and triples. In the next work, such papers will be generalized in the terms of natural numbers and obtained different relations of them with quadratic fields. So, it will be more useful for readers to apply these works to other topics.

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**SOME NUMERICAL RESULTS AND CLASSIFICATIONS ON THE  $P_{\mp 19^2}$   
DIOPHANTINE REGULAR QUADRUPLES****Assoc. Prof. Dr. Özen ÖZER**Department of Mathematics, Faculty of Science and Arts, Kırklareli University,  
Kırklareli,, 39100, Türkiye**ÖZET**

Literatürde “ $r$ -elemanlı Diyofant  $P_k$  kümelerinin pozitif tamsayılar kümesinin bir alt kümesi olduğu ve  $r$ -farklı doğal sayıyı içeren  $\Gamma = \{\zeta_1, \zeta_2, \zeta_3, \dots, \zeta_r\}$  kümesinin elemanlarının  $i, j=1, 2, \dots, r$  ve  $i \neq j$  için  $\zeta_i \cdot \zeta_j + k$  bir tam kare tamsayı olması” şeklinde tanımlanır. Bu çalışmada, Diyofant  $P_{\mp 19^2}$  kümelerini elde etmek için ilk olarak bir elemanlıdan iki elemanlı kümeye geçilecek şekilde başlayarak bazı doğal sayıları ele almaktayız. Daha sonra, bu tür kümeler için (düzenlilik koşullarıyla) üç elemanlı kümeye genişletilebilirliğini araştırmaktayız. Bundan sonra, bu tür kümelerin dördüncü elemanları üzerinde bazı sonuçlar elde edilmekte ve bunlar dört elemanlı Diyofant  $P_{\mp 19^2}$  kümelerine genişletilmektedir. Cebirsel yollarla ilerlenen bu bakış açısıyla bazı karakterizasyon sonuçları gösterilmektedir. Son olarak, özel  $k$  asal sayı değeri için  $P_{\mp k^2}$  'nin genelleştirileceği bir sonraki çalışmamızın temeli olarak (bu çalışmayı dikkate almak için) çalışma hakkında bazı yeni yaklaşımlar ve görüşler verilmektedir.

**Anahtar Kelimeler:** Dört Elemanlı Diyofant  $P_{\mp k}$  Kümeleri,  $P_{\mp k}$  Kümelerinin Karakterizasyonu, Pell Denklemlerinin Tamsayı Çözümleri, İkinci Dereceden Kalıntı Teoremi, Kuadratik Kalıntı Teoremi, Kuadratik Karşılıklık Teoremleri, Legendre Sembolü, Pozitif Tamsayılar, Asal Sayılar, Düzenlilik Koşulu.

**SOME NUMERICAL RESULTS AND CLASSIFICATIONS ON THE  $P_{\mp 19^2}$   
DIOPHANTINE REGULAR QUADRUPLES****ABSTRACT**

In the literature, it is defined that “Diophantine  $P_k$  sets with  $r$ -tuples is a subset of positive integers’ set and includes  $\Gamma = \{\zeta_1, \zeta_2, \zeta_3, \dots, \zeta_r\}$   $r$ -different natural numbers with the condition  $\zeta_i \cdot \zeta_j + k$  perfect square integer for  $i, j = 1, 2, \dots, r$  and  $i \neq j$ .” In the present work, we consider some natural numbers to get Diophantine  $P_{\mp 19^2}$  sets by starting from size one to two firstly. Then, extendibility to size three of them (with regularity conditions) is investigated for such sets. After that, some results on the fourth elements of the such sets are obtained and they are extended to Diophantine  $P_{\mp 19^2}$  sets with size four. Some characterization results are demonstrated on this perspection using algebraic ways. Lastly, some new approximations and opinions are given on the work to consider this work as a base of the our next work which will be generalized of  $P_{\mp k^2}$  for special type of  $k$  prime.

**Keywords:** Diophantine  $P_{\mp k}$  Sets with Size Four, Characterization of  $P_{\mp k}$  Sets, Integral Solutions of Pell Equations, Quadratic Residue Theorem, Quadratic Reciprocity Theorems, Legendre Symbol, Positive Integers, Prime Numbers, Regularity Conditions.

## **INTRODUCTION, PRELIMINARIES AND METHODS OF THE PAPER**

Number theory (which is studied on numbers and their properties) is a queen of mathematics and other sciences. It involves large number of topics such as prime numbers, factorization, Diophantine equations theory, modular arithmetic, congruence, continued fractions, elliptic curves, arithmetic functions, algebraic numbers, quadratic forms, class number, sieve theory, reciprocity theory... so on. Different from mathematics, number theory is also connected with cryptography such as online shopping, mobile phone privacy, secure online banking tools.

For this work, we consider Diophantine set theory and use concepts of the theory which are given in the reference section.

It is known that a lot of examples (such as clock, weeks, ...) of modular arithmetic (includes different types of congruences and their properties) has been in the real life as well as science (probabilistic primality test, cryptography, legendre symbol, quadratic reciprocity law etc. are used in this work).

Diophantus who is the father of algebra lived between 250 and 350 A.D. approximately. He also introduced representations for unknowns with the degree of the variables as Diophantine equations. The equations in two or more variables with integer solutions are named by Diophantine equations. Especially, a general form of Pell like equations (a type of Diophantine equations) is in the form  $ax^2 - by^2 = \mp N$  where  $d$  and  $N$  are integers. Even it has many (finite or infinite) solutions, the fundamental solution is given by the pair  $(a, b)$  where they are positive and minimal.

In this work, we discuss how can we obtain Diophantine  $P_{\mp 19^2}$  pairs and their extensions. Firstly, we introduce some notations as modular arithmetic, quadratic residue, Legendre symbol, quadratic reciprocity laws with their basic properties. Then, characterization of the elements of Diophantine  $P_{\mp 19^2}$  sets is determined. Also, extendibility of Diophantine  $P_{\mp 19^2}$  pairs are demonstrated as Diophantine  $P_{\mp 19^2}$  triples and quadruples for several numerical results using different methods of determination of the solutions of Pell equations. Lastly, some other open problems are mentioned for Diophantine  $P_{\mp 19^2}$  pairs, triples and quadruples.

Following concepts for our work can be given briefly:

**Definition 1. (Quadratic Residue)**



Assume that  $\gamma$  is a positive integer. If  $\gcd(\beta, \gamma) = 1$  i.e.  $\beta, \gamma$  are coprimes) and the quadratic congruence  $z^2 \equiv \beta \pmod{\gamma}$  can be solvable, then an integer  $\beta$  is defined as a quadratic residue of  $\gamma$ .

The other way around,  $\beta$  is a quadratic nonresidue of  $\gamma$  if the congruence  $z^2 \equiv \beta \pmod{\gamma}$  has no solution.

The theorem:

*“If  $q \neq 2$  is a prime number, then there are certainly  $(q-1)/2$  quadratic residues (mod  $q$ ) and  $(q-1)/2$  quadratic nonresidues (mod  $q$ ) in the set of integers from 1 to  $q-1$ .”*

also demonstrated the number of integers how many of them are quadratic residues (mod  $q$ ) for  $q$  an odd prime.

Legendre symbol is associated with quadratic residues and defined rely on it as follows;

**Definition 2. (Legendre Symbol)**

Assume  $q$  is an odd prime and  $m$  is any integer. The Legendre symbol  $(m/q)$  is defined as follows;

- $(m/q) = +1;$             if  $m$  is a quadratic residue (mod  $q$ ),
- $(m/q) = -1;$         if  $m$  is a quadratic non-residue (mod  $q$ ) and,
- $(m/q) = 0;$          if  $q$  divides  $m$

It is also proved as  $(m/q) \equiv m^{(q-1)/2} \pmod{q}$  by Euler.

The law of quadratic reciprocity is related with Legendre symbol and primes. It also defined as follows:

**Definition 3. (The Law of Quadratic Reciprocity)**

Suppose that  $P$  and  $Q$  are odd primes. The multiplying of their Legendre symbols has the following certain formula:

$$\left(\frac{Q}{P}\right)\left(\frac{P}{Q}\right) = (-1)^{\frac{P-1}{2} \cdot \frac{Q-1}{2}}$$

This is named as Quadratic Reciprocity Law.

In especially:

If  $P \equiv Q \equiv 1 \pmod{4}$ , then the congruences  $z^2 \pmod{Q} \equiv P \pmod{Q}$  and  $z^2 \pmod{P} \equiv Q \pmod{P}$  can be either both solvable or both not solvable.

If  $P \equiv Q \equiv 3 \pmod{4}$ , then one of the congruences  $z^2 \pmod{Q} \equiv P \pmod{Q}$  and  $z^2 \pmod{P} \equiv Q \pmod{P}$  can be solvable, the other not solvable.

Generalization of the Legendre symbol is named by Jacobi symbol and defined as follows:

**Definition 4. (Jacobi Symbol)**

Suppose  $n$  and  $m$  are any integers. The Jacobi symbol  $(m/n)$  is defined as follows;

$$\left(\frac{m}{n}\right) = \left(\frac{m}{Q_1}\right) \cdot \left(\frac{m}{Q_2}\right) \cdot \left(\frac{m}{Q_3}\right) \dots \left(\frac{m}{Q_s}\right)$$

where  $\left(\frac{m}{Q_s}\right)$  denote the Legendre symbols (for  $i=1, \dots, s$ ) of a modulo the prime numbers  $Q_i$  (without exponential value) dividing  $n$ .

**Definition 5. (Dujella’s papers and other Diophantine set references)**

Suppose that  $t$  is an integer. A  $P_t$ -set of size  $m$  is determined by a set  $Z = \{k_1, k_2, k_3 \dots k_m\}$  of distinct positive integers where their multiply are increased by  $t$  is the square of an integer for each  $i \neq j$ .

A  $P_t$ -set  $Z$  is extended to a new  $P_t$ -set with size  $m+1$ , if there exists a positive integer  $x \notin Z$  such that  $Z \cup \{x\}$  is once more a  $P_t$ -set. If  $m=3$  then it is named as Diophantine  $P_t$  triple.

**Definition 6. (Regularity Condition for Triples from Dujella’s papers)**

A Diophantine  $P_t$ -triple  $Z = \{k_1, k_2, k_3\}$  in set of the positive integers is named by regular if the condition  $(k_3 - k_2 - k_1)^2 = 4 \cdot (k_1 k_2 + t)$  is satisfied.

**Definition 7. (Regularity Condition for Quadruples from Dujella’s papers)**

A Diophantine  $P_t$ -quadruple  $Z = \{k_1, k_2, k_3, k_4\}$  in set of the positive integers is named by regular if the condition  $t \cdot (k_4 + k_3 - k_2 - k_1)^2 = 4 \cdot (k_1 k_2 + t)(k_3 k_4 + t)$  is proved.

**3.MAIN RESULTS**

Firstly, characterization of the numbers are determined for Diophantine  $P_{361}$  and  $P_{-361}$  sets as follows:

**Theorem 1.** A Diophantine  $P_{-361}$ -set can not include many positive integers such as written by  $3a, 4b, 7c, 11d, 23e, 31f, 43g, 47h$ , ( $a, b, c, d, e, f, g, h$  are positive integers) so on...

**Proof.** In this proof, we just make proof for  $7c$  and  $23e$  ( $c, e$  positive integers) different from other works and the rest can be done by readers similarly.

(i) Assume that  $7c$  ( $c \in \mathbb{Z}^+$ ) is in the Diophantine  $P_{-361}$ -sets. So, following equation has solution for  $x \in P_{-361}$  using the definition of the Diophantine  $P_{-361}$ -set:

$$7c \cdot x - 361 = A^2$$

Applying (mod 7) to such equation we have  $A^2 \equiv +3 \pmod{7}$  quadratic congruence. So, we obtain following result for Legendre symbol by using definitions (quadratic reciprocity law, legendre symbol, residue) of preliminaries section.

$$\left(\frac{3}{7}\right) = -1$$

It implies that  $A^2 \equiv +3 \pmod{7}$  has not got any solution and  $7c \cdot x - 361 = A^2$  can not be solved. This is a contradiction.

Therefore, 7 or  $7c$  ( $c \in \mathbb{Z}^+$ ) can not be in the Diophantine  $P_{-361}$ -sets.

(ii) Suppose that  $23e$  ( $e \in \mathbb{Z}^+$ ) is in the Diophantine  $P_{-361}$ -sets. Then, followings has solution for  $y \in P_{-361}$  using the definition of the Diophantine  $P_{-361}$ -set:

$$23e \cdot y - 361 = B^2$$

Applying (mod 23) to such equation, we obtain  $B^2 \equiv +7 \pmod{23}$  quadratic congruence. So, following result is achieved for Legendre symbol using q definitions of uadratic reciprocity law, legendre symbol, residue in preliminaries section.

$$\left(\frac{7}{23}\right) = -1$$

It implies that  $B^2 \equiv +7 \pmod{23}$  has not got any solution and  $23e \cdot y - 361 = B^2$  can not be solved. This is a contradiction.

Hence, 23 or  $23e$  ( $e \in \mathbb{Z}^+$ ) can not be in the Diophantine  $P_{-361}$ -sets.

**Theorem 2.** A Diophantine  $P_{-361}$ -set can include all types of natural numbers.

**Proof.** As it is seen that  $+361 = 19^2$  is a perfect square and every natural number can belong to a Diophantine  $P_{-361}$ -set from the definition of the legendre symbol and property of  $(m/q) = 1$  unless  $q$  prime divides  $m$ . Thus, it is not need to classified Diophantine  $P_{-361}$ -set s for natural numbers.

After now, it is worked how some special numerical values can be extended to a Diophantine  $P_{-361}$  or  $P_{+361}$  pairs, triples or quadruples as follows:

**Theorem 3.** The set  $\{2\}$  is extended to Diophantine  $P_{+361}$  pairs with positive integers 40, 84, 132, 240, ... so on.

**Proof.** Let us consider that  $\vartheta$  is the second positive integer in the set of  $\{2\}$  as Diophantine  $P_{+361}$  pairs. Then, we have following equation with solutions ( $d$  is an integer) using the definition of Diophantine  $P_{+361}$  pairs ;

$$2\vartheta + 361 = d^2$$

It is easily seen that  $\vartheta = 40$  is the smallest positive such that this smallest integer makes the left-hand side of the equation a perfect square. ( $2 \cdot 40 + 361 = 441 = 21^2$ ). Also, there are other positive  $\vartheta$  integers such as  $\vartheta = 84$  ( $2 \cdot 84 + 361 = 529 = 23^2$ ),  $\vartheta = 132$  ( $2 \cdot 132 + 361 = 625 = 25^2$ ), ... etc make the left-hand side of the equation a perfect square.

So,  $\{2, 40\}$ ,  $\{2, 84\}$ ,  $\{2, 132\}$ , ... are Diophantine  $P_{+361}$  pairs.

**Theorem 4.** The set  $\{2, 132\}$  can be extended to regular Diophantine  $P_{+361}$  triples with positive integers 184, 240, ... etc.

**Proof.** Assume that  $\aleph$  is the third positive integer in the set of  $\{2, 132\}$  as Diophantine  $P_{+361}$  triples. So, followings have solutions ( $e, f$  are integers) from the definition of Diophantine  $P_{+361}$  triples;

$$2\aleph + 361 = e^2 \text{ and } 132\aleph + 361 = f^2$$

Dropping  $\aleph$  from the above equations, we get

$$66e^2 - f^2 = 23465$$

Pell equation. If we search fundamental solutions of this Pell equation, we have 12 (twelve) different fundamental solutions as follows:

$$(19, 19), (-19, 19), (23, 107), (-23, 107), (27, 157), (-27, 157),$$

$$(29, 179), (-29, 179), (57, 437), (-57, 437), (97, 773), (-97, 773).$$

So,  $66e^2 - f^2 = 23465$  has 12 fundamental solutions. If we use them we obtain  $\aleph = 184$  is the smallest positive such that this smallest integer makes the left-hand side of the equation a perfect square. Additionally,  $\aleph = 184$  also makes the left-hand side of the equation a perfect square.

Therefore,  $\{2, 132, 184\}$ ,  $\{2, 132, 240\}$ , ... are Diophantine  $P_{+361}$  pairs.

We should prove whether or not  $\{2, 132, 184\}$ ,  $\{2, 132, 240\}$ , ... are Regular Diophantine  $P_{+361}$  triples?

Using regularity condition (Definition 6 in preliminaries section) for Diophantine  $P_k$  triples, it is seen that they are regular Diophantine  $P_{+361}$  triples ( $(184 - 132 - 2)^2 = 4 \cdot (2 \cdot 132 + 361)$  and  $(240 - 132 - 2)^2 = 4 \cdot (2 \cdot 132 + 361)$ ).

Thus, the proof is complete.

**Theorem 5.** The set  $\{2, 132, 184\}$  can be extended to Diophantine  $P_{+361}$  quadruples with least positive integer 240.

**Proof.** Suppose that  $\theta$  is the fourth positive integer in the set of  $\{2, 132, 184\}$  as Diophantine  $P_{+361}$  quadruples. Then, following equations have solutions ( $m, n, s$  are integers) from the definition of Diophantine  $P_{+361}$  quadruples;

$$2\theta + 361 = m^2, \quad 132\theta + 361 = n^2 \quad \text{and} \quad 184\theta + 361 = s^2$$

Dropping  $\theta$  from the all equations mentioned as above, we obtain following three Pell equations:

$$66m^2 - n^2 = 23465 \quad \text{and} \quad 92m^2 - s^2 = 32851 \quad \text{and} \quad 46n^2 - 33s^2 = 4693$$

If we search fundamental solutions of these Pell equations, we have results as follows:

$66e^2 - f^2 = 23465$  has following fundamental solutions;

(19,19), (-19, 19), (23,107), (-23, 107), (27,157), (-27, 157),  
(29,179), (-29, 179), (57,437), (-57, 437), (97,773), (-97, 773).

$92m^2 - s^2 = 32851$  has following fundamental solutions;

(19,19), (-19, 19), (25,157), (-25, 157), (29,211), (-29, 211)  
(41,349), (-41, 349), (95,893), (-95, 893), (229,2189), (-229, 2189)

$46n^2 - 33s^2 = 4693$  has following fundamental solutions;

(19,19), (-19, 19), (25,27), (-25, 27), (179,211), (-179, 211)

When the solutions are examined, it is seen that there is a common solution that provides all three Pell equations. Therefore, this triple Pell equation system has a common solution. In that case, it can be mentioned that the Diophantine  $P_{+361}$  triple can be extended to the Diophantine  $P_{+361}$  quadruple.

Hence,  $\theta$  is calculated as  $\theta = 240$  and  $\{2, 132, 184\}$  can be extended to Diophantine  $P_{+361}$  quadruples by  $\{2, 132, 184, 240\}$ .

From the Definition 7 (Regularity condition for Diophantine  $P_t$  quadruple), it is easily seen that  $\{2, 132, 184, 240\}$  is not regular Diophantine  $P_{+361}$  quadruple.

So, the proof is completed.

**Remark 1:** it is quite difficult to identify these sets as the numbers in the sets get larger. That is why, there is still open problems to get practical algorithm for such sets.

**Theorem 6.** Following statements are true.

(i) The set  $\{44\}$  is extended to Diophantine  $P_{+361}$  pairs with positive integers 82, 100, 156, 180, 252, 282, 370, etc.

(ii) The set  $\{44, 100\}$  can be extended to regular Diophantine  $P_{+361}$  triples with positive integers 282, 720, ... so on.

(iii) The set  $\{44, 100, 282\}$  can be extended to Diophantine  $P_{+361}$  quadruples with smallest positive integer 720.

(iv) ...

**Proof.** Considering the proof of Theorem3, Theorem4 and Theorem5, readers can easily see the proof the theorem.

Analogously, following theorems are obtained for Diophantine  $P_{-361}$  sets too.

**Theorem 7.**

(a) The set  $\{37\}$  is extended to Diophantine  $P_{-19^2}$  pairs with positive integers 41, 53, 146, 170, 325, 361, etc.

(b) The set  $\{37, 146\}$  is extended to Diophantine  $P_{-19^2}$  triples with positive integers 325, 905 and also, the set  $\{37, 325\}$  is extended to Diophantine  $P_{-19^2}$  triples with positive integers 361, 578, 905, ... so on...

(c) The set  $\{37, 146, 325\}$  is extended to Diophantine  $P_{-19^2}$  quadruple and also, the set  $\{37, 325, 578\}$  can be extended to Diophantine  $P_{-19^2}$  quadruple with same positive integers 905.

**Proof.** The proof of the theorem can be easily seen by using the above-mentioned theorems in a similar way.

**Remark 1:** Each of the following expressions are provided.

The set  $\{5\}$  is extended to;

(i) Diophantine  $P_{-19^2}$  pair as  $\{5, 82\}$  (ii) Diophantine  $P_{-19^2}$  triple as  $\{5, 82, 101\}$   
Diophantine  $P_{-19^2}$  quadruple as  $\{5, 82, 101, 361\}$

**Remark 2:** As an open question if we fix  $\{37, 325\}$  or  $\{37, 905\}$  as Diophantine  $P_{-19^2}$  pairs it may be searched what kind of natural numbers (characterization) can be added to them for making Diophantine  $P_{-19^2}$  triples, quadruples or more.

**CONCLUSION**

In this work, we found out several Diophantine  $P_{\mp 19^2}$  pairs and obtained their extension to Diophantine  $P_{\mp 19^2}$  triple and quadruple. We also determined characterization of the numbers in the Diophantine  $P_{\mp 19^2}$  sets. Moreover, numerical results on Diophantine  $P_{\mp k^2}$  pairs, triples or quadruples can be specified with any k integers by the readers using our work.

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## **İNSAN HAKLARINDAN BİRİ OLAN SU HAKKININ METALAŞMASI**

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### **ÖZET**

Su, insan yaşamının sürdürülebilirliği için hayati bir önem taşımaktadır. Sadece biyolojik ihtiyaç için değil aynı zamanda sağlıklı bir çevre ve sanitasyon için de gereklidir. Buna rağmen Dünya genelinde temiz, sağlıklı ve içilebilir suya ulaşamayan milyonlarca insan bulunmaktadır. Özellikle az gelişmiş ve gelişmekte olan bir çok ülke kuraklıkla mücadele etmekte, bu ülkelerde temiz suya erişim sorunu artarak devam etmektedir. Birleşmiş Milletler raporlarına göre sağlıklı suya ulaşımın zorlaşması sonucunda yüzbinlerce çocuk yaşamını yitirmekte veya ciddi derecede sağlık sorunları yaşamaktadır. Bu sebeple sivil toplum kuruluşları, uluslararası kuruluşlar ve bilim insanları tarafından suyun insani bir hak olarak tanımlanması sıklıkla dile getirilmeye başlanmış, son yıllarda su hakkı, ulusal ve uluslararası bir çok belgeye konu olmuştur. Ancak, yeryüzündeki temiz su kaynağının sınırlı miktarda olması, suyun bir insan hakkı olarak değilde bir meta olarak düşünülmesine neden olmuştur. Birleşmiş Milletler'in 2015 yılında yayınladığı sürdürülebilir kalkınma hedeflerinde herkesin 2030 yılına kadar temiz ve içilebilir suya eşit derecede ve belirli bir bedel ödeyerek ulaşabileceğinden bahsedilmiştir. Suyun bedelinden bahsedilmesi gelecekte suyun daha kıt ve ulaşılması zor bir kaynak olacağını ortaya koymaktadır. Bu bildiri, gelecekte ticari bir ürün olarak algılanacak olan suyun aslında bir insan hakkı olarak değerlendirilmesi gerektiğini ortaya koymayı amaçlamaktadır. Bildirinin literatüre katkısının yanı sıra devletlerin su hakkını diğer insan haklarıyla ilişkilendirmeleri için üretecekleri politikalara sağlayacağı katkı açısından önemli olduğu düşünülmektedir. Bildiride su hakkı kavramının tarihçesine değinilmiş, ulusal ve uluslararası belgelerde su ile ilgili literatüre yer verilmiştir. Nitel araştırma yöntemine dayalı olarak gerçekleştirilen bu çalışmada; literatür taraması ve ulusal kurum ve kuruluşların raporları incelenerek veriler elde edilmiştir. Elde edilen bu veriler, doküman analizi tekniği ile değerlendirilmiş, araştırma sonucunda ülkelerin sosyal devlet gereği su hakkı konusunda neler yapabilecekleri, çalışmaların neler olabileceği konusunda önerilerde bulunulmuştur.

**Anahtar kelimeler:** Su, Su hakkı, insan hakkı, sanitasyon,



**COMMERCIALIZATION OF THE RIGHT TO WATER, ONE OF THE HUMAN RIGHTS**

**ABSTRACT**

Water is vital for the sustainability of human life. It is necessary not only for biological need, but also for a healthy environment and sanitation. Despite this, there are millions of people around the world who do not have access to clean, healthy and potable water. Especially many underdeveloped and developing countries are struggling with drought, and the problem of access to clean water continues to increase in these countries. According to the United Nations reports, hundreds of thousands of children die or experience serious health problems as a result of the difficulty in accessing healthy water. For this reason, the definition of water as a human right has been frequently mentioned by non-governmental organizations, international organizations and scientists, and the right to water has been the subject of many national and international documents in recent years. However, the limited amount of clean water on earth has caused water to be considered a commodity rather than a human right. In the sustainable development goals published by the United Nations in 2015, it is mentioned that everyone can reach clean and potable water equally and at a certain price until 2030. Mentioning the cost of water reveals that water will be a scarce and hard-to-reach resource in the future. This paper aims to reveal that water, which will be perceived as a commercial product in the future, should actually be considered as a human right. In addition to its contribution to the literature, the paper is thought to be important in terms of its contribution to the policies that states will produce in order to associate the right to water with other human rights. In the declaration, the history of the concept of the right to water is mentioned, and the literature on water is included in national and international documents. In this study, which was based on the qualitative research method; The data were obtained by examining the literature review and the reports of national institutions and organizations. These obtained data were evaluated with the document analysis technique, and as a result of the research, suggestions were made about what the countries could do about the right to water as a requirement of the social state.

**Keywords:** Water, right to water, human right, sanitation,

## 1. GİRİŞ

Su, insanođlu için biyolojik ve sürdürülebilir sağlıklı bir çevre oluşturabilmek için vazgeçilmez bir unsurdur. Suyun vazgeçilmez oluşu sebebi ile ilk medeniyetlerin nehir kıyılarında hayat bulduđu ve gelişimlerini bu bölgelerde sağladığı bilinmektedir. Günümüzde gelişmiş ülkelerin tükettikleri su miktarları suyun aynı zamanda ülkelerin gelişmişlik düzeylerine katkıda bulunduđunu da göstermektedir (Kılıç & Karataş, 2018;37)

Hızla artan küreselmeye paralel olarak sanayi sektöründeki gelişmeler, kentsel nüfusun sürekli olarak artması, nüfus artışı sonucunda tarım alanlarının büyümesi gibi faktörler temiz su ihtiyacının artmasına sebep olmaktadır. Buna paralel olarak küresel iklim değışikliđi sebebi ile kuruyan kaynaklar ve su kirliliđi ise temiz su kaynaklarının tükenmesine yol açmaktadır. Su kaynađının sınırlı olması birçok tartışmayı beraberinde getirmektedir. Tartışmalar suyun bir insan hakkı olduđu ile suyun metalaşması üzerine odaklanmaktadır.

Suyun insan hakkı olmasını savunanlar sağlıklı suya herkesin yeterli miktarda erişiminin sağlanması gerektiğinden bahsetmektedirler. Bu anlayışa göre su hakkı, yaşam hakkı talebinden çok da farklı değildir. Su yaşam hakkının unsurudur (Narin, 2016;730). Herkesin sağlıklı suya erişimini sağlayabilmek için uluslararası hukuk devreye girerek birçok bilimsel çalışmalar ve toplantılar yapmış, su hakkının yer aldığı ifadeler bildirilere, anayasalara, yasalara ve mahkeme içtihatlarına girmeye başlamıştır.

Suyun mülkiyeti ve kontrolü, Dünya'nın pek çok yerinde kamu yönetiminin elindedir. Kamu yönetimleri sosyal devlet olmanın bir geređi olarak insan hakkı olan suyu düşük maliyetle, sübvans ederek ve ödeme gücüne bakılmaksızın halka ulaştırmaktadır (Küçükbaşol, 2015:57). Suyun bir meta değeri olduđunu savunanlar ise 1992 yılında düzenlenen Dublin Konferansı'nda ortaya bu düşüncüyü ortaya koymuşlardır. Konferansta suyun ekonomik bir değeri olduđu deklare edilmiştir. Suyun metalaşmasını savunanlar, kamu yönetiminin suyun dağıtımı ve kontrolünü bırakmasını, oluşacak boşluđun küresel şirketler eliyle doldurulmasını savunmaktadırlar. Buradaki amaç suyun belirli bir fiyat ile halka satılmasını sağlamaktır.

Suyun metalaşması, serbestçe bir şekilde alınıp satılabilmesi, dünya genelinde ithalat - ihracat konusu yapılabilmesi ve bunun önündeki her türlü ulusal engelin kaldırılması için uluslararası ticareti düzenleyen GATT (Tarifeler ve Ticaret Genel Anlaşması) ve DTÖ (Dünya Ticaret Örgütü) anlaşmalarına hükümler konulmuştur (Küçükbaşol, 2015:56). Suyun özelleşmesi durumunda piyasada tekelleşme oluşacak, su fiyatları yükselecek ve alt gelir grupları suya erişimde zorlanacaktır. Oysaki devletler herkesin sağlıklı suya erişebilmesi için gereken

ekonomik, sosyal ve siyasal ortamı oluşturacak politika ve stratejileri geliştirmelidir. Bu durumda suyun bir insan hakkı olarak herkese eşit derecede gitmesi mi yoksa su dağıtım hizmetlerinin özel sektörce yapılarak ücretlendirilmesinin mi doğru olup olmadığı tartışılmalıdır.

Bu çalışma su hakkının insan hakları arasında yer almasını gerektiğini açıklayabilmek amacı ile dört bölümden oluşmaktadır. Birinci bölümde Dünya su istatistikleri açıklanarak suyun önemi ortaya konulacaktır. İkinci bölümde “su hakkı” kavramı açıklanarak bu kavramın gündeme gelme süreci ulusal ve uluslararası metinlerde su hakkına dair yer alan bilgilere yer verilecek, su hakkı kavramının diğer insan hakları ile ilişkisi ortaya konulacaktır. Üçüncü bölümde suyun metalaşma süreci ve metalaşmayı savunan fikirler ele alınacaktır. Çalışmanın son bölümünde ise suyun insan hakkı olması üzerinde durulacak, devletlere suyun metalaşması durumunda sosyal devlet anlayışı olarak neler yapabileceklerine dair önerilerde bulunulacaktır.

## **2. DÜNYA SU İSTATİSTİKLERİ**

Dünya yüzeyindeki suyun % 97,5'i tuzludur, % 2,5 oranındaki tatlı suyun % 70 gibi önemli bir oranı Antartika ve Grönland'da buz kütleleri halinde, kalan kısmın büyük bölümü ise derin yeraltı küresinde bulunmaktadır (Yıldız, 2007:15). Geçtiğimiz elli yılda, su kaynaklarının miktarı aynı kalmasına rağmen, su çekimi üç katına çıkmıştır (WWAP, 2012).

Dünya her geçen yıl su konusunda daha fazla stresli bir hale gelmektedir. Birleşmiş Milletler'in 2019 yılında hazırladığı Dünya Su Raporu'na göre 1980 yılından sonra yaşanan teknolojik gelişmeler, kentleşme ve diğer faktörler nedeniyle mevcut su tüketimi her geçen yıl, bir önceki yıla oranla %1 oranında artmaktadır. Su tüketiminin en fazla olduğu yer tarım sektörüdür. Küresel olarak tarım sektörü yıllık su çekiminin %69'unu oluşturmaktadır. Sanayi (elektrik üretimi dahil) %19'unu ve hane halkı ise %12'sini oluşturmaktadır (AQUASTAT, 2022). Küresel su talebinin 2050 yılına kadar benzer bir oranda artmaya devam etmesi, mevcut su kullanım seviyesinin %20 ila %30 üzerinde bir artışa denk gelmesi beklenmektedir (Burek , 2016).

Dünya genelinde 2 milyardan fazla insan güvenli suya erişememektedir. Suya erişim sorunu yaşayanların genel nüfusa oranı yalnızca %11 iken, 31 ülkede bu oran %25'e ile %70 arasında yer almaktadır. 22 ülkede suya erişim sorunu %70'in üzerinde seyretmektedir (UN, 2018). Yetersiz su temini, sanitasyon ve hijyene atfedilen ishaller hastalıklar nedeni ile her yıl 2,4

milyona yakın insan hayatını kaybetmektedir. (UNICEF;2004) Bu durum toplam küresel hastalık yükünün %3,7'sine eşdeğerdir (WHO, 2002).

Küresel iklim değişikliğinin hali hazırda suya erişimde zorluk çeken bölgelerde erişim sorununu arttırması, doğal çevrenin bozulması ve küresel su kaynakları üzerindeki baskıların devam etmesi durumunda, küresel gayri safi yurtiçi hâsılanın (GSYİH) %45'inin, Dünya nüfusunun %52'sinin ve küresel tahıl üretiminin %40'ının risk altında olacağı tahmin edilmektedir. (UN, 2018). Böyle bir durumda yoksul nüfus orantısız bir şekilde etkilenecek ve hâlihazırda artan eşitsizlikler daha da derinleşecektir.

Tüm doğal afetlerin yaklaşık %90'ı su ile ilgilidir. 1995-2015 yılları arasında belgelenmiş sel felaketleri, belgelenen tüm doğal afetlerin %43'ünü oluşturmuş, 2,3 milyar insanı etkilemiş, 157.000 kişinin ölümüne sebep olmuş ve 662 milyar ABD doları hasara neden olmuştur. Kuraklık ise doğal afetlerin %5'ini oluşturmuş, 1,1 milyar insanı etkilemiş, 22.000 kişinin ölümüne sebep olmuş aynı yıllar arasında 100 milyar ABD doları hasara neden olmuştur (Dinavasova, 2019).

İklim değişikliğinin gelecek yıllarda şiddetli hava olaylarının sıklığını ve büyüklüğünü arttırması beklenmektedir. Ekonomik İşbirliği ve Kalkınma Teşkilatı (OECD) bugün 1,2 milyar olan sel riski altındaki insan sayısının 2050'de 1,6 milyara çıkacağını (dünya nüfusunun yaklaşık %20'si) ve risk altındaki varlıkların ekonomik değerinin 2050 yılına kadar 45 trilyon ABD Doları civarında olmasını beklemektedir. (OECD, 2016).

Dünya genelinde her on kişiden üçü (2,1 milyar kişi veya dünya nüfusunun %29'u) güvenli bir şekilde yönetilen içme suyu hizmetinden faydalanamamaktadır. Dünya genelinde güvenli bir şekilde yönetilen içme suyu hizmetlerini kullanan kişi sayısının üçte biri (1,9 milyar) kırsal alanlarda yaşamaktadır. (UNICEF, 2017). Güvenli bir şekilde yönetilen su hizmetlerinin kapsamı, bölgeler arasında önemli ölçüde farklılık göstermektedir. Sahra Altı Afrika'da bu oran %24 iken Avrupa ve Kuzey Amerika'da bu oran %94'tür. Halen doğrudan arıtılmamış yüzeysel su kaynaklarından içme suyunu kullanan 159 milyon insanın %58'i Sahra Altı Afrika'da yaşamaktadır (UNICEF, 2017). Yoksulluk içinde yaşayan insanlar, suya ve sanitasyona, sağlık ve eğitim hizmetlerine ve en temel ihtiyaçlarına ulaşmak için her gün mücadele etmektedir (Castaneda, 2016).

### **3. SU HAKKI, SU HAKKININ İNSAN HAKLARI İLE İLİŞKİSİ**

Bu bölümde su hakkının tarihsel gelişimi ve su hakkı kavramının insan hakları ile olan ilişkisi ortaya konulacaktır. Ayrıca su ile ilgili bölgesel, ulusal ve uluslararası metinler incelenecektir.

#### **3.1. Su Hakkı Kavramı ve Kavramın Tarihsel Gelişimi**

Su hakkı birçok bölgesel, ulusal ve uluslararası metinde doğrudan veya dolaylı olarak yer almıştır. 1949 tarihli Cenevre Sözleşmeleri savaş esirleri ile sivil halkın yeterli miktarda suya erişiminin sağlanması yükümlülüğünü getirmektedir. Bu sözleşmeler uluslararası alanda su hakkına dair önemli metinlerdir. Literatürde su hakkına dair en önemli metin 1977 yılında yayınlanan Mar Del Plata Dünya Su Konferansıdır. Konferansın kapanış bildirgesinde, sosyal ve ekonomik konumu ne olursa olsun suyun tüm insanlar için temel bir ihtiyaç olduğu belirtilmiştir. Bu konferans sonrasında su sorunu uluslararası bir boyutta tartışılmaya başlamıştır.

1979 yılında yayınlanan Kadınlara Karşı Her Türlü Ayrımcılığın Önlenmesine Dair Uluslararası Sözleşmenin 14/2. maddesinde kadın ve erkeğin içme suyundan eşit şekilde yararlanmasına 1989 yılında yayınlanan Çocuk Hakları Sözleşmesinin 24/2/c. maddesinde ise çocukların hem içilebilir suya hem de beslenme, çevre gibi konulara erişiminin sağlanmasına vurgu yapılmıştır. Bir yıl sonrasında ise Afrika Çocuk Hakları ve Esenliği Şartı'nın 14/2. maddesi ile sözleşmeye taraf olan devletlerin her çocuğa yeterli düzeyde beslenme ve güvenilir içme suyu sağlanması gerektiği kararlaştırılmıştır.

1992 yılında Dublin'de yapılan Uluslararası Su ve Çevre Konferansı'nda suyun ekonomik bir mal olduğu belirtilerek su sorunu farklı bir tartışma alanına kaymıştır. Dublin Bildirisi su hakkını açıkça tanımakla birlikte suya ekonomik bir değer atfetmesi nedeniyle sonraki dönemde eleştirilere konu olmuştur (Salihoğlu, 2006). Dublin konferansı sonrasında aynı yıl Rio'da yapılan BM Çevre ve Kalkınma Konferansı'nda Eylem Planı olan Gündem 21'de Mar del Plata Su Konferansının kararları onaylanmış, her bireyin içme suyuna erişim hakkı olduğu ve bu konunun toplumca kabul edilmesi gerekli olan bir ön koşul olduğu ifade edilmiştir.

1994 yılında BM Uluslararası Nüfus ve Kalkınma Konferansı'nda tüm bireylerin kendisi ve ailesi için yeterli su ve sanitasyon hakkının olduğu savunulmuş, Eylül 2002'de ki Dünya Sürdürülebilir Kalkınma Zirvesinde insan onuru, temiz su, sanitasyon gibi konularda hedefler ve planlar açıklanmış, Kasım 2002'de ise BM 15 nolu Genel Yorum'da su hakkının insanlık onuruna yakışan bir hayat için vazgeçilmez olduğu ifade edilmiştir.

BM Ekonomik Sosyal ve Kültürel Haklar Komitesi farklı tarihlerde yaptığı yorumlarda su hakkına değinmiştir. BM sözleşmelerinin genel yorum kısımları devletler için bağlayıcı olmamakla birlikte büyük kabul görmektedirler (Rudolf, 2007: 23). BM yorumlarından 1991 tarihli 4 nolu Genel Yorum konut hakkına değinmiş ve su konusunda erişilebilirliği konu edinmiştir. 1994 tarihli 5 nolu Genel Yorum'da ise engelli hakları içerisinde su ve gıda gibi temel ihtiyaçların karşılanmasının programların temelinin oluşturduğu belirtilmiştir. 1995 tarihli 6 nolu Genel Yorumda yaşlılara yeterli su olanaklarının tanınmasından, 2000 tarihli 14 nolu Genel Yorum'da ise sağlık hakkı ile bağlantılı olarak su hakkından bahsedilmiştir. BM yorumlardan 15 Nolu Genel Yorum, uluslararası alanda su hakkını bağımsız bir insan hakkı olarak ortaya koyması açısından literatürde de önem atfedilmiştir. Bu yorum suyun bir hak olduğunu kabul ederek, “herkesin kişisel ve ev içi kullanımları için yeterli, güvenli, kabul edilebilir, erişilebilir ve bedeli ödenebilir suya sahip olma hakkını” öngörmektedir. (Rudolf, 2007: 23).

BM 15 Nolu Genel Yorum'da su üç ana unsur üzerinde değerlendirilmektedir. Buna göre, su hakkının korunabilmesi için belirli bir miktarda suyun mevcut olması, bu suyun belirli bir nitelikte olması ve suyun erişilebilir olması gerekmektedir. Suyun mevcut olması her birey için kişisel ve sanitasyon için yeterli ve sürekli olmasıdır. Yeterlilik ile ilgili miktarlar Dünya Sağlık Örgütü'nün belirlediği ilkeler ile dikkate alınmaktadır. Bu ilkelere göre bir bireyin günlük 20 litre suya ihtiyacı olduğu belirtilmiştir. Suyun nitelik bakımından güvenli olması, zararlı maddelerden arındırılmış olması ve rengi, kokusu ve tadının kabul edilebilir olması gerekmektedir.

15 Nolu Genel Yorum'da suyun bir diğer unsuru erişilebilir olmasıdır. Suyun erişilebilirlik unsuru da kendi içerisinde dört farklı başlıkta yer almaktadır. Suya fiziksel olarak erişim her bireyin konutunun ya da iş yerinin yakınında su kaynağının olması anlamına gelir. Bu konuda Dünya Sağlık Örgütü 30 dakikalık ulaşım mesafesi ya da 1 km'lik ulaşım mesafesini erişilebilir olarak tanımlamaktadır. Bu rakamlar zaman açısından 5 dakika, mesafe açısından 100 metre düzeyinde ise suya orta düzeyli bir erişimden bahsedilmektedir. Suyun kullanıldığı mekanda doğrudan kaynağa ulaşılabilir ise optimum bir erişimden bahsedilebilir. Ekonomik olarak her bireyin eşit derecede erişiminin sağlanması keyfi kesintilerin olmaması ve su ile ilgili her bilgiye şeffaf bir şekilde erişilebilmesi BM'nin 15 nolu Genel Yorumunda yer almaktadır.

Su hakkı insan haklarına dair metinlerde de geniş bir şekilde yer almıştır. BM İnsan Hakları Yüksek Komisyonu'nu tarafından 2007 yılının Ağustos ayında yayınlanan raporda güvenli bir

içme suyu ve sanitasyonunun artık bir insan hakkı olarak kabul edilmesi gerektiğinin altı çizilerek, yaşam ve sağlığın sürdürülebilirliği için kişisel ve genel kullanımlarda yeterli miktarda güvenli içme suyuna erişimde ayırım gözetilmemesi gerektiği vurgulanmaktadır (Kılıç & Karataş, 2018). Bu kararın dışında 2009 ve 2010 tarihli İnsan Hakları Konseyi kararları su hakkını konu edinmiştir. Su hakkının birçok yerel, bölgesel, ulusal ve uluslararası metinde yer alarak tartışılıyor olması bu hakkı doğuran birçok gerekçenin var olduğunu göstermektedir. Tablo 1 incelendiğinde BM başta olmak üzere pek çok kuruluş suyun bir hak olması için birçok çalışma yürütmüş ve uluslararası alanda sözleşmeler imzalamış, bildiri ve kararlar yayınlamışlardır.

**Tablo 1: Su Hakkına Yönelik Tarihsel Gelişim Süreci**

<b>Tarih</b>	<b>Toplantı, Sözleşme, Karar vb.</b>	<b>Su Hakkı İle İlgili Görüş</b>
Mart 1977	Mar del Plata BM Su Konferansı	Birleşmiş Milletler Eylem Planı, suyu ilk kez bir hak olarak kabul etmiş ve “Gelişme evreleri ve sosyal ve ekonomik koşulları ne olursa olsun tüm halklar, temel ihtiyaçlarına eşit miktarda ve kalitede içme suyuna erişim hakkına sahiptir” denilmiştir.
Aralık 1979	Kadınlara Karşı Her Türlü Ayrımcılığın Önlenmesi Sözleşmesi (CEDAW)	Sözleşme, kadınlara karşı ayrımcılığı sona erdirmek için bir gündem belirlemiş ve metninde hem suya hem de sanitasyona açık bir şekilde atıfta bulunmuştur. Madde 14(2)(h) “Taraflar, kadın ve erkek eşitliği temelinde, katılmalarını ve bundan yararlanmalarını sağlamak için kırsal alanlarda kadınlara karşı ayrımcılığı ortadan kaldırmak için uygun tüm önlemleri alacaklardır. Kırsal kalkınma ve özellikle bu kadınlara aşağıdaki hakları sağlayacaktır: ... (h) Özellikle barınma, sanitasyon, elektrik ve su temini, ulaşım ve iletişim ile ilgili olarak yeterli



		yaşam koşullarından yararlanma”.
Kasım 1989	Çocuk Haklarına Dair Sözleşme	Sözleşme su, çevresel sanitasyon ve hijyen den açıkça bahsetmektedir. Madde 24(2): “Taraflar Devletler bu hakkın tam olarak uygulanmasını takip edecek ve özellikle aşağıdaki uygun önlemleri alacaklardır: ... c) diğerlerinin yanı sıra, çevre kirliliğinin tehlikeleri ve riskleri göz önünde bulundurularak, hazır teknolojinin uygulanması ve yeterli besleyici gıdaların ve temiz içme suyunun sağlanması yoluyla; ... (e) Ebeveynler ve çocuklar başta olmak üzere toplumun tüm kesimlerinin bilgilendirilmesini, eğitime erişimini ve çocuk sağlığı ve beslenmesi ile ilgili temel bilgilerin kullanımı, emzirmenin avantajları, hijyen ve çevre temizliği konularında desteklenmelerini sağlamak ve kazaların önlenmesi”
Ocak 1992	Uluslararası Su ve Sürdürülebilir Kalkınma Konferansı.	Dublin Konferansın 4. ilkesinde “...öncelikle tüm insanların uygun fiyata temiz suya ve saniteasyona erişim temel hakkını tanımak hayati önem taşımaktadır”.

Haziran 1992	Birleşmiş Milletler Çevre ve Kalkınma Konferansı.	Rio Zirvesi , Gündem 21'in 18. Faslı , Mar del Plata Su Konferansı'nın tüm halkların içme suyuna erişim hakkına sahip olduğu Kararını onaylanmış olup buna “ortak kabul edilen öncül” adı verilmiştir.
Eylül 1994	Birleşmiş Milletler Uluslararası Nüfus ve Kalkınma Konferansı	Bu konferansta tüm bireylerin: “Yeterli gıda, giyim, barınma, su ve sanitasyon dahil, kendileri ve aileleri için yeterli bir yaşam standardına sahip olma hakkına sahip olduklarını” tekrar edilmiştir.
Aralık 1999	BM Genel Kurulu Kararı A/Res/54/175	Genel kurul kararının 12. Maddesi , “diğerlerinin yanı sıra kalkınma hakkının tam olarak gerçekleştirilmesinde : (a) Gıda ve temiz su hakları temel insan haklarıdır ve bunların desteklenmesi hem ulusal hükümetler hem de uluslararası toplum için ahlaki bir zorunluluk teşkil eder”.
Eylül 2002	Dünya Sürdürülebilir Kalkınma Zirvesi	Johannesburg Zirvesi'nin insan onurunun bölünmezliğine odaklanmasını memnuniyetle karşılandığı belirtilerek temiz su, sanitasyon, enerji, sağlık hizmetleri, gıda güvenliği ve biyolojik çeşitliliğin korunması gibi temel gereksinimlere erişim hızının artması için planlama ve ortaklıklar konuşulmuştur.

Kasım 2002	Genel Yorum No. 15.	Genel Yorum 15 , su hakkını teyit eden 1966 Uluslararası Ekonomik, Sosyal ve Kültürel Haklar Sözleşmesi'ni (ICESCR) uluslararası hukukta yorumlamıştır. Bu Yorum, su hakkının yorumlanması için kılavuz ilkeler açıklamıştır. Madde 11, yeterli yaşam standardı hakkı ve Madde 12, ulaşılabilir en yüksek sağlık standardı hakkı ile taraf devletlere hak ve yükümlülükler getirmiştir. Ayrıca su ile ilgili hangi eylemlerin ihlal teşkil edeceğini tanımlanmıştır. Suyu erişim, insan onuruna uygun bir yaşam sürmek için vazgeçilmezdir denilerek diğer insan haklarının gerçekleşmesi için su hakkı bir ön koşul olarak belirtilmiştir.
Mart 2003	Dünya Üçüncü Su Forumu ve Bakanlar Konferansı	Kyoto'da düzenlenen konferansta suyun bir hak olduğuna değinilmemiş, temel insan ihtiyacı olduğu ifade edilerek kavram değişikliğine gidilmiştir.
Temmuz 2005	İçme Suyu ve Sanitasyon Hakkının Gerçekleştirilmesine İlişkin Taslak Kılavuz. E/CN.4/Sub.2/2005/25	BM Ekonomik ve Sosyal Konseyi Özel Raportörü El Hadji Guisse'nin raporunda yer alan ve İnsan Haklarının Teşviki ve Korunması Alt Komisyonunda kabul edilen taslak kılavuz ilkeler, hükümetlere, politika yapıcılarına, uluslararası kuruluşlara ve su ve sanitasyon sektöründe çalışan sivil toplum üyelerine içme suyu ve sanitasyon hakkının uygulanmasında yardımcı olmayı amaçlamıştır. Bu kılavuzda yer alan ilkelerde su ve sanitasyon hakkını yasal olarak tanımlanmamış, hakkın

		uygulanması için rehberlik sağlar.
Kasım 2006	İnsan Hakları Konseyi Kararı 2/104	“Birleşmiş Milletler İnsan Hakları Yüksek Komiserliği Ofisi devletlere uluslararası insan hakları belgeleri kapsamında güvenli içme suyuna ve sanitasyona adil erişimle ilgili insan hakları yükümlülüklerinin kapsamı ve içeriği hakkında, ilgili sonuçları ve tavsiyeleri içeren ayrıntılı bir çalışma yürütmüştür.
Aralık 2006	Engellilerin Haklarına İlişkin Sözleşme	28. madde, engellilerin yeterli yaşam standardına sahip olma hakkını tanımlar ve “2. Taraf Devletler, engellilerin sosyal korunma ve engelliliğe dayalı ayrımcılık olmaksızın bu haktan yararlanma hakkını tanırlar ve aşağıdaki önlemler de dahil olmak üzere bu hakkın gerçekleşmesini sağlamak ve teşvik etmek için uygun adımları atar: (a) engellilerin temiz su hizmetlerine eşit erişimi ve engellilikle ilgili ihtiyaçlar için uygun ve uygun fiyatlı hizmetlere, cihazlara ve diğer yardımlara erişiminin sağlanması”.
Mart 2008	İnsan Hakları Konseyi Kararı 7/22	Bu kararlar, İnsan Hakları Konseyi “Üç yıllık bir süre için güvenli içme suyuna ve sanitasyona erişimle ilgili insan hakları yükümlülükleri konusunda bağımsız bir

		uzman atamaya” karar vermiştir.
Ekim 2009	İnsan Hakları Konseyi Kararı	Bu kararda, İnsan Hakları Konseyi, insan hakları yükümlülükleri konusunda bağımsız uzmanlarla istişareyi memnuniyetle karşılamış, güvenli içme suyu ve sanıtasyona erişim, bağımsız uzmanın ilk yıllık raporunu kabul etmiştir. İlk kez, devletlerin sanıtasyona erişimle ilgili ayrımcılığı ele alma ve ortadan kaldırma yükümlülüğü olduğu kabul edilmiş ve devletleri bu alandaki eşitsizlikleri etkin bir şekilde ele almaya teşvik etmiştir.
Temmuz 2010	BM Genel Kurulu Kararı A/RES/64/292	Bu BM Kararı ilk kez su ve sanıtasyon hakkını resmen tanımıştır. Karar temiz içme suyu ve sanıtasyonun tüm insan haklarının gerçekleştirilmesi için esas olduğunu belirtmiştir. Karar, devletleri ve uluslararası kuruluşları, ülkelere, özellikle de gelişmekte olan ülkelere, herkes için güvenli, temiz, erişilebilir ve uygun fiyatlı içme suyu ve sanıtasyon sağlamak için finansal kaynaklar sağlamaya, kapasite geliştirmeye ve teknoloji transferine yardımcı olmaya davet etmektedir.

Eylül 2010	İnsan Hakları Konseyi Kararı A/HRC/RES/15/9	BM Genel Kurulu kararının ardından, BM'nin bu kararı İnsan Hakları Konseyi, su ve sanitasyon haklarının mevcut uluslararası hukukun bir parçası olduğunu teyit etmiş, bu hakların devletler üzerinde yasal olarak bağlayıcı olduğunu belirtmiştir. Ayrıca devletlere, şu anda hizmet verilmeyen ve yetersiz hizmet verilen alanlar da dahil olmak üzere, güvenli içme suyuna ve sanıtasyona erişimle ilgili insan hakları yükümlülüklerinin aşamalı olarak tamamen gerçekleştirilmesini sağlamak için uygun araçlar ve mekanizmalar geliştirmeleri için çağrıda bulunmuştur.
Nisan 2011	İnsan Hakları Konseyi Kararı A/HRC/RES/16/2	Bu kararda, İnsan Hakları Konseyi güvenli içme suyuna ilişkin görevlendirilen özel raportörün görev süresinin uzatılmasına karar vermiş, insan hakkının güvenli içme suyu ve sanıtasyona tam olarak uygulanmasını teşvik etmek için, pratik uygulamaların teşvik edilmesi sağlanmıştır.
2019	Birleşmiş Milletler Dünya Su Kalkınma Raporu	Rapor, herhangi bir şekilde ödeme yapılmaması nedeniyle su hizmetlerinin kesilmesinin insan hakları ihlali teşkil edebileceğini belirtmiştir.

**Kaynak:** (UN, The Human Right to Water and Sanitation Milestones, 2022)

### 3.2 Su Hakkının İnsan Hakları İle İlişkisi

Su sorunu su kaynaklarının kirlenmesi, küresel iklim değişikliği, çatışmalar sonucu su kaynaklarının tahrip edilmesi, düzensiz kentleşme, su israfı gibi insanoğlundan kaynaklanan birçok sebeple her geçen gün büyüyen ve yakın gelecek krize dönüşecek bir olaydır. Herkesin yeterli, güvenli ve kabul edilebilir nitelikteki suya fiziksel ve ekonomik olarak erişebilmesi için su hakkı kavramı ortaya atılmıştır. Bu kavram sağlıklı içme suyuna ve temizlik için kullanılacak

sanitasyona erişmenin insan onurunun ayrılmaz bir parçası olma düşüncesiyle uluslararası bir anlayış ile gelişmeye başlamıştır (McGraw, 2011:132)

Su hakkı tanımının ilk defa yer aldığı metin 1977 yılında BM'nin gerçekleştirdiği Su Konferansı'nda ortaya çıkan Mar Del Plata Eylem Planı'dır. Bu metinde insanların yeterli miktarda ve kalitede erişme hakkı olduğu ifade edilmiştir. Konferansta, ekonomik koşullarına bakılmaksızın, herkesin temel gereksinimleri için eşit miktarda ve kalitede içme suyuna erişim hakkı olduğu vurgusu yapılmış, ancak öncelikle suya erişim sıkıntısı yaşayan savaş ve silahlı çatışma mağdurları, kadınlar, çocuklar ve mahkûmlar için uluslararası alanda güvence yaratılmaya çalışılmıştır (Topçu, 2009). Mar Del Plata Eylem Planı sonrasında yapılan tartışmalarda su hakkının birçok hak ile ilişkili olduğu görülebilmektedir.

İnsanların yaşamlarını sürdürmelerini engelleyen veya imkansız hale getirerek tehdit eden her olay yaşam hakkı ile alakalıdır (Ioanna, 2007:123). İnsanoğlunun doğuştan sahip olduğu en önemli haklarından biri olan yaşam hakkı yasalarla korunmakta ve bu hakkın keyfi olarak bireyin elinden alınamayacağı hukuki metinlerde yer almaktadır. Kavramsal tartışmalar incelendiğinde suyun insan hayatını devam ettirebilmesi için hayati bir öneme sahip olduğu, bu sebeple her insanın yeterli, güvenilir ve erişilebilir içme suyuna ve sanitasyona sahip olması gerektiği konusu tartışmasızdır. Bu durumda susuzluk sebebi ile insan yaşamının son bulacağı düşünülür ise suyun yaşam hakkının bir ön koşulu olduğu söylenebilir.

İnsan Hakları Evrensel Bildirgesinin 3.maddesinde “Herkesin yaşama hakkı ile kişi özgürlüğü ve güvenliğine hakkı vardır.” ifadesine yer verilmiştir. Su yaşamın bir gereksinimi olduğu için suyun bir insan hakkı olduğuna dair yorum yapılabilir. 6 Ekim 2010 tarihli BM İnsan Hakları Komite kararında, temiz içme suyu ve sanitasyona erişimin, yaşam ve sağlık hakkı ile insan onurundan türeyen bir hak olduğu ifade edilmiştir.

Su hakkının bir başka insan hakkı ile ilişkisi ise sağlık hakkıdır. Uluslararası hukuktaki en geniş formuyla düzenlenen sağlık hakkı, Ekonomik, Sosyal ve Kültürel Haklara İlişkin Uluslararası Sözleşmesi'nin 12. maddesinde düzenlenmiştir. Burada Taraf Devletlere, herkesin ulaşılabilecek en yüksek fiziksel ve zihinsel sağlık standartlarını tanıma ve bu hakkın tam anlamıyla kullanılmasını sağlamak için gerekli tedbirleri alma yükümlülüğü verilmiştir. İnsanların güvenilir su kaynaklarına erişememeleri birçok sağlık sorununu beraberinde getireceği düşünülür ise, sağlık hakkı ile su hakkının ilişkisi ortaya koyulmaktadır.

Ekonomik, Sosyal ve Kültürel Haklara İlişkin Uluslararası Sözleşmesi'nde konut hakkına da atıfta bulunulmuştur. Sözleşmenin 11. maddesinde herkesin yeterli beslenme, giyim ve konuta

sahip olması gerektiğini belirtmektedir. Yeterli konut kavramı Birleşmiş Milletler tarafından doğal ve ortak kaynaklara, temiz içme suyuna ulaşabilme v.d. imkânına sahip konutlar olarak ifade edilmektedir. Böylelikle su hakkı konut hakkı ile iç içe geçen bir hak olarak görülebilmektedir.

Sağlıklı bir çevre ile su arasındaki ilişki de çok derin bir şekilde kendini göstermektedir. Çünkü su döngüsü çevrenin ve ekosistemin en önemli unsurlarından biridir. Su kaynakların tahrip edilmesi ve kirletilmesinin su arzına zarar verdiği düşünüldüğünde çevre ile su ilişkisi kaçınılmazdır. 6 Haziran 1972 tarihinde kabul edilen Birleşmiş Milletler İnsan Çevresi Konferansı Stockholm Deklarasyonu ilk maddesinde çevrenin korunması ikinci maddesinde ise gelecek nesiller için su kaynaklarının korunması gerektiğini belirtmiştir.

#### **4. SUYUN METALAŞTIRILMASINA YÖNELİK ÇALIŞMALAR**

Su ile ilgilenen kuruluşların biri olan Birleşmiş Milletler'in yayınladığı göre gelecek yıllarda içilebilir sağlıklı suya erişmekte güçlükler yaşanacağı, başka bir deyişle su kıtlığı yaşanması muhtemel olarak görülmektedir. Suyun metalaşması konusundaki temel yaklaşımlar bu öngörülerden dolayı ortaya atılmaktadır. Bu yaklaşımlar suyun korunabilmesini ilke edinmeye çalışarak su dağıtımının özelleştirilmesi gerektiğini söyler.

Suyun metalaşması ilk defa 1992 yılında Dublin'de ortaya atılmış, sonrasında Dünya Su Forumu'nda Su Komisyonu tarafından yayınlanmış olan bildiriye su yönetiminin önemli bir sorun olduğu ve suyun serbest piyasa ekonomisine açılması gerektiği fikri ileri sürülmüştür (Narin, 2016). Dünya Bankası ve IMF'de suyun özelleştirilmesi fikrini destekleyen kuruluşlardan olmuştur. Bu kuruluşlar, kendilerine kredi için başvuru yapan ülkelere suyu özelleştirmelerini şart koşmuş ve kredi vermeyi bu şarta başlamıştır. Bu iki kuruluştan kredi alan ülkeler su yönetimlerini özelleştirerek kredi almışlardır. 1971 yılında Dünya Bankası tarafından yayınlanan Su Arzı isimli raporda yoksul hanelerin evsel su tüketimlerinin belirli bir miktarının sübvansede edilerek su hizmetlerinin kendi kendini finanse eden bir karakter taşıması gerektiğinden bahsetmiştir. Dünya Bankası kentte yaşayan yoksulların çoğu yerde su ihtiyaçlarını damacaneler ile sağladığını ve şu anki hizmetin onlar için zaten erişilebilir olmadığını söyleyerek yoksulların belirlenecek bedelin üç dört katını bile ödemek için istekli olabileceğini, susuzluktansa parayla dahi olsa suya sahip olmak istediklerini ileri sürmektedir. Suyun ekonomik değeri ile ilgili çalışmalar yürüten BM ise yayınlamış olduğu Sürdürülebilir Kalkınma Hedeflerinden altıncı hedefinde herkesin 2030 yılına kadar güvenli ve uygun bedelli



bir içme suyuna erişiminin sağlanmasından bahsederek suyun metalaşmasına yönelik çalışmaları desteklemiştir. BM'nin geçmişte (1977 Mar del Plata) içilebilir suya erişimin bir insan hakkı olduğu görüşünü yansıtmaya ve daha sonrasında suyun bir bedel ile erişilmesini savunması, hak temelli su yaklaşımından piyasacı bir yaklaşıma kayıldığı yorumlarına neden olmuştur (Kılıç & Karataş, 2018).

New York merkezli Amerikan iş dünyası dergisi olan Fortune, 2010 yılında hazırladığı Dünya'nın en büyük şirketleri listesinde 200 şirkete yer vermiş, bu şirketler arasında Almanya menşeli RWE, ABD menşeli Suez ve Fransa menşeli Vivendi firmaları yer almıştır. Bu üç firma dünya su tekeli elinde bulunduran firmalar olarak bilinmektedir (Kartal, 2009). Su endüstrisinin kar oranları incelendiğinde petrol sanayisinin %40'ına tekabül ettiği görülmektedir. Bu oran Dünya'da ki suyun şu ana kadar %5'inin özelleştirildiği varsayılır ise çok büyük bir kar oranı olarak değerlendirilmektedir. Su piyasasının genişliği, sürekliliği ve kâr payı birlikte değerlendirildiğinde, ticari gaye ile hareket eden su şirketlerinin motivasyonunu anlamak zor olmayacaktır. (Narin, 2016). Tüm bu veriler ile gelecekte su kıtlığı yaşanmasın diye suyun özelleştirilmesine yönelik gösterilen çabaların aynı zamanda devasa boyutlara ulaşması beklenen su endüstrisini büyütme için olduğu da görülebilmektedir.

Suyun metalaşmasına yönelik tartışmaları anlayabilmek için uluslararası kuruluşların almış oldukları kararları ve kamuoyuna deklare ettikleri metinler incelenmelidir. Uluslararası Su Kaynakları Birliği (IWRA, 1971), Su ve Çevre Konferansı (Dublin,1992), Kalkınma ve Çevre Konferansı (Rio,1992), Hizmet Ticareti Genel Anlaşması (GATS,1995), Dünya Su Konseyi (DSK,1996) , Dünya Su Forumu (DSF,1997) suyun metalaşmasına yönelik çalışmalar yürütmüş ve suyun belirli bölgelerde özelleştirilmesini hızlandırılmıştır. Son yıllarda suyun metalaşması yönünde önemli girişimlerde bulunan ulusal ve uluslararası kuruluşlar, kamu-özel işbirliği veya kamu-kamu işbirliği modellerini öne sürerken, tezlerini "kamusal" gerekçelere dayandırmaktadır (Üstün, 2009). Oysaki yapılan araştırmalarda Dünya genelinde su kaynaklarının büyük bölümü halen kamu mülkiyetinde bulunmaktadır ve su hizmetleri ortalama olarak Asya ülkelerinde %99'u, Afrika'da %97'si Orta ve Doğu Avrupa ile Güney Amerika'da %96'sı, Kuzey Amerika'da %95'i, Batı Avrupa Ülkelerinde %80'i kamu kurumları tarafından yönetilmektedir (Sarı & Tuluay, 2011).

Suyun piyasa ürünü olması için çalışmalar yürüten kuruluşlardan birisi de Dünya Su Konseyi'dir. Dünya Su Konseyi, karar vericileri suyun sürdürülebilir ve adil gelişimi için hayati bir siyasi öncelik olduğuna ikna etmek için uluslararası toplumu bir araya getirmeyi

amaçlamaktadır. Bu konsey 1997 yılında kurulmuş olup her üç yılda bir düzenlenen Su Forumlarının finansörlüğünü yapmaktadır. İlk su forumu Fas (1997)'ta yapılmış, sonrasında sırası ile Lahey (2000), Kyoto (2003), Mexico (2006) İstanbul (2009), Marsilya (2012), Gyeongbuk ve Daegu (2015), Brezilya (2018)'de düzenlenmiş, 2022 yılı forumunun ise Dakar'da gerçekleştirileceği duyurulmuştur. Dünya Su Konseyi su ve sanitasyona genel erişimi sağlamak veya iyileştirmek ve BM'nin Sürdürülebilir Kalkınma Hedeflerine ulaşmak için su sektöründe yatırıma ihtiyaç olduğunu belirtmektedir.

Su yönetimi ile ilgili Avrupa Birliği'nde üyeleri arasında bir dizi çalışmalar yürütmüştür. AB'nin en gelişmiş çalışması 2000 yılında benimsenmiş olan Su Çerçeve Direktifi'dir. 22 Kasım 2000 tarihinde kabul edilerek yürürlüğe giren Su Çerçeve Direktifi AB'nin su politikasının anayasası olarak kabul görmektedir (İZKA, 2020). Direktif suyu kirleten faktörlerin olması halinde temizlenme maliyetlerin karşılanması, su kullanımı ile ilgili ücretlerin belirlenmesi gibi ana amaçlara yer vermektedir.

Avrupa Parlamentosu ve Konseyinin 2000/60/EC sayılı Direktifi'nin kilometre taşlarının yazıldığı metnin ilk aşamasında "Su, diğerleri gibi ticari bir ürün değil, aksine korunması, savunulması ve bu şekilde muamele edilmesi gereken bir mirastır." ifadesine yer verilmiştir. Ancak 4. aşamada "Topluluktaki sular, her amaç için yeterli miktarda iyi kaliteli suya olan talebin sürekli artması nedeniyle artan bir baskı altındadır." denilerek su krizinin yaşanabileceğine dair emareler sunmuştur. 38. aşamada ise "Üye Devletler tarafından ekonomik araçların kullanılması, bir eylem programının parçası olarak uygun olabilir." denilerek suyun metalaşmasına doğru atılan ilk adım atılmıştır.

Su Çerçeve Direktifinin 9. maddesi ise su hizmetleri dolayısı ile yapılan harcamaların geri kazanılmasını içermektedir. Üye devletler, çevre ve kaynak maliyetleri de dahil olmak üzere su hizmetlerinin maliyetlerini geri alacak ve sanayi, hane halkı ile tarıma ayrılan farklı su kullanımlarının, su hizmetlerinin maliyetlerinin karşılanmasında sosyal, çevresel ve ekonomik etkiler dikkate alınabilecektir. Görüldüğü üzere AB'nin yayınladığı Su Çerçeve Direktifi, suyun kirlenmesi ve su hizmetinin sağlanması için yapılan altyapı harcamalarının maliyetlerinin karşılanmasında yetkiyi hükümetlere vererek bu konuda ülkelerin vatandaşların ekonomik gelişmişlik düzeyini de dikkate alarak maliyetlendirme yapmaları gerektiğinden bahsetmiştir. Bu direktif ile AB'nin suyun metalaşmasına yönelik ciddi bir adım attığı söylenebilir.

Su kıtlığına dair çözümün metalaşmak olduğu bilim dünyası tarafından da yapılan önemli bir tartışmadır. Shiva (2002:31) Su kıtlığının sebebinin ve su sorununun tek çözüm yolunun suyun

ticarileştirilmesi olduğunu, su hakkını kabul etmenin kendisi ile birlikte birçok sorunu doğuracağını bu sebeple su hakkının tanınmasının doğru olmadığını savunmuştur. Bakker (2007: 438)'de benzer bir şekilde suyun metalaşmasını savunarak suyun insan hakkı olarak kabul edilmesi durumunda devletlerin herkese eşit su dağıtımını yapabilmek için mali kaynaklarını zorlayacağı ve bu durumun su savaşına dönüşebileceğini söylemiştir. Devletlerin mevcut su kaynaklarını herkes için erişilebilir yapması bazı ekonomik politik ve çevresel sorunları beraberinde getirecektir (Sav, 2007: 346).

## **5. SONUÇ VE DEĞERLENDİRME**

İçilebilir, nitelikli ve güvenli içme suyuna ve evsel kullanıma uygun suya erişebilmek, uluslararası kuruluşlarca kabul görmüş bir insan hakkıdır. Bu hak BM'nin 28 Temmuz 2010 tarihli Genel Kurulu ile tanınmaktadır. Ancak BM ve diğer kuruluşların su hakkının doğrudan bir insan hakkı olmasına yönelik uzun yıllardır yapmış olduğu çalışmalar su hakkı sorununun tam olarak çözülebilmesine yetmemiştir. Devletler, su hakkına yönelik çalışmalarını anayasalarına, yasalarına ve yönetmeliklerine ve iç hukuklarına etmekten kaçınabilir. Çünkü su hakkı teoride uygulanabilir, pratikte uygulanması güç bir hak olarak görülmektedir.

Su hakkı konut hakkı gibi maliyeti yüksek, denetimi zor bir haktır. Ancak zorluğu, maliyeti, uygulanabilirliği ne kadar zor olursa olsun suyun bir insan hakkı olarak tanımlanması önemlidir. Örneğin; Konut hakkı bir haktır, fakat her bireyin insan onuruna yakışan bir konuta erişmesi devletler için büyük maliyetler ortaya çıkarmaktadır. Devletler iç politikaları ile konut sorununu çözebilmek için toplu konutlar, sosyal konutlar, krediler vb. çalışmalar yaparak bu hakkın kullanılmasına katkıda bulunur. Beslenme hakkı bir haktır. Ancak hala dünya genelinde açlıktan ölen çocuklar bulunmaktadır. Su hakkının da bir hak olarak devletler tarafından benimsenerek iç hukuka entegre edilmesi, su hizmetlerinin ise konut örneğinde olduğu gibi kamu eliyle sağlanarak veya sübvansede edilerek uygun bir bedelle sunulması gerekir.

İnsan hakları devletin onayına tabi değildir. Bu sebeple geçici olmamakla birlikte geri alınabilecek bir niteliğe sahip değildir. Su hakkının birçok insan hakkının ön bileşeni olması, suyun olmaması durumunda birçok insan hakkından bahsedilemeyeceği için doğal olarak bir insan hakkı şeklinde görülmesi gereklidir. Devletler suyu bir insan hakkı olarak tanımlamalı ve kendi iç hukuklarına dahil etmelidir.

Devletler iyi bir su yönetimi için ülke genelinde suyun tek elden yönetilmesini sağlamalıdır. (su yönetiminin yerelden ziyade merkezileştirilmesi). Özellikle dezavantajlı durumda olan

kadın, kız, engelli, yoksul, yaşlı, mahkum, işçi, göçmen gibi kişilerin suya erişimine öncelik verilmesi ve bu kesimlerin eşitsizliğe maruz kalmaması için anayasal tedbirler alınmalıdır.

Su tüketimi ile mücadele edebilmek için her bireyin yeterli miktar ve kalitede suya erişimi devlet tarafından öncelikli ve bedelsiz olarak temin edilmeli, bireylerin günlük ihtiyaçlarını aşan miktardaki suyun tüketilmesini önlemek için aşırı tüketimle mücadele edilmelidir. Bunun için ailelerin kişi başına düşen su miktarı belirlenmeli, kontrollü ve kotalı sistemler ile son kullanıcının aşırı su tüketimi önlenmelidir. Suyu belirlenenin üstünde kullanmak isteyen bireylerden su hizmetleri için ilave ücretler alınmalıdır. Böylelikle suyu ihtiyaç olarak kullanan kişilere su bir hak olarak verilmeli, aşırı tüketerek suyun gelecek nesillere aktarılmasına zarar veren kişilere karşı tedbir alınmalıdır.

Su şebekesinin olmadığı yerlerde suyu hak olarak tanımlayarak öncelikle %100 oranında su şebeke hizmeti verilmeli, bunun olmadığı yerlerde ise günlük su ihtiyaçları su taşımacılığı ile yapılmalıdır. Bu yerlerde kurulacak hijyenik su depolarına su taşımacılığı yapıp oluşan maliyet ise devletlerce karşılanmalıdır. Su arıtma sistemleri elektrik enerjisi ile çalıştığı için su hizmetleri yüksek maliyetle sunulmaktadır. Bunun yerine güneş ve rüzgar gibi enerji sistemleri ile elektrik üreterek maliyetler düşürülmelidir.

Suyun geri dönüşümü sağlanarak su kaynaklarının tüketiminin azalması sağlanmalı, geri dönüşüm tesislerinin sayısı arttırılmalıdır. Su kaynaklarının hasar görmesine sebebiyet veren sel vb. doğal olayların gerçekleşme ihtimali göz önünde bulundurularak su taşıyan sistemler teknolojik olarak geliştirilmelidir. Gecekondu gibi su şebekesinin ulaştırılmadığı, su kaynağının sınırlı veya mevcut olmadığı alanlarda su büfelerinin kurulması teşvik edilmeli, suya erişim uygun maliyetlerle karşılanabilmelidir. Su tesislerinin yapılmasında siyasi kaygılar güdülmeyen az nüfuslu alanlara yüksek maliyetli tesisler yapmak yerine daha fazla insanın erişim sağladığı bölgelere gerekli yatırımlar yapılmalıdır. Kaçak su çekimi yapan kişi veya kişilere gerekli cezai yaptırımlar arttırılmalı, bu kişilerin diğer insanların su ve sanitasyon haklarını ihlal etmeleri önlenmelidir.

Sonuç olarak; Su hakkı kavramı tüm insanların biyolojik ve fiziki ihtiyaçlarının asgari düzeyde karşılanması için var olması gereken bir haktır. Bu hak su kıtlığı karşısında bireylerin yeterli düzeyde güvenli, nitelikli suya ulaşabilmesini kabul eder. Suyun özelleştirilmesi ile birlikte



tekelci bir anlayış faturaların yükselmesine ve doğal olarak tüm insanların suya erişebilmesine zarar verebilir. Bu durum başka insan haklarının elde edilebilme için tarihsel süreçte yer alan eylem ve protestolar ile toplumsal huzursuzluklara neden olabilir.

Su ve sanitasyon insan haklarının gerçekleştirilmesi için esastır ve her hakkın gerçekleştirilmesi diğer haklar için önemli bir etkiye sahiptir. Yetersiz su; yaşam, çevre, konut, gıda, sağlık ve eğitim hakkını kısıtlar veya bu hakların oluşmasını engeller. Bu sebeple su bir insan hakkıdır ve devletlerin bu hakkı mutlak suretle kendi ulusal mevzuatlarına entegre etmeleri gerekmektedir.

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## **RASİM ÖZDENÖREN’İN HİKÂyelerİNDE AİLE**

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### **ÖZET**

Sanat ve edebiyat dünyamızın önemli isimlerinden biri olup pek çok kitaba imza atmış olan Rasim Özdenören, yaklaşık elli yıllık yazarlık serüveninde on bir hikâye kitabı yayımlamıştır. Pek çok edebiyat dergisinin de kurucuları arasında yer alan Özdenören, edebiyat kuramına dair yazdığı yazılarla da edebî eserlerine düşünce boyutu kazandıran yazarlardan birisidir. İslam uygarlığının kendine özgü değer yargılarını ve duyarlılığını hikâyelerine taşıyan yazar, hikâyelerini bir mesaj verme kaygısı ile yazmadığının da altını çizer. Hikâye kitapları tematik olarak okunduğunda yabancılaşma ve başkaldırı, çözülmenin ekonomik boyutları, ölüm ve ahiret düşüncesi, aile, çocuk, ev ve tasavvuf üzerine yoğunlaştığı görülür. Rasim Özdenören’in eserlerindeki “aile” meselesi, kendisini besleyen alt meseleler arasında biraz daha belirginleşen “geçim sıkıntısı”, “bireyler arası ilişkileri etkileyen bir unsur olarak geleneksel yapı” başta olmak üzere değişik açılardan ele alınabilir. Kişilerin çoğunu bir ailenin bireylerinin oluşturduğu Özdenören hikâyelerinde aile, daha çok “oğul”un hikâyesi vasıtasıyla anlatılır. Bu çalışmada yazarın hikâye türündeki eserlerinin; anlatma, diyalog, bilinç akışı, iç monolog vb. anlatım teknikleri kullanılarak hikâye metodolojisi çerçevesinde incelemesi yapılacak, hikâyelerinde “aile” temasını nasıl ele aldığı ve aile temasına verdiği önem ortaya konulacaktır. Daha önce bu konu ile ilgili yapılan çalışmalar incelendiğinde yazarın hikâye metinlerinde yer alan birçok konuya temas edildiği fakat aile temasının derinlemesine incelenmemiş olması dikkatimizi çekmiştir. Bu çalışma ile Özdenören’in hikâyelerinde aile temasını nasıl ele alıp işlediği ayrıntılı bir şekilde ortaya konulacaktır.

**Anahtar Kelimeler:** Rasim Özdenören, Hikâye, Tema, Aile, Tasavvuf.

## **FAMILY IN RASİM ÖZDENÖREN'S STORIES**

### **ABSTRACT**

Rasim Özdenören, who is one of the important names of our art and literature world and has signed many books, has published ten story books in his fifty-five-year adventure of writing. Özdenören, who is among the founders of many literary magazines, is one of the authors who bring a thought dimension to his literary works with his articles on literary theory. The author, who carries the unique value judgments and sensitivity of Islamic civilization to his stories, also underlines that he does not write his stories with the concern of giving a message. When the story books are read thematically, it is seen that they focus on alienation and rebellion, the economic dimensions of disintegration, the thought of death and the hereafter, family, children, home and mysticism. The "family" issue in Rasim Özdenören's works can be handled from different perspectives, especially "liveability", which becomes more evident among the sub-issues that feed him, and "traditional structure as a factor affecting interpersonal relations". In Özdenören stories, where most of the people are members of a family, the family is mostly told through the story of the "son". In this study, the author's works in the genre of stories; narration, dialogue, stream of consciousness, internal monologue, etc. It will be examined within the framework of story methodology by using narrative techniques, how he handles the theme of "family" in his stories and the importance he gives to the theme of family will be revealed. When the previous studies on this subject are examined, it has drawn our attention that many subjects in the author's story texts have been touched on, but the family theme has not been examined in depth. With this study, it will be revealed in detail how Özdenören handles the family theme in his stories.

**Key words:** Rasim Özdenören, Story, Theme, Family, Sufism.

## GİRİŞ

Türk edebiyatında hikâyenin menşei sözlü anlatı edebiyat dönemine kadar uzanmaktadır. Mitolojik hikâyeler, destan türleri, masallar ile başlayan ilk anlatı türlerinin genel amacı insanları sosyo-dini yönden geliştirerek, onların kâmil insan olmasını sağlamaktır. Bu durum, bu tip edebi eserlerin genel ağırlıkta, halk hikâyesi kategorisinde değerlendirilmesine yol açmaktadır. Türk hikâye tarihinin ilk örnekleri sayılabilecek eserler olarak destanların mensur bölümleri ve Uygur Türk topluluğuna ait *çatıklar* gösterilebilir. Yapılan çalışmalarda İslamiyet'in kabulünden başlayarak Tanzimat dönemine kadar geçen süreçte pek çok hikâye türüne rastlanılmaktadır. Bunların gazâvâtnâme, fetihnâme, siyer, menâkıbnâme gibi sıralanması mümkündür. Nitekim tüm bu bilgilerin yanında Türk bilim ve sanat dünyası hikâye türünün ilk örneğini *Dede Korkut Hikayeleri* olarak kabul etmektedir. Dede Korkut hikâyelerinin mekan-zaman ve yüceltilmiş insan tipini barındırması Türk hikâyeciliği açısından önem arz etmektedir.<sup>1</sup> Nitekim gerek halk edebiyatı, gerekse divan edebiyatında, mensur ve manzum hikâyenin varlığı bilinen bir gerçekliktir<sup>2</sup>.

Türk halk edebiyatında hikâye ise, bambaşka bir boyutta olup zengin bir kültürü içerisinde barındırmaktadır. Burada belirli bir zaman dilimi, coğrafya çerçevesinde bir anlatıya dönüşerek farklı unsurlardan beslenip; dini, tarihi ve sosyal olayların harmanlanması ile oluşmuş eserlere rastlamak mümkündür. Bu kapsamda halk edebiyatı eski zamanlarda anlatı türündeki destanlardan oldukça fazla beslenerek şekillenmiştir. Örneğin halk edebiyatında döşeme ve soylama geleneği, destan geleneğinin devamı sayılmaktadır. Nitekim Eski Türklerdeki şamanlar, halk hikâyelerinde ozanlara dönüşerek hikâye geleneğini sürdürmüştür<sup>3</sup>.

Genel ağırlıkta destanları referans alan halk hikâyeleri, düzyazı ve şiir olmakla beraber zaman içerisinde yazınsal sanat kısmının ivme kazanmasıyla, kişi ve olayların gerçeğe daha uygun bir perspektife girmesiyle aşk, tarih, gibi konular ile destanlardan ayrılmıştır. Gelişimini sürdüren halk hikâyeleri zamanla farklı kaynaklardan da beslenmeye başlar. Ve zaman içinde farklı kaynaklardan da beslenerek gelişimini sürdürür. Yaşayan veya yaşadığı rivayet edilen saz şairlerinin (âşık) hayatları, dinî ve millî hâdiselere dayalı kahramanlıklar ve özellikle Anadolu coğrafyasında yaşanan gerçek olaylar, halk hikâyelerine kaynaklık eder.<sup>4</sup>

<sup>1</sup> Ahmet Uslu, **1980 – 2000 Yılları Arası Türk Hikâyeciliğinde Yapı**, Dicle Üniversitesi Sosyal Bilimler Enstitüsü Türk Dili ve Edebiyatı Yayınlanmamış Doktora Tezi, Diyarbakır 2016, s-12-14.

<sup>2</sup> Perteve Naili Boratav, **Halk Hikâyeleri ve Halk Hikâyeciliği**, İstanbul: Kültür Bakanlığı Yay., 2002, s.33

<sup>3</sup> Kasap, İ. (2005). “**Halk Hikâyeleri Üzerine**”, Hece Aylık Edebiyat Dergisi, Türk Öykücülüğü Özel Sayısı, (2. Basım), Ankara.

<sup>4</sup> Ali İhsan Kolcu, **Öykü Sanatı**, (3. Baskı), Erzurum: Salkımsöğüt. s.17-19.

Hikâye sözcüğünü Arapça'dan devşiren Türk edebiyatı, Tanzimat dönemiyle beraber Batı edebiyatında edebî bir tür olarak ivme kazanan hikâye ile tanışır. Hikâye, edebi bir tür olarak kabul görene dek, gerek Batı edebiyatı olsun, gerekse Arap-Fars edebiyatlarında farklı adlandırmalar altında zaten bulunmaktaydı. Fransız edebiyatı ve dilinde “narration “anlatım”, conte “masal”, récit “anlatı”, historie “tarih”, historiette, nouvelle “roman”; Alman edebiyatında ise “Geschichte, Märchen “tarih” sözcükleri hikâyeye karşılık ya da onu da içerecek şekilde kullanılmıştır.<sup>5</sup>

Bahsedildiği üzere Türk edebiyatında hikâye, 19. Yüzyılın ikinci yarısında ivme kazanmıştır. Bu alanda ilk örneklere Samipaşazade'nin *Küçük Şeyler* adlı eserinde bulunan kısa hikayelerde rastlamaktayız. 1880 sonrası dönemde, yukarıda saydığımız ilk örneklerden sonra henüz roman, tiyatro oyunu ve şiir kadar popüler bir tür olmamakla birlikte kısa hikâye yazılmaya ve okunmaya başlanmıştır. Hüseyin Rahmi Gürpınar (1864-1944), Halit Ziya Uşaklıgil (1866-1945), Hüseyin Cahit Yalçın (1874-1957), Mehmet Rauf (1875-1931), Ahmet Hikmet Müftüoğlu (1870-1927), Ömer Seyfettin (1884-1920), Refik Halit Karay (1888-1965), Halide Edip Adıvar (1882-1964), Yakup Kadri (1889-1974) kısa hikâye türünde yapıtlar ortaya koyarlar<sup>6</sup>.

Bundan sonraki dönemde gerek Tanzimat sonrası, gerekse Cumhuriyet döneminde hikâye türünde çalışmalar hız kazanmaya devam ederek gelişimini sürdürmüştür<sup>7</sup>. Çalışmamızın ana temasını oluşturan Rasim Özdenören'in hikayelerinde ‘aile’ kavramı yaklaşık 50 yıl hikâye yazmaya devam eden yazarın hayatında önemli bir yere sahiptir. 1970 sonrası Türk hikâyeciliğinin önemli kalemlerinden olan yazarın, hikâyelerinde öne çıkan üç mesele etrafında hikâyeciliği değerlendirilmiştir<sup>8</sup>.

Burada bizim için aile manevi bağ duygusu önem kazanmaktadır. İlişkiler bazında baba-oğul ve baba-kız ilişkileri açısından yapılan değerlendirmelerde, çocuğun gözünden babanın olumsuz bir karakter olduğu dikkat çekmektedir. Ancak yazarın karakterler açısından kendi ailesinden bir yansıma olmadığı da bilinmektedir. Bu durumu şöyle özetlemekte Özdenören;

<sup>5</sup> M. Kayahan Özgül, *Hikâyenin Romani. Hece Türk Öykücülüğü* Özel Sayısı 46/47,2005, s. 33-41.

<sup>6</sup> S. Dilek Yalçın-Çelik, *Türk Edebiyatında Kısa Hikâye Hakkında Yapılan Çalışmalar*, Türkbilig Dergisi, 2002/3, s. 106-129.

<sup>7</sup> Eyüp Güneş, “*Rasim Özdenören’le Modernizm ve Edebiyat Üzerine Söyleşi*”, Akademik Sosyal Araştırmalar Dergisi, Y. 2, S. 8, Aralık 2014, s. 601-613.

<sup>8</sup> Kemal Erol- Emin Emrullah Erol, *Rasim Özdenören’in Gül Yetiştiren Adam’ında Kültürel Yabancılaşmaya Karşı Geleneksel Tepki*, Türkiyat Mecmuası, C.27/2, 2017, s..132.

‘Hiçbir hikâyemde babam ile olan ilişkiye yer vermedim.’ diyerek, karakterlerin hikâye çatısı altında toplanmasını sağlayan bir virtüöz olduğunu kanıtlamaktadır<sup>9</sup>.

Aile kavramına dair çözümleneleri İkinci kitabı *Çözülme*’de görmek daha mümkündür. Yazarın 1973 yılında kaleme aldığı eserde; günümüz insanının içine düştüğü bunalımlar, öz değerlerinden çözümlenmeyle birlikte gelen sorunların aileye yansımaları üzerinde durmuştur. *Çözülme*, edebiyat çevrelerinde, Türk edebiyatındaki en dikkate değer uzun hikâyeler arasında gösterilmiştir. Ülkemizdeki sosyal değişimi aile üzerinden yansıtan bu hikâyelerde bireyin devindiği çevre, ilk kitaba nazaran oldukça genişlemiştir<sup>10</sup>.

Özdenören hikâyelerinde aile üzerinden dönemin sosyo-ekonomik şartları da göz önüne alındığında geçim sıkıntısı, bireylere yansımaları ve ailedeki etkileri üzerinde durmaktadır. Hikâyelerinde aile karakterleri üzerinde baba ve oğul perspektifinde bakan Özdenören, dönem koşulları da dikkate alındığında baba ve oğul arasında bir gerginlik, iletişimsizlik, uyumsuzluk, çatışma temalarını sıkça görürüz<sup>11</sup>.

Gerek baba-oğul ilişkisinin öne çıktığı hikâyelerde, gerekse babanın bu ilişki dışında yer aldığı yazarın diğer hikâyelerinde baba, istisnalar dışında olumsuz bir tiptir<sup>12</sup>. Babanın olumsuz bir karakterde olması dönemin giriftli baba-oğul çatışmasından kaynaklanmaktadır. Dönemin babalarının ataerkil bir mizaçta olması, sertlik ve dolaylı bir yakınlık, bu duruma bir örnek oluşturabilir<sup>13</sup>.

Baba karakterlerinin “baba-oğul” ilişkisinde olumsuz ve yer yer suçlu bir tip olarak çizilmesi, yazarın “sadece gördüklerini” yazdığını söylediği toplumsal gerçeklerle ilgili bir durum olarak düşünülebilir. Ancak “baba-oğul” ilişkisinin yazarın hikâyelerinin pek çoğunda öne çıkması ve söz konusu ilişkinin belirtilen şekillerde hikâyeye dünyasına yansımaları yazarın toplumsal gerçeklere belli bir açıdan bakıp bakmadığı sorusunu da akla getirir. Mesela “Bu toplumsal gerçeklik içinde hikâyeye dünyasına taşınmaya değer bulunacak hiç mi farklı bir baba portresi, baba-oğul ilişkisi olmaz” sorusu bu noktada ilk olarak akla gelmektedir. Hikâyelerde annelerin hasta olduğu pek görülmezken, birçok hikâyede babanın hasta olması da acaba yalnızca bu toplumsal gerçeklikle mi ilgilidir? Buradan da anlaşılacağı üzere ailede anne baba karakterlerinden hareketle ailedeki bağları, toplumsal çizgideki yerleri, konumları üzerinde

<sup>9</sup> Kaplan, Ramazan, “*Çözülme Veya Ailedeki Yangın*”, *İşyan Kelimeler* (Hazırlayan: Âlim Kahraman), Kaknüs Yayınları, İstanbul 2007. 269.

<sup>10</sup> Rasim Özdenören, *Çözülme*, İz Yayıncılık, Ankara 2012, S.49-61.

<sup>11</sup> İlyas Dirin, “*Rasim Özdenören*”, *Yedi İklim* yayımları, İstanbul 1999, s. 55-56.

<sup>12</sup> Rasim Özdenören, *Hastalar ve Işıklar*, Yayıncılık, Ankara 1998, s.55-56.

<sup>13</sup> Alim Kahraman, “*Rasim Özdenören’le Üç Oturum (III. Oturum)*”, *İşyan Kelimeler*, Kaknüs Yayınları, İstanbul, 2007, s.194.

durulmuştur. Özdenören; ailede anneyi bir adım öne alırken, baba karakterine hem olumsuz bir çizgi çizmiş, aynı zamanda hayatın tüm yükünü yüklenen ve bu yolda hastalıklarla boğuşan bir figür ortaya koymaktadır<sup>14</sup>.

Rasim Özdenören, *Hastalar ve Işıklar* adlı eserinde çeşitli nedenlerle işsiz kalmış, doğru düzgün işi olmayan yoksul kişileri anlatır<sup>15</sup>. Eserde, bu kişilerin yaşadığı maddî sıkıntılar ve bu sıkıntıların aileye yansımaları ile yaşanan değişimler sonucu ortaya çıkan çözülme de ele alınır. Çözülme ve değişimler sıkıntılar doğurur. Bu sıkıntılar, değişim ve modern dünyanın çekici tarafıyla aşılmaya çalışılır. Bu eserdeki hikâyelerin çoğunda geleneğe ait diyebileceğimiz bir dünya ile modern yaşamın çatışma havası karşımıza çıkar.<sup>16</sup>

Özdenören'in hikayelerinde, köy yada kent farketmeksizin bir sosyo-ekonomik çatışma karşımıza çıkmaktadır. Aile temalı eserlerde yoksulluk ve bunun aileler üzerindeki etkileri, yetinememe ya da, kaybolan figürler anlatılır. Burada ailelerin hayata tutunma mücadeleleri göze çarpmaktadır. Usta bir kalem olan Özdenören'in döneme eğilerek uyarladığı analizler aslında hayattan birer kesit olarak karşımıza çıkar<sup>17</sup>.

*Çözülme*, Özdenören'in ikinci hikâye kitabı olarak okuyucuya ulaşmıştır. Bu hikâyeye 1973'te yayımlanmıştır. *Çözülme* adlı hikâyede okuyucu gelenek modernizm çatışması ile karşı karşıya kalır. Yazar, bu eserin de sosyal hayatta yaşanan ekonomik, soysal ve kültürel değişimlerin şahısların ve ailelerine sirayet eden değişiklikleri, çatışmaları ortaya koyarken yeni düzene uyum sağlamaya çalışan şahısların ve ailelerin yaşadığı çözülmeyi de anlatır. Bu eserde dört öykü işlenmektedir. Eserde aile mefhumu noktasında önem arz eden *Çözülme* adlı hikâyeye, 1977 senesinde TRT adına Yücel Çakmaklı tarafından televizyon filmi olarak uyarlanmış ve beyaz perdeye aktarılmıştır.<sup>18</sup>

Özdenören'in bir diğer hikâyeye kitabı olan *Çarpılmışlar* adlı hikâyesinde; yanlış yollara sevk edilmiş insanların dini inanç sınırlarından da uzaklaşması nedeni ile herkese ve herşeye nasıl

<sup>14</sup>Tosun, Necip, **Türk Öykücülüğünde Rasim Özdenören**, İz Yayıncılık, İstanbul 1996, s.38.

<sup>15</sup> Firdevs Canbaz Yumuşak, **Rasim Özdenören Ve Öykücülüğü**, Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic Volume 7/2 Spring 2012, p.1281-1299 , ANKARA/TURKEY, s.1282.

<sup>16</sup> Eyüp Güneş- Mustafa Karabulut, **Rasim Özdenören'in Hikâyelerinde Gelenek-Modernizm Çatışması**, Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, S.16, s.428.

<sup>17</sup> Tosun, Necip, **Türk Öykücülüğünde Rasim Özdenören**, s.38-41.

<sup>18</sup> Rasim Özdenören, **Çözülme**. İstanbul. İz Yayıncılık, İstanbul 2012, s.7.

da yabancılaştığı ve toplum nezdinde açmazlara sürüklendiği anlatılmaktadır<sup>19</sup>. Hikâyenin gerek toplum nezdinde, gerekse aile hayatı çerçevesinde etkileri, usta bir biçimde işlenmiştir. Eserde aile teması işlenirken, geçmişteki aile tipleri ve figürleri ile dönemdeki modern aile yapısı dikkat çekmektedir. Burada da diğer hikâye kitaplarında olduğu gibi zor bir hayatı omzuna almış baba karakteri karşımıza çıkmaktadır. Anlaşılan o ki burada da baba ve oğullarda olduğu gibi bir çatışma söz konusudur<sup>20</sup>.

Özdenören'in edebiyat dünyasına önemli eserler bırakan bir yazar olduğu yazmış olduğu eserlerden de anlaşılmaktadır. Yazarın, olay örgüsü ve bunun işleyişi olsun -tabiri caizse- ustalık ile eserlerini kaleme aldığı bilinmektedir<sup>21</sup>. Bu nedenle eserlerinin her biri birbirinden kıymet arz etmektedir. Özdenören hikâye türünde olan bir diğer eseri ise *Çok Sesli Bir Ölüm* adlı eseridir. Bu eseri diğerlerinden ayıran yegane özellik ise eser, Özdenören'in askerlik zamanında yazdığı bir çalışmadır. Bu çalışma meydana getirilirken Nuri Pakdil üstadın da, Özdenören'e pozitif baskısının etkili olduğu yadsınamaz bir gerçektir. Eser; 1974 yılında kaleme alınmış olup, aile noktasında değinildiği noktalar bulunmaktadır. Aile bireylerinin modern hayata ayak uydurmak uğruna giriştikleri hırs, aile temellerine verilen zararların bir unsuru olarak karşımıza çıkmaktadır. Yazarın diğer hikâyelerinde de olduğu gibi modernizm çatışması aile içerisine kadar indirgenmiştir. Bu çatışma sonucunda ise yok olan, kaybolan aileler işlenmiştir<sup>22</sup>.

Aile, yazarın hemen hemen her eserinde işlediği bir tema olarak karşımıza çıkmaktadır. Yazar eserlerinde aile temasını işlerken gelenek ve modernizm çatışması üzerine sık sık durmuştur. Bu temayı yazarın yedinci kitabı olan *Hışırta* adlı eserinde de görmekteyiz. *Hışırta* adlı hikâye kitabı incelendiği zaman kadının ön planda olduğu bir eserle karşılaşılır. Eserde aşk, ihtiras, evlilik konularının yanında ailelerdeki boşanmaların ana nedeni olarak modernizm çatışması sonrasındaki mutsuzluklar, yetinemeyişler ve ihtiraslar sonrası yıkılan yuvalar işlenmektedir.

<sup>19</sup> Ramazan Kaplan, “Çözülme Veya Ailedeki Yangın”, *Işıyan Kelimeler* (Hazırlayan: Âlim Kahraman), Kaknüs Yayınları, İstanbul 2007, s.269

<sup>20</sup>Rasim Özdenören. *Çarpılmışlar*, İz Yayıncılık, İstanbul 1998, S.25-27.

<sup>21</sup> Mehmet Nezir Eryarsoy. . *Gül yetiştiren adam*, İlke Yayınları, İstanbul 2009, s.129-177.

<sup>22</sup> Rasim Özdenören *Çok Sesli Bir Ölüm*, İz Yayıncılık, İstanbul 1998, S.27-29.

Eserdeki hikâyelerde kadın, ana tema olarak işlenmektedir. Kadına toplumsal baskı özellikle mutsuz evliliklerde, boşanmalarda kadınların yaşadığı toplumsal tepkimeler, çocuklarıyla yaşamış oldukları zorlukları, modern yaşamın çarklarına uymuş, buna uygun yaşayan, gününü gün eden kadınları, bu kadınların imkânsız aşklarını kadınların gözünden anlatan yazar, ara sırada işlemiş olduğu konulara eleştirel bir biçimde yaklaşır<sup>23</sup>.

Yazarın, eserlerini kaleme alırken, kendi ailesi temelli bir anlatı oluşturmadığı, bağımsız bir anlatı tekniği kullandığı eserleri incelendiği zaman ortaya çıkmaktadır. *Hışırta* adlı eserinde kadın temasının işlenmesi diğer eserlerinde erkek temasının kullanılmasından kaynaklanmaktadır. Nitekim diğer eserlerinde baba-oğul çatışması yahut babanın biraz uzak bir kişilik olarak işlenmesi *Hışırta* adlı eserini diğer hikâyelerinden ayırmaktadır. Yazarın dil, üslub ve biçem olarak mükemmel bir akış sergilediği görülmektedir. Hikayeler ağır bir havada başlayarak çatışmaların yaşandığı bir arenaya dönüşmektedir.

## SONUÇ

Rasim Özdenören kaleme aldığı eserlerinde gelenek ve bunun doğuşunu, toplum hayatına olan katkılarını okuyucuya aktaran ender hikâyecilerimizdendir. Ait olduğu dönem içerisinde geleneklerin hali hazırda canlılığını koruyor olması; yazarın, gerek ailesi gerekse çevresinden almış olduğu bilgi birikimi ile harmanlanarak, Türk edebiyatına zengin eserler vermesinde yardımcı olmuştur.

Özdenören'in hikâyeleri incelendiği zaman bazı karakterlerin diğerlerinden bir tık daha önde olduğu söylenebilir. Burada baba karakteri ağırlık kazanırken, olumsuz baba tipi, her soruna olumlu yaklaşan ve aile içerisindeki dengeyi sağlayan bir anne tipi karşımıza çıkmaktadır. Özdenören'in hikâyelerinde kadınlar 'sevgili' konumunda daha çok sınav aracı olarak analiz edilmektedir. Bilhassa tasavvuf temalı hikâyeleri için bu durum geçerlidir. Hikâyelerinde evin kız çocukları; ekseriyetle şanssızdırlar, yahut bedensel olarak engellilerdir. Bir başka talihsizlikleri ise başlarından geçen kötü bir evlilik yapmış tiplerdir. *Çarpılmışlar* adlı hikâyede ise bu kez alışılmış baba-oğul çatışması, yerini baba-kız çatışması olarak göze çarpmaktadır. Rasim Özdenören'in öykülerinde en dikkat çekici özelliklerin başında hikâye kahramanlarının duruşları ön plandadır. Kahramanlar, yetişme şartlarına, içinde buldukları ortama, mensup oldukları kuşağa ve kültürel etkilere göre bir durum alış sergiler.

<sup>23</sup> Eyüp Güneş- Mustafa Karabulut, *Rasim Özdenören'in Hikâyelerinde Gelenek-Modernizm Çatışması*, s.1294.





Sonuç olarak kahramanlar, kendileri için biçilmiş rolü yaşayan karakterlerdir. Yazarın hikâyelerinde karamsar anlatı metodu aktarılması, öykü kişilerinin genellikle umutsuz ve olumsuz tipler olmasından kaynaklanmaktadır. Özdenören, amacının hiçbir zaman öykü üzerinden mesaj vermek olmadığını ısrarla vurgulamıştır. Öte yandan öykülerin yansıttığı tarihsel ve sosyal gerçeklik de göz ardı edilmemelidir. Esasen bu tavır yazarın gerçekçi yaklaşımının bir yorumudur. Özdenören, ideal öykü kişileri çizmemiştir. Eserlerde genel olarak geçmiş ve gelecek çatışması, bunun aile üzerindeki etkileri üzerinde durulmuştur. Nitekim eserlerindeki çatışma, kuşak yahut geçmişteki geleneksel adetler ile modern zamanların aile düzenine ayak uyduramaması ve bunun için hırs boyutunda ait olunmayan bir sisteme adapte olunmak istemesi, aile mefhumun dağılmasına kadar giden olumsuz durumların okuyucuya ustalıkla aktarımı yapılmıştır.

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**VERGİ ORANLARI İLE VERGİ GELİRLERİ ARASINDAKİ İLİŞKİNİN LAFFER EĞRİSİ AÇISINDAN DEĞERLENDİRİLMESİ: TÜRKİYE ÖRNEĞİ**

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**ÖZET**

1970'lerin ekonomik sorunlarına alternatif bir çözüm getirebilmek için ABD'de ortaya çıkan ve vergi indirimlerine dayanan arz yönlü ekonomi politikası birçok ülkede uygulanmıştır. Arthur Laffer, vergi oranlarındaki indirimlerin vergi gelirlerini artırırken, vergi oranlarındaki artışların vergi gelirlerini azaltacağı görüşünü dile getirmiştir. Bu fikir daha sonra Laffer eğrisi olarak tanımlanmıştır. Laffer etkisi halen tartışmalı konulardan biri olmasına rağmen, farklı ekonomiler için farklı dönemlerde test edilmiş ve genel olarak Laffer'ın görüşlerini destekleyen sonuçlara ulaşılmıştır. Bu çalışmanın amacı, Türkiye'nin 1980-2020 dönemi için Laffer eğrisini tahmin etmektir. 1980 yılının seçilmesinin nedeni, 1980 sonrası ekonomik yapıdaki değişimlere paralel olarak vergi sisteminde de kapsamlı değişikliklerin yapıldığı bir dönem olmasıdır.

**Anahtar Kelimeler:** ARDL, Laffer Eğrisi, Yaklaşım Vergi Oranları, Vergi Gelirleri, Türkiye

**EVALUATION OF THE RELATIONSHIP BETWEEN TAX RATES AND TAX REVENUES IN ACCORDANCE WITH THE LAFFER CURVE: THE CASE OF TURKEY**

**ABSTRACT**

In order to bring an alternative solution to the economic problems of the 1970s, the supply-side economic policy, which emerged in the USA and was based on tax reductions, was implemented in many countries. Arthur Laffer expressed the view that while tax rate cuts increase tax revenues, increases in tax rates will decrease tax revenues. This idea was later described as the Laffer curve. Although the Laffer effect is still one of the controversial issues, it has been tested for different economies in different periods and generally, results supporting Laffer's views have been reached. The aim of this study is to estimate Turkey's Laffer curve for the period 1980-2020. The reason for choosing the year 1980 is that it was a period in which extensive changes were made in the tax system in parallel with the changes in the economic structure after 1980.

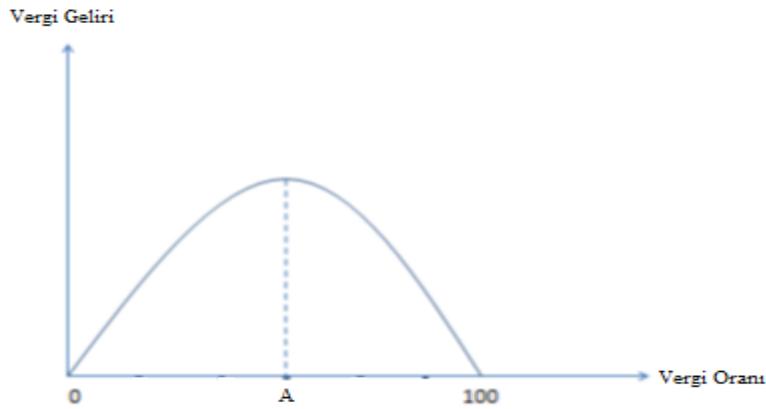
**Keywords:** ARDL, Laffer Curve, Approach Tax Rates, Tax Revenues, Turkey

## GİRİŞ

1970’li yıllarda Keynesyen iktisadın talep yönlü bakış açısına getirilen eleştiriler sonucu ekonomide Arz yanlı iktisadın görüşleri özellikle ABD’de etki alanı bulmuştur. 1980’li yıllardan itibaren daha çok vergi indirimleri politikasına ağırlık veren arz yanlı iktisat politikaları uygulanmaya başlanmıştır. Keynesyen iktisadın sorunlarına çözüm olarak Amerikalı iktisatçı A. Laffer vergi indirimlerini önermiş ve vergi indirimleri sonucu toplam piyasa üretiminin ve toplam vergi gelirlerinin artacağını savunmuştur. Diğer bir deyişle Laffer vergi oranlarında yapılan indirimin vergi gelirlerini azaltmayacağını aksine arttıracığını iddia etmiştir. Laffer’in vergi oranları ile vergi gelirleri arasındaki ilişkiyi farklı dönemlerde farklı ülkeleri ele alarak oluşturduğu hipoteze Laffer Eğrisi denilmektedir. Ancak vergi oranları ile vergi gelirleri arasındaki ilişkiyi ilk defa ele alan kişi 14. yüzyılda İbni Haldun’dur.

İbni Haldun Mukaddime adlı eserinde konuyu ele alarak toplumlar oluşurken küçük matrahlar karşılığında alınan vergilerin yüksek vergi gelirleri sağladığını bununla birlikte toplumlar genişleyince büyük matrahlı vergilere karşılık düşük vergi gelirleri elde edildiğini belirtmiştir (Khalidun, 1981:230).

Bu çalışmanın amacı 1980-2020 dönemi itibariyle Türkiye için vergi gelirleri ve vergi oranları arasındaki ilişkiyi Laffer Eğrisi ile tahmin ederek Türkiye’de uygulanan vergi politikalarının etkinliğinin değerlendirilmesidir. Bu doğrultuda çalışmanın birinci bölümünde literatürde vergi gelirleri ile vergi oranları ilişkisini ele alan çalışmalar özetlenmiş, ikinci bölümünde ekonometrik yöntemle değişkenler arasındaki ilişki analiz edilmiştir. Üçüncü bölümde de analiz sonucu elde edilen ampirik sonuçlar uygulanan politikalar çerçevesinde değerlendirilerek yorumlanmış ve politika önerilerinde bulunulmuştur.



Şekil 1: Laffer Eğrisi

Hükümetler daha düşük bir vergi oranı ile aynı vergi gelirini elde etmeleri mümkün olduğu için uzun dönemde A noktasının sağ tarafında faaliyette bulunmak istemeyeceklerdir. Bununla birlikte Laffer eğrisi tek başına vergi oranlarındaki indirimin vergi gelirlerini arttıracakını ya da azaltacağını anlatmamaktadır. Çünkü vergi gelirlerinin vergi oranındaki değişime tepkisi dikkate alınan zaman dilimine, mevcut vergi sistemine, mevcut vergi oranlarının düzeyine, kayıt dışı ekonomiye kayma kolaylığına ve üretim faktörlerinin eğilimlerine bağlıdır. Eğer mevcut vergi oranı çok yüksek ise vergi oranı indiriminin iktisadi etkisi aritmetik etkisine bağlı olarak vergi gelirlerini arttıracaktır (Bilgin, 2018:87).

Laffer'in Laffer eğrisi ile ilgili ortaya koyduğu ulusal ve uluslararası literatürde farklı dönemler ve farklı veri setleriyle çeşitli ülke ekonomileri için test edilmiştir.

Vergi gelirleri ile vergi oranları arasındaki ilişkiyi açıklayan Laffer Eğrisi, bireylerin vergi sonrası karlarının artması durumunda daha çok çalışacakları; firmaların ve girişimcilerin de vergi sonrası karlarının artması durumunda daha çok yatırım yapacakları varsayımına dayanmaktadır (Kurt, 2017:9).

## LİTERATÜR TARAMASI

**Tablo 1.1:** Laffer Eğrisine Yönelik Literatür Taraması

Yazar	Veri Seti	Yöntem	Sonuçlar
Beenstock (1979)	1946-1977	Sıradan En Küçük Kareler (SEK)	Analiz sonuçlarına göre İngiltere Laffer Eğrisinin normal bölgesindedir. İngiltere için optimal vergi oranı %60'tır.
Moldoff (1980)	1954-1978	Sıradan En Küçük Kareler (SEK)	Amerika için çan şeklide bir eğri elde edilememiştir. Vergi oranları ve vergi gelirleri reel olarak artmakla beraber enflasyondan dolayı bireyler daha yüksek vergi dilimlerine itilmekte bu yolla da vergi gelirleri yükselmektedir.
Blinder (1981)	-	Teorik	Blinder, Laffer eğrisinin matematiksel olduğunu bu nedenle de Laffer eğrisinin faktör esnekliklerine bağlı olarak uygulanabileceğini ileri sürmüştür. Esneklikler arttıkça vergi gelirleri maksimum olacak vergi oranları daha düşük olacaktır.
Fullerton (1982)	-	Simülasyon	Amerika Laffer eğrisinin sağ tarafında diğer bir deyişle caydırıcı bölgesinde yer almaktadır.
Derdiyok (1993)	1960-1988	Sıradan En Küçük Kareler (SEK)	Çalışmada iki model kurulmuştur. Her iki modelin sonuçlarına göre de Türkiye'de yönetimler eğrinin normal bölgesindedir.
Yamak ve Yamak (1995)	1960-1990	Sıradan En Küçük Kareler (SEK)	Türkiye için Laffer eğrisini dolaylı vergiler, dolaysız vergiler ve toplam vergiler için tahmin etmişlerdir. Dolaylı vergiler açısından 1963-1977 döneminde ve toplam vergiler açısından 1971-1973 ve 1975-1981 dönemlerinde

			Türkiye eğrinin caydırıcı bölgesinde faaliyette bulunmuştur.
Yamak (1996)	1960-1993	Sıradan En Küçük Kareler (SEK) Ve Kalman-Filtre	Analiz sonuçlarına göre uygulanan ortalama vergi oranı açısından vergi yönetimlerinin Laffer eğrisinin caydırıcı ya da normal bölgesinde olup olmadığı tam olarak belirlenememiştir.
Doğan (2002)	1979-2000	Sıradan En Küçük Kareler (SEK)	Türkiye dolaysız vergiler açısından eğrinin solunda yer alırken, toplam vergi gelirleri açısından eğrinin sağ tarafında yer almaktadır.
Karabulut (2006)	1980-2003	Sıradan En Küçük Kareler (SEK)	Türkiye 1997 yılına kadar eğrinin sol tarafında yer alırken, bu yıldan itibaren eğrinin sağ tarafındadır.
Erinç (2009)	1982-2008	Sıradan En Küçük Kareler (SEK)	Toplam vergi gelirleri için Laffer eğrisi yoktur.
Kurt (2017)	2004-2015	Sıradan En Küçük Kareler (SEK) Ve Hodrick-Prescott Filtreleme	
Bilgin (2018)	1982-2016	Sıradan En Küçük Kareler (SEK)	

Beenstock (1979), 1946-1977 dönemi yıllık verileri ile Laffer eğrisini İngiltere ekonomisi için sıradan en küçük kareler yöntemi (SEK) ile ortaya koymaya çalışmıştır. Vergi gelirleri olarak “merkezi yönetimin gelir ve harcamalar üzerinden alınan vergiler + milli sigorta katılım payları + yerel yönetim payları” toplamını almıştır. Vergi oranını ise vergi gelirlerinin GSYH’ya oranı şeklinde hesaplamıştır. Analiz sonuçlarına göre İngiltere için optimal vergi oranı %60’tır.

Moldoff (1980), Beenstock’un 1979 yılındaki çalışmasını 1954-1978 dönemi çeyrek verileri kullanarak ABD için SEK yöntemi ile gerçekleştirmiştir. Enflasyonun kişileri daha yüksek bir vergi dilimine ittiğini belirterek vergi gelirleri ve vergi oranı arasındaki ilişkiyi hem cari hem de sabit fiyatlarla ele almıştır. Analiz sonucunda ABD için vergi gelirleri ile vergi oranları için Laffer eğrisi şeklinde bir eğri elde edilememiştir.

Derdiyok (1993) Türkiye’de vergi gelirleri ile vergi oranları arasındaki ilişkiyi 1960-1988 dönemi yıllık verileri ile tahmin etmiştir. Tahmin tekniği olarak SEK kullanmıştır. Analiz

sonuçlarına göre 1988 yılında %27,95 ile zirve yapmıştır. Türkiye Laffer eğrisinin normal bölgesinde yer almaktadır.

Doğan (2002) Laffer eğrisini 1979-2000 dönemi için Beenstock'un İngiltere için Türkiye için tahmin etmiştir. Çalışmada iki ayrı model kurulmuştur. İlk modelde dolaysız vergi gelirlerini, ikinci modelde ise toplam vergi gelirlerini ele almıştır. Analiz sonuçlarına göre Türkiye 2000 yılında dolaysız vergiler açısından eğrinin solunda yer alırken, toplam vergi gelirleri açısından eğrinin sağ tarafında yer almaktadır.

Kurt (2017), Türkiye ekonomisi için Laffer eğrisini 2004:Q1-2015:Q2 dönemi verilerini kullanarak Sıradan En Küçük Kareler (SEK) tahmin etmiştir. Çalışmada olası bir sahte regresyon ve çoklu bağıntı sorununu kaldırmak amacıyla Hodrick-Prescott Filtreleme yöntemi kullanılmıştır. Analiz sonuçlarına göre 2015:Q2'de optimal vergi oranları sırasıyla %25.3, %16.7 ve %9.06'dır.

Bilgin (2018), Türkiye için 1982-2016 dönemi verilerini kullanarak Laffer eğrisini Beenstock'un öne sürdüğü statik, dinamik ve GSYİH'nin gecikmesini içeren 3 farklı model ile tahmin etmiştir. Dinamik modele uygulanan analiz sonuçlarına göre 1982-1999 yılları arası ve 2003-2010 arası Laffer eğrisinin normal alanını göstermektedir. Diğer modelin analiz sonuçlarına göre ise 1982-2010 döneminde Türkiye Laffer eğrisinin normal bölgesinde yer almaktadır. Bu dönemde vergi oranındaki artışlar vergi gelirlerini arttırmaktadır.

### **EKONOMETRİK MODEL**

Çalışmada Laffer Eğrisinin etkisini ölçebilmek adına 1980 ile 2020 yılları arasında vergi gelirleri ile vergi oranı verileri kullanılarak zaman serisi analizlerinden faydalanılmıştır. 1980-2020 yılları arasındaki vergi gelirleri verisi OECD DATA BASE, Dünya Bankası ve Hazine Maliye Bakanlığı veri setlerinden alınmıştır. GSYH verisi Türkiye İstatistik Kurumu (TÜİK), TEFE-TÜFE verisi Türkiye Cumhuriyet Merkez Bankası Elektronik Veri Dağıtım Sistemi (EVDS)'den alınmıştır. Vergi geliri verisi TEFE verisi ile reelleştirilmiştir. Vergi oranı verisi ise reel vergi geliri verisinin GSYH ile bölünmesiyle oluşturulmuştur.

Çalışmada Eviews 10 paket programından yararlanılarak ARDL Sınır Testi yaklaşımıyla eşbütünleşme ilişkisi tespit edilmiş, devamında uzun ve kısa dönemli etkiler ortaya konmaya çalışılmıştır.

Çalışmanın matematiksel kalıbı Eşitlik 3.1'deki şekilde kurulmuştur.

$$RVergiGeliri_t = \beta_0 + \beta_1 Trend + \beta_2 RVergiOranı_t + \varepsilon_t \quad (3.1)$$



Değişkenlerin durağanlığı Genişletilmiş Dickey-Fuller (ADF) testiyle, değişkenler arası eşbütünleşmenin varlığı ise ARDL sınır testi yaklaşımıyla incelenecektir.

Durağan olmayan veri setlerinde çıkan sonuçlar yanıltıcı olabilmektedir. Zaman serilerinde durağanlık testlerinde serinin ortalaması ve varyansına dikkat edilir. Eğer ortalama ve varyans iki dönem arasındaki uzaklığa bağlı kalıyorsa durağandır. Bu durum zayıf durağanlık olarak tanımlanmaktadır (Gujarati, Porter, Şenesen & Günlük. 2012, s. 740). Bir  $Y_t$  zaman serisi için aşağıdaki gibidir;

$$E(Y_t) = \mu \quad (3.2)$$

$$var(Y_t) = E(Y_t - \mu)^2 = \sigma^2 \quad (3.3)$$

$$Y_k = E[(Y_t - \mu)(Y_{t+k} - \mu)] \quad (3.4)$$

Burada  $Y_k$  ile ifade edilen değişken  $k$  gecikmedeki ardışık ortak varyansı yani  $Y_t$  ile  $Y_{t+k}$  arasındaki farkın ortak varyansını göstermektedir.

Dickey-Fuller (1979) birim kök testine ilave olarak bağımlı değişkenin gecikmeli değerlerinin de eklenmesiyle oluşturulan Genişletilmiş Dickey-Fuller (1981) birim kök testinde hata terimlerde otokorelasyon problemi olduğunda da birim kök testi uygulanabilmektedir.

*Sabitli*

$$\triangleright \Delta Y_t = \alpha_1 Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \varepsilon_t \quad (3.5)$$

*Sabitli*

$$\triangleright \Delta Y_t = \mu + \alpha_1 Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \varepsilon_t \quad (3.6)$$

*Trendli*

$$\triangleright \Delta Y_t = \mu + \alpha_1 Y_{t-1} + a_2 t + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \varepsilon_t \quad (3.7)$$

ADF birim kök testinin sıfır hipotezi seri “birim kök içerir” şeklinde kurulmuştur. Bu nedenle yapılan testler sonucunda olasılık değerlerinin %1-%5 ve %10 anlamlılık düzeylerinin altında çıkması boş hipotezi reddetmemize; serilerin birim kök içermediği sonucuna ulaşılmaktadır. ADF birim kök testi sonuçları Tablo 3.1’de verilmiştir.

**Tablo 0.1:** Genişletilmiş Dickey-Fuller Birim Kök Test Sonuçları

<b><u>DÜZEYDE</u></b>						
	<b>SABİTLİ</b>		<b>SABİTLİ - TRENDLİ</b>		<b>SABİTSİZ</b>	
	<i>T-statistic</i>	<i>Prob.</i>	<i>T-statistic</i>	<i>Prob.</i>	<i>T-statistic</i>	<i>Prob.</i>
<b>VERGİ GELİRİ</b>	0.458936	0.9830	-2.230315	0.4603	3.403050	0.9997
<b>VERGİ ORANI</b>	-2.631614	0.0954	-2.517843	0.3183	-0.977112	0.2884
<b><u>BİRİNCİ DERECE FARKI ALINDIĞINDA</u></b>						
	<b>SABİTLİ</b>		<b>SABİTLİ – TRENDLİ</b>		<b>SABİTSİZ</b>	
	<i>T-statistic</i>	<i>Prob.</i>	<i>T-statistic</i>	<i>Prob.</i>	<i>T-statistic</i>	<i>Prob.</i>
<b>VERGİ GELİRİ</b>	-5.075676	0.0002	-5.111867	0.0009	-3.946297	0.0002
<b>VERGİ ORANI</b>	-9.462900	0.0000	-9.849056	0.0000	-9.409342	0.0000

Tablo 3.1’de görüldüğü üzere vergi geliri verisi Sabitli, Trendli ve Sabitsiz modellerde %10 istatistiksel anlamlılık düzeyinde durağan olmadığı görülmüştür. Vergi oranı ise sadece sabitli modelde %10 anlamlılık düzeyinde durağandır. Ancak %5 ve %1 istatistiksel anlamlılık düzeyinde durağan olmadığı görülmektedir.

Her iki veri de birinci derece farkları alındığında %1 istatistiksel anlamlılık düzeyinde dahi sıfır hipotezi reddederek durağan olduğu sonucuna ulaşılmaktadır.

Çalışmada değişkenlerin  $I(1)$ ’den büyük olmamak kaydıyla farklı derecelerde durağanlaştığı görülmektedir. Bu nedenle, ARDL sınır testi yöntemi ile eşbütünleşme ilişkisinin aranması gerekmektedir. Akaike bilgi kriterlerine göre uygun ARDL modeli, ARDL(5,4) şeklinde tahmin edilmiştir. Eşbütünleşme ilişkisinin olup olmadığının tespitinde kullanılan ARDL sınır testi sonuçları Tablo 3.2’te verilmiştir.

**Tablo 0.2: Eşbütünlük Testi (F Bound Test)**

<b>F Bound Test</b>		Sıfır Hipotez: Eşbütünlük Yok		
<b>k</b>	<b>F İstatistiği</b>	<b>Önem Seviyesi</b>	<b>Alt Sınır</b>	<b>Üst Sınır</b>
		10%	4.05	4.49
<b>1</b>	<b>8.129408</b>	5%	4.68	5.15
		2,5%	5.3	5.83
		1%	6.1	6.73

F İstatistik değeri kritik değerlerin üzerinde ise eşbütünlüğün olduğu, kritik değerlerin altında ise eşbütünlüğün olmadığı sonucuna ulaşılmaktadır. F-İstatistik değeri (8.129408) tüm kritik değerlerin üzerinde olduğu, modelde eşbütünlük olmadığını ifade eden sıfır hipotez reddedilerek değişkenler arası eşbütünlük olduğu görülmüştür.

Eşbütünlüğün olduğu görülen modelde kısa ve uzun dönemli tahminler yapılabilmektedir. Hesaplanan uzun dönemli ilişki Tablo 3.3'de gösterilmiştir.

**Tablo 0.3: Uzun Dönem Katsayıları**

<b>Değişken</b>	<b>Katsayı</b>	<b>Standart Hata</b>	<b>t-İstatistiği</b>	<b>Olasılık Değeri</b>
<b>C</b>	-2.226280	4.986953	-4.464208	0.0002
<b>@Trend</b>	1.217859	2.511392	4.849340	0.0001
<b>RVergiGelir(-1)</b>	-0.955154	0.198003	-4.823936	0.0001
<b>VergiOran(-1)</b>	1.085160	2.445657	4.441180	0.0002
<b>D(RVergiGelir(-1))</b>	0.306625	0.170158	1.802006	0.0847
<b>D(RVergiGelir(-2))</b>	0.142240	0.178779	0.795619	0.4344
<b>D(RVergiGelir(-3))</b>	-0.152109	0.178956	-0.849978	0.4041
<b>D(RVergiGelir(-4))</b>	-0.294431	0.167713	-1.755561	0.0925
<b>D(VergiOran)</b>	4.708826	2.002511	2.351461	0.0276
<b>D(VergiOran(-1))</b>	-8.531527	2.550691	-3.344791	0.0028
<b>D(VergiOran(-2))</b>	-7.930541	2.489851	-3.185147	0.0041
<b>D(VergiOran(-3))</b>	-3.890021	2.029008	-1.917203	0.0677

Tablo 3.3'de ARDL uzun dönem sonuçları verilmektedir. Elde edilen bulgulara göre vergi oranındaki değişim aynı dönem içerisinde etkisi literatüre ters bir şekilde pozitif etkilemekte ve istatistiksel olarak anlamlıdır.

Ancak vergi oranlarındaki tüm gecikmeler istatistiksel olarak anlamlı olmakla birlikte literatür uygun bir şekilde vergi gelirlerini negatif etkilemektedir. Bu negatif etkinin dönem geçtikçe azaldığı görülmektedir.

Elde edilen bulgulara göre, vergi oranlarının vergi gelirlerini etkisi istatistiksel olarak anlamlıdır. Buna göre vergi oranlarındaki %1’lik bir değişim vergi gelirlerini %8 oranında ters yönde etkilemektedir.

Bir sonraki gecikme ele alındığında ise istatistiksel olarak anlamlı olan sonuçlara göre vergi oranlarındaki %1’lik bir artış vergi gelirlerini %7 oranında azaltmaktadır. Bu etki 3. gecikmede ise daha da azalmaktadır ve vergi oranlarındaki %1’lik bir değişim vergi gelirlerini %3 oranında negatif yönde etkilemektedir.

### Hata Düzeltme Modeli

Modelimizde değişkenler arasındaki kısa dönem ilişkinin analizinde ARDL hata düzeltme modeli kullanılmıştır. Model Eşitlik 3.8’deki gibidir:

$$\Delta \text{Vergi Geliri} = c + \sum_{i=1}^k \beta_i \Delta \text{VergiOran}_{t-i} + \tau_i \text{CointEq}_{t-1} + \varepsilon_t \quad (3.8)$$

Eşitlik 3.8’de yer alan “c” modeldeki sabit terimi, CointEq ise hata düzeltme terimini temsil etmektedir. Modelde gecikmeli değişkenlerin sayısı “k”, gecikme sayısı ise “i” olarak gösterilmektedir. Kısa dönem katsayıları ise Tablo 3.4’de gösterilmiştir.

**Tablo 0.4:** Kısa Dönem Katsayıları

<u>Değişken</u>	<u>Katsayı</u>	<u>Standart Hata</u>	<u>t-İstatistiği</u>	<u>Olasılık Değeri</u>
<u>C</u>	-2.104494	4.389036	-4.794888	0.0001
<u>D(RVergiGelir(-1))</u>	0.306625	0.153821	1.993385	0.0582
<u>D(RVergiGelir(-2))</u>	0.1422401	0.155106	0.917050	0.3686
<u>D(RVergiGelir(-3))</u>	-0.152109	0.154337	-0.985565	0.3346
<u>D(RVergiGelir(-4))</u>	-0.294431	0.150495	-1.956421	0.0627
<u>D(VergiOran)</u>	4.708826	1.581343	2.977739	0.0067
<u>D(VergiOran(-1))</u>	-8.531527	2.394063	-3.563619	0.0017
<u>D(VergiOran(-2))</u>	-7.930541	2.380647	-3.331255	0.0029
<u>D(VergiOran(-3))</u>	-3.890021	1.944187	-2.000847	0.0573
<u>CointEq(-1)</u>	-0.955154	0.185514	-5.148683	0.0000

Hata düzeltme modelinde, hata düzeltme katsayısı olarak adlandırılan CointEq (-1) katsayısının negatif ve anlamlı olması beklenmektedir. Hata düzeltme katsayısının anlamlı ve negatif olması değişkenlerin uzun dönem ilişkisinden sapmanın sonraki dönemlerde yeniden dengeye geleceği anlamına gelmektedir. Tablo 3.4’deki değer incelendiğinde CointEq (-1) katsayısı (-)0.955154

ve %1 önem seviyesinde dahi istatistiksel olarak anlamlı olduğu görülmektedir. Yani uzun dönem dengesinden sapmalar yaşandığında yaklaşık 1 yılda tekrar dengeye gelmektedir. Diğer bir ifade ile uzun dönem dengede meydana gelen sapmanın %95,51'i bir sonraki dönemde dengeye gelmektedir.

Vergi oranlarındaki değişimin vergi gelirlerine olan etkiye bakıldığında kısa dönemli modelde de uzun dönem ile paralel ve yakın seyrettiği görülmektedir.

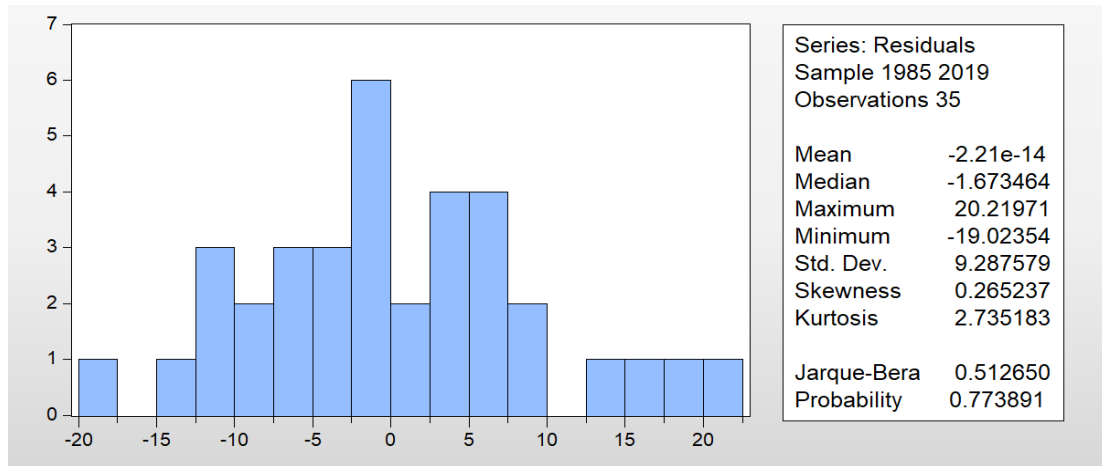
Vergi oranlarındaki değişim seviyesinde vergi gelirlerini pozitif etkilediği ve %1 önem seviyesinde ise istatistiksel olarak anlamlıdır.

Vergi oranlarındaki gecikmeler ise yine uzun dönemde olduğu gibi vergi gelirlerini aynı doğrultuda negatif etkilemektedir. Vergi oranlarının birinci gecikmesine bakıldığında vergi oranlarındaki yukarı yönlü bir değişim vergi gelirlerini ters yönde etkilemektedir.

Aynı durum diğer iki gecikmede de geçerli olup ikinci gecikme %1 üçüncü gecikme ise %10 istatistiksel önem seviyesinde anlamlı olup vergi gelirleri üzerinde ters yönlü ilişkisi bulunmaktadır.

### **Model Varsayımları**

Modelin güvenilirliğini sorgulamak amacıyla aranan varsayımlardan birisi normallik testidir. Normallik sınaması Jarque-Bera test istatistiği ile belirlenmiş ve sonuç Şekil 3.1'de gösterilmiştir.



**Şekil 0.1** Normallik Testi (Jarque-Bera)

Şekil 3.1'de de görüldüğü üzere olasılık değerinin 0.05 anlamlılık düzeyinden büyük olması "hata terimleri normal dağılmaktadır" şeklinde belirlenen sıfır hipotezi reddedememektedir. Hata terimlerinin normal dağılım koşulunu sağladığı sonucuna ulaşılmıştır.

Bir diğer varsayım ise sıfır hipotezin “otokorelasyon yoktur” şeklinde kurulduğu otokorelasyon testidir. Tablo 3.5’de otokorelasyon testi sonuçları gösterilmiştir.

**Tablo 0.5:** Breusch-Godfrey Serial Correlation LM Test Sonuçları

<b>F-İstatistiği</b>	<b>0.774527</b>	<b>Olasılık F(2, 21)</b>	<b>0.4736</b>
<b>R2</b>	2.404396	<b>Olasılık, Ki-Kare(2)</b>	0.3005

Tablo 3.5’de görüleceği gibi olasılık değeri %10 istatistiksel anlamlılık düzeyinde dahi “Otokorelasyon Yoktur” şeklinde kurulan sıfır hipotezi sınamakta ve reddedilememektedir. Bu sonuç ile tahmin edilen modelde otokorelasyon sorununun olmadığına karar verilmiştir.

Değişen varyans sorununu ise Breusch-Pagan-Godfrey değişen varyans testi uygulanarak incelenmiştir. Test sonuçları Tablo 3.6’da verilmiştir.

**Tablo 0.6:** Breusch-Pagan-Godfrey Değişen Varyans Testi

<b>F-İstatistiği</b>	<b>0.475497</b>	<b>Olasılık F(32, 20)</b>	<b>0.9706</b>
<b>R2</b>	22.89996	<b>Olasılık, Ki-Kare(32)</b>	0.8814

Breusch-Pagan-Godfrey değişen varyans testinde boş hipotez olasılık değerinin 0.05 istatistiksel anlamlılık düzeyinden büyük olması halinde değişen varyans sorununun olmadığı yönünde kurulmuştur. %10 istatistiksel anlamlılık düzeyinde dahi sıfır hipotez reddedilemediğinden hata teriminde değişen varyans sorunu gözlemlenmediği ortaya konulmuştur.

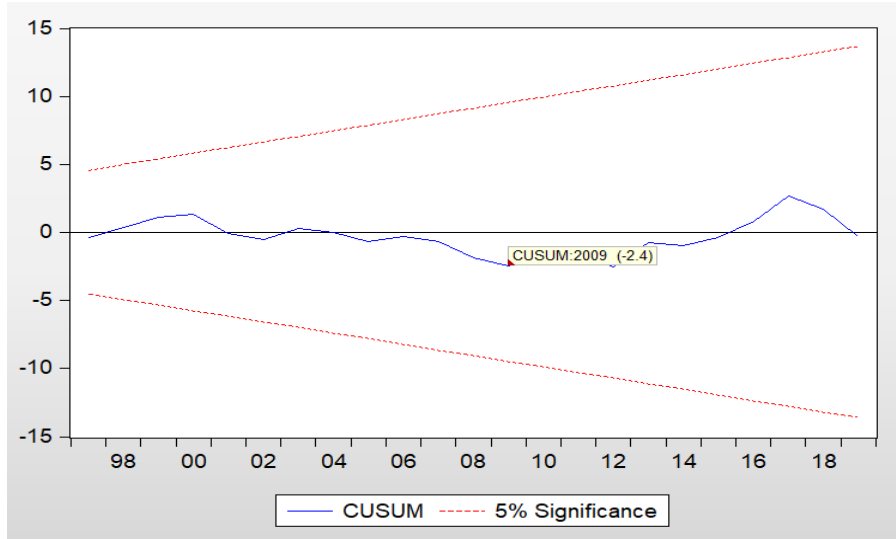
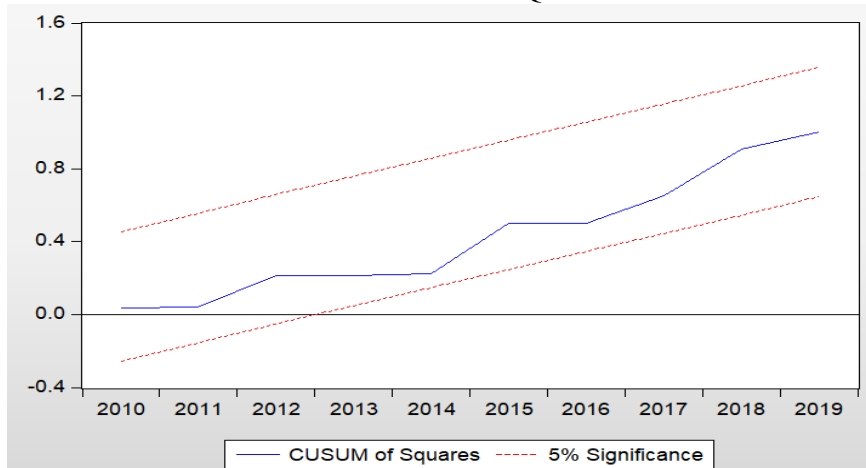
Modelin matematiksel kalıbını doğru seçilip seçilmediği Ramsey Reset testi ile belirlenmektedir. Test sonuçlarının 0.05 istatistiksel anlamlılık seviyesinden büyük çıkması “modelin matematiksel kalıbı doğru seçilmiştir” şeklindeki sıfır hipotezi reddedilememektedir. Ramsey reset test bulguları Tablo 3.7’de verilmiştir.

**Tablo 0.7: Ramsey Reset Testi**

	Değer	SD	Olasılık
<b>t-İstatistik</b>	0.993311	22	0.3314
<b>F-İstatistik</b>	0.986668	(1, 22)	0.3314

Tablo 3.7’de yer alan olasılık değerlerine bakıldığında %10 istatistiksel anlamlılık düzeyinde dahi sıfır hipotez reddedilememektedir. Bu durum modele eklenen üssel değişkenlerin bağımlı değişken üzerinde etkisi olmadığı ve matematiksel kalıbının doğru formda kurulduğu kararını desteklemektedir.

Model varsayımlarından son olarak uzun dönem katsayıların istikrarlılığını belirlemek amacıyla yapılan CUSUM ve CUSUMSQ testleri Grafik 3.1 ve 3.2’de sunulmuştur.

**Grafik 0.1: CUSUM Testi**

**Grafik 0.2: CUSUMSQ Testi**


Grafik 3.1'e bakıldığında CUSUM testinde hata terimleri toplamının standart sapmaya oranının %5 kritik değerler arasında kaldığı ve sapma yapmadığı görülmektedir.

Grafik 3.2'de ise daha hassas olan CUSUMSQ testinde hata terimleri kareleri toplamı varyansının %5 kritik değer sınırlarından çıkmadığı görülmektedir. Bu durum tahmin sonuçlarının istikrarlı olduğunu göstermektedir.

## SONUÇ

İktisadi düşünceler tarihinde dönemin konjonktürel şartlarına bağlı olarak klasik ve Keynesyen iktisat temelli arz ve talep yönlü politikalar uygulanmıştır. 1929 Dünya bunalımına kadar klasik iktisadi düşüncenin arz yanlı politikaları geçerli iken bu bunalımın Klasik politikalarla aşlamaması sonrasında Keynesyen iktisadi düşüncenin talep yönlü politikaları gündeme gelmiştir. Keynesyen politikalar da 1970 petrol krizine kadar geçerli olmuş ve o dönemde yaşanan stagflasyon olgusuna talep yönlü politikalar çözüm olamamıştır. Bu süreçte arz yönlü politikalar yeniden gündeme gelmiştir. Özellikle ABD'de gelişen arz yönlü iktisadın temel aracı vergi indirimleridir. ABD'li iktisatçı A. Laffere'e göre vergi indirimleri vergi gelirlerini azaltmayacak aksine arttıracaktır. Laffer'in bu hipotezi günümüzde hala tartışılrsa da farklı ekonomiler için farklı dönemlerde test edilmiştir.

Çalışmada elde edilen bulgulara göre vergi oranındaki değişimin vergi gelirlerine etkisi literatüre ters şekilde pozitifdir. Yani vergi oranındaki bir değişim aynı dönem içerisinde vergi gelirlerini pozitif etkilemektedir ve istatistiksel olarak anlamlıdır. Bu durum vergi oranındaki değişimin bir sonraki dönemde geliri etkilemesi ile ilişkilendirilebilir. Vergi oranındaki artış nedeniyle bir sonraki döneme kalmak istemeyen mükellefler cari yıl içerisinde vergi ödemelerini tamamlamakta ve sonraki döneme aktarım yapmamaktadırlar. Bu durum da vergi gelirlerini, vergi oranının arttırıldığı cari yıl içerisinde arttırmaktadır.

Gecikmelere bakıldığında ise literatüre uygun bir şekilde vergi oranlarındaki artış vergi gelirlerini ters yönde etkilemekte ve istatistiksel olarak anlamlı olduğu görülmektedir. Vergi oranlarındaki %1'lik bir değişim vergi gelirlerini birinci gecikmede %8 oranında ters yönde etkilediği görülmektedir. Bu etkinin her bir gecikmede azaldığı gözlemlenme ve literatüre uygun olduğu görülmektedir.

Laffer eğrisine göre cari vergi oranları optimal vergi oranından yüksek ise vergi oranındaki artış karşısında vergi gelirleri artmayacaktır. Böyle bir durumda vergi gelirlerini arttırmanın yolu vergi oranlarında indirime gitmektir. Türkiye'de son yıllarda cari vergi oranları optimal vergi



oranlarını üzerinde seyretmektedir. Bu durum vergi yükünde artış demektir ki ekonomiyi ve vergi gelirlerini olumsuz yönde etkiler. Ağır vergi yükü kayıt dışı ekonomiyi teşvik edici bir unsur olarak karşımıza çıkar.

Yapılan tahmin ve analizler neticesinde Laffer eğrisinin Türkiye için çalıştığı söylenebilir. Bu durum beraberinde kayıt dışılığı da arttırmaktadır. Artan oranlar vergi gelirlerini oluşturan vergisini ödeyen kişilerin yükünü arttırmakta ancak kümülatif vergi gelirlerinde bir yükseliş olmamaktadır. Kayıt dışının kayıt altına alınması, vergi idare ve denetimini daha etkin ve işlevli bir hale getirebilmek ve vergi yükünün daha adil bir biçimde dağıtılabilmesi için Türk Vergi Sistemi üzerinde kapsamlı bir reform veya Avrupa Birliği'ne uyum sürecindeki vergi politikaları değerlendirilmeye alınmalıdır. Vergi gelirini arttırmak vergi yükünü daha adil dağıtabilmekle mümkündür.

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## **ÖĞRETMENLERİN GÖZÜNDEN ÖĞRETMENLİK MESLEK KANUNU**

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### **ÖZET**

Son dönemlerde ülkemizde eğitim alanında önemli yenilikler yapılmıştır. Bu yeniliklerin en önemlilerinden birisi eğitim sisteminin en stratejik paydaşı olan öğretmenlere yönelik çıkarılan Öğretmenlik Meslek Kanunudur. Öğretmenlik Meslek Kanunu'nun üçüncü maddesinde öğretmenlik, "Eğitim ve öğretim ile bununla ilgili yönetim görevlerini üzerine alan özel bir ihtisas mesleğidir." şeklinde tanımlanmıştır. Bu tanımdan anlaşılacağı gibi özel bir ihtisas gerektiren öğretmenlik, aday öğretmenlik sürecinden emeklilik sürecine kadar hem ekonomik hem sosyal hem de kültürel anlamda çağa ayak uyduran, öğretmene toplumsal nitelik ve statü kazandıran bir meslektir. Bu çalışmada Öğretmenlik Meslek Kanunu'nun ekonomik, sosyal, kültürel ve mesleki yeterlilik anlamında öğretmenler tarafından nasıl algılandığının ortaya konulması amaçlanmıştır. Bu amaç doğrultusunda çalışmada nitel araştırma yöntemlerinden olan durum çalışması deseni tercih edilmiştir. Çalışmanın evrenini 2022-2023 eğitim-öğretim yılında Ağrı İli Merkez İlçesi'nde görev yapan tüm öğretmenler oluşturmaktadır. Araştırmada evren içerisinden amaçlı örneklem yöntemlerinden olan maksimum çeşitlilik yöntemi kullanılarak 20 öğretmenin görüşü alınmıştır. Görüşü alınan öğretmenlerin seçiminde cinsiyet, eğitim düzeyi, branş ve görev yaptıkları okulların sosyo-ekonomik düzeylerinin farklı olmasına dikkat edilmiştir. Araştırmada yarı yapılandırılmış görüşme formu kullanılmıştır. Görüşme yoluyla toplanan verilerin çözümlenmesinde içerik analizi kullanılmıştır. İlk aşamada toplanan veriler bilgisayara aktarılarak ham veri metinleri elde edilmiştir. Daha sonra bu metinler, araştırmacı tarafından birkaç kez okunup değerlendirilmiş ve ön kodlamalar yapılmıştır. Kodların oluşturulmasında alan yazında kullanılan kavramlar ve görüşmelerden elde edilen veriler göz önünde bulundurulmuştur. Bu çalışmanın ardından, kodlar bir araya getirilerek ortak yönleri bulunmuş, böylece araştırma bulgularının ana hatlarını oluşturacak temalar belirlenmiştir.

**Anahtar kelimeler:** Öğretmen, öğretmenlik meslek kanunu

**TEACHING PROFESSIONAL LAW FROM TEACHERS' EYES****ABSTRACT**

In recent years, important innovations have been made in the field of education in our country. One of the most important of these innovations is the Teaching Profession Law, which was enacted for teachers, who are the most strategic stakeholders of the education system. In the third article of the Teaching Profession Law, teaching is a special profession that takes on education and training and related management duties. defined as. As it can be understood from this definition, teaching, which requires a special specialization, is a profession that keeps up with the times both economically, socially and culturally, from the candidate teaching process to the retirement period, and gives the teacher a social qualification and status. In this study, it is aimed to reveal how the Teaching Profession Law is perceived by teachers in terms of economic, social, cultural and professional competence. For this purpose, the case study design, which is one of the qualitative research methods, was preferred in the study. The universe of the study consists of all teachers working in the Central District of Ağrı Province in the 2021-2022 academic year. In the research, 20 teachers' opinions were taken by using the maximum diversity method, which is one of the purposeful sampling methods from the universe. In the selection of the teachers whose opinions were taken, attention was paid to the fact that gender, education level, branch and socio-economic levels of the schools they work in were different. A semi-structured interview form was used in the research. Content analysis was used to analyze the data collected through interviews. In the first stage, the collected data were transferred to the computer and raw data texts were obtained. Afterwards, these texts were read and evaluated several times by the researcher and pre-coded. In the creation of the codes, the concepts used in the literature and the data obtained from the interviews were taken into consideration. After this study, the codes were brought together and common aspects were found, so that the themes that would form the main lines of the research findings were determined.

**Keywords:** Teacher, teaching professional law

## 1. GİRİŞ

Teknolojinin hızla geliştiği ve dünyaya yön verdiği bir dönemde insanlık henüz deneyimlemediği bir dünyaya doğru yolculuk yapmaktadır. Bu yolculuk artık dünya sınırlarını aşmakta ve gelişmeler karşısında insanlığı ilerde nelerin beklediğini tahmin etmek gittikçe zorlaşmaktadır. Salgın hastalıklar, küresel ısınma, savaş ve kavgalar, hızlı nüfus artışı, finansal krizler, işsizlik, göçler, mülteci krizleri gibi toplumsal olaylar insanlığı bir bilinmezliğin içerisine doğru sokmakta ve tehdit etmektedir.

Tüm bu olumsuzluklar karşısında ülkeler toplumsal ve ekonomik kalkınma planları doğrultusunda çeşitli çalışmalar yapmakta ve başarılı olabilmek için çaba harcamaktadır. Bu planların başarıya ulaşmasında en önemli unsur ise nitelikli insan kaynağıdır. Böyle bir durumda ülkeler vatandaşlarının ekonomik ve toplumsal refahını artırma konusunda eğitime ve dolayısı ile nitelikli öğretmenlere ihtiyaç duymaktadır.

Ülkelerin toplumsal ve ekonomik kalkınma programlarında başarılı olmasındaki en önemli unsurların başında eğitim sisteminin geldiği bilinmektedir. Böyle bir durumda genç nüfus oranı fazla olan Türkiye’ de eğitim sistemi ve buna bağlı olarak öğretmenlerin niteliği çok önemlidir (Altan ve Özmuşul, 2022).

Öğretmen Yetiştirme Genel Müdürlüğü tarafından 2017 yılında yayımlanan “Öğretmen Mesleğinin Genel Yeterlilikleri” konulu çalışmada ulusal ve uluslararası uzmanlar, akademisyenler, öğretmenler, diğer katılımcılar ve paydaş görüşleri neticesinde 6 ana yeterlik alanı oluşturulmuştur. Bunlar;

- Kişisel ve mesleki değerler- mesleki gelişim,
- Öğrenciyi tanıma,
- Öğrenme ve öğretme süreci,
- Öğrenmeyi, gelişimi izleme ve değerlendirme,
- Okul, aile ve toplum ilişkileri,
- Program ve içerik bilgisidir (ÖYGM, 2017).

Dünyanın neredeyse her yerinde karşılaşılan olumsuzluklarda ilk başvuru alanı eğitimidir. Yapay zekânın ve sanal öğrenme ortamlarının kullanılmaya başladığı hatta sanal yaşam alanlarının oluşturulmaya çalışıldığı, ekonomik alışverişlerin yapıldığı bir sanal evrende toplumsal değerleri korumanın, geleceğimizi şekillendiren gençlerin milli ve manevi temellerini korumanın yolu hiç kuşkusuz ki eğitimden geçmektedir. Dolayısı ile kendisini sürekli güncel tutmaya çalışan, dijitalleşen dünyadaki hızlı değişim ve dönüşümleri yakından takip eden,

uygulamaya koyan ve bunun yanında gelecek nesillerin yetiştirilmesinde özel bir yeri olan öğretmenlere verilen önemin artırılması gerekmektedir.

Gelecek kaygısı yaşamadan maddi ve manevi sıkıntılardan sıyrılmış, toplumsal statü kazanmış, refah düzeyi yükseltilmiş mutlu bir öğretmen profili oluşturulduğunda eğitimin kalitesinin artacağı kuşkusuzdur. Bu bağlamda öğretmenlik meslek kanunu, hem ekonomik hem kültürel hem de sosyal statü açısından tatmin edici olmalıdır.

Öğretmenlik mesleği ile ilgili kamuoyunun ve eğitim paydaşlarının profesyonel bir meslek olma konusundaki düşüncelerinin sonucunda ilk olarak 2005 yılında yayınlanan yönetmelik ile öğretmenlik kariyer basamakları getirilmiş ve 2006 yılında uzman öğretmenlik sınavı yapılmıştır. Daha sonra sınavın tekrarı yapılmamış ve sonraki yıllarda yönetmelik uygulanmamıştır. 1-3 Aralık 2021 tarihinde 20. Milli Eğitim Şurası'nda tekrar gündeme gelen Öğretmenlik Meslek Kanunu, 14 Şubat 2022 tarihinde 31750 sayılı Resmi Gazete'de yayımlanarak tekrar yürürlüğe girmiştir.

Türkiye'de öğretmenlik mesleği; 1739 sayılı Milli Eğitim Temel Kanunu'nun 43.Maddesinde ve 31.12.2021 tarihinde meclise sunulan, 03.02.2022 tarihinde kabul edilen, 14.02.2022 tarihinde Resmi Gazete'de yayımlanarak yasalaşan Öğretmenlik Meslek Kanunu'nun 3.Maddesinde "Devletin eğitim, öğretim ve bununla ilgili yönetim görevlerini üzerine alan özel bir ihtisas mesleğidir." şeklinde tanımlanmıştır. Bu tanımdan anlaşılacağı gibi özel bir ihtisas gerektiren öğretmenlik, aday öğretmenlik sürecinden emeklilik sürecine kadar hem ekonomik hem sosyal hem de kültürel anlamda çağa ayak uyduran, öğretmene toplumsal nitelik ve statü kazandıran bir meslektir.

Yayımlanan Öğretmenlik Meslek Kanunu 12 maddeden oluşmaktadır. Bu kanunun 6.maddesinde öğretmenlik kariyer basamakları, uzman öğretmenlik ve başöğretmenlik olmak üzere ikiye ayrılmıştır.

Uzman öğretmenlik için;

1. Aday öğretmenlik dâhil öğretmenlikte en az on yıl hizmetin bulunması,
2. Mesleki gelişime yönelik 180 saatlik eğitimi tamamlamış olmak,
3. Mesleki gelişim alanında uzman öğretmenlik için öngörülen asgari çalışmalarını tamamlamış olmak,
4. Kademe ilerlemesi cezası bulunmamak,
5. Yazılı sınavdan 70 ve üzeri puan almak, şartlarının yerine getirilmesi gerekmektedir.

Başöğretmenlik için;

1. Uzman öğretmenlikte en az on yıllık hizmetin bulunması,

2. Mesleki gelişime yönelik 240 saatlik eğitimi tamamlamış olmak,
3. Yazılı sınavdan 70 ve üzeri puan almış olmak, şartlarının yerine getirilmesi gerekmektedir. Kanunun aynı maddesinde “*Yüksek lisans eğitimini tamamlayanlar uzman öğretmen ünvanı için öngörülen, doktora eğitimini tamamlayanlar ise başöğretmen ünvanı için öngörülen yazılı sınavdan muaf tutulur.*” ifadesi ile uzman öğretmenlik ve başöğretmenlik sınavlarından muaf olma durumu da ayrıca belirtilmiştir (ÖMK, 2022).

Kanunun 8.maddesinde ise Öğretmenlik Meslek Kanunu kapsamında, 657 sayılı Devlet Memurları Kanunu’nun 152’nci maddesi değiştirilerek uzman öğretmen ve başöğretmen unvanına sahip kişilerin, eğitim ve öğretim tazminatında artış yapılmaktadır. Uzman öğretmenlere yapılan eğitim-öğretim tazminatı %20’den %60’a çıkarılmaktadır. Aynı ödeme başöğretmenler için %40’tan %120’ye çıkarılmaktadır. Ayrıca öğretmenlerin derecelerine göre ek göstergeleri ayrıntı bir şekilde ifade edilmiştir (ÖMK, 2022).

Diğer mesleklerde olduğu gibi öğretmenlik mesleğinde de kişilerin mesleki davranışları, meslek bağlılıkları, başarılı olma durumları ve refah düzeyleri kişilerin meslekleri ile ilgili düşünceleri ile ilişkilidir. Toplumun öğretmenlik mesleğini algılama düzeyi kadar öğretmenlerin mesleklerini ve toplumsal algıyı nasıl algıladıkları da önem arz etmektedir (Altan ve Özmuşul, 2022).

Öğretmenlik mesleği toplum nezdinde “kutsal” bir meslek olarak görülmekte iken profesyonel öğretmenlik kelimesi günlük hayatta kullanılmamaktadır. Fakat bu durum öğretmenlik mesleğinin profesyonel bir meslek olduğu gerçeğini değiştirmemektedir. Kanun ve tanımlarda yer alan öğretmenlik mesleğine yönelik ifadeler mesleğe ilişkin algıların oluşması ve yerleşmesi istendik düzeyde değildir (İş ve Birel, 2022).

Bu bağlamda araştırmanın problem cümlesini oluşturan “Öğretmenlerin gözünden öğretmenlik meslek kanunu nasıl algılanmaktadır?” sorusu ile Öğretmenlik Meslek Kanunu’nun ekonomik, sosyal, kültürel ve mesleki yeterlilik anlamında öğretmenler tarafından nasıl algılandığının ortaya konulmasının literatüre katkı sağlayacağı düşünülmektedir.

### **Etik Durum**

Bu bildiri, araştırma sürecinde herhangi bir canlıdan veri elde edilmediğinden dolayı etik kurul izni gerektirmeyen araştırmalar kategorisinde yer almaktadır.

### **Araştırmanın Amacı**

Ağrı İli Merkez İlçesi’nde görev yapan öğretmenler ve yarı yapılandırılmış görüşme formundan elde edilen veriler ile sınırlı olan araştırmada, okullarda kadrolu olarak görev yapan öğretmenlerin bakış açısıyla öğretmenlik meslek kanununa ilişkin görüşlerinin belirlenmesi amaçlanmaktadır.

Bu amaç doğrultusunda “Öğretmenlerin gözünden öğretmenlik meslek kanunu nasıl algılamaktadır?” sorusu araştırmanın ana problem cümlesi olarak belirlenmiştir.

Bu çalışma ile 2022 yılında yürürlüğe giren öğretmenlik meslek kanununun öğretmenler açısından ne ifade ettiği ve ideal bir meslek kanununda neler olması gerektiğine ilişkin araştırmacılara veri sağlaması bakımından önem arz etmektedir.

Bu araştırma ile öğretmenlik meslek kanununun öğretmenlere ekonomik, sosyal, kültürel ve mesleki yeterlilik anlamında neler kazandırıldığının ortaya konulması ve sonraki süreçte olası bir kanun değişikliğinde ideal bir meslek kanununda nelerin olması gerektiği konusunda ilgili literatüre katkı sağlaması düşünülmektedir.

## **2. YÖNTEM**

### **Araştırma Modeli**

Bu çalışmada öğretmenlerin gözünden öğretmenlik meslek kanununun nasıl algılandığının incelenmesi amaçlandığından nitel araştırma modeli olan durum çalışması deseni kullanılmıştır. Çalışmada öğretmenlerin öğretmenlik meslek kanunu hakkında görüşleri derinlemesine incelenmiştir. Nitel araştırmayı, gözlem, görüşme ve doküman analizi gibi nitel veri toplama yöntemlerinin kullanıldığı, algıların ve olayların doğal ortamda gerçekçi ve bütüncül bir biçimde ortaya konmasına yönelik nitel bir sürecin izlendiği araştırma olarak tanımlamak mümkündür (Yıldırım ve Şimşek, 2021).

### **Evren ve Örneklem**

Araştırma evrenini 2022-2023 eğitim-öğretim yılında Ağrı ilinde görev yapan tüm branşlardaki kadrolu öğretmenler oluşturmaktadır. Araştırmada evren içerisinden amaçlı örneklem yöntemlerinden olan maksimum çeşitlilik yöntemi kullanılarak 20 öğretmenin görüşü alınmıştır. Görüşü alınan öğretmenlerin seçiminde cinsiyet, eğitim düzeyi, branş ve görev yaptıkları okulların sosyo-ekonomik düzeylerinin farklı olmasına dikkat edilmiştir.

### **Veri Toplama Aracı**

Araştırmada verilerin elde edilmesi için yarı yapılandırılmış görüşme formu kullanılmıştır. Öğretmenli meslek kanunu ile ilgili görüşlerin tespit edilebilmesi için formda aşağıda yer alan sorular sorulmuş ve cevapları elektronik ortama kaydedilmiştir:

1. Öğretmenlik Meslek Kanunu’nu incelediniz mi?
2. Öğretmenlik Meslek Kanunu’nun yeterli olduğunu düşünüyor musunuz?
  - 2.1. Kanunu öğretmenlerin toplumsal statüsü bakımından yeterli görüyor musunuz? Neden?
  - 2.2. Kanunu öğretmenlerin özlük hakları bakımından yeterli görüyor musunuz? Neden?



2.3. Kanunu maddi kazanç bakımından yeterli görüyor musunuz? Neden?

3. Sizce ideal bir öğretmenlik meslek kanununda nasıl olmalıdır?

### Verilerin Analizi

Görüşme yoluyla toplanan verilerin çözümlenmesinde içerik analizi kullanılmıştır. İlk aşamada toplanan veriler bilgisayara aktararak ham veri metinleri elde edilmiştir. Daha sonra bu metinler, araştırmacı tarafından birkaç kez okunup değerlendirilmiş ve ön kodlamalar yapılmıştır. Kodların oluşturulmasında alanyazında kullanılan kavramlar ve görüşmelerden elde edilen veriler göz önünde bulundurulmuştur. Bu çalışmanın ardından, kodlar bir araya getirilerek ortak yönleri bulunmuş, böylece araştırma bulgularının ana hatlarını oluşturacak temalar belirlenmiştir.

**Tablo 1:** Görüşü alınan öğretmenlere ait demografik bilgiler

		Frekans (f)
Cinsiyet	Erkek	12
	Kadın	8
	<b>Toplam</b>	<b>20</b>
Eğitim Durumu	Lisans	16
	Yüksek Lisans	4
	<b>Toplam</b>	<b>20</b>
Kıdem	0-10	13
	11-20	7
	<b>Toplam</b>	<b>20</b>
Branş	Sınıf Öğretmeni	10
	Rehberlik ve Psikolojik Danışman	3
	Beden Eğitimi Öğretmeni	1
	Okul Öncesi Öğretmeni	1
	Müzik Öğretmeni	1
	Türkçe Öğretmeni	1
	Fen Bilgisi Öğretmeni	1
	İngilizce Öğretmeni	1
	Matematik Öğretmeni	1
	<b>Toplam</b>	<b>20</b>

### BULGULAR

Bu bölümde öğretmenlerden alınan görüşler doğrultusunda tema ve kod bilgileri ile tablolar oluşturulmuş. Kodlara ilişkin frekanslar verilmiştir. Tema ve kodlar ile ilgili öğretmenlerden alınan görüşler değiştirilmeden verilmeye çalışılmıştır.

Aşağıda yer alan tabloda çalışmanın birinci temasını oluşturan Öğretmenlik Meslek Kanunu'nu incelediniz mi? sorusuna karşılık verilen bilgilere yer verilmiştir.

**Tablo 2:** Öğretmenlik Meslek Kanunu'nun incelenme durumu frekans bilgileri

Tema	Kod	Frekans (f)
Öğretmenlik Meslek Kanununun İncelenmesi	Evet	16
	Hayır	4

Tablo 2 incelendiğinde Öğretmenlik Meslek Kanunu'nun öğretmenler tarafından incelenip incelenmediği araştırılmak istenmiştir. Katılımcı 20 öğretmenden 16 tanesi kanunu incelemiş, 4 öğretmen ise kanunu kısmen incelediğinden dolayı hayır cevabını vermiştir.

Çalışmanın ikinci teması öğretmenlerin gözünden Öğretmenlik Meslek Kanununun Yeterli olup olmadığı ile ilgilidir. Öğretmen görüşleri doğrultusunda ikinci temaya ait kodlar ve frekans bilgileri aşağıdaki tabloda verilmiştir.

**Tablo 3:** Öğretmenlik Meslek Kanunu'nun yeterliliği görüşü ile ilgili frekans bilgileri

Tema	Kod	Frekans (f)
Öğretmenlik Meslek Kanununun Yeterliliği	Yetersiz	16
	Yeterli	1
	Kısmen Yeterli	3

Tablo 3 incelendiğinde Öğretmenlik Meslek Kanununun yeterliliği ile ilgili öğretmen görüşlerine başvurulmuş ve 20 katılımcı öğretmenden 16 tanesi kanunun yetersiz olduğunu belirtirken, 1 öğretmen yeterli olduğunu ve 3 öğretmeninde kanunun kısmen yeterli olduğunu geliştirilmesi gerektiğini belirtmişleridir.

Yetersiz kategorisinde katılımcı öğretmenlerden biri “...oldukça sade bir kanun olmuş. Tartışmalı olan pek çok konu ele alınmamış, durumu yönetmeliklere bırakılmıştır. Mesleğe seçilme şartlarını, icrası sırasında uyulması gereken prosedürleri, emeklilik ve sonrası ile özel durumları düzenlemesi gibi konular yok. Sadece 12 madde ile sınırlı kalması pek çok açıdan kanunu yetersiz kılıyor.” (Ö<sub>9</sub>) şeklinde görüş belirtmiştir.

Kısmen yeterli kategorisinde ise katılımcı öğretmenlerden biri “Kanunu kısmen yeterli görüyorum. Olmaması gereken bir aday öğretmenlik sınavının kaldırıldı ve 3600 ek gösterge verildi. Bunların dışında bir kazanım göremiyorum...” (Ö<sub>1</sub>) şeklinde görüşlerini belirterek kanunun kısmen yeterli olduğunu belirtmiştir.

Çalışmanın üçüncü teması Öğretmenlik Meslek Kanunu'nun öğretmenlerin toplumsal statüsü bakımından yeterli olup olmadığı ile ilgilidir. Öğretmen görüşleri doğrultusunda oluşturulan kodlar ve frekans bilgileri aşağıdaki tabloda verilmiştir.

**Tablo 4:** Öğretmenlik Meslek Kanunu'nun öğretmenlerin toplumsal statüsü bakımından yeterli olup olmadığı ile ilgili kod ve frekans bilgileri

Tema	Kod	Frekans (f)
Öğretmenin Toplumsal Statüsü	Ayrıştırma ve çekişme	8
	Mesleğin Değersizleşmesi	6
	Sınav kaygısı ve motivasyon	6
	Öğretmen-Öğrenci-Veli İlişkisi	4
	Sınav uygulaması	2

Tablo 4 incelendiğinde kanunun toplumsal statü temasına ait kodlar ile ilgili (ayrıştırma ve çekişme, mesleğin değersizleştirilmesi, sınav kaygısı ve motivasyon, öğretmen-öğrenci-veli ilişkisi ve sınav uygulaması) 20 öğretmen görüş belirtmiştir. Bu temalara ait öğretmen görüşleri aşağıda belirtilmiştir.

Ayrıştırma kodu ile ilgili görüşleri incelendiğinde öğretmenlerden biri “*Kanunun öğretmenlerin statüsünü artıracığından daha çok ayrıştıracağına inananlardım. Unvan sınavını kazanamayan öğretmenlerin sırtında gereksiz bir yük oluşacağı kanaatindeyim. Öğretmen zaten zorlu bir KPSS sürecinden geçip atandığı için alanında uzman olan kişidir. Sınav olmadan belli bir senesini dolduran öğretmenin uzman ve başöğretmen sıfatını alması daha mantıklı olabilir. Fakat bu durum bile öğretmenler arasında ayrılmaya yol açabilir.*” (Ö<sub>16</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “*Kanunun öğretmenin toplumsal statüsündeki yerine katkısı yok bence. Ayrıca uzman öğretmen ve başöğretmen kariyer basamakları öğretmenler arasında ayrılmaya da neden olabilir...*” (Ö<sub>9</sub>) şeklinde görüş belirtmiştir.

Mesleğin değersizleşmesi kodu ile ilgili olarak öğretmenlerden biri “*Öğretmenlere günümüzde eskisi kadar değer verilmiyor, veliler okula öğrencilerini verirken öğretmenin kadrolu, sözleşmeli, ücretli niteliklerinden hangisine sahip olduğunu sorgulayıp ona göre tavır sergileyebiliyor. Bu durumun içine başöğretmen, uzman öğretmende dâhil olursa daha karmaşık bir hal alacağını, öğretmenler arasında işbirliği yerine çekişmenin artacağını düşünüyorum. Öğretmenlerin toplumsal statü bakımından gereken saygı ve değeri şu anda bile yeterince gördüğünü düşünmüyorum.*” (Ö<sub>11</sub>) şeklinde görüş belirtirken başka bir öğretmen ise “*Öğretmenlerin toplumsal statüsü bakımından 12 maddelik bir kanunun yeterli olmadığını düşünüyorum. Bu kanun kendi içinde yetersiz kalmışken öğretmenin toplumsal statüsüne de bir etki yaratacağını düşünmüyorum. Hatta öğretmenlerin toplum içindeki değerine olumsuz etki edeceği kanaatindeyim.*” (Ö<sub>10</sub>) şeklinde görüş belirtmiştir.

Sınav kaygısı ve motivasyon kodu ile ilgili olarak öğretmenlerden biri “*Kariyer basamakları sınavını kazanamayan öğretmenlerin sırtında gereksiz bir yük oluşacağı ve motivasyonlarının düşeceği kanaatindeyim.*” (Ö<sub>16</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “*İnsanların*

genel yargısı unvan odaklı olduğunu özellikle öğretmeni tanımayan velilerin öğretmenin yaptığı işleri, başarıları bilmediği için unvanına bakıp ona göre karşılaştırma yapacağını düşünüyor. Bu durumun özellikle bulunduğu okula yeni gelen öğretmenler için motivasyon düşürücü etken olabilir.” şeklinde görüş belirtmiştir.

Öğretmen, öğrenci ve veli ilişkisi kodu ile ilgili olarak öğretmenlerden biri “Kanun öğretmenleri toplumsal statü bakımından ayırtmaktadır. Böyle bir durumda da zaman içinde öğretmen-veli, öğretmen-öğrenci ilişkilerini zedeleneyecektir.” (Ö<sub>3</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “...veliler okula öğrencilerini verirken öğretmenin kadrolu, sözleşmeli, ücretli niteliklerinden hangisine sahip olduğunu sorgulayıp ona göre tavır sergileyebiliyor. Bu durumun içine başöğretmen, uzman öğretmende dâhil olursa daha karmaşık bir hal alacaktır. Bu da öğretmenlerin velilerle ve öğrencilerle daha fazla sıkıntı yaşayacağı anlamına gelmektedir...” (Ö<sub>11</sub>) şeklinde görüş belirtmiştir.

Sınav uygulaması kodu ile ilgili olarak öğretmenlerden biri “...öğretmenlerin uzman olduğunu gösteren unsurlar yapılan sınav değil edindikleri tecrübeler en güzel kanıttır. Sınava girmek için sağlanan kriterler bence en iyi tecrübeler listesidir. Bu maddelerden örneğin 5 tanesini tamamlayan öğretmen zaten kanunu ayarlayan kişilerin gözünde de uzman öğretmen kriterinde. Bu sebeple öğretmenin bilgisine ve tecrübesine göre kariyer basamakları düzenlenmeliydi.” (Ö<sub>19</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “...öğretmenin uzman öğretmen veya başöğretmen ünvanını alabilmesi için 10 yıl gibi bir zamanın şart koşulması ya da bir sınava tabi tutulmasının doğru olduğunu düşünmüyorum. Yüksek lisansın akademik kariyer ve alanında uzmanlaşmak değil de artık ‘yapmak için yapmak’ konumuna getirildiğini düşünüyorum.” (Ö<sub>6</sub>) şeklinde görüş belirtmiştir.

Çalışmanın dördüncü teması Öğretmenlik Meslek Kanunu’nun öğretmenlerin özlük hakları bakımından yeterli olup olmadığı ile ilgilidir. Öğretmen görüşleri doğrultusunda oluşturulan kodlar ve frekans bilgileri aşağıdaki tabloda verilmiştir.

**Tablo 5:** Öğretmenlik Meslek Kanunu’nun öğretmenlerin özlük hakları bakımından yeterli olup olmadığı ile ilgili kodlar ve frekans bilgileri

Tema	Kod	Frekans (f)
Öğretmenin Özlük Hakları	Özlük haklarının detaylandırılması	12
	3600 ek gösterge	6
	10 yıl kuralı	4
	Yazılı sınav	3

Tablo 5 incelendiğinde kanunun öğretmenlerin özlük hakları temasına ait kodlar ile ilgili ( Özlük haklarının detaylandırılması, 3600 ek gösterge, 10 yıl kuralı, yazılı sınav ve aday öğretmenlik) 20 öğretmen görüş belirtmiştir. Bu temalara ait öğretmen görüşleri aşağıda belirtilmiştir.

Özlük haklarının detaylandırılması kodu ile ilgili olarak öğretmenlerden biri “...özlük haklarına yeterince düzenleme getirilememiştir. Daha detaylı, öğretmenin sorunlarını arttıracak haklar değil, gerçek sorunlarını çözebilecek düzenlemeler getirilebilir...” (Ö<sub>4</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “Özlük hakları konusunda yüzeysel bir kanundur. Sadece kariyer ve ek gösteregeyi konu almış. Eğer ki bir meslek kanununu çıkarılmışsa bunun sürekli değişen yönetmeliklere bırakılmadan hakların garanti altına alındığı bir kanun olmasını dilerdim.” (Ö<sub>19</sub>) şeklinde görüş belirtmiştir.

Bu görüşlerin dışında öğretmenler, özlük haklarının detaylandırılmasını gerektiren düzenlemelerin gerekli olduğu yönündeki görüşleri de dile getirmişlerdir. Bu bağlamda öğretmenlerden biri “Kadın öğretmenlerin doğum için verilen ücretli izin sürelerinin arttırılması gerekiyor. Ayrıca 2010 öncesi atamalarda zorunlu hizmet süreleriyle beraber hesaplanan ek derece ve kademelerin 2010 sonrası atamalarda verilmemektedir. Kanunla beraber bu maddede düzenlenebilirdi.” (Ö<sub>5</sub>) şeklinde izin ve terfi haklarının düzenlenmesi ile ilgili görüş belirtmiştir. Bir başka öğretmen ise “Sözleşmeli öğretmenliğin kaldırılarak eşit işe eşit hakların verilmesi gerektiği ve tayin haklarının düzenlenmesi gerektiğini düşünüyorum.” (Ö<sub>13</sub>) şeklinde sözleşmeli öğretmenlik ile ilgili görüş bildirmiştir.

3600 ek gösterge kodu ile ilgili olarak öğretmenlerden biri “Öğretmenlik Meslek Kanunu’nu ile birlikte aday öğretmenlik kaldırıldı ve en önemli kazanımlardan birisi olan 3600 ek gösterge verildi.” (Ö<sub>1</sub>) şeklinde görüş belirtmiştir.

10 yıl kuralı kodu ile ilgili olarak öğretmenlerden biri “...yıl ve sınav şartı ile öğretmenlerin uzman ve başöğretmen unvanlarını alması tuhaf. Sınav olabilir ama her unvan için 10 yıl şartının olması benim açımdan adil değil. Bir öğretmenin 10 yıl görev yapması onun öğretmenlik mesleğinde daha iyi bir unvan hak ettiği anlamına gelmemelidir.” (Ö<sub>1</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “...zaten aldığımız eğitimler ve seminerlerle sürekli kendini güncelleyen öğretmenler olarak bundan 10 yıl sonra da başka bir sınav önkoşulu getirerek alanımızda uzmanlaşabileceğimiz varsayılıyor. Öğretmenin mesleki yeterliliğini bir sınavla ölçebilecek geçerliliği ve güvenilirliği yüksek bir sınav mümkün mü? Diye düşündürüyor bana. Aynı zamanda yüksek lisans eğitimini tamamlamış ve diplomasını alarak alanında uzmanlaşmış sayılan bir öğretmenin 10 yıl geçmeden uzman olarak görülmemesi başka bir tezatlık doğuruyor.”(Ö<sub>6</sub>) şeklinde görüş belirtmiştir.

Yazılı sınav kodu ile ilgili olarak öğretmenlerden biri “*Yazılı sınav içeriği öğretmenlik mesleğini ileriye taşıyacak düzeyde değil, uzmanlık deneyim ve alanında yapılan eğitim ürünleriyle olur.*” (Ö<sub>17</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “*Öğretmen zaten zorlu bir KPSS sürecinden geçip atandığı için alanında uzman olan kişidir. Sınav olmadan belli bir senesini dolduran öğretmenin uzman ve başöğretmen sıfatını alması daha mantıklı olabilir.*” (Ö<sub>16</sub>) şeklinde görüş belirtmiştir.

Çalışmanın beşinci teması Öğretmenlik Meslek Kanunu’nun öğretmenlerin ekonomik refah düzeylerini ne kadar etkilediği ile ilgilidir. Öğretmen görüşleri doğrultusunda oluşturulan kodlar ve frekans bilgileri aşağıdaki tabloda verilmiştir.

**Tablo 6:** Öğretmenlik Meslek Kanunu’nun öğretmenlerin ekonomik refah düzeylerini ne kadar etkilediği ile ilgili kodlar ve frekans bilgileri

Tema	Kod	Frekans (f)
Ekonomik Refah	Geçim kaygısı	11
	Ekonomik haklar ve itibar	6
	Zorunlu hizmet bölgesi	3

Tablo 6 incelendiğinde kanunun öğretmenlerin ekonomik refahı temasına ait kodlar ile ilgili (Geçim kaygısı, ekonomik haklar ve itibar, zorunlu hizmet bölgesi) 20 öğretmen görüşü belirtmiştir. Bu temalara ait öğretmen görüşleri aşağıda belirtilmiştir.

Geçim kaygısı kodu ile ilgili olarak öğretmenlerden biri “*...her öğretmenin maaşının ve ek ödemelerinin günümüz ekonomik şartlarına uygun olarak düzenlenmesini, geçim sıkıntısının motivasyonlarının önüne geçmeyererek öğretmenlerin eğitim öğretime odaklanmalarını sağlayabilmelidir. Öğretmen ay sonunu getirebilmeyi, kira ödemeyi düşünmek yerine kendini geliştirecek aktivitelere yönelecek ekonomik gücü emeğinin haklı karşılığı olarak almalıdır.*” (Ö<sub>11</sub>) şeklinde görüş bildirmiştir. Bir başka öğretmen ise “*...diğer meslek gruplarıyla kıyaslandığında ve öğretmenlik mesleğinin ana temasında “insan yetiştirmek” olduğu için ekonomik olarak kaygıların minimal düzeyde olması gerektiğini düşünüyorum.*” (Ö<sub>15</sub>) şeklinde görüş belirtmiştir.

Ekonomik haklar ve itibar kodu ile ilgili olarak öğretmenlerden biri “*... yaptığımız meslek değeri paha biçilemez değerdir. Verilecek olan kariyer başmakları ücreti ve sınav ile bunun yapılması öğretmenlik mesleğinin itibarını zedeleyici bir durumdur.*” (Ö<sub>7</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “*Toplumsal statüsü bakımından bir meslek grubunun güçlü, çekici ve itibarlı olmasının en etkili yolu ekonomik olarak kişiyi rahata erdirecek bir maaşının olması gerektiğini*

*düşünüyorum. Meslek kanunu incelediğimizde iyi bir iyileştirmenin yapılmadığını düşünüyorum.*” (Ö<sub>15</sub>) şeklinde görüş belirtmiştir.

Zorunlu hizmet bölgesi kodu ile ilgili olarak öğretmenlerden biri “...zorunlu koşulan şark görevinde öğretmene mesleki anlamda içinde bulunduğu koşullara rağmen tatmin edebilecek ve motivasyonun sağlayabilecek ekstra bir maaş karşılığının olmaması ve bu hakların bütün devlet memurları arasında sadece öğretmenlere tanınmıyor oluşunu eksiklik olarak görüyorum.” (Ö<sub>6</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “...ek ders ücretleri, nöbet görevleri, maaş karşılığı ders saatleri gibi konulara değinilmemiştir. Ayrıca zorunlu hizmet bölgesindeki öğretmenlere ilave tazminat verilmelidir.” (Ö<sub>12</sub>) şeklinde görüş belirtmiştir.

Çalışmanın altıncı teması öğretmenlerin gözünden ideal bir Öğretmenlik Meslek Kanunu'nun nasıl olması gerektiği ile ilgilidir. Öğretmen görüşleri doğrultusunda oluşturulan kodlar ve frekans bilgileri aşağıdaki tabloda verilmiştir.

**Tablo 7:** Öğretmenlerin gözünden ideal bir Öğretmenlik Meslek Kanunu'nun nasıl olması ile ilgili kodlar ve frekans bilgileri

Tema	Kod	Frekans (f)
İdeal Meslek Kanunu	Geniş kapsamlı bir meslek kanunu	10
	Hukuki kapsam	7
	Bölge ve okul şartları	5
	Atama ve yer değiştirme	3
	Okul yöneticileri	3
	Niteliğe önem verilmesi	2
	Paydaş görüşleri	2
	Basın açıklaması ve grev hakkı	1

Tablo 7 incelendiğinde öğretmenlerin gözünden ideal bir Öğretmenlik Meslek Kanunu'nun nasıl olması gerektiği ile ilgili (Geniş kapsamlı bir meslek kanunu, Hukuki kapsam, bölge ve okul şartları, atama ve yer değiştirme, okul yöneticileri, niteliğe önem verilmesi, paydaş görüşleri, basın açıklaması ve grev hakkı) 20 öğretmen görüş belirtmiştir. Bu temalara ait öğretmen görüşleri aşağıda belirtilmiştir.

Geniş kapsamlı bir meslek kanunu kodu ile ilgili olarak öğretmenlerden biri “*Öğretmenlik Meslek Kanunu maalesef beklentilerin çok altında kalmış bir kanun olduğundan dolayı birçok eksiği vardır. Öğretmenlik Meslek Kanunu öğretmenlerin üzerindeki toplumsal baskıyı azaltmasını, öğretmenlerin yoksulluk sınırının altında ücretlere çalıştığı gerçeğini değiştirmesini, branşlar arasındaki ücret, çalışma yoğunluğu gibi konularının da kanunda olmasını bekliyordum. Bu bakımdan daha ayrıntılı ve kapsamlı olmalıydı.*” (Ö<sub>10</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “*Tüm öğretmenlerin kendini geliştirmesi ve bu yönde eğitimler alması konusunda*



*hem fikirim fakat bunun bazı şartlara bağlı olması (yüksek lisans, 10 yıl vb.) ve sonucunda sınav şartı konulmasının öğretmenlerin saygınlığını zedelediğini düşünüyorum. Öğretmenlerin barışçıl şekilde çalışmalarını sürdürmelerinin sektöre uğrayacağını ve rekabetin, hırsın artacağını daiminde öğrencilerinde, eğitim camiasının da bu durumdan olumsuz etkileneceğini sanıyorum. Bunun yerine her branş için çağdaş eğitime uygun olarak tüm öğretmenlere gerekli kurslar verilmesini ve tüm öğretmenlerin maaşları ile ek ödemelerinin iyileştirilmesini kapsayan geniş kapsamlı bir kanunu daha doğru buluyorum.” (Ö<sub>11</sub>) şeklinde görüş belirtmiştir.*

Hukuki kapsam kodu ile ilgili olarak öğretmenlerden biri “...tıpkı sağlık sektöründe olduğu gibi öğretmene şiddet uygulayanların ilave yaptırımlara, caydırıcı para ve hapis cezalarına maruz bırakılmıyordu.” (Ö<sub>9</sub>) şeklinde şiddet ile ilgili görüş belirtmiştir. Bir başka öğretmen ise “...öğretmenin inanç, düşünce özgürlüğü, kendisini veyahut ailesini tehdit eden, sözlü ya da fiili şiddetten korunmasını sağlayan hükümlere yer verilmiştir.” (Ö<sub>14</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “İdeal bir kanun öğretmenlerin kendilerini güvende ve huzurlu hissettirebilecek bir kanun olmalı. En önemlisi tehdit ve şiddete karşı korunmalı öğretmen. Değer görmeli toplum nezdinde. Maddi yönden desteklenmeli ki öğretmen kendini öğrencilerine adayabilmeli.” (Ö<sub>12</sub>) şeklinde görüş belirtmiştir.

Bölge ve okul şartları kodu ile ilgili olarak öğretmenlerden biri “...doğu görevi farkı olmalıydı. Her meslekte olan bu ayrıcalığın öğretmenlikte olmayışı bu bölgelerde yıllarca çalışan öğretmenleri en kısa sürede kaçmaya yönlendiriyor. Kalkınmada öncelikli yörelerde çalışan yönetici ve öğretmenler daha fazla ücret almalıdır.” (Ö<sub>9</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “...sosyo-ekonomik olarak dezavantajlı okullarda görev yapan öğretmenlere iş ve işlemlerini gerçekleştirirken esneklik sağlanmalıdır.” (Ö<sub>3</sub>) şeklinde görüş belirtmiştir.

Atama ve yer değiştirme kodu ile ilgili olarak öğretmenlerden biri “sözleşmeli öğretmenlere kadro, öğretmenlerin yer değiştirme önündeki engel, öğretmenleri şiddete karşı koruma kanunu olmalıdır.” (Ö<sub>8</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “Hizmet içi eğitim, yöneticilikte geçen süreler, çalışma saatleri ve izinler, annelere yönelik pozitif tutum, doğu görevi, tazminatlar, yer değiştirme ve atama gibi pek çok unsuru açıklayan/düzenleyen maddeler olmalıydı.” (Ö<sub>9</sub>) şeklinde görüş belirtmiştir.

Okul yöneticileri kodu ile ilgili olarak öğretmenlerden biri “Okul yöneticisi kadrosuyla alakalı düzenlemeler yapılabilirdi. Çünkü öğretmenlikte idarecilik geçici kadro olarak görünüyor. Herhangi bir tayin durumunda öğretmenliğe tekrar dönmek zorunda kalınıyor.” (Ö<sub>4</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “Meslek Kanununda atamalar, öğretmen idareci



*hakları ve özellikle velilerin uyması gereken kurallar olarak madde olması.” (Ö<sub>19</sub>) şeklinde görüş belirtmiştir.*

*Niteliğe önem verilmesi kodu ile ilgili olarak öğretmenlerden biri “Eğitimlerin niceliğinden niteliğine odaklanılmalıdır. Öğretmen haklarını gerçek anlamda gözetildiği bir kanun oluşturulmalıdır.” (Ö<sub>6</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “Yıllarını mesleğine adanmış öğretmenleri motive edici bir kazanım yok, öğretmenlik mesleği bir süreçtir ve değerlendirme sürece göre olmalı yazılı sınav olmamalı, Türkiye’nin bütün bölgeleri aynı sosyal, ekonomik ve iklimi sahip değil doğuda çalışan öğretmenlere destek olunmalı niteliği arttıracak maddeler konulmalı.” (Ö<sub>17</sub>) şeklinde görüş belirtmiştir.*

*Paydaş görüşleri kodu ile ilgili olarak öğretmenlerden biri “Mevcut eğitim sisteminde yapılması planlanan değişiklikler veya uygulamalar, öğretmenlerin, görüş ve önerileri dikkate alınarak belirlenmelidir.” (Ö<sub>3</sub>) şeklinde görüş belirtmiştir. Bir başka öğretmen ise “Böyle bir kanun çıkarılmak istenilecek ama bu işin mutfağındaki öğretmenin görüşlerine başvurulmayacak, bu işin sahasında olan öğretmenin talep ve şikâyetleri göz ardı edilecek. Bu şekilde, bu yöntemle hazırlanmış bir yasanın kabul görülebilirliği mümkün mü? Bana göre bu yasanın en büyük eksikliği budur. Bu, gömleğin üst düğmesini yanlış iliklediğinde ondan sonraki tüm düğmelerin de yanlış ilikleneceği gerçeği gibidir. Doğru sonuca yanlış yoldan gidilmez. Sorun eksiklik en başta yapılmıştır. İzlenen yol yöntem yanlıştır. Öğretmenin görüşleri, talepleri göz ardı edilmiştir.” (Ö<sub>14</sub>) şeklinde görüş belirtmiştir.*

*Basın açıklaması ve grev hakkı kodu ile ilgili olarak öğretmenlerden biri “Öğretmenlerin maalesef grev hakkı yok. Devlet memuru olan doktorlar istedikleri zaman grev yapabiliyorlar öğretmenler yapamıyor. Öğretmenler haklarını savunmak için grev hakkının olması gerektiğini düşünüyorum. Yine öğretmenler hakkını savunmak için diğer devlet memurlarından farklı olarak basına demeç verebilmeli ve sorunlarını sıkıntılarını anlatabilmeli.” (Ö<sub>1</sub>) şeklinde görüş belirtmiştir.*

## **SONUÇ VE DEĞERLENDİRME**

14.02.2022 tarihinde Resmi Gazete’de yayımlanarak yasalanan Öğretmenlik Meslek Kanunu’nu öğretmenlerin nasıl algıladığı ile ilgili öğretmen görüşleri ortaya konulmuş ve yarı yapılandırılmış görüşme formu ile elde edilen veriler analiz edilmiştir.

Tüm meslek gruplarında olduğu gibi öğretmenlik mesleğinde de hazırlanan kanunlar, yönetmelikler ve yenilikler ilgili meslek gruplarına mensup kişilerce incelenmektedir. Öğretmenler de kendilerini yakından ilgilendiren ve güncel bir mesele olan Öğretmenlik Meslek



Kanunu' nu nasıl algıladıkları çok önemlidir. Bu durum öğretmenlerin çalışma hayatlarını, mesleğe bağlılıklarını, toplumun mesleğe bakış açısının öğretmene yansımaları, öğretmenin okuldaki başarısını ve motivasyonunu doğrudan etkilemektedir.

Çalışmanın birinci temasında kanunun öğretmenler tarafından incelenip incelenmediği araştırılmıştır. Görüşmeye katılan 20 öğretmenin 16'sı kanunu incelemiş, 4 öğretmen ise kısmen incelemiştir. Bu durum Öğretmenlerin meslekleri ile ilgili yayımlanan kanun, yönetmelik ve yenilikler yakından takip ettikleri sonucunu ortaya çıkarmaktadır.

İkinci temada, öğretmenler tarafından genel olarak kanunun yetersiz olduğunu belirtilmiştir. Yetersizlik konusunda en çok kanunun özlük hakları, öğretmene şiddet ve ekonomik refah bakımından eksik olduğu yönünde görüş belirtilmiştir. Bu bağlamda 12 maddeden oluşan kanunun öğretmenliğin aday öğretmenlik sürecinden başlanarak emeklilik sürecine kadar olan sürecini kapsayan bir şekilde detaylandırılması gerektiği sonucuna ulaşılmıştır. Kanunun yeterli veya kısmen yeterli olduğu yönündeki görüşler ise aday öğretmenlik sınavının kaldırılması, 3600 ek göstergenin verilmesi ile ilgilidir.

Üçüncü temada, kanunun toplumsal statüyü nasıl etkilediği yönündeki görüşler incelendiğinde genel olarak kariyer basamaklarının öğretmenleri ayrıştıracağı ve toplumsal statüye zarar vereceği yönünde düşünce ortaya çıksa da kariyer basamaklarının belirlenmesinde sınavın olmaması gerektiği yönünde görüşler de belirtilmiştir. Bu durumda öğretmenlerin her ne kadar kariyer basamaklarını doğru bulmasa da sınavsız bir kariyer basamaklarına da olumlu yaklaştıkları sonucuna ulaşılabilir.

Katılımcı öğretmenler öğretmenlik mesleğinin değersizleşmesi, sınav kaygısının oluşması, öğretmen motivasyonunun olumsuz etkilenmesi, öğretmen, öğrenci ve veli ile ilişkilerin zarar görebileceği yönünde görüşler belirtilmiştir. Öğretmenlik mesleğinin eskisi kadar değer görmediği ve veliler tarafından öğretmen seçimine kadar müdahale edilmeye çalışıldığı belirtilmiştir. Velilerin öğrencilerini okula gönderdiğinde sözleşmeli öğretmen, kadrolu öğretmen veya ücretli öğretmen gibi ayrımları yaparak okul idarelerine sınıf seçiminde baskı yapmaktadırlar. Öğretmenlik kariyer basamakları ile birlikte öğretmenlik türlerine bir de uzman öğretmenlik ve başöğretmenlik ünvanlarının eklenmesi daha karmaşık bir durumu ortaya çıkacağı sonucunu ortaya çıkarabilir. Ulaşılabilen bir diğer sonuç ise kariyer basamakları sınavına girmek istemeyen öğretmenlerin alanında uzmanlaşmak için değil, sınavdan muaf olabilmek için ücret karşılığında yüksek lisans yapma yoluna gittikleridir.

Dördüncü temada, kanunun öğretmenlerin özlük haklarını nasıl etkilediği yönündeki görüşler genel olarak kanun maddelerinin daha ayrıntılı bir şekilde ele alınması gerektiği şeklindedir. Bu detaylandırma kadın öğretmenlerin izin hakları, 2010 sonrası göreve başlayan öğretmenlerin kademe ve derece olarak 2010 öncesi göreve başlayan öğretmenlerden avantajlı olmaları, sözleşmeli ve kadrolu öğretmen ayrımının ortadan kaldırılması, uzman öğretmen ve başöğretmen unvan tanımlarının ve haklarının net bir biçimde ifade edilmesi, sınavın kaldırılması şeklinde olduğu söylenebilir. Kanun ile 3600 ek göstergenin getirilmesi öğretmenler tarafından olumlu olarak ifade edilmesine karşın kariyer basamaklarında 10 yıl kuralının olması ve yazılı sınav şartının olması adil karşılanmamaktadır.

Öğretmenlik mesleğinin özel ihtisas gerektiren bir meslek olması, kendisini sürekli güncel tutan ve yeniliklere açık bir meslek olması dolayısıyla 10 yıl kuralını beklemeden öğretmenlerin uzman öğretmen ve başöğretmen ünvanlarını alabilmeleri gerektiği öğretmenler tarafından belirtilmiştir. Bu bağlamda yüksek lisans ve doktorasını tamamlamış olan öğretmenlerin zaten alanlarında uzman oldukları ve yıl şartına gerek duyulmadan ünvanların verilmesi gerektiği sonucuna ulaşılabilir.

Beşinci temada, kanunun öğretmenlerin ekonomik refah düzeylerini nasıl etkileyeceği yönündeki görüşler genel olarak insan yetiştirme en zor meslekler arasında yer aldığı ve mesleğin karşılığının maddi olarak alınmadığı, geçim sıkıntı yaşayan öğretmenlerin işlerine odaklanmalarını olumsuz etkilediği şeklindedir. Bunun yanında ekonomik olarak rahat olan mesleklerin daha çekici ve itibarlı olduğu yönünde görüşler belirtilmiştir. Zorunlu hizmet bölgelerinde çalışan öğretmenlerin ekonomik refahlarını arttırma yönünde kanunda herhangi bir maddenin bulunmaması da öğretmenler tarafından belirtilen görüşler arasında yer almaktadır. Tüm bu görüşler doğrultusunda Öğretmenlik Meslek Kanunu'nda ekonomik refahın arttırılması yönündeki maddeler ve zorunlu hizmet bölgelerinde çalışan öğretmenlerin haklarının yer aldığı maddelere yer verilmesi gerektiği sonucuna ulaşılabilir. Ayrıca öğretmenler tarafından kanunda yer alan kariyer basamakları sınavı ile ekonomik hakların iyileştirilmesi arasındaki bağlantının mesleğin itibar kaybına neden olduğu ve bu sebeple sınav uygulamasının kaldırılması gerektiği sonucuna ulaşılabilir.

Altıncı temada, öğretmenlerin gözünden ideal bir Öğretmenlik Meslek Kanunu'nun nasıl olması gerektiği yönündeki görüşler genel olarak ekonomik şartları iyileştirmenin yanında hukuki yönden öğretmenlerin haklarını koruyan, çalıştığı bölge şartlarının göz önüne alan, asıl kadrosu öğretmen olan okul idarecilerinin haklarının yer aldığı, öğretmenlerin sınıflara ayrılmadığı, öğretmenlik mesleğinin bir bütün olarak değerlendirildiği daha geniş kapsamlı bir kanun olması

şeklindedir. Ayrıca öğretmenler tarafından kanunda atama ve yer değiştirme, şiddete karşı yaptırımlar, izin hakları, çalışma saatleri, sözleşmeli öğretmenlerin kadroya alınması, hizmet içi eğitim gibi maddelerinde yer alması gerektiği belirtilmiştir. Öğretmenlik Meslek Kanunu'nun uygulamaya konulması başlangıç için olumlu bir kazanımdır. Bunun yanında daha nesnel ve kapsamlı bir kanuna sahip olunması gerektiği düşünülmektedir. Bu süreçten sonra da mesleğin bir kariyer mesleği olarak toplum gözünde değer bulabileceği düşünülmektedir.

Tüm bu görüşler doğrultusunda öğretmenlerin haklarının korunması, genişletilmesi ve çağa ayak uydurması için hazırlanan Öğretmenlik Meslek Kanunu, öğretmenlerin gözünden:

1. Kanunun resmiyet kazanması
2. Aday öğretmenlik sınavının kaldırılması
3. 3600 ek göstergenin verilmesi gibi konularından dolayı kısmen yeterli olduğu algısını oluşturmaktadır.

Bunun yanı sıra:

1. Geniş kapsamlı olmadığı
2. Ekonomik refaha katkısının az olduğu
3. Özlük haklarının detaylandırılmadığı
4. Toplumsal statüye katkı sağlamadığı
5. Öğretmenler arasında çekişme ve ayrıştırmaya neden olabileceği
6. Sınav ile paranın bir araya gelmesinin mesleğin itibarını azaltacağı
7. Öğretmeni şiddete karşı korumadığı
8. Kadın öğretmenlerin annelik izinlerine yer verilmediği
9. Okul yöneticilerinin haklarına yer verilmediği
10. Sözleşmeli öğretmen haklarına yer verilmediği
11. Atama ve yer değiştirme maddelerine yer verilmediği sonuçlarına ulaşılarak öğretmenlerin gözünden Öğretmenlik Meslek Kanunu'nun öğretmenler tarafından yeterli olmadığı şeklinde algılamasına neden olmaktadır.

## **ÖNERİLER**

Öğretmenlerin kariyer basamaklarında yükselebilmeleri için sınav yerine nitelik olarak fark yaratan çalışmalara ve öğretmen veya öğrenci başarılarına göre değerlendirilmeler yapılabilir.

Yüksek lisans ve doktora yapılan alanlar ilgili branş veya eğitim alanlarından olmak şartı ile 10 yıl kuralı kaldırılarak uzman öğretmen veya başöğretmen ünvanlarının verilmesi yönünde değerlendirme yapılabilir.

Uzman öğretmen veya başöğretmen ünvanı alan öğretmenlere yöneticilik tercihlerinde bulduklarında öncelik verilebilir.

Zorunlu hizmetini tamamladıktan sonra zorunlu hizmet bölgesi olan bölgede çalışmaya devam eden öğretmenlere ek ödemeler yapılarak bu bölgeler cazip çalışma alanlarına dönüştürülebilir.

Dezavantajlı okullarda çalışan öğretmenlere barınma, kırtasiye, ulaşım vb. alanlarda motivasyonunu sağlamak amacıyla destek olunabilir.

Öğretmenlerin çağa ayak uydurabilmesi, teknolojiyi yakından takip edebilmesi, sosyal ve kültürel etkinliklere katılabilmesi için ekonomik refah düzeyini arttıracak ek maddeler ile kanun detaylandırılabilir.

Okul yöneticisi olarak görev yapan öğretmenlerin yıllık izinlerde ek ders kayıplarının önüne geçebilecek ve yönetici olarak iller arasında yer değiştirme yapabilmesinin önünü açacak düzenlemeler kanunda yer alarak detaylandırılabilir.

Unutulmamalıdır ki geleceğimizin teminatı olan çocuklarımızı ve gençlerimizi yetiştirme görevi öğretmenlerdedir. Tüm toplumun birliktelik sağlayabilmesi için de öğretmenlik mesleğine itibar kazandırmak ve öğretmenlerin ekonomik, sosyal ve kültürel refahını sağlamak çok önemlidir.

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**ETİK LİDERLİĞİN ÖRGÜTSEL GÜVEN ÜZERİNDEKİ ETKİSİNE YÖNELİK BİR  
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Administration, Kahramanmaraş

**ÖZET**

Kişilerarası ilişkilerde ve eylemlerde normatif uygunluk dâhilinde yönetim sergileyen, karar almada etik düşünce yapısını ilke alan, önyargısız ve tarafsız davranan, kişilerin haklarını savunan ve çalışanlar üzerinde güven duygusu oluşturan liderlik yaklaşımı etik liderlik olarak tanımlanır. Bireyler ve kurumlar arasında yaşanan duygulardan etkilenen, davranış, tutum, sosyal ilişkiler ve beklentiler doğrultusunda gelişen örgütsel güven; çalışanların kurum tarafından verilen taahhütlere uyulacağına ilişkin algıları doğrultusunda oluşan inancı ifade eder. Bireylerin etik liderlik algılarının örgütsel güven duyguları üzerindeki etkisi bu çalışmada incelenmiştir. Bu kapsamda İstanbul'da faaliyet gösteren 4 yıldızlı otellerde yönetici ve çalışan konumundaki bireylerde anket tekniği ile veriler toplanmıştır. Tesadüfi örneklem yöntemiyle elde edilen verilerde SPSS programı ile analizler yapılmış, değişkenlerin tanımlayıcı istatistikleri, korelasyon ve regresyon testleri ile önermeler arasındaki ilişkinin yönü ve etki düzeyi incelenmiştir. Değişkenler arasında yapılan korelasyon analizi sonucunda; etik liderlik ile örgütsel güven ve örgütsel güvenin alt boyutları olan bilişsel güven ve duygusal güven arasında istatistiksel olarak anlamlı pozitif yönde önemli ilişkilerin olduğu bulunmuştur. Regresyon analizi sonuçlarına göre ise etik liderliğin çalışanların örgütsel güven duygularını yükselttiği görülmüştür. Elde edilen bu bulgular doğrultusunda etik liderlik davranışlarını benimseyen işletmelerin, çalışanların güven duygusunu kazanacağı ve bunun olumlu etkilerinin de işletmelerin faaliyetlerine yansıtacağı sonucuna ulaşılmıştır.

**Anahtar Kelimeler:** Etik Liderlik, Örgütsel Güven, 4 Yıldızlı Oteller.

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**A FIELD RESEARCH ON THE IMPACT OF ETHICAL LEADERSHIP ON  
ORGANIZATIONAL TRUST**

**ABSTRACT**

Ethical leadership is defined as a leadership approach that demonstrates normative compliance in interpersonal relations and actions, and takes ethical thinking as a principle in decision-making. Ethical leaders are people who act impartially, without prejudice, defend the rights of people, and create a sense of trust on employees. Organizational trust, on the other hand, develops in line with behaviour, attitude, social relations and expectations, which are affected by the emotions experienced between individuals and institutions. It refers to the belief formed in line with the perceptions of the employees that the commitments given by the organization will be respected. The effect of individuals' ethical leadership perceptions on organizational trust has been examined in this study. In this context, data were collected from individuals who are managers and employees in 4-star hotels operating in Istanbul by survey technique. The data obtained by the random sampling method were analysed with the SPSS program. The descriptive statistics of the variables, correlation and regression tests and the direction and effect level of the relationship between the propositions were examined. As a result of the correlation analysis between the variables; it was found that there are statistically significant positive and significant relationships between ethical leadership and organizational trust and cognitive trust and emotional trust, which are sub-dimensions of organizational trust. According to the results of the regression analysis, it was seen that ethical leadership increased the organizational trust of the employees. In line with these findings, it has been concluded that the businesses that adopt ethical leadership behaviours will gain the feeling of trust of the employees and the positive effects of this will be reflected in the activities of the businesses.

**Keywords:** Ethical Leadership, Organizational Trust, 4 Star Hotels.



## **GİRİŞ**

Bireyler gereksinimlerini karşılamak için bir topluluk içerisinde yaşamak durumundadırlar. Belirli bir amaca yönelik insanların bir araya gelmiş olması yönetilme ihtiyacını gerekli kıldığından, bu durum liderlik olgusunu ortaya çıkarmaktadır (Bakan ve Doğan, 2013: 3). Gruplar halinde yaşayan ve sosyal bir varlık olan insanlar, birlikte yaşamının bir ihtiyacı olarak kendilerini belirli hedeflere taşıyacak bir lider etrafında birleşmeye gereksinim duyarlar. Eğer bireyler hedeflerine ulaşmak için herhangi bir kişinin etkisinde kalıyor ve onu takip ediyorsa, o toplulukta liderlik olgusunun varlığından söz edilebilir. Bu yüzden liderlik kavramı ile insan yaşamının her evresinde karşılaşmak kaçınılmaz olmaktadır. Herhangi bir topluluğu belirli bir hedefe taşımak için onları etkileme ve kendisini takip ettirme yeteneğine sahip olan liderlik günümüze kadar gelmiş ve önemini hiç kaybetmemiştir (Gündüz ve Dedekorkut, 2014: 95).

Liderlik, bir işletmede öngörülen hedeflerin belirlenmesinde bu hedeflere ulaşılması için alınacak kararların neler olacağı, işletmenin kısımları ve çalışan bireyler arasındaki koordinasyon, iş birliği ve ahengin sağlanması görevlerini üstlenen bir yapıdır (Bakan, 2007: 104). Farklı liderlik tarzları içerisinde önemi giderek daha çok artan ve çeşitli araştırmalara konu olan liderlik türlerinden birisi de etik liderliktir. Bu tarz liderler etik davranışları ilke yapan, önyargısız ve tarafsız davranan, kişilerin haklarını savunan ve çalışanlar üzerinde güven duygusu oluşturan bireylerdir (Teyfur vd., 2013: 85). Bireyler üzerinde genellikle olumlu bir etki bırakan etik liderlik, diğerleri ile ilişkilerinde normatif olarak uygun davranan ve bu faaliyetleri artırmayı hedefleyen, iki yönlü iletişim ve etkin düşünme yöntemlerini kullanan liderlik tipidir. Etik liderler, topluluğu göz önünde tutarak ilkeli ve dikkatli kararlar alarak doğruluk, dürüstlük ve adalet ilkeleri içinde hareket ederler (Brown vd., 2005: 117).

İşletmelerde önem verilmesi gereken diğer bir olgu da örgütsel davranış şekilleridir. İnsanların bir kuruma katılması ve kurumuna aidiyet duygusu taşıması kişinin tutum ve davranışlarında etkili olmaktadır (Koç, 2009: 201). Bireyler sahip oldukları sınırlı imkânlar ile ihtiyaçlarını karşılamada çoğu zaman yetersiz kalmaktadır. İnsanlar bu yetersizliği gidermek için diğer bireyler ile etkileşime girerek eksikliklerini karşılama yoluna girdiğinden ortak hedeflere sahip insanlar bir araya gelmektedir. Bu birliktelik, kişiler arasında maddi ve duygusal bağlar kurulmasına yardımcı olan örgütleri oluşturmaktadır (Bağcı, 2013: 164). Örgütler, birden fazla kişinin çabalarını birleştirmesi sonucu ortaya çıkan işbirliği organizasyonu veya bireylerin ortak hedefler ve değerler uğruna ortaya koydukları birliktelik olarak tanımlanabilir (İşcan ve Timuroğlu, 2007: 120).

Günümüzde yaşamın her alanında yer alan örgütsel olgunun ortaya çıkmasının nedeni bireylerin tek başına başaramadığı şeyleri elde edebilme isteğidir. Örgütlerde ana unsur insan olduğundan bireyler faaliyetlerini bazı anlamlar üzerine kurarak sürdürmektedirler. Bu yüzden örgüt yöneticilerinin görevleri, örgütsel bütünlemeyi sağlayarak çalışanları ortak algılar ve paylaşımlar üzerinde bir arada tutmaktır (Şahal, 2005: 7). Bu tanımlamalara bağlı olarak örgütsel davranış türleri işletme bilimi dünyasında farklı kategorilere ayrılarak incelenmektedir. Örgütsel davranış türleri içerisinde çalışanların, örgütün sağladığı desteğe ilişkin algıları, liderin sözünün doğru olacağı ve sözünde duracağına olan inancı olarak tanımlanan örgütsel güven iş yaşamı yönünden büyük öneme sahiptir. Genel olarak bireyler tarafından doğruluk ve dürüstlük üzerine kurulmuş bir kavram olarak kabul edilen güvenin, kurumların başarılı olmasında önemli bir faktör olduğu kabul edilir. Kısa sürede oluşmayan güven duygusunun yerleşmesi için uzun ve özverili çabalara ihtiyaç vardır. Kişi ve kurum arasında güvenin oluşmasında örgütlere düşen yükümlülük daha fazladır. Kurum değerlerinin çalışanlarca benimsenmesi, örgütün hedef, vizyon ve inançlarının kabul edilmesi ancak çalışanların örgütlerine karşı duydukları güvenle sağlanabilir. Güven, genellikle kişiler arasında karşılıklı olduğundan ve birçok faktör tarafından etkilendiğinden geniş anlamda bir güven ortamı oluşturmak zor olsa da, lider konumundaki kişilerin örnek tutum ve davranışları ile bu başarılabilir bir durum olmaktadır. Bir kurumda ilişkilerin güven duygusu temeline oturması ve bireylerinde güven algısının oluşması örgütüne bağlı, örgütü ile bütünleşen ve işlerinde başarılı bireylerin sayısını artırır (Demircan ve Ceylan, 2003: 139).

Küreselleşmenin yaşandığı günümüzde liderlik türleri ile ilgili çalışmaların giderek artmasının yanı sıra liderlik türlerinin örgütsel yönetim kavramlarıyla ilişkilerini açıklayan çalışmalar da yapılmakta ve liderlik kavramının örgütsel davranışlar üzerinde farklı düzeylerde etkilerini görmek mümkün olmaktadır (Teyfur vd., 2013: 85). Kurumlarda güvene dayalı bir çalışma ortamının yaratılmasında etik lider davranışları önemli olduğundan, etik lider davranışı sergileyen bireylerin işletmelere kazandırılması için çaba sarf edilmelidir (Engelbrecht, 2017: 377). Bu araştırmada turizm sektöründe çalışanların etik liderlik ve örgütsel güven kavramlarına ilişkin algıları ile bunlar arasındaki ilişkinin düzeyi ortaya konulmaya çalışılmıştır.

### **ETİK LİDERLİK KAVRAMI**

Bireylerin birlikte yaşaması ile ortaya çıkan lider ve liderlik kavramlarının başlangıcı çok eski dönemlere kadar gitmekte ve bu kavramlar yönetim bilimlerinde önemli çalışma konularının başında gelmektedir. İnsan yaşamında toplulukların oluştuğu her alanda liderlik olgusu ile



karşılaşmak mümkündür. Liderlik, lider durumundaki kişinin kendisi ile birlikte hareket eden bireyleri ortak bir hedefe ulaştırmasında kullanılan önemli bir araçtır (Bektaş, 2016: 43).

Liderlik kavramı, belirlenen hedeflere ulaşabilmek için mevcut koşullar altında bir topluluktaki kişileri etkileyerek; onların öngörülen hedeflere yönlendirilmesi olarak tanımlanabilir. Belirli bir amaca yönelik olarak kişileri yönlendiren, onları etkileyen ve topluluğun kendisini takip etmesini sağlayan kişiler lider olarak tanımlanmaktadır. Göstermiş olduğu örnek davranışları, aldığı kararların olumlu veya olumsuz sonuçlarından etkilenen kişi sayısı ve topluluğun gelecekteki durumu liderin önemini belirler (Koçel, 2015: 677).

İnsanlar, sürekli gelişen ve değişimlere uğrayan sosyal, kültürel ve ekonomik bir ortamda hangi alanda yer alırlarsa alsınlar her dönemde toplum içerisinde kendisine rehberlik edebilme yeteneğine sahip güçlü ve donanımlı bir lider arayışı içerisinde girmektedir (Bakan ve Doğan, 2013: 75). Kurumların gelişebilmeleri için yönetim, etik prensiplere bağlı olarak hareket etmelidir. Etik değerlerin ön planda tutulduğu işletmelerde çalışanlar yalnızlık duygusu taşımazlar, çalıştıkları kuruma karşı aidiyetleri gelişir ve verimlilikleri daha yüksek olur (Erogluer ve Yılmaz, 2015: 281). Lider konumundaki kişiler, kendisini takip edenlerin belirli bir hedefe yönelmelerini sağlarken, etik tutumlarını eylemleri ile göstermek zorundadırlar. Çünkü etik değerler; beraber yaşamanın, nitelikli insan olmanın ve kişileri etkilemenin en önemli unsurudur (Yılmaz, 2006: 28).

Kurumlarda liderlik yeteneklerine sahip olmakla birlikte aynı zamanda iş etiğini anlama ve sergileme olanağı sağlayan bir liderin seçilmesi önemli bir husustur (Chan vd., 2011: 228). Etik liderlerin sahip olduğu gücün kaynağını örgütteki etik uygulamalardan alması bu liderlik tipinin en karakteristik özelliğidir. Etik liderler, işletme içerisinde oluşan yanlış müdahale ederek yanlışın büyümesini engellerler. Bu yüzden etik liderler, kurumun başarısı ve gelişimine engel olacak durumlara karşı savunma stratejileri geliştirirler. Örgütte oluşacak etik yapı, çalışanlar arasında güven oluşturacağından liderlerin başarılı olabilmeleri için etik açıdan yeterli olgunluğa sahip olmaları gerekir. Liderlerin etik davranışları uygulamasında, liderin bireyler üzerinde oluşturduğu güven duygusu büyük bir etkiye sahiptir (Yaman, 2010: 11). Dürüst ve güvenilir olduğu düşünülen etik liderler; insanları ve toplumu ilgilendiren konularda etik ve adil davranan dengeli kararlar üreten, sevecen ve ilkeli karar mercileri olarak görülür. Takipçileri ile etik konularda iletişim kurarak standartlar belirler ve bu standartların takip edildiğini görmek için ödül ve cezalar uygulatırlar. Bireyler, ödül ve disiplin uygulamalarını dikkatle izleyerek neyin kabul edilebilir veya kabul edilemez olduğunu görüp kendi davranışlarını düzenlerler (Brown ve Trevino, 2006: 597).

Etik liderler, kuruluşun hedefleri ile çalışanların ve dış paydaşların amaçlarını bütünleştirir, paydaşlarla saygı ve güven temeli üzerine kurulmuş ilişkiler içerisinde olmanın tüm örgütsel çabaların altın standardı olduğunu kabul ederler. Etik liderler güven, saygı, dürüstlük, eşitlik, adalet ve merhamet gibi temel ilkelerin etik bir ortamda oluşacağına inanır ve tüm çalışanlar için etik açıdan samimi bir çalışma ortamı oluşturur, etik konuları paylaşır, rol modeli olarak hizmet verir ve çalışanların gelişimine yönelik faaliyetlerde bulunur. Çalışanların ihtiyaçlarını ve haklarını göz önünde tutarak onlara karşı adil şekilde davranır (Bello, 2012: 231). Etik lider konumunda olan bireyler, çalışanlara açık bir şekilde yaklaştıklarından ve çalışanlar için önemli olan konularda adil karar verdiklerinden dolayı kişilerin kurumun işlerine katılımlarını sağlarlar (De Hoogh ve Den Hartog, 2008: 300).

Etik liderliğe önem verilmesi ile kurumlar, yalnızca bireysel örgüt üyelerini değil aynı zamanda bu örgütün hizmet verdiği toplulukları da etkileyen ekonomik tuzaklardan kaçınabilirler (Resick vd., 2006: 357). Etik ilkelerin kabul edilmesi ve pratiğe dönüştürülmesinde lider konumundaki kişilere önemli görevler düştüğünü ifade eden Bakan ve Doğan (2013: 81) etik liderlerin; beraber çalıştığı kişilerin beceri kazanmalarına yardımcı olan, etik değerleri, belirlenen misyon ve vizyon doğrultusunda aldığı kararları uygulayan, etik davranan, adil ve ilkeli kararlar veren, dürüst ve güvenilir olan, beraber çalıştığı kişileri olumlu yönde etkileyen ve onları motive eden kişiler olduğunu ifade etmişlerdir. Ayrıca grubunda yer alan bireyler ile iletişim halinde olan, koşulların gerektirdiği şekilde ödül ve cezalar uygulayan, kendini takip eden bireylere cesaret veren, kurumun amaç ve değerlerini sık bir şekilde hatırlatan, paydaşları ile etik değerlerin yaratılması ve paylaşımında iletişim halinde bulunan kişiler olduklarını belirtmişlerdir.

### **ÖRGÜTSEL GÜVEN KAVRAMI**

Güven kavramı hem bireysel hem de örgütsel alanda üzerinde çok durulan ve tartışılan bir konudur. Kişilerin kendi aralarında ve kurumları ile olan ilişkilerinin sağlıklı ve sürdürülebilir olmasında güven duygusu büyük öneme sahiptir. Güven, tek taraflı olmayan, karşılıklı olarak gelişen bir duygudur (Karcıoğlu ve Naktiyok, 2015: 20). Bireylerin tüm ilişkilerinin temelini oluşturan güven, onların kendilerini emniyette görmelerini ve psikolojik yönden birlik içerisinde olmalarını sağlar. Bir kurumda çalışmaya başlayan bireyin ilk yapacağı faaliyet, çalıştığı örgüt ile ilgili araştırma yaparak kuruma ve yöneticilere ne düzeyde güvenebileceği hakkında bilgi toplamaktır. Hiçbir kişi güven ortamının oluşmadığı bir işletmede çalışmak veya bulunmak istemez. Çünkü insanlar kendilerini güvende gördükleri zaman mutlu ve huzurlu hissederler (Bakan, 2011: 168).

Ekonomik ve çevresel faktörlerin değişkenlik gösterdiği yüzyılımızda kişilerin işbirliği ve takım halinde çalışma ihtiyaçlarının artması örgütsel güven anlayışını ön plana çıkarmıştır. Güven, kişileri bir arada tutup bir nevi yapıştırıcı rol oynayarak sosyal sermayenin temel unsuru olmaya başlamıştır. Güven duygularının geliştiği işletmelerde, kurumun amaç ve hedeflerini yakalaması daha kolay olmaktadır. Karşılıklı olarak gelişen güven olgusu, bireyler ve kurumlar arasındaki ilişkilerin önemli bir ögesidir (İşcan ve Sayın, 1010: 195). Bireylerde güven duygusunun gelişmesinde, örgütün dürüst ve tutarlı davrandığına yönelik düşüncenin oluşması önemlidir. İşletmelerde güven ortamının oluşmasında dürüstlüğün yanı sıra eylem ve davranışlardaki tutarlı davranışlar da etkili unsurlar olarak görülmektedir (Aksoy ve Özkan, 2016: 33).

Bireyler ve kurumlar arasında yaşanan duygulardan etkilenen ve farklı olay ve olgulardan yola çıkılarak oluşan güven; davranış, tutum, sosyal ilişkiler ve beklentiler doğrultusunda gelişir. Çağdaş işletmelerde çoğulculuk ilkesine dayalı, geniş kapsamda katılımı öngören, hiyerarşinin olmadığı ya da çok az olduğu yapılar geçerli olmaya başlamıştır. Güven duygusu, sosyal yapılarda sağlıklı ilişkilerin devam ettirilmesinde temel unsurdur. Çalışanlar, örgütlerine güven duyduklarında olumsuz şartlar karşısında kendilerinde daha fazla mücadele etme gücü bulurlar (Asunakutlu, 2002: 10). Günümüzde işletmeler arasında artan rekabet gücü ile başa çıkabilmek için örgüt içi güvenin geliştirilmesi gerekir. Böyle bir ortamda kişiler ve kurumlar arasında güvene yüksek düzeyde ihtiyaç vardır (Huff ve Kelley, 2003: 81).

Liderlere, çalışanların örgüte olan güvenlerini ve işe adanmışlıklarını sağlayabilmek için büyük sorumluluklar düştüğünden lider konumunda yer alan kişilerin bu bilinçte olmaları gerekir. (Taşlıyan vd., 2016: 2558). Yatay ilişki olarak kabul edilen örgüt içindeki güven ilişkisi de kurum için önemlidir (Rindfleisch, 2000: 81). Örgüt içindeki ve diğer örgütler arasındaki güvenin iyi ölçülmesi gerekir. Güven düzeyinin doğru bir şekilde belirlenmesi örgütlerin daha iyi yönetilmesine ve geliştirilmesine yardımcı olacaktır (Seppanen vd., 2007: 261). Kurumlar, şeffaflığı arttırmak ve yardımsever davranmakla birlikte güven arayan bireyler için örgütsel güveni de sağlamalıdır. Yine aynı şekilde işletmeler paydaşlarında güven algısını oluşturacak bilgi kaynaklarından faydalanarak güven mesajları vermelidirler (Pirson ve Malhotra, 2011: 1100).

Mayer vd. (1995: 711) tarafından organizasyonlarda güven ve risk olaylarının birbiriyle ilişkili olduğu, ikisi arasındaki ilişkinin net bir şekilde tanımlanması gerektiği belirtilmiştir. Bu ilişki belirlenirken güvenen ve güvenilen tarafların göz önünde tutulması gerekliliği ifade edilmiştir. İşletmelerde oluşan bir riski yönetmek için genellikle güven ve kontrol sistemlerinden faydalandığından bunların birbirini dışlayan faktörler olarak düşünülmesi gerektiği

vurgulanmıştır. Çünkü güven sınırlarını aşan bir risk söz konusu olduğunda, kontrol sistemi devreye girerek bu riski güvenle yönetilebilecek düzeye düşürebilir. Ancak dikkat edilmesi gereken husus bir örgütte kontrol sisteminin çok güçlü olması örgütte güvenin oluşumuna engel olabilir.

İşletmelerde oluşacak güven ile kurum ve çalışanlar arasındaki işbirliği gelişecek, bireylerin örgüte olan bağlılıkları, yenilik yapma arzuları ve motivasyonları artacaktır (Hubbell ve Chory Assad, 2005: 47). Örgütlerin temel fonksiyonlarından biri olan ve geliştirilmesi gereken güven, örgütün hedef ve amaçlarına ulaşma ve örgütsel etkinlik düzeyine bağlı olarak gelişir. Kurumlarda güven artırıcı faaliyetler çalışanın örgüte olan bağlılığını geliştirir (Ayden ve Özkan, 2014: 165). Çalışanların yetenek, bilgi ve becerilerini görev yaptıkları kurumlar için kullanma istekleri kurumlarına duymuş oldukları güven duygusu ile yakından ilişkilidir. Kişiler arasındaki ilişkileri oluşturan sosyal sistemler ve kurallar, güven esasına bağlı olarak gelişmektedir. İşletmenin hedeflerine ulaşabilmesi için kişilerin ve kurumun birbirine güvenerek görevlerini yapması gerekir (Eroğlu, 2014: 53, 63).

Örgütsel güven üzerine yapılan çalışmalar içerisinde ön plana çıkan Cummings ve Bromiley (1996: 317)' e göre örgütsel güven davranışsal, bilişsel ve duygusal olmak üzere üç temel esas üzerinde değerlendirilmiştir. Yapılan değerlendirmeler sonucunda davranışsal boyut göz ardı edilerek diğer iki boyut esas alınmıştır. Araştırmacılar tarafından örgütsel güven, iyi niyet ve dürüstlük üzerine kurulmuş ve bir kişinin ya da topluluğun başka bir kişiye veya topluluğa yönelik düşünce ve inanışları olarak tanımlanmıştır. Örgütsel güven, bir örgütte karşılıklı etkileşim ve iyi niyetli yaklaşım temelinde oluştuğundan fırsatçılık ve istismarcılık türü davranışlardan uzak durmayı gerektirir. Bu tanımlamalar ışığında örgütsel güven, iyi niyetli çabaları içeren ve dürüstlük ilkesini benimseyen bir olgu olarak kabul edilir.

**Bilişsel Güven:** Bilişsel güven kavramında, örgüt veya kişilerin dürüstlükleri, yetkinlikleri ve becerileri göz önünde tutulur. Bu özelliklere sahip olma düzeylerine göre çalışanlarda bilişsel güven olgusu oluşmaya başlar. Bireyler bir başkasına güvenebilmek için gerçekçi nedenler ararlar. Bu değerlendirme sonucunda karşı tarafın dürüstlük, yetkinlik ve becerilerinin bireyde oluşturduğu algılara bağlı olarak bilişsel güven gelişir (McAllistar, 1995: 30). Bilişsel güvenin gelişiminde kişi veya topluluklara güven duymak için bilişsel bir süreç takip edilir. Bilişsel güven, inandırıcı bilgiyi içeren rasyonel bir tercihin sonucunda kişilere güven duyulması ile oluşur. Güven duymayı isteyen taraf, karşı tarafın taşıdığı özellikleri hesaplayarak güvenilirliği değerlendirir. Ancak bilişsel güven, kişilerin elde ettiği bilgiler doğrultusunda ve duygusal güvenin de etkisi ile zamanla değişime uğrayabilir (Morrow vd., 2004: 53).



**Duygusal Güven:** Kişilerde duygusal güven, bilişsel güvenin oluşumundan sonra gelişmeye başlar ve oluştuktan sonra bilişsel güvenin etkileri azalır. Oluştuktan sonra ortadan kalkması çok zor olan duygusal güven uzun süreli olarak devam eder. Kişiler arasındaki etkileşim arttıkça duygusal güvenin derinliği de artmakta, ilişkilerde duygusal faktörler daha ön plana çıkmaktadır. Bu etkileşimin sonucunda, karşı tarafın da aynı düşünceler içinde olduğu düşünülerek duygusal bağlılık gelişmekte, kişiler arasındaki iyi düşünceler ön plana çıkmaktadır (McAllistar, 1995: 30). Duygusal güven, söz ve davranışlar ile arzu ve isteklerin birbiriyle örtüşmesi veya aralarındaki tutarlılık düzeyi olarak ifade edilir. Duygusal güven, kısmen bilişsel güveni de içine alan bireyin istekleri ile tutumlarının uyuma düzeyine bağlı olarak gelişen güvendir. Duygusal güvenin gelişmesi için öncelikli olarak bilişsel güvenin belirli bir düzeye ulaşması gerekir (Cummings ve Bromiley, 1996: 328).

### **ETİK LİDERLİK ve ÖRGÜTSEL GÜVEN İLİŞKİSİ**

Etik liderlik ile örgütsel güven arasındaki ilişkiyi belirlemek amacı ile yapılan bir araştırmada, etik liderlerin çalışanlar için güvene dayalı bir çalışma ortamının yaratılmasında kilit rolünün olduğu vurgulanmıştır. Bu yüzden kuruluşların etik temelli iş sistemlerinin uygulanması ile duyulan güvenin geliştirilmesini sağlamak için sorumluluk almaları gerektiği ifade edilmiştir (Engelbrecht, 2017: 377). Çalışanların etik liderlik algılarının örgütsel güven seviyeleriyle pozitif ilişkili olduğunu ortaya koyan bir araştırmada, etik liderlerin ahlaklı olarak algılanmalarına bağlı olarak çalışanlara karşı ilgili ve işverenleriyle güçlü bir bağa sahip güvenilir kişiler olarak değerlendirildikleri görülmüştür. Çalışanların ise örgütsel sonuçlardan yüksek memnuniyet duydukları ve kuruluşlarının daha etkili olduğunu düşündükleri belirtilmiştir (Johnson vd., 2012: 3). Yine yapılan bir araştırmada, etik liderlik davranışları ile bireylerin örgütsel güven algıları arasında pozitif yönde ve yüksek düzeyde anlamlı bir ilişki bulunduğundan lider konumundaki kişilerin bireylerin güvenlerini artırmak için etik davranışları ve bu konuda evrensel eğitimlerin verilmesi gerektiği vurgulanmıştır (Ertürk, 2019: 119).

Etik liderlik becerilerinin örgütsel güven düzeyini anlamlı bir şekilde etkilediğini belirten araştırma sonucunda, yöneticilerinin etik liderlik becerilerini geliştirecek eğitim programlarının hazırlanması ve çalışanların örgütsel güven düzeylerini olumsuz etkileyen faktörlerin araştırılmasının gerektiği ifade edilmiştir (Teyfur vd., 2013: 104). Yapılan başka bir çalışmada ise etik liderlik davranışının çalışanların örgütlerine olan güveni oluşturduğu, güvenilir ve adil bir iş yeri yaratmak için etik lider yetiştirmenin önemli olduğu vurgulanmıştır (Xu vd., 2016: 493). Etik liderliğin, liderler ve takipçileri arasında daha güvenilir bir ilişkinin kurulmasında önemli bir

role sahip olduğu (Akker vd., 2009: 116), etik liderlik davranışları yerine getirildikçe bireylerin örgütsel güven düzeyleri artacağından etik liderlik becerilerini geliştirecek eğitim programlarının hazırlanması önerilmiştir (Cemaloğlu ve Kılınç, 2012: 147). Üstün vd. (2021: 225) tarafından etik liderlerin istenilen uygun davranışları göstermesi durumunda izleyenleri koruyan ve onlara güven veren bir yapıya sahip olduğu ifade edilmiştir. Farklı araştırmacılar tarafından yapılan çalışmalarda da etik liderlik ile örgütsel güven arasında pozitif yönlü önemli ilişkilerin olduğu sonucuna ulaşılmıştır (Taşlıyan vd., 2016: 2541; Sökmen, 2019: 917; Pucetaite, 2014: 234). Bu çalışmada da etik liderliğin örgütsel güven üzerindeki etkisi turizm sektöründe incelenmiştir. Hizmet sektöründe hem etik ilkelere yönelik davranış sergilemek hem de kaliteli hizmet sunumunda bulunmak için etik liderlik ve örgütsel güven davranışları önem arz etmektedir. Bu nedenle, turizm sektörünün, araştırma amacı için seçilmiş doğru sektör olduğu kanaati oluşmuştur.

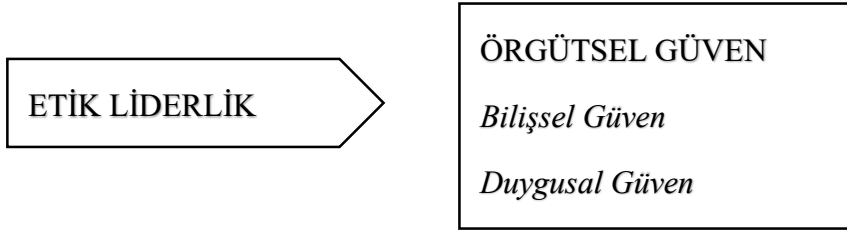
#### **ARAŞTIRMANIN AMACI ve MODELİ**

Kurumlarda farklı liderlik ve yaklaşım tarzı gösteren lider konumundaki kişilerin bu davranışları, örgütsel davranış türleri üzerinde farklı şekillerde etkili olabilmektedir. Bireylerin lider davranışına göre örgütsel davranış türlerini değerlendirmeleri hizmet sektöründe daha belirgin olarak görülmektedir. Yapılan bu çalışmada İstanbul ilinde aktif olarak faaliyette bulunan 4 yıldızlı otellerde görev yapan kişilerin, işletmelerinde lider konumundaki bireylerin etik liderlik davranışlarının algıladıkları örgütsel güvene olan etkileri belirlenmeye çalışılmıştır. Bu kapsamda sektörde çalışanlar ile yapılan anket uygulamasında kişilerin etik liderlik ve örgütsel güven algıları ölçümlenmeye çalışılmıştır. Araştırma sonucunda ulaşılan bulgular ile lider davranışlarının kuruma olan etkisi ortaya konularak işletmelerin daha verimli düzeye getirilmesi için bilimsel düzeyde katkı sağlamak hedeflenmiştir. Etik liderlik konusu üzerine yapılan araştırmalar incelendiğinde etik liderliğin örgütsel güvenin artmasında önemli düzeylerde etkili olduğu görülmüştür. Daha önce yapılan bu araştırma sonuçları da dikkate alınarak etik liderlik ve örgütsel güvenin alt boyutları arasında aşağıdaki hipotezler geliştirilmiştir. Oluşturulan hipotezler doğrultusunda araştırmanın modeli Şekil 1’ de verilmiştir,

**H1:** Etik liderlik, örgütsel güvenin alt boyutu olan bilişsel güveni anlamlı ve pozitif yönde etkiler.

**H2:** Etik liderlik, örgütsel güvenin alt boyutu olan duygusal güveni anlamlı ve pozitif yönde etkiler.





**Şekil 1.** Araştırmanın Modeli

### **ARAŞTIRMANIN YÖNTEMİ**

İşletmeleri daha verimli ve etkin düzeylere getirebilmek için turizm sektöründe faaliyette bulunan 4 yıldızlı otel çalışanlarıyla, bir lider davranış türü olan etik liderliğin örgütsel güvenin alt boyutlarına yönelik etki düzeyini belirlemek için bir anket uygulaması yapılmış ve araştırmada ilişkisel tarama modeli seçilmiştir. Araştırmanın amacı doğrultusunda İstanbul ilinde faaliyette bulunan 4 yıldızlı otellerde görev yapan 200 kişide tesadüfi örneklem yöntemiyle bir anketör firma aracılığı ile anket uygulaması yapılmıştır.

Araştırma kapsamında etik liderlik ve örgütsel güven kavramları üzerine yapılan araştırmalar incelenerek olabildiğince geniş bir literatür taraması yapılmış, önermeler hedef kitle tarafından daha iyi anlaşılması için düzenlenmiştir. Ankette katılımcıları tedirgin edecek hiçbir özel bilgi istenmemiştir. Anket uygulamasında etik liderlik ve örgütsel güven önermeleri, “1 Kesinlikle Katılmıyorum”, “2 Katılmıyorum”, “3 Kararsızım”, ”4 Katılıyorum” ve “5 Kesinlikle Katılıyorum” ifadelerinden oluşan 5’ li Likert tarzı ölçek ile ölçülmeye çalışılmıştır. Anketten elde edilen veriler SPSS programına girilmiş, SPSS statistics adlı program yardımı ile analizleri yapılmıştır. Anket ölçeklerinin ilk önce Cronbach’s Alfa ile güvenilirlik düzeyleri tespit edilmiş, değişkenlere ait ortalama ve standart sapma değerleri hesaplanmış, korelasyon ve regresyon analizleri ile önermeler arasındaki ilişkilerin düzeyi, yönü ve etki derecesi belirlenmeye çalışılmıştır. Yapılan bu analizler sonucunda etik liderlik ve örgütsel güven üzerine daha önce yapılan araştırma bulguları da incelenerek değişkenler arasındaki ilişkiler yorumlanmış ve çıkarımlar elde edilmeye çalışılmıştır.

İşletmelerde lider konumundaki kişilerin etik liderlik davranış düzeylerini belirlemek için Brown vd. (2005: 126) tarafından geliştirilen tek alt boyutlu ve 10 önermeden oluşan ölçek kullanılmıştır. Brown vd. (2005: 126)’nin oluşturduğu ölçek; Çoklar (2012: 90), Güçel vd. (2012: 105) ve Akdoğan ve Demirtaş (2014: 114) tarafından yapılan araştırmalarda da kullanılmış ve ölçeğin güvenilir olduğu kabul edilmiştir.

Çalışanların örgütsel güven algılarını belirlemek için Cummings ve Bromiley (1995: 328) tarafından geliştirilen, bilişsel ve duygusal olmak üzere 2 alt boyutu olan ölçek kullanılmıştır. Cummings ve Bromiley (1996: 317) tarafından oluşturulan örgütsel güven ölçeğinin uluslararası literatürde en yaygın kullanılan ölçek olduğu görülmüştür. Kuramsal yapısı güçlü olan ölçeğin oluşturulan kısa formunda davranışsal boyut elemine edilmiş, bilişsel ve duygusal alt boyutları altında toplanmıştır. Kısa formunun düşünülmesinin nedeni kısa formun uzun forma göre daha uyumlu ve geçerlilik düzeyinin daha yüksek bulunmasıdır. Araştırmacılar ölçeğin kısa formunda, önemli ölçüm varlıklarının ödün vermeden kullanılmasından dolayı daha kullanışlı bir ölçek olduğunu ifade etmişlerdir. Kullanılan örgütsel güven ölçeği; bilişsel boyut 8 ve duygusal boyut 4 önerme olmak üzere toplam 12 önermeden oluşmaktadır. Cummings ve Bromiley (1995: 328)'in örgütsel güven ölçeği Güçel vd. (2012: 105), Ayden ve Özkan (2014: 157) ve Arslan ve Esatoğlu, (2017: 325) tarafından yapılan araştırmalarda da kullanılmış, ölçeğin güvenilir olduğu görülmüştür.

## **BULGULAR**

### **Araştırmanın Güvenirliliği**

Yapılan araştırmada veri toplama aracı olarak kullanılan ölçeklerin güvenirliliği Cronbach's Alfa değerleri ile belirlenerek test edilmiştir. Araştırmacılar tarafından Cronbach's Alfa 0,70 ve üzeri ( $0,70 \leq \alpha \leq 1$ ) olduğunda ölçek güvenilir olarak değerlendirilmektedir (Tavakol ve Dennick, 2011: 54). Araştırmada kullanılan ölçeklerin Cronbach's Alfa değerleri 0,70'in üzerinde bulunduğundan ölçekler güvenilir kabul edilmiştir (Tablo 1).

**Tablo 1.** Araştırmada Kullanılan Ölçeklerin Güvenirlilik Analizleri

<b>Değişkenler</b>	<b>Önerme Sayısı</b>	<b>Cronbach's Alfa</b>
Etik liderlik	10	0,949
Bilişsel Güven	8	0,943
Duygusal Güven	4	0,826

### **Katılımcıların Demografik Özellikleri**

Turizm sektöründe faaliyette bulunan otel işletmelerinde çalışanlar ile yapılan araştırmaya katılanların cinsiyet, yaş, medeni durum, eğitim durumu, çalışma süresi ve işletmedeki pozisyonları incelenmiştir. Çalışanların çoğunluğunun erkeklerden oluştuğu, genç çalışanların ağırlıkta olduğu sektörde bekâr bireylerin evlilerden daha fazla yer aldığı görülmüştür. Eğitim durumlarına göre ise lise mezunlarının ilk sırada bulunduğu, bunları lisans ve ön lisans mezunlarının takip ettiği, çalışanların büyük kısmının işyerlerinde kısa süredir çalıştığı (1-5 yıl)

ve katılımcıların büyük çoğunluğunun çalışan pozisyonunda (%82) olduğu görülmüştür (Tablo 2).

### Araştırma Değişkenlerinin Ortalama ve Standart Sapma Değerleri

Katılımcıların etik liderlik ve örgütsel güvenin alt boyutlarında yer alan önermelere vermiş oldukları cevaplar değerlendirildiğinde olumlu yönde görüş bildirdikleri söylenebilir (Tablo 3).

**Tablo 2.** Araştırmaya Katılanların Demografik Özellikleri

	Frekans	Yüzde		Frekans	Yüzde
<b>Cinsiyet</b>			<b>Medeni Durum</b>		
Erkek	126	63,0	Bekâr	106	53,0
Kadın	74	37,0	Evli	89	44,5
			Diğer	5	2,5
<b>Yaş</b>			<b>Eğitim Düzeyi</b>		
20-25	72	36,0	Lise	82	41,0
26-30	67	33,5	Ön Lisans	48	24,0
31-35	38	19,0	Lisans	49	24,5
36-40	17	8,5	Lisans Üstü	15	7,5
41-45	4	2,0	Diğer	6	3,0
46-50	1	0,5			
51 ve üzeri	1	0,5			
<b>Çalışma Süresi</b>			<b>Pozisyon</b>		
1-5 yıl	146	73,0	Üst düzey yönetici	8	4,0
6-10 yıl	24	12,0	Orta düzey yönetici	18	9,0
11-15 yıl	24	12,0	Alt düzey yönetici	10	5,0
16-20 yıl	6	3,0	Çalışan	164	82,0
21 yıl ve üstü	0	0,0			

**Tablo 3.** Araştırma Değişkenlerinin Ortalama ve Standart Sapma Değerleri

Değişkenler	Ortalama	S.S
Etik liderlik	3,48	0,747
Bilişsel Güven	3,28	0,742
Duygusal Güven	3,23	0,732

### Araştırma Değişkenlerine Ait Korelasyon ve Regresyon Değerleri

Araştırma değişkenleri olan etik liderlik ile örgütsel güvenin alt boyutları arasındaki ilişkiyi incelemek için yapılan korelasyon analizinde, etik liderlik ile örgütsel güvenin alt boyutları arasında pozitif yönlü istatistiksel olarak önemli ve anlamlı ( $p < .01$ ) ilişkilerin olduğu tespit edilmiştir (Tablo 4). Olumlu lider davranışı olarak görülen etik lider davranışlarının bireylerin bilişsel ve duygusal güvenlerinin gelişiminde önemli role sahip olduğu görülmüştür. Elde edilen bulgular doğrultusunda, işletmelerde etik lider davranışlarının çalışanların örgüte olan güven duygularını arttırdığı sonucu çıkarılabilir. Araştırmada bağımsız değişken olan etik liderlik ile bağımlı değişkenler olan bilişsel ve duygusal güven arasında yapılan regresyon analizi

sonuçlarına göre, etik liderliğin, örgütsel güvenin alt boyutları olan bilişsel güveni %53,6 ve duygusal güveni %50,4 düzeylerinde istatistiksel olarak anlamlı ve önemli düzeylerde açıklama gücüne sahip olduğu sonucuna ulaşılmıştır (Tablo 5). Yapılan literatür araştırmasında Xu vd., (2016: 493) tarafından gerçekleştirilen bir araştırmada etik lider davranışlarının örgütsel güven üzerinde olumlu yönde, önemli etkisinin olduğu bulunmuştur. Yine Akker vd., (2009: 116) ile Cemaloğlu ve Kılıncı (2012: 147) tarafından yapılan araştırmalarda da bu çalışmada elde edilen bulguları destekleyen sonuçlara ulaşılmış; araştırmacılar, etik liderliğin örgütsel güvenin oluşumunda önemli etkisinin olduğunu belirterek kurumların etik liderliğe önem vermeleri gerektiğini vurgulamıştır.

**Tablo 4.** Araştırma Değişkenlerinin Korelasyon Değerleri

Değişkenler	Bilişsel Güven	Duygusal Güven
Etik Liderlik	,732**	,710**

\*\* Korelasyon 0.01 düzeyinde anlamlıdır.

**Tablo 5.** Etik Liderlik ile Örgütsel Güvenin Alt Boyutları Regresyon Analizi

Değişkenler	Bilişsel Güven (p: 0,001)		Duygusal Güven (p: 0,001)	
	Beta	t	Beta	t
Etik Liderlik	,732 $\Delta R^2=,536$	15,122 F: 228,678	,710 $\Delta R^2=,504$	14,187 F: 201,270

## SONUÇ VE DEĞERLENDİRME

Sosyal bir varlık olan insanlar kendilerini belirli hedeflere taşıyacak bir lider etrafında birleşmeye ihtiyaç duyarlar. Kişiler hedeflerine ulaşmak için bir kişinin etkisinde kalıyor ve onu takip ediyorsa o toplulukta liderlik olgusundan söz edilebilir. Bu yüzden insan yaşamının her evresinde liderlik kavramı ile karşılaşmak mümkündür (Gündüz ve Dedekorkut, 2014: 95). Liderlik, bir kurumda hedeflerin belirlenmesinde ve bu hedeflere ulaşılmasında alınacak kararların neler olacağını ve çalışanlar arasında iş birliğini sağlayan bir yapıdır (Bakan, 2007: 104). Kurumlarda gözlenen farklı liderlik tarzları içerisinde önemi giderek daha çok artan etik liderler, etik davranışları ilke edinen, tarafsız davranan, kişilerin haklarını savunan ve çalışanlar üzerinde güven duygusu oluşturan kişilerdir (Teyfur vd., 2013: 85). Bireyler üzerinde genellikle olumlu bir etki bırakan etik liderler, etkin düşünme yöntemlerini kullanıp ilkeli ve dikkatli kararlar alarak doğruluk ve dürüstlük içinde hareket ederler (Brown vd., 2005: 117).

İşletmelerin, artan rekabet gücü ile başa çıkabilmeleri için kişi ve kurum arasında güvene ihtiyaç duyulduğundan örgüt içi güvenin oluşturulması gerekir (Huff ve Kelley, 2003: 81). Örgütsel

güven, iyi niyet ve dürüstlük üzerine kurulan ve bir kişinin ya da topluluğun başka bir kişi veya topluluğa yönelik olarak düşünce ve inanışlarıdır. Örgütsel güven, iyi niyetli çabaları içeren ve dürüstlük ilkesini benimseyen bir olgu olarak kabul edilir (Cummings ve Bromiley, 1996: 317). Sosyal yapılarda sağlıklı ilişkilerin devam ettirilmesinde temel faktör olan güven duygusu, bireylere olumsuz şartlar karşısında kendilerine daha fazla mücadele etme gücü katar (Asunakutlu, 2002: 2, 10).

İşletmeler için önemli kavramlar olan etik liderlik ve örgütsel güven arasındaki ilişkiler bu çalışmada incelenmeye çalışılmıştır. Bu kapsamda turizm sektöründe hizmet veren otel çalışanlarında bir anket uygulaması yapılmıştır. Araştırma bulguları sonucunda etik liderlik ile örgütsel güvenin alt boyutları olan bilişsel güven ve duygusal güven arasında pozitif yönlü istatistiksel olarak anlamlı ve önemli ilişkilerin olduğu görülmüştür. Yapılan regresyon analiz sonuçlarında etik liderliğin bilişsel güveni %53,6 ve duygusal güveni %50,4 düzeylerinde istatistiksel olarak etkileme ve açıklama gücüne sahip olduğu sonucuna ulaşılmıştır. Yapılan analiz sonuçlarına göre etik lider davranışlarının uygulanmasına önem verilen işletmelerde bireylerin çalıştıkları işletmelerine olan güven duygularının olumlu yönde etkilendiği ve arttığı ifade edilebilir. Elde edilen sonuçlar, bu konuda çalışmalar yapan araştırmacıların bulguları ile değerlendirildiğinde; Johnson vd. (2012: 3), Ertürk (2019: 119), Teyfur vd. (2013: 104) ve Pucetaite (2014: 234) tarafından yapılan araştırmalar ile desteklenmiş ve uyumlu bulunmuştur. Yine araştırmacılar tarafından; etik liderlerin çalışanlar için güvene dayalı bir çalışma ortamının yaratılmasında kilit rolünün olduğu (Engelbrecht, 2017: 377), güvenilir ve adil bir iş yeri yaratmak için etik lider yetiştirmenin önemli olduğu (Xu vd., 2016: 493) ve etik liderliğin, bireyler ile güvenilir bir ilişkinin kurulmasında önemli bir etkiye sahip olduğu belirtilmiştir (Akker vd., 2009: 116).

Yapılan araştırma ile elde edilen sonuçlar ve diğer araştırmacıların bulguları değerlendirildiğinde, çalışanlarda işletmelerine duyulan güvenin gelişmesinde etik liderlerin önemli bir etkisinin olduğu görülmektedir. Kurumlar için en önemli güç kaynakları olan çalışanlarda güven duygusunun oluşması işletmelerin varlığını sürdürmelerinde ve rakipleri ile rekabet edebilmelerinde önemli bir üstünlük sağlayacaktır. Bu yüzden kurum yöneticilerinin işletmelerinde lider konumundaki kişilerin etik lider davranışlarını ne düzeyde uyguladıklarını önemsemeleri gerekmektedir. Ayrıca kurumlar tarafından etik lider davranışlarının yerleşmesi için hangi uygulamaların yapılması gerektiği belirlenmelidir.

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**WHISTLEBLOWING, İŞE YABANCILAŞMA ÜZERİNDE NE DÜZEYDE  
ETKİLİDİR?**

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**ÖZET**

Çalışanların kurumlarında meydana gelen mesleki suiistimali, yetersizliği, ihmali veya tehlikeyi ortaya çıkaran bir davranış türü olan whistleblowing eylemi içsel ve dışsal boyutları ile riskler içeren bir faaliyettir. Çalışanlarda yalnızlık, güçsüzlük, anlamsızlık, memnuniyetsizlik ve duyarsızlaşma gibi duyguların yaşanmasına neden olan işe yabancılaşma ise bireyin, ürün ve süreç üzerindeki kontrolünü ve dolayısıyla işte kendini ifade etme kapasitesini kaybettiği durumlarda ortaya çıkan bir olgudur. Bu araştırmada kurumlarda çalışanların whistleblowing davranışlarının işe yabancılaşma duyguları üzerindeki etkisi incelenmiştir. Bu kapsamda turizm sektöründe çalışan yönetici ve çalışan konumundaki kişilerden anket tekniği ile veriler sağlanmıştır. Tesadüfî örneklem yönetimi ile elde edilen veriler SPSS istatistik program ile analiz edilmiş, korelasyon ve regresyon testleri ile önermeler arasındaki ilişkilerin yönü, düzeyi ve etkisi belirlenmeye çalışılmıştır. Korelasyon analizi sonuçlarına göre; whistleblowingin alt boyutu olan içsel ve dışsal ifşa ile işe yabancılaşma arasında negatif, kayıtsızlık ile işe yabancılaşma arasında ise pozitif yönlü önemli ilişkiler bulunmuştur. Bu bulgular doğrultusunda içsel ve dışsal ifşa yapan bireylerin işlerinde yabancılaşma duygularını yaşamadığı hatta işlerini benimsedikleri ifade edilebilirken, whistleblowing eylemine kayıtsız kalan kişilerin işlerine çok fazla önem vermediklerinden yabancılaşma duygularını daha derin hissettikleri sonucuna ulaşılmıştır.

**Anahtar Kelimeler:** Whistleblowing, İşe Yabancılaşma, Turizm.

**HOW EFFECTIVE IS WHISTLEBLOWING ON WORK ALIENATION?****ABSTRACT**

The act of whistleblowing, which is a type of behaviour that reveals professional misconduct, inadequacy, negligence or danger in the institutions of the employees, is an activity that includes risks with its internal and external dimensions. Experiencing feelings such as loneliness, powerlessness, meaninglessness, dissatisfaction and depersonalization in employees can cause work alienation in employees. Work alienation is a phenomenon that occurs when the individual loses his/her control over the product and process and thus the capacity to express himself/herself at work. In this study, the effect of whistleblowing behaviours of employees on their feelings of work alienation was examined in institutions. In this context, data were obtained from the managers and employees working in the tourism sector with the survey technique. The data obtained by random sampling management were analysed with the SPSS statistical program. With correlation and regression tests, the direction, level and effect of the relations between the propositions were tried to be determined. According to the results of the correlation analysis; negative relationships were found between internal and external disclosure, which is the sub-dimension of whistleblowing, and work alienation, and positive relationships were found between indifference and work alienation. In line with these findings, it was found that individuals who made internal and external disclosure did not experience feelings of work alienation and even adopted their jobs. However, it has been concluded that people who are indifferent to the whistleblowing act feel alienation more deeply since they do not attach much importance to their work.

**Keywords:** Whistleblowing, Work Alienation, Tourism.

## **GİRİŞ**

Kurumlarda ortaya çıkan birtakım olumsuz gelişmeler çalışanlar tarafından bazı yerlere aktarılabilmektedir. Literatürde whistleblowing olarak tanımlanan ifşa etme, tüm sektörlerde ortaya çıkabilecek bir olgudur. Bu kavram genellikle bir işletmedeki etik ve meşru olmayan bir eylem ve davranışın kurumun içindeki veya dışındaki bireylere iletilmesidir. Belirli bir enformasyona sahip olan, whistleblowingi gerçekleştiren kişi kurumda daha önce çalışmış veya hâlâ çalışan durumunda birisi olabilir (Aktan, 2015: 21). Tanımı konusunda net bir görüş birliği sağlanamayan whistleblowing kavramını bazı araştırmacılar sadece kurum içerisinde duyurulan davranışlar olarak ifade ederken, bazı araştırmacılar bu davranışın kurum dışına taşınması ile gerçekleştiğini ifade etmektedir. Genel olarak bireyin örgüt kaynaklarını kendisi için kullanması, hukuksuz davranışlar sergilenmesi ve ayrımcılık yapılması gibi davranışlar whistleblowing içerisinde değerlendirilen eylemlerdir (Esen ve Kaplan, 2012: 49). Kurumlarda yanlış uygulamaların önüne geçilmesi ve işletmelerin amaçlarına ulaşması bakımından önemli olan ifşa eylemi, risk taşıyan bir faaliyet olup, eylemi gerçekleştiren kişi hakkında bazen olumsuz bir algı oluşmasına ve yaptırımlara maruz kalmasına neden olabilmektedir (Kozak ve Şahin, 2018: 1; Dungan vd., 2019: 1).

Çalışanlarına değer veren, amaçların gerçekleştirilmesine yardımcı olan, moral ve motivasyon sağlayan bir yönetim tarzının benimsenmesinin bireysel ve örgütsel çıktılara olumlu olarak yansımaları beklenen bir durumdur. Ancak örgütte uygulanan yönetim tarzının çalışanlar tarafından olumsuz olarak değerlendirilmesinin bireylerin tutum ve davranışlarına olumsuz yönde yansımaları da muhtemel bir gelişmedir. Yani yönetim tarzının; bireylerin pozitif ve isteğe bağlı davranışlar sergilemesinin öncülü olabileceği gibi, iş tatminsizliği, işten ayrılma niyeti, üretkenlik karşıtı iş davranışları ve işe yabancılaşma gibi olumsuz çıktılara da yol açması beklenmektedir (Kanten ve Ülker, 2014: 17). İnsanlar, işlerinde hiçbir etkilerinin olmadığını ve özellikle kendilerini değersiz ve anlamsız hissettiklerinde bu durumun önemli olumsuz etkileri olur (Tummers ve Den Dulk, 2013: 850). Sanayileşme ile birlikte üzerinde en fazla durulan konulardan birisi olan işe yabancılaşma, çalışanın işi ile arasındaki bağın ortadan kalkması ya da azalmasıdır. İşe yabancılaşma yaşayan işletmeler, diğerlerinden daha dezavantajlı hale gelirler (Taştan vd., 2014: 132). Rekabet koşulları nedeniyle iş yaşamında yüksek düzeyde örgütüne bağlı, örgüt desteği ile birlikte performansını yükselten ve işine karşı yabancılaşma hissetmeyen çalışanlara daha fazla ihtiyaç duyulmaktadır (Çalışkan ve Pekkan, 2017: 29).

İnsanlığın yaratılışı ile var olduğu düşünülen yabancılaşma olgusunun en çok görüldüğü alanlardan birisi çalışma ortamlarıdır. Örgütteki bireyler, olumsuz olarak algıladıkları birtakım

durum ve olayların etkisiyle örgüt içerisinde kendilerini güçsüz ve değersiz hissetmekte, zamanla işlerinden, diğer çalışanlardan ve kendilerinden uzaklaşmaktadır. İşletmeler açısından büyük ölçüde bir iş gücü kaybı yaratan bu durum, kurumlarda etkinliği ve verimliliği azaltmakta, örgütsel faaliyetlerin başarısızlıkla sonuçlanmasına yol açabilmektedir. Özellikle nitelikli çalışanlarda oluştuğunda, örgütün performansını ciddi boyutta olumsuz yönde etkileyebilecek bir sorun olan yabancılaşma, iş görenlerin işine ve kurumuna karşı soğukluk hissederek uzaklaşması durumudur (İrdem, 2021: 274). Yapılan bu araştırmada işletmelerde etik, ahlak ve yasalara uymayan davranışların içerdeki veya dışardaki kişilere iletilmesi olarak (Kozak ve Şahin, 2018: 1) ifade edilen whistleblowing ile bireyin işi üzerindeki kontrolünü ve dolayısıyla kendini ifade etme kapasitesini kaybettiği durum olarak (Mendoza ve Lara, 2007: 57) tanımlanan işe yabancılaşma arasındaki ilişki incelenmiştir.

### **WHISTLEBLOWING KAVRAMI**

Örgütlerde ortaya çıkan yanlış davranışlar kuruma, çalışanlara ve müşterilere zarar verebilir. Kurum çalışanları, işyerlerindeki yanlışları bulmak ve bildirmek için kuruluş tarafından etkin bir şekilde yönlendirildiğinde yanlışlar azaltılabilir ya da zamanla düzeltilebilir. Whistleblowing (ifşa etme), yanlış davranışların (yasadışı, ahlak dışı veya gayri meşru uygulamalar) mevcut veya eski örgüt üyeleri tarafından ifşa edilmesidir. İfşa edenlerin karşı karşıya kaldığı olumsuz misilleme nedeniyle çalışanlar iş arkadaşlarının yanlış davranışlarını ihbar etme konusunda isteksizlik yaşadığında kurumlar, yanlışlarını kendi kendilerine düzeltme fırsatını kaçırmaları. Ayrıca çalışanlar tarafından bu durum dışarıdaki kişiler ile paylaşıldığında, potansiyel olarak kuruluşların itibarı zedelenebilir veya yasal maliyetlere maruz kalınabilir. Bu yüzden whistleblowing davranışına çalışanların nasıl teşvik edileceği örgütsel etik yönetimi açısından önemli bir konudur (Zhou vd., 2018: 197).

Kurumlarda meydana gelen mesleki suiistimali, yetersizliği, ihmali veya tehlikeyi ortaya çıkaran kişilerin davranışı olan whistleblowing eylemi içsel ve dışsal boyutları ile riskler taşıyan faaliyettir. Bu nedenle bireyin, ifşa kararı alması asla kolay olmayıp yasal bir bildirim zorunluluğu olmadığı sürece her şey başarısız olduğunda atılacak bir adım olarak düşünülmelidir. Çalışanların, gördüğü bir yanlış düzeltmek için dışsal bir ifşada bulunmadan önce organizasyon içindeki tüm kanalları kullanması ve başarısız olması gerekir (Ray, 2006: 438). İçsel ifşa genellikle sağduyulu bir yaklaşım ile yönetimde gücü olan kişilerin dikkatini çekmeyi amaçlamaktadır. Kurumların içsel ifşaları teşvik etmesi ve bunlara yanıt vermesi dışsal ifşaları önleyebilir veya azaltabilir (Jubb, 1999: 91). İşletmelerde yönetici konumundaki kişiler tarafından bir ifşa politikası

belirlenebilir ve uygulanabilir. Ancak elde edilen bilgiler denetim komitesine veya yönetim kuruluna aktarılmalıdır. Bu aşamalarda bilgiyi ifşa eden kişinin gizliliğinin korunması ve bilginin doğruluğu önemlidir. Kurumlar ortaya konulan iddiaları araştırmalı, değerlendirmeli ve gerektiğinde yaptırımlar uygulamalıdır (Eaton ve Akers, 2007: 70).

Whistleblowing, kurum içine veya kurum dışına yönelik olarak yapıldığında farklı şekillerde değerlendirilebilmektedir. Kurumsal yanlışın dışarıdaki bir alıcıya ifşa edilmesi sadakatsizlik olarak görülürken, dâhili bir alıcıya ifşa edilmesi sadakat olarak görülebilmektedir (Andrade, 2015: 321). Çalışanlar, kuruluşlar ve genel olarak toplum üzerindeki whistleblowing etkisi tartışmalı olsa da topluma sağladığı faydaları nedeniyle yükselişte olan ve sosyal açıdan önemli bir eylem tarzıdır. Nasıl, neden, kim tarafından, ne oldu ve kime sorularının cevabı ifşa etmenin kapsamı içerisindedir. İfşa etmenin toplum, kurum ve yöneticiler açısından olumsuz sonuçları olabileceğinden yöneticiler ifşa etmenin farklı özelliklerini iyi anlamalı, oluşabilecek yanlış davranışı önlemek veya zararını en aza indirmek için konunun tüm yönlerini dikkatlice değerlendirmelidir (Culiberg ve Mihelic, 2017: 787-799). İfşa edicilerin bireysel farklılıklarına bağlı olarak whistleblowing eylemlerinin sonucunda farklı çıktılar elde edilebilir (Watts ve Buckley, 2017: 671). İfşacının gücü, organizasyondaki otorite düzeyine ve durumdaki rolüne bağlıdır. İfşa edici, örgütte denetçi pozisyonunda ise daha fazla yetki ve resmi güce sahip olduğundan diğerlerini etkilemede daha başarılıdır ve başkalarının bu kişiye misilleme yapma olasılığı daha düşüktür (Rehg vd., 2008: 225).

Sisteme sempati duyan ve kurumlarına bağlı kişiler olarak tanımlanan whistleblowerler (ifşa ediciler), genellikle güçlü bir şekilde sorgulayabilen, kuruluşuna hizmet etmeye çalışan, iyilikle uyumlu bir duruşa sahip olan ve kilit bilgileri elinde tutan kararlı kişilerdir (Lemoine ve Michael, 2021: 5). İfşa edenler, etik olmayan davranışların potansiyel olumsuz sonuçlarına karşı ifşa etmenin faydalarını göz önünde bulundurlar. Ancak ifşa etme süreci bir dizi zor kararı içerir. Whistleblower (ifşa ediciler), içerisinde bulunduğu kuruluşa karşı yapılan yanlışları bildirdiğinde üstü kapalı bir gerilimle karşı karşıya kalabilir ve bu süreçte işini kaybetme tehlikesi ile yüz yüze gelebilir (McGlynn ve Richardson 2014: 14).

Kurumlarda, etik dışı davranışların belirlenmesi ve hilelerin ortaya çıkarılmasında önemli bir araç olan whistleblowing bazen kahramanca görünürken bazen de kınanabilir (Uyar ve Yelgen, 2015: 102; Dungan vd., 2010: 129). İş yaşamında giderek daha fazla yaygınlaşmaya başlayan ifşa etme davranışları çalışanlara ve müşterilere zarar verecek uygulamaların durdurulmasında yardımcı olabilmektedir. Ancak ifşa edenlerin misillemeden korkması ve hatta buna maruz kalması cesaretlerini kırabilmektedir (Magnus ve Viswesvaran, 2005: 295). Bazı durumlarda bir çalışan

tarafından kurumun herhangi yasa dışı veya gayri meşru bir eylemi açıklandığında bu durum yasal işlem ile sonuçlanabilir. Bir kişi whistleblowing (ifşa etme) yapmaya karar verdiğinde; yanlış yapmanın ciddiyetini ve ifşa etmeden böyle bir faaliyeti durdurmanın mümkün olup olmadığını düşünmeli, suçu kime bildirmesi gerektiğine karar vermelidir. Çalışanlar yanlış davranışları tespit edebilecek en iyi kişilerdir. Bu nedenle çalışanlar, bu tür eylemleri zamanında bildirmeye teşvik edilmelidir. Çünkü böyle bir davranış, kurumu herhangi bir zararlı faaliyete karşı koruyabilir (Dasgupta ve Kesharwani, 2010: 12).

### **İŞE YABANCILAŞMA KAVRAMI**

İşletmelerin yoğun rekabet ortamına uyum sağlayabilmeleri ve varlıklarını sürdürebilmeleri oldukça zordur. Yaşanan bu zor rekabet koşulları, kuruma ve bireylere yeni sorumluluklar yüklediğinden bu durum çalışanların kendi benliklerinden yavaş yavaş kopmasına ve uzaklaşmasına neden olabilmektedir (Örücü vd., 2021: 602). Organizasyonların sahip oldukları çalışanlar en önemli sermayeleridir. Bu sermayeden en doğru şekilde faydalanabilmek için çalışanların verimliliğini ve etkinliğini artırabilecekleri ortam ve koşulların sağlanması gerekmektedir. İşletmelerin geleceklerini doğrudan etkileyen ve kurumu başarıya götürecek kişi olan çalışanların önemi özellikle son yıllarda ortaya çıkan rekabetçi iş ortamları ve koşulları nedeniyle daha da büyük önem taşımaktadır. Örgütün hedeflerine ulaşmasında önemli bir fonksiyona sahip olan bireyler, bazı faktörlerin etkisine bağlı olarak işe yabancılaşma duygusu yaşayabilmektedir. Çalışanın işe yabancılaşması, fiziksel ya da psikolojik anlamda kendisini kurumdan soyutlaması veya uzaklaştırmasıdır. Bireylerin motivasyon ve çalışma isteğini olumsuz yönde etkileyen işe yabancılaşma, zamanla daha da derinleşerek işten ayrılmalara neden olabilmektedir. Bu nedenle kurumlar tarafından işe yabancılaşmaya neden olan faktörlerin belirlenmesi önemlidir (Demirez ve Tosunoğlu, 2017: 69-80).

İşletmelerde hizmet kalitesinin en temel belirleyicisi olan çalışanların; kurumunun temel politikalarına ve stratejilerine güvenmesi, diğer çalışanlarla ilişkilerinde yardımlaşma ve dayanışma duygularına sahip olması önemlidir. Çalışanların yaşayacağı olumsuz gelişmeler çalışan verimliliğinin düşmesine, örgüt içi çatışma ortamının doğmasına ve özellikle çalışanların işe yabancılaşmasına neden olabilmektedir (Aşık, 2018: 32). Bireyler, iş özerkliklerine sınır getirildiğinde güçsüzlük ile birlikte anlamsızlık ve kendine yabancılaşma duygularını da yaşayabilirler (Sarros vd., 2002: 287). İşletmelerin en önemli girdisi olarak görülen çalışanların yabancılaşma olgusunu yaşamaları kurumu olumsuz yönde etkileyen pek çok sorunu ortaya çıkarmaktadır. Yabancılaşan bir kişi kendisini mutsuz hissetmekte, fiziksel ve zihinsel yönden

kendini geliştirememekte, çalışmalarını basit ve monoton bir döngü olarak görmektedir (Korkmazer ve Ekingen, 2017: 468).

Bireylerin iş yükünün fazla olması, katı hiyerarşik yapılar, işin özellikleri ve çalışanların karar alma süreçlerine katılamaması gibi faktörler bireyi işinden soyutlayabilmektedir. Ayrıca bireyin, rolünün ne olduğu konusunda belirsizlik yaşaması işle ve örgütle bağlarını zayıflatabilir. Aynı zamanda işe yabancılaşma, bireye psikolojik yönden zarar vererek iş doyumunu da azaltabilir (Atay ve Gerçek, 2017: 322). Yabancılaşma benlik kaybı, umutsuzluk, yalnızlık, güçsüzlük, ayrılma, kayıtsızlık, kaygı, tecrit, anlamsızlık, hoşnutsuzluk, memnuniyetsizlik ve duyarsızlaşma duyguları şeklinde kendisini gösterebilmektedir. İşe yabancılaşma kişinin iş arkadaşlarıyla olan sosyal ilişkilerindeki memnuniyetsizliği ve amirlerinden memnun olmaması sonucu da oluşabilir (Hoy, 198: 110). Yabancılaşma diğer insanlardan, kişinin değerlerinden, benlikten ve genel olarak topluma bağlayan kısımlardan uzaklaşma hissini kapsar. Yabancılaşma, sinir bozucu bir durumun sonucunda da oluşabileceğinden zihinsel sağlığı zayıf olan bireylerde daha hızlı ve kolay görülebilir. İşe yabancılaşma nereden kaynaklanmış olursa olsun bireylerin tutumlarını ve sosyal davranışlarını etkileyebilmektedir. Bu sadece bireyin genel sosyal hayatı için değil mesleği ile ilgili sosyal hayatı için de geçerlidir (Yadav ve Nagle, 2012: 338).

Bireylerin yabancılaşması, sadece siyasal ve ekonomik temelli ilişkilerde bozulma olmayıp bütün ilişkilerde de bir bozulmayı kapsayabilir. Gelişen bu bozulmanın sonucunda, bireyler kendi benliklerine uygun olmayan biçimde yaşamak durumunda kalabilirler (Tuna ve Yeşiltaş, 2014: 108). Çalışanlar, daha fazla sorumluluk ve daha zorlu görevler üstlenmeye istekli olsalar da artan beklentileri karşılanmadığında işlerine yabancılaşabilirler. İşe yabancılaşma kritiktir çünkü yabancılaşmış çalışanlar işlerini çok az önemserler, işlerine çok az enerji harcarlar ve işleri yalnızca dışsal ödüller için yaparlar (Ramaswami vd., 1993: 179). İşe yabancılaşma, bir kişinin iş dünyasından duygusal, psikolojik ve aktivasyon olarak ne ölçüde koptuğunu temsil eder (Hirschfeld ve Feild, 2000: 792).

Yabancılaşma duygusunu yaşayan bir çalışan, bilişsel ve duygusal anlamda yaptığı işle bağımlı koparabileceğinden yabancılaşmanın önlenmesi için örgütsel düzeyde bazı müdahalelerin yapılması önem kazanmaktadır. Yabancılaşmayı azaltmak için; bireyin yaptığı işin değiştirilmesi ve zenginleştirilmesi, çalışma saatlerinin esnekleştirilmesi, bağımsız çalışma gruplarının oluşturulması, etkili bir iletişimin kurulması, işyerinde sağlıklı ve güvenli bir iş ortamının sağlanması ve işle ilgili süreçleri geliştirme konusunda çalışanın katılımının teşvik edilmesi gibi uygulamalar örgütsel düzeyde yapılabilir (Korkmazer ve Ekingen, 2017: 469). Ayrıca yorucu çalışma koşullarının iyileştirilmesi, terfi ve ödül sistemlerinin geliştirilmesi, monotonluğun



azaltılması, çalışanların kendi aralarındaki ve yönetimle olan ilişkilerinin güçlendirilmesi, çalışana güven duyulması ve takdir edilmesi yardımcı olabilecek faaliyetlerdir (Aşkın, 2018: 38).

### **WHISTLEBLOWING ve İŞE YABANCILAŞMA İLİŞKİSİ**

Yapılan literatür taramasında whistleblowing ve işe yabancılaşma arasındaki ilişkiyi doğrudan araştıran bir çalışmaya ulaşılamamıştır. Whistleblowing ve işe yabancılaşma arasındaki ilişkiyi inceleyen bu araştırmanın bu yönüyle literatüre önemli katkı sağlayacağı düşünülmektedir. Garrick (2017: 40) tarafından yapılan bir araştırmada ifşa edicilerin (whistleblower) kurumdaki çalışanlar tarafından misillemeye, ayrımcılığa ve izolasyona uğrayabileceği ancak bunu ifşa edicilerin anlayabileceği belirtilmiştir. Yapılan diğer bir araştırmada whistleblowing eyleminde bulunan kişilerin yanlışları bildirmeleri halinde çalışanlar tarafından dışlanmaya maruz kalacaklarının farkında oldukları ifade edilmiştir (Watts ve Buckley, 2017: 675). Kurumlarda gizlilik kültürünün yerleşmemesi, kamu otoritelerinin hesap vermemesi, işleyişin açık olmaması ve gücün kötüye kullanılmasının yolsuzluğun artmasına neden olacağı, whistleblowing gibi serbest bilgi akışının kısıtlanması ile de bireylerde güçsüzlük ve yabancılaşma duygularının filizleneceği belirtilmiştir (Jacob, 2014: 1).

İfşa edicilerin dışlanması ve sözlü veya fiziksel tacizle karşılaşılması çoğunlukla whistleblowing konusunun ve ifşa edenin gerçek niyetinin anlaşılması ve önyargılı meslektaşların desteğinin olmamasından kaynaklanabilmektedir. Çalışanların misilleme ile karşılaşma ve yönetimden güvence alamama korkusu, suiistimalleri bildirmekten kaçınmalarına neden olabilmektedir (Ahmad ve Shariff, 2009: 6). Yapılan başka bir çalışmada ise ifşa edicilere kurumları tarafından destek verilip verilmemesine bağlı olarak yabancılaşma yaşanabileceğinden bu konuda daha fazla araştırma yapılmasının faydalı olacağı sonucuna ulaşılmıştır (McGlynn ve Richardson, 2014: 232). Dolayısıyla literatür bilgilerinden de anlaşılacağı gibi whistleblowing eyleminde bulunan bireylerin işe yabancılaşma yaşayıp yaşamadığına yönelik araştırmalar yapılmamış olup, diğer bireylerin bu kişilere yönelik duygu ve düşünceleri ile bu kişilerin olası maruz kalabileceği eylemlerin belirlenmesine yönelik araştırmalar yapılmıştır. Ancak, literatürde whistleblowing faaliyetinin yabancılaşma ile sonuçlanabileceği yönünde görüşler olduğu da görülmektedir (Jacob, 2014: 1). Bu araştırmaya orijinallik kazandıracak unsur, whistleblowing faaliyetinde bulunan bireyin bu eyleminin sonucunda işe yabancılaşma duygusunu yaşayıp yaşamadığını belirlemeye yönelik olması ve bu iki değişken arasındaki ilişkiyi detaylı şekilde inceleyen bir çalışmanın literatürde bulunamamasıdır. Ayrıca, bu çalışmada whistleblowing davranışı çok boyutlu (içsel ifşa, dışsal ifşa ve kayıtsızlık) olarak ele alınmış olup, ifşa eyleminin (içsel veya

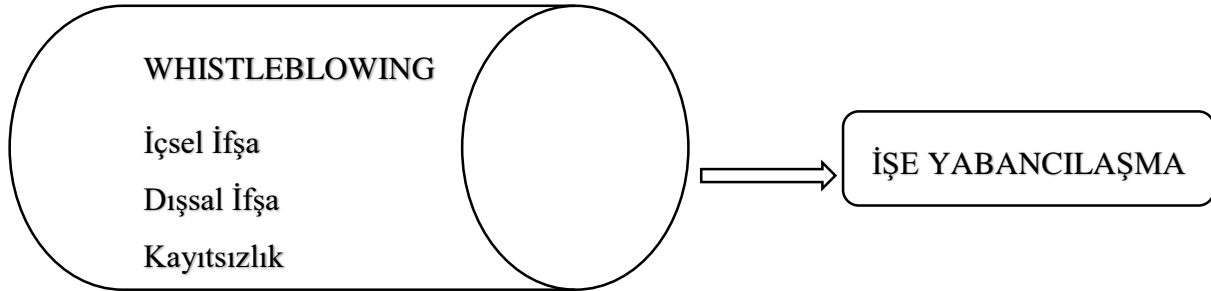
dışsal) ve kayıtsızlığın, çalışanın yabancılaşma davranışını ne yönde etkilediğinin de açığa çıkarılması amaçlanmaktadır.

### **ARAŞTIRMANIN AMACI**

Bu araştırmada, işletmelerdeki olumsuz gelişmeleri ifşa etme olarak tanımlanan whistleblowing ile bireylerde umutsuzluk, yalnızlık, güçsüzlük, kayıtsızlık, memnuniyetsizlik ve duyarsızlaşma gibi duygular ile ortaya çıkan işe yabancılaşma arasındaki ilişkinin incelenmesi amaçlanmıştır. Yapılan literatür taramasında bu iki değişken arasındaki ilişkiyi inceleyen kapsamlı bir çalışmaya ulaşılamamıştır. Araştırmada whistleblowing faaliyetinde bulunan bireylerin işe yabancılaşma duygusunu yaşayıp yaşamadığı belirlenerek bu alanda literatüre bilimsel katkı sağlanması hedeflenmiştir.

### **ARAŞTIRMANIN MODELİ ve HİPOTEZLER**

Araştırma, Nevşehir ilinde turizm sektöründe çalışanların whistleblowing davranışlarının işe yabancılaşmaya etkisini belirlemek amacıyla taşıdığından ilişkisel tarama modeli seçilerek hazırlanan model doğrultusunda aşağıdaki hipotezler oluşturulmuştur (Şekil 1).



**Şekil 1.** Araştırmanın Modeli

**H1:** Whistleblowingin alt boyutu olan içsel ifşa, işe yabancılaşmayı negatif yönde etkiler.

**H2:** Whistleblowingin alt boyutu olan dışsal ifşa, işe yabancılaşmayı negatif yönde etkiler.

**H3:** Whistleblowingin alt boyutu olan kayıtsızlık, işe yabancılaşmayı pozitif yönde etkiler.

### **ARAŞTIRMANIN YÖNTEMİ ve KULLANILAN ÖLÇEKLER**

Whistleblowing ve işe yabancılaşma arasındaki ilişkiyi araştırmak için araştırma verilerini elde etmek amacıyla Nevşehir ilinde turizm sektöründe yönetici ve çalışan konumundaki kişilerde anket uygulaması yapılmıştır. Anket tekniği ile elde edilen verilerin sağlıklı olması için katılan

bireylerden onları tanımlayacak hiçbir özel bilgi istenmemiştir. Whistleblowing ve işe yabancılaşma önermeleri; “1 Kesinlikle Katılmıyorum”, “2 Katılmıyorum”, “3 Kararsızım”, “4 Katılıyorum” ve “5 Kesinlikle Katılıyorum” ifadelerinden oluşan 5 aşamalı Likert ölçeği ile değerlendirilmiştir. Elde edilen verilerin analizi SPSS adlı program ile yapılmış, anketlerde kullanılan ölçeklerin güvenirliliği Cronbach’s Alfa ile test edilmiştir. Korelasyon ve regresyon analizleri ile değişkenler arasındaki ilişkilerin düzeyi, yönü ve etki derecesi belirlenmiş, bulgular yorumlanmış ve araştırmanın bulguları oluşturulmuştur.

Whistleblowing ölçmek için Park vd. (2005: 394)’nin geliştirdiği üç alt boyut (dışsal ifşa, içsel ifşa ve kayıtsızlık) ve 9 önermeden oluşan ölçekten faydalanılmıştır. Ölçek; “Örgüt içindeki resmi raporlama kanallarını kullanırım”, “İç prosedürleri kullanarak rapor ederdim” ve “Kötülük hakkında sessiz kalırdım” gibi önermeleri içermektedir. Park vd. (2005: 394) tarafından oluşturulan ölçek Chamberlin vd. (2017: 38) ve Nayir ve Herzig (2012: 205) tarafından kullanılmış ve güvenilir bulunmuştur. İşe yabancılaşmayı ölçmek için Hirschfeld ve Feild (2000: 791) tarafından oluşturulan ölçek tek boyut altında 10 önermeden oluşmaktadır. Ölçek; “Çalışmanın ne işe yaradığını merak ediyorum”, “İş hayatının çoğu anlamsız faaliyetlerde boşa harcanıyor” ve “ İş ile ilgili büyük bir heves göstermeyi gereksiz görüyorum” gibi önermeleri içermektedir. Hirschfeld ve Feild (2000: 791) tarafından geliştirilen işe yabancılaşma ölçeği Kurtulmuş ve Karabıyık (2016: 464); Tuna ve Yeşiltaş (2014:109) ve Tokmak (2014: 144) tarafından yapılan araştırmalarda da kullanılmış ve güvenilir bulunmuştur.

## **BULGULAR**

### **Araştırmanın Güvenirliliği**

Araştırma değişkenleri olan whistleblowing ve işe yabancılaşma ölçeklerinin güvenirliliği Cronbach’s Alfa ile ölçülmüştür. Tavakol ve Dennick (2011: 54) tarafından Cronbach’s Alfa değerleri 0,70 ve üzerinde ( $0,70 \leq \alpha \leq 1$ ) olduğunda güvenilir olarak değerlendirilmektedir. Araştırmada yer alan whistleblowing ve işe yabancılaşma değişkenlerinin Cronbach’s Alfa değerleri 0,797-0,911 arasında bulunduğundan ölçekler güvenilir kabul edilmiştir (Tablo 1).

**Tablo 1.** Araştırmada Kullanılan Ölçeklerin Güvenirlik Değerleri

<b>Değişkenler</b>	<b>Önerme Sayısı</b>	<b>Cronbach’s Alfa</b>
İçsel İfşa	4	0.797
Dışsal İfşa	3	0.909
Kayıtsızlık	2	0.799
İşe Yabancılaşma	10	0,911

### Kişilerin Demografik Özelliklerine İlişkin İstatistikler

Katılımcıların demografik özellikleri ile (cinsiyet, yaş, medeni durum, eğitim durumu, çalışma süresi ve işletmedeki pozisyonları) ilgili bulgular Tablo 2’ de verilmiştir. Araştırmanın yapıldığı turizm sektöründe yer alan katılımcılardan yaklaşık her üç kişiden ikisinin erkek ve 20-45 yaş aralığındaki bireylerin çoğunlukta olduğu görülmüştür. Katılımcıların, eğitim durumları incelendiğinde lise ve ön lisans mezunlarının ilk sıralarda yer aldığı, çalışma sürelerinin genellikle 10 yıldan daha az ve yarısının çalışan (yönetici konumunda bulunmayan) konumunda olduğu görülmüştür (Tablo 2).

**Tablo 2.** Araştırmaya Katılanların Demografik Özellikleri

	Frekans	Yüzde		Frekans	Yüzde
<b>Cinsiyet</b>			<b>Medeni Durum</b>		
Erkek	128	64.0	Bekâr	99	49.5
Kadın	72	36.0	Evli	94	47.0
			Diğer	7	3.5
<b>Yaş</b>			<b>Eğitim Düzeyi</b>		
20-25	66	33.0	Lise	63	31.5
26-30	50	25.0	Ön Lisans	77	38.5
31-35	28	14.0	Lisans	36	18.0
36-40	18	9.0	Lisans Üstü	11	5.5
41-45	15	7.5	Diğer	13	6.5
46-50	17	8.5			
51 ve üzeri	6	3.0			
<b>Çalışma Süresi</b>			<b>Pozisyon</b>		
1-5 yıl	83	41.5	Üst düzey yönetici	19	9.5
6-10 yıl	69	34.5	Orta düzey yönetici	43	21.5
11-15 yıl	31	15.5	Alt düzey yönetici	38	19.0
16-20 yıl	11	5.5	Çalışan	100	50.0
21 yıl ve üstü	6	3.0			

### Araştırma Değişkenlerinin Ortalama ve Standart Sapma Değerleri

Katılımcıların whistleblowingin alt boyutu olan içsel ifşaya katılıyorum ifadesine ve dışsal ifşaya kararsızıma daha yakın düzeylerde olumlu yönde, kayıtsızlık alt boyutuna ise katılmıyorum ifadesine daha yakın düzeyde olumsuz yönde görüş bildirdikleri görülmüştür. Yine iş yabancılaşma ifadelerine kararsızıma daha yakın olmak üzere olumsuz yönde görüş ifade ettikleri söylenebilir (Tablo 3).

**Tablo 3.** Araştırma Değişkenlerinin Ortalama ve Standart Sapma Değerleri

Değişkenler	Ortalama	S.S
İçsel İfşa	3.65	0.867
Dışsal İfşa	3.07	1.198
Kayıtsızlık	2.39	1.154
İşe Yabancılaşma	2,79	0,904

### Araştırma Değişkenlerine Ait Korelasyon ve Regresyon Değerleri

Korelasyon analizi bulgularına göre; whistleblowingin alt boyutu olan içsel ifşa (-0,282\*\*) ve dışsal ifşa (-0,327\*\*) ile işe yabancılaşma arasında negatif yönlü olmak üzere istatistiksel olarak anlamlı ( $p < .01$ ) ve önemli ilişkilerin olduğu sonucuna ulaşılmıştır. Whistleblowingin alt boyutu olan kayıtsızlık ile işe yabancılaşma arasında pozitif yönlü (0,395\*\*) istatistiksel olarak anlamlı ( $p < .01$ ) ve önemli düzeyde ilişki görülmüştür (Tablo 4).

Regresyon analizi sonuçlarına göre whistleblowingin alt boyutu olan içsel ifşa işe yabancılaşmayı %7,9 ve dışsal ifşa ise yabancılaşmayı %10,7 düzeyinde etkileme gücüne sahip olduğu tespit edilmiştir. Whistleblowingin alt boyutu olan kayıtsızlığın ise işe yabancılaşmanın artmasını %15,6 düzeyinde etkileme ve açıklama gücüne sahip olduğu görülmüştür (Tablo 5). Bu bulgular doğrultusunda whistleblowing davranışları olan içsel ifşa, dışsal ifşa ve kayıtsızlık davranışlarının işe yabancılaşma davranışını etkiledikleri ancak whistleblowing davranışının alt boyutlarının işe yabancılaşma üzerinde farklı yönde (pozitif ve negatif) ve düzeyde etkiler oluşturduğu sonucuna ulaşılmıştır. Araştırma bulguları sonucunda whistleblowing davranışlarından olan içsel ifşa ve dışsal ifşa eylemlerinde bulunan kişiler işlerine yabancılaşma duygusu yaşamazken, işletmede gelişen olaylara kayıtsız kalan kişilerin işe yabancılaşma duygusunu yüksek düzeyde yaşadıkları gözlenmiştir. Elde edilen verilerden içsel ve dışsal ifşa eyleminde bulunan kişilerin işlerini benimsedikleri, önem verdikleri ve bundan dolayı bu eylemde buldukları; kayıtsız kalan kişilerin ise tam tersi yönünde işlerini benimsemedikleri ve işlerine yabancılaştıklarından işletmelerinde gelişen bazı olumsuz olayları görmezlikten gelerek kayıtsız kaldıkları çıkarımı yapılabilir.

Yapılan literatür araştırmasında whistleblowing ile işe yabancılaşma arasındaki ilişkiyi doğrudan inceleyen bir çalışmaya ulaşılamamıştır. Ancak konuya yakın çalışmalar incelendiğinde; ifşa edicilerin (whistleblower) kurumdaki çalışanlar tarafından misillemeye, ayrımcılığa ve izolasyona uğrayabileceği ancak bunu ifşa edicilerin anlayabileceği belirtilmiştir (Garrick, 2017: 40). Yine whistleblowing eyleminde bulunanların yanlışları bildirmeleri halinde dışlanma gibi olası olumsuz sonuçların farkında oldukları ancak ifşayı ahlaki bir davranış olarak gördükleri ifade edilmiştir (Watts ve Buckley, 2017: 675). İfşa edicilerin kendilerine kurumları tarafından

destek verilip verilmemesine bağlı olarak yabancılaşma yaşayabileceklerinden bu konuda daha fazla araştırmanın yapılması önerilmiştir (McGlynn ve Richardson, 2014: 232). Dolayısıyla, bu çalışmada önemli bulgular elde edilmiş olup, bu bulguların geliştirilebilmesi için whistleblowing davranışının işe yabancılaşma üzerindeki etkisi incelenirken, örgütsel destek değişkeninin aracı etkisinin incelenmesi faydalı ve doğru bir yaklaşım olacaktır.

**Tablo 4.** Araştırma Değişkenlerinin Korelasyon Değerleri

Değişkenler	İçsel İfşa	Dışsal İfşa	Kayıtsızlık
İşe Yabancılaşma	-,282**	-,327**	,395**

\*\* Korelasyon 0.01 düzeyinde anlamlıdır.

**Tablo 5.** Whistleblowing Alt Boyutları ile İşe Yabancılaşma Regresyon Analizleri

Değişkenler	İçsel İfşa (p: 0,001)		Dışsal İfşa (p: 0,001)		Kayıtsızlık (p: 0,001)	
	Beta	t	Beta	t	Beta	t
İşe Yabancılaşma	-,282 $\Delta R^2=,079$	-4,134 F: 17,087	-,327 $\Delta R^2=,107$	-4,867 F: 23,689	,395 $\Delta R^2=,156$	6,056 F: 36,673

## SONUÇ ve DEĞERLENDİRME

İşletmelerde çalışanlara, kuruma ve müşterilere zarar verebilen bazı yanlış davranışlar ortaya çıkabilir. Çalışanlar, işyerindeki yanlışları bulmak ve bildirmek için yönlendirildiğinde (kurum tarafından veya yönetici düzeyinde) daha büyük sorunların önleneme veya düzeltilme imkânı olabilir. Whistleblowing (ifşa etme), yasadışı veya ahlak dışı yanlış davranışların mevcut veya eski örgüt üyeleri tarafından ifşa edilmesidir Zhou vd., 2018: 197). Kurumlarda ortaya çıkan suiistimali, ihmali veya tehlikeyi ortaya çıkaran bireylerin bir davranışı olan whistleblowing içsel ve dışsal boyutları ile riskler taşıyan bir eylemdir (Ray, 2006: 438).

Yabancılaşma ise umutsuzluk, yalnızlık, güçsüzlük, kayıtsızlık, kaygı, tecrit, anlamsızlık, hoşnutsuzluk, memnuniyetsizlik ve duyarsızlaşma duygularını içeren bir duygu halidir. İşe yabancılaşma bireyin, diğer çalışanlara kıyasla göreceli konumu, büyüme ve gelişme fırsatları, iş arkadaşlarıyla olan sosyal ilişkilerindeki sorunları, amirlerinden ve meslektaşlarından memnun olmaması sonucu oluşabilmektedir (Hoy, 198: 110). Kişinin, işe yabancılaşması nereden kaynaklanmış olursa olsun tutumlarını ve sosyal davranışlarını etkileyebilmektedir (Yadav ve Nagle, 2012: 338). Bu kapsamda whistleblowing davranışı ile işe yabancılaşma arasında bir ilişkinin olup olmadığını belirlemek amacı ile turizm sektöründe bu araştırma yapılmıştır.

Yapılan araştırma verileri ve verilerin analizleri sonucunda; whistleblowingin alt boyutu olan içsel ifşa ve dışsal ifşa ile işe yabancılaşma arasında negatif yönlü; kayıtsızlık ile işe yabancılaşma

arasında pozitif yönlü olmak üzere istatistiksel olarak anlamlı ve önemli ilişkilerin olduğu sonucuna ulaşılmıştır. Regresyon analizi sonuçlarına göre whistleblowingin alt boyutu olan içsel ifşanın işe yabancılaşmayı %7,9 düzeyinde ve dışsal ifşanın %10,7 düzeyinde işe yabancılaşmayı negatif olarak etkilediği görülmüştür. Whistleblowingin alt boyutu olan kayıtsızlığın ise işe yabancılaşmanın artmasını %15,6 düzeyinde etkileme ve açıklama gücüne sahip olduğu bulgusuna ulaşılmıştır. Elde edilen bulgular whistleblowing davranışları olan içsel ifşa, dışsal ifşa ve kayıtsızlık ile işe yabancılaşma arasında farklı etkileşimlerin olduğunu göstermiştir. Whistleblowing eylemini içsel ve dışsal ortamlarda yapan kişilerin işe yabancılaşma duygusu yaşamadığı ve hatta tersi yönde işe yabancılaşmalarının azaldığı, işletmelerde olumsuz şekilde gelişen olaylara kayıtsız kalan kişilerin işe yabancılaşma duygusunu yüksek düzeyde yaşadığı gözlenmiştir. Bu bulgulardan işlerini benimseyen ve önemseyen bireylerin yaşanan olumsuzluklardan kurumlarının zarar görmesini önlemek amacı ile içsel ve dışsal ortamlara bu olumsuzlukları aktardığı ve bundan dolayı işe yabancılaşma duygularının azaldığı sonucuna ulaşılabilir. Çalıştıkları kurumda işlerini önemsemeyen, benimsemeyen kişilerin ise işletmelerinde gelişen bazı olumsuz olayları görmezlikten gelerek kayıtsız kaldıkları çıkarımı yapılabilir.

Whistleblowing ile işe yabancılaşma arasındaki ilişkiyi inceleyen araştırmalara literatür taramasında ulaşılamasa da elde edilen bu sonuçları kısmen destekleyen araştırmaların olduğu görülmüştür. İfşa edicilerin kurumdaki çalışanlar tarafından ayrımcılığa ve izolasyona uğrayabileceği ve bunu ifşa edicilerin öngördükleri belirtilmiş (Garrick, 2017: 40), ancak bu kişilerin faillerin eylemlerini ifşa etmeyi ahlaki bir davranış olarak gördükleri ifade edilmiştir (Watts ve Buckley, 2017: 675). Lemoine ve Michael (2021: 5) ifşa edicilerin (whistleblower) işlerine ve kurumlarına bağlı olan, kuruluşlarına hizmet etmeye çalışan, iyilikle uyumlu bir duruşa sahip ve kararlı kişiler olduklarını belirtmiştir. Diğer bir araştırmada da whistleblowing gibi bilgi akışının kısıtlanması ile bireylerde güçsüzlük ve yabancılaşma duygularının gelişeceği belirtilmiştir (Jacob, 2014: 1). Whistleblowing ve işe yabancılaşma arasındaki ilişkiyi doğrudan inceleyen bir çalışmaya ulaşamadığından bu durumun araştırmaya orijinallik kazandıracağı ve literatüre önemli katkı sağlayacağı düşünülmektedir. Ancak, bu çalışma yalnızca turizm sektöründe çalışan, kısıtlı sayıda katılımcı ile yapılmış olup, bulguların genelleştirilebilmesi için farklı sektörlerde daha büyük örneklem ile yeni çalışmaların yapılması faydalı olacaktır. Ayrıca iki değişken arasındaki ilişki ve etkileşim incelenirken örgütsel destek gibi bazı değişkenlerin aracıl değişken olarak çalışılması da önerilmektedir. Yönetimin, kendi işletmelerinde var olan ve önlem alınmadığı takdirde önemli negatif sonuçları ortaya çıkabilecek durumların çalışanlar

tarafında dile getirilmesi için gerekli desteği sunacak öneri sistemleri gibi mekanizmaları kurgulamaları kendileri için faydalı sonuçlar doğurabilecektir. Uygulayıcıların, whistleblowing davranışını bir nevi işletmeyi ispiyonlama, zorda bırakma davranışı olarak değil, olumlu eleştiri mekanizması olarak algılamaları da önem arz etmektedir. Hiçbir bilginin gizli kalamayacağı, bir olumsuzluğu ilk duyanın işletme yetkililerinin olmasının önlem alma anlamında daha faydalı olacağı bilinmelidir. Şayet whistleblowing gibi davranışlar işletme içerisinde yönetilecek önemli davranışlar olarak algılanmayacaksa, bu durumda işletmelerde ve kurumlarda yapılan iç denetim faaliyetlerinin etkinliğini de sorgulamak gerekecektir.



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**ŞANLIURFA İLİ YABANCI OT SORUNUNUN ve KİMYASAL MÜCADELE  
DURUMUNUN BELİRLENMESİ**

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**ÖZET**

Tarımsal üretim ve tarım dışı alanlarda önemli sorunlara neden olan yabancı otlara karşı kullanılan herbisitler ciddi çevresel ve ekolojik sorunlara neden olmaktadır. Etkili bir mücadele yöntemini seçmek için olan yabancı ot türlerini bilmek önem taşımaktadır. Bundan dolayı bu çalışmayı 2022 yılında Şanlıurfa ili tarım alanlarında ve kültür bitkilerinde sorun olan yabancı ot türlerini, tarım ve tarım dışı alanlarda kimyasal mücadele durumunu ve herbisitlere dayanıklı yabancı ot durumunu belirlemek amacıyla yürütülmüştür. Çalışma kapsamında Şanlıurfa Tarım ve Orman Müdürlüğüne bağlı ruhsatlı 100 Bitki Koruma Ürünleri (BKÜ) Bayileri ile yüz yüze anketler yapılmıştır. Araştırma sonucunda, bayilerin yarısından fazlası (%52) tarım alanlarında yoğun bir yabancı ot probleminin olduğunu ifade etmişlerdir. Tarım alanlarında en fazla yoğunlukta bulunan yabancı ot türleri sırasıyla; *Sorghum halepense* (L.) Pers. (%80), *Avena sterilis* L (%78) ve *Amaranthus retroflexus* L. (%60) olduğunu belirtmişlerdir. Yabancı otların en fazla sorun teşkil ettiği kültür bitkileri içerisinde sırasıyla; mısır (%82), pamuk (%78) ve buğday (%78) geldiğini ve bundan dolayı kimyasal mücadelenin de en fazla bu bitkilerde yapıldığını ifade etmişlerdir. Bayilerin %72'si çiftçilerin yabancı otlar sorun olduktan sonra bayilere geldiğini belirtmişlerdir. Bayilerin büyük bir çoğunluğu herbisitlerin yoğun bir şekilde kullanıldığının ve bazı yabancı otların kontrol altına alınamadığını belirtmişlerdir. Bu yabancı otların başında da sırasıyla; *Sorghum halepense* (L.) Pers. (%58), *Myagrum perfoliatum* L. (%26) ve *Convolvulus arvensis* L. (%22) türlerin geldiğini belirtmişlerdir. Sonuç olarak Şanlıurfa ilinde yabancı otların tarım dışı ve tarım alanlarda sorun teşkil ettiğini ve yabancı otlara karşı mücadele etmek amacıyla herbisitlerin sık ve yoğun kullanımından dolayı herbisit dayanıklılığı gün geçtikçe artmaya devam edeceği ve sorun teşkil edeceği görülmektedir.

**Anahtar kelimeler:** Yabancı ot, Herbisitler, Dayanıklılık, Anket, *Sorghum halepense*



## DETERMINATION OF WEED PROBLEMS and CHEMICAL CONTROL STATUS OF ŞANLIURFA PROVINCE

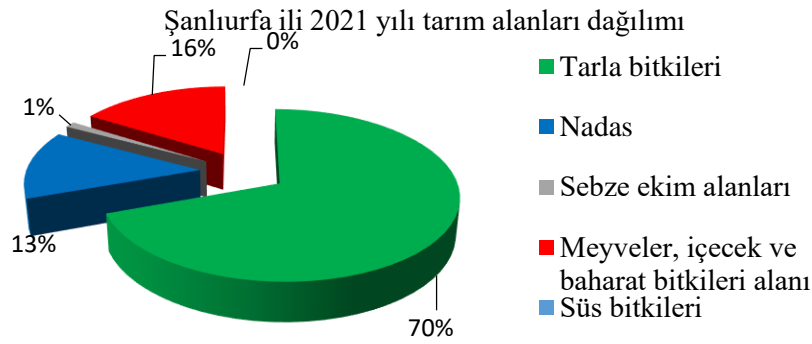
### ABSTRACT

Herbicides used for weed control that cause significant problems in agricultural production areas and non-agricultural areas cause serious environmental and ecological problems. It is important to know the weed species in order to choose an effective control method. Therefore, this study was carried out to determine the weed species that are a problem in agricultural areas and crop plants in Şanlıurfa province in 2022, the chemical control situation in agricultural and non-agricultural areas and the status of weed resistant to herbicides. Within the scope of this study, face-to-face questionnaires were conducted with 100 licensed Plant Protection Products (CPP) Dealers affiliated to Şanlıurfa Directorate of Agriculture and Forestry. As a result of the research, more than half of the dealers (52%) stated that there is an intense weed problem in agricultural areas. Weed species with the highest density in agricultural areas are respectively; *Sorghum halepense* (L.) Pers. (80%), *Avena sterilis* L (78%) and *Amaranthus retroflexus* L. (60%). Among the crop plants in which weeds cause the most problems, respectively; They stated that corn (82%), cotton (78%) and wheat (78%) come and that chemical control is mostly done in these plants. 72% of the dealers stated that the farmers came to the dealers after weeds became a problem. Majority of the dealers stated that herbicides are used intensively hence some weeds cannot be controlled. These weeds are reported as; *Sorghum halepense* (L.) Pers. (58%), *Myagrum perfoliatum* L. (26%) and *Convolvulus arvensis* L. (22%) respectively. As a result, it is seen that weeds cause a serious problem in both non-agricultural and agricultural areas in Şanlıurfa province and herbicide resistance will continue to increase gradually and will become a problem due to the frequent and intensive use of herbicides to control weeds.

**Keywords:** Weeds, Herbicide, Resistance, Questionnaire, *Sorghum halepense*

## 1. GİRİŞ

Güneydoğu Anadolu bölgesinde yer alan Şanlıurfa İli mevcut tarım potansiyeli itibariyle zengin ve elverişli bir durum arz etmektedir. Yüzölçümü 19.451 km<sup>2</sup> olan ilin 10.445.551 da tarım alanı mevcuttur. Türkiye’de toplam tarım alanlarının %4,45’ine sahip olup, tarım alanları en fazla olan üçüncü il konumundadır. Güneydoğu Anadolu bölgesinde ise toplam tarım alanlarının %20,3’üne sahip olup ilk sırada gelmektedir (TÜİK, 2022). Şanlıurfa ili toplam tarım alanlarının %70’ini tarla bitkileri ekim alanları oluşturmaktadır (Şekil 1.1).



Şekil 1.1. Şanlıurfa ili 2021 yılı tarım alanları dağılımı

Şanlıurfa ilinde pek çok ürün yetiştirilmekte olup, tarla bitkileri bakımından en fazla pamuk (5.503.824 da), buğday (3.097.490 da) ve mısır (1.278.420 da), meyvecilik bakımından antep fıstığı (1.489.025 da) ve sebzeler bakımından domates (39.128 da) gibi ürünler en fazla ekim alanlarına sahiptir (Çizelge 1.1).

**Çizelge 1.1.** Şanlıurfa ilinde 2021 yılında yetiştiriciliği yapılan kültür bitkileri ekim/dikim alanları ve üretim miktarları (TÜİK, 2022)

Ürünler	Ekim alanı (da)	Üretim miktarı (ton)	Ürünler	Ekim alanı (da)	Üretim miktarı (ton)	Ürünler	Ekim alanı (da)	Üretim miktarı (ton)
Pamuk	5.503.824	1.759.023	Adi Fiğ	8.418	631	Domates	39.128	204.153
Buğday	3.097.490	1.182.655	Bezelye Yemlik	7.388	4.491	Biber	29.510	85.139
Mısır	1.278.420	1.541.150	Çeltik	5.150	2.177	Karpuz	16.740	55.796
Kırmızı Mercimek	1.188.121	105.386	Saya Fasulyesi	4.058	908	Kavun	8.531	18.398
Arpa	1.010.239	126.819	Patates	2.300	6.657	Patlıcan	5.672	25.573
Ayçiçeği	68.660	16.459	Adi Fiğ	8.418	631	Hıyar	5.193	14.516
Nohut	60.871	6.532	Antep Fıstığı	1.489.025	38.576	Soğan	5.136	15.559
Fiğ Yeşil ot	57.911	51.895	Zeytin	70.876	5.725	Sarımsak	2.718	3.090
Yonca Yeşil ot	55.311	63.229	Badem	50.980	7.219	Acur	2.083	4.013
Şeker Pancarı	11.189	76.287	Biber Kuru İşlenmemiş	38.459	117.004	Üzüm	10.455	4.067
Yonca Tohumu	10.140	335	Nar	15.708	11.681	Diğer	8.913	6.073

Dünya nüfusu artmaya devam ederken, tarımsal üretimin de buna uygun şekilde artması gerekiyor. Önümüzdeki 40 yılda, insanlığa uygun miktarda ve kalitede gıda sağlanabilmesi için tarımsal üretim yaklaşık %60 oranında artması gerekmektedir (Röös *et al.*, 2017). Önümüzdeki 30 yıl içinde dünya nüfusunun ciddi bir oranda artması öngörülmektedir (Hofstra and Vermeulen, 2016). Küresel nüfusun ise 2050 yılına kadar 9-11 milyar arasında olacağı tahmin edilmektedir (BM, 2012). Artan dünya nüfusu beslenme ihtiyacını karşılamak için bitkisel üretimi arttırmak gerekmektedir (Riggs *et al.*, 2018). Tarımsal üretim alanlarının genişletilme imkânının olmamasından dolayı, üretimi artırmanın tek yolu verimi arttırmaktan geçmektedir (Demirbaş ve Atış, 2005). Fakat tarım alanlarında verimi azaltan etmenler bulunmakta olup, bunların başında yabancı otlar gelmektedir (Swinton and Van Deynze, 2017). Tarım alanlarında yabancı otlar önemli verim (Tepe, 1998; Gharde *et al.*, 2018) ve kalite kayıplarına sebep olmaktadır (Jabran and Chauhan 2018). Yabancı otlar, sürdürülebilir tarımsal üretimin ve küresel gıda güvenliğinin önündeki en önemli engellerden birisidir (Oerke, 2006). Yabancı otlar bol miktarda tohum



üretmeleri, hızlı şekilde büyümeleri ve rizom, yumru, stolon gibi bitkinin farklı kısımlarıyla çoğalmalarından dolayı çevreye kolayca yayılmaktadırlar (Yıldırım ve Ekin, 2003). Böylelikle yabancı otlar kültür bitkileri ile besin, ışık ve su gibi kaynaklar için rekabete girerek kültür bitkilerinin büyümelerini ve fizyolojik aktivitelerini olumsuz etkileyerek ürünün verim ve kalitesini düşüreceğinden ekonomik kayıplara neden olmaktadır (Rajcan ve Swanton 2001; Kholi *et al.*, 2004).

Yabancı otlar değişik kültür bitkilerinde oluşturduğu zarar oranı birbirinden farklılık göstermektedir. Bazı yabancı otlar sadece bir kültür bitkisinde sorun oluştururken, diğer bazı türler birden fazla kültür bitkisinde sorun oluşturabilmektedir. Ayrıca sebep oldukları zararlar coğrafik bölgelere göre de değişiklik göstermektedir (Günca, 2016). Yabancı otlar sadece tarım alanlarında değil tarım dışı alanlarda da sorun oluşturmaktadır (Günca, 2016: Gürbüz ve Alptekin, 2022). Tarım dışı alanlarda ve kültür bitkilerinde sebep oldukları zararları ve verim kayıplarını önlemek için yabancı otları erken dönemde kontrol etmek büyük bir önem arz etmektedir (Günca, 2016: Su, 2020: Gürbüz ve Alptekin, 2022).

Günümüzde tarım dışı (Günca, 2016: Gürbüz ve Alptekin 2022) ve tarım alanlarında iş gücü ve maliyetlerinin de artmasından dolayı, hızlı sonuç vermesi, kolay uygulanabilmesi ve düşük maliyetinden dolayı yabancı otlarla mücadele etmek için kimyasal mücadele yöntemleri tercih edilmektedir (Kitiş, 2011). Yabancı otlara karşı kimyasal mücadele İkinci Dünya Savaşı'ndan sonra yaygın olarak kullanılmaya başlanmış (Vats, 2015) ve günümüzde Dünyada pestisit kullanımının %52,51'sini herbisitler oluşturmaktadır (FAO, 2022). Türkiye'de ise kullanılan toplam 52.965 ton pestisitinin %25'i herbisitler oluşturmaktadır (TÜİK, 2022). Dünyada pestisitler içinde en fazla herbisitler kullanılırken (FAO, 2022), Türkiye'de ise fungisitlerden sonra ikinci sırada gelmektedir (TÜİK, 2022).

Yabancı otları kontrol etmek için kullanılan herbisitler (Su, 2020), hatalı ve yoğun olarak kullanıldıklarından dolayı, ciddi çevresel ve ekolojik sorunlara yol açmakta (Sardana *et al.*, 2017), ayrıca insan sağlığına (Silva *et al.*, 2019; Jabłońska-Trypuć *et al.*, 2019) olumsuz etkilere neden olmaktadır. Herbisit kullanımından dolayı su, toprak ve gıda maddelerinde herbisit kalıntısının artmasına sebep olarak insanlar için tehdit oluşturmaktadır (Ugbede Itodo, 2019). Ayrıca yüksek dozda herbisit kullanımı yabancı ot dayanıklılığına sebep olmaktadır (Heap and Duke, 2018; Peterson *et al.*, 2018). Herbisitlere karşı dayanıklılık kazanan yabancı otlar, modern tarımda önemli bir endişe kaynağı olup (Perotti *et al.*, 2020), tarımsal üretim maliyetleri de arttırmaktadır (Beckie, 2020). Günümüzde bilinen 31 herbisit etki mekanizmasının 21'in de 165 farklı aktif maddeye karşı 267 yabancı ot türü dayanıklılık kazanmıştır. Bunlar 97 farklı kültür bitkisi

içerisinde 72 farklı ülkede dayanıklı hale gelmiştir (Heap, 2022). Bundan dolayı herbisitleri bilinçli ve doğru bir şekilde kullanmak büyük önem taşımaktadır. Yabancı otlarla ekonomik ve etkili bir mücadele yapmanın en temel ilkesi, yabancı ot türlerinin ve bu türlerin biyolojilerinin iyi bilinmesi gerekmektedir (Özer ve ark., 1998). Bu sebeple tarım ve tarım dışı alanlarda bulunan yabancı otların bilinmesi ve bunların biyolojik özelliklerinin ve ekolojik isteklerinin bilinmesi uygulanacak yabancı ot kontrol yönteminin seçilmesinde ve etkili olmasında büyük önem arz etmektedir. Sonrasında bölgenin ekolojik özellikleri de göz önünde bulundurarak bölgeye göre özel çözüm önerileri geliştirilmelidir (Özaslan ve Kendal, 2014).

Bu araştırma Şanlıurfa ili genelinde tarım alanlarında ve kültür bitkilerine göre sorun olan yabancı ot türleri, tarım ve tarım dışı alanlarında kimyasal mücadele durumunu ve ildeki herbisitlere dayanıklı yabancı ot durumunu belirlemek amacıyla yürütülmüştür.

## **2. MATERYAL ve YÖNTEM**

Güneydoğu Anadolu bölgesinde yer alan Şanlıurfa, 37 49'- 40 10' doğu meridyeni ile 36 41'- 37 57' kuzey paralelleri arasında yer alır. Ortalama yükseltisi 518 m olup, karasal iklim özelliği bulunmaktadır. Çalışma 2022 yılında Şanlıurfa İl Tarım ve Orman Müdürlüğü'ne bağlı Bitki Koruma Ürünleri (BKÜ) ve Zirai Mücadele Alet ve Makineleri Bayileriyle yüz yüze anket çalışması olarak yapılmıştır. Şanlıurfa ili Tarım ve Orman Müdürlüğüne bağlı 100 BKÜ bayisi ile yüz yüze görüşülüp 18 soruluk anket çalışması yapılmıştır.

Yapılan anket çalışması araştırmaya katılanların;

- Yaş gruplarına göre dağılımı, eğitim durumları ve kaç yıllık bayi oldukları,
- Şanlıurfa ili tarım alanlarında ve kültür bitkisine göre sorun olan yabancı ot türleri,
- Yabancı otların en fazla sorun teşkil ettiği kültür bitkileri,
- Yaygın olarak kullanılan herbisitler ve herbisitlerin kültür bitkilerine göre kullanımı,
- Çıkış öncesi ve çıkış sonrası herbisit kullanımı,
- Herbisitlerin kontrol altına almadığı yabancı ot türlerinin olup olmadığı,
- Yabancı otlara karşı total kimyasal mücadelenin yapılıp yapılmadığı gibi konularda sorular sorulmuştur.

### **Veri Analizi**

Anket sonucunda elde edilen verilerin SPSS 20 istatistik paket programında dökümleri alınmıştır. Bulgular frekans ve yüzde dağılımı olarak gösterilmiştir.

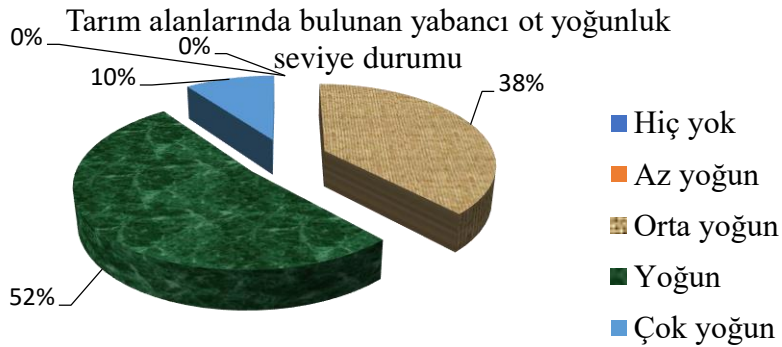
### 3. BULGULAR ve TARTIŞMA

Çalışmaya katılım gösterenlerin yaş gruplarına göre dağılımı, eğitim durumları ve kaç yıllık bayi oldukları ile ilgili yöneltilen sorulara verilen cevapların frekans ve yüzde değerleri Çizelge 3.1’de verilmiştir

**Çizelge 3.1.** Yaş aralıkları, eğitim durumları ve kaç yıllık bayi oldukları gibi sorulara verilen cevapların frekans ve yüzde (%) değerleri

Yaş	F	%	Eğitim Durumu	F	%	Kaç Yıllık Bayi	F	%
20-30	16	16	Üniversite	94	94	1-5	22	22
31-40	40	40	Yüksek lisans	6	6	5-10	20	20
41-50	34	34				10-15	44	44
50+	10	10				15+	12	12
Toplam	100	100	Toplam	100	100	Toplam	100	100

Katılımcıların %16’sı 20-30 yaş aralığının da, %40’ı 31-40 yaş aralığında %35’i 41-50 yaş aralığında ve %10’u ise 50+ yaşındadır (Çizelge 3.1). Eğitim durumları bakıldığında, %94’ü üniversite mezunu ve %6’sı yüksek lisans mezunu olmaktadır. Araştırmaya katılım gösteren bayilerin 22 tanesinin 1-5 yıllık bayi, 20 tanesinin 6-10 yıllık, 44 tanesinin 10-15 yıllık ve 12 tanesinin 15 yıllık bayilerden oluşmaktadır (Çizelge 3.1). Bayilere sorulan Şanlıurfa ili tarım alanlarında bulunan yabancı ot yoğunluk seviye durumu sorusuna verilen cevapların frekans ve yüzde (%) değerleri Şekil 3.1’de verilmiştir.



**Şekil 3.1.** Şanlıurfa ili tarım alanlarında bulunan yabancı ot yoğunluk seviye durumu nedir sorusuna verilen cevapların yüzde (%) değerleri

Ankete katılım gösteren bayilere, ilinizde yabancı ot yoğunluk hangi seviyededir sorusuna, bayilerin %52’si yoğun, %38’i orta yoğunlukta ve %10’u ise çok yoğunlukta olduğunu belirtmişlerdir (Şekil 3.1). Alptekin ve ark. (2022), Mardin ilinde yaptıkları çalışmada bayilerin %60’ı tarım alanlarında yabancı otların ‘yoğun’ olduğunu belirtmişlerdir. Buda yürüttüğümüz

çalışma sonucu ile benzerlik taşımaktadır. Ankete katılım gösteren bayilere yöneltilen Şanlıurfa ilinde tarım alanlarında yoğun olarak bulunan yabancı ot türleri hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri Çizelge 3.2’de sunulmuştur.

**Çizelge 3.2.** Tarım alanlarında yoğun olarak bulunan yabancı ot türleri hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Latince adı	Türkçe adı	Frekans	Yüzde (%)
<i>Sorghum halepense</i> (L.) Pers.	Kanyaş	80	80
<i>Amaranthus retroflexus</i> L.	Kırmızı köklü horozibiği	60	60
<i>Sinapis arvensis</i> L.	Yabani hardal	54	54
<i>Avena sterilis</i> L.	Kısır yabancı yulaf	78	78
<i>Alopecurus myosuroides</i> Huds.	Tilki Kuyruğu	44	44
<i>Xanthium strumarium</i> L.	Domuz pıtrağı	12	12
<i>Myagrurn perfoliatum</i> L.	Gönül Hardalı	58	58
<i>Portulaca oleraceae</i> L.	Semizotu	34	344
<i>Convolvulus arvensis</i> L.	Tarla sarmaşığı	58	58
<i>Chenopodium album</i> L.	Sirken	12	12
Diğer			

\*Birden fazla şık işaretlendiğinden dolayı toplam %100’ü aşmaktadır

Ankete katılım gösteren bayilerin %80’i Şanlıurfa ilinde tarım alanlarında *Sorghum halepense* (L.) Pers., %78’i *Avena sterilis* L., %60’ı *Amaranthus retroflexus* L., %58’i *Sinapis arvensis* L. ve %58’i *Convolvulus arvensis* L. yabancı ot türlerinin yoğunlukları fazla olduklarını belirtmişlerdir (Çizelge 3.2). Alptekin ve ark. (2022), yaptıkları çalışmada elde ettikleri sonuçlar çalışmamızın sonuçları ile benzerlik taşımaktadır. Ayrıca bayilerin tarım alanlarında yoğun olarak belirttiği yabancı ot türleri ile Tepe (1998), Demir ve ark. (2001), Tepe (2014), Gökalp ve Üremiş (2015), Kaplan ve Bayhan (2016) ve Turan (2019), Bozhüyük ve ark., (2022), Alptekin ve Gürbüz (2022) çalışmalarında yoğun olarak belirttikleri yabancı ot türleri benzerlik taşımaktadır. Bayilerin yabancı otların yoğun olarak bulunduğu kültür bitkileri hangileridir sorusuna verdikleri cevapların frekans ve yüzde (%) değerleri Çizelge 3.3’te verilmiştir.

**Çizelge 3.3.** Yabancı otların yoğunlukta bulunduğu kültür bitkileri hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Kültür bitkisi	Frekans	Yüzde (%)
Mısır	82	82
Pamuk	78	78
Buğday	78	78
Arpa	24	24
Biber	6	6
Mercimek	52	52
Nohut	14	14
Domates	8	8
Diğer	6	6

\*Birden fazla şık işaretlendiğinden dolayı toplam %100'ü aşmaktadır

Bayilerin %82'si Şanlıurfa ilinde yabancı otların yoğun olarak mısır, %78'i buğday, %78'i pamuk, %52'si mercimek, %24'ü arpa, %14'ü nohut, %8'i domates ve %6'sı biber ve diğer kültür bitkileri ekim alanlarında olduklarını belirtmişlerdir (Çizelge 3.3). Çalışmada elde ettiğimiz sonuçlar ile Alptekin ve ark. (2022), elde ettiği sonuçlar benzerlik taşımaktadır. Ayrıca bayiler tarafından belirtilen yabancı otların yoğunlukta olduğu kültür bitkileri mısır ekim alanlarında için (Hançerli ve Uygur, 2017; Arslan, 2018), buğday ekim alanlarında için (Sırrı, 2019; Özkan, 2022) pamuk ekim alanlarında için (Şahin ve ark., 2020), domates ekim alanlarında için (Torun, 2022; Akelma, 2022) tarafından yapılan çalışmalarla örtüşmektedir. Bayilere sorulan kültür bitkilerine göre yoğunlukta bulunan yabancı ot türleri sorusuna verilen cevapların frekans ve yüzde (%) değerleri Çizelge 3.4'te sunulmuştur.

**Çizelge 3.4.** Kültür bitkilerine göre en fazla yoğunlukta bulunan yabancı ot türleri hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri

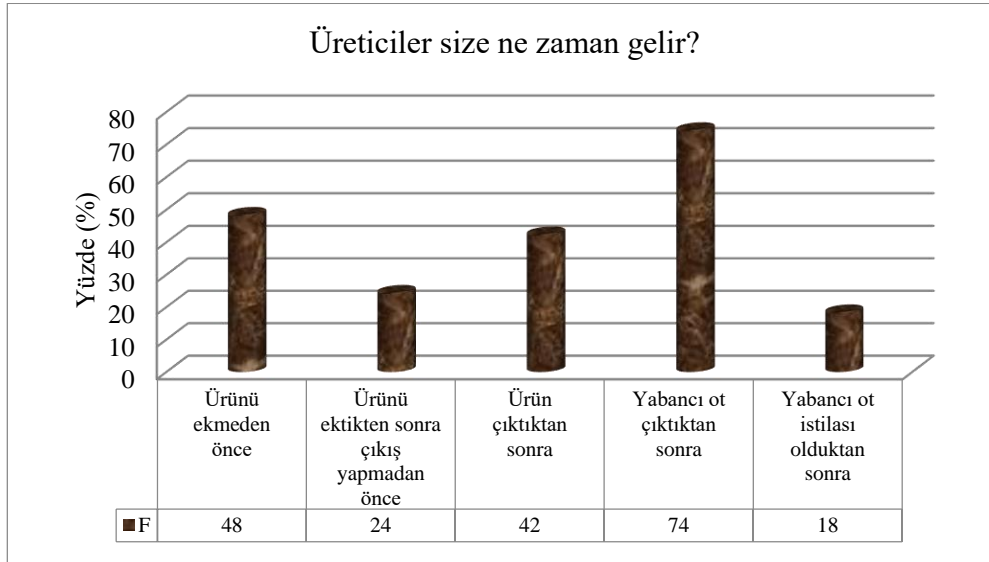
Yabancı ot türleri	Buğday	Mısır	Pamuk	Arpa	Domates	Mercimek	Nohut	Biber
<i>Sorghum halepense</i>	-	80	70	-	30	-	-	12
<i>Amaranthus retroflexus</i>	-	68	68	-	12	-	-	14
<i>Sinapis arvensis</i>	82	-	-	60	-	72	44	-
<i>Avena sterilis</i>	88	-	-	68	-	76	64	-
<i>Alopecurus myosuroides</i>	22	40	52	-	-	-	-	-
<i>Portulaca oleraceae</i>	-	34	30	-	-	-	-	8
<i>Xanthium strumarium</i>	-	24	42	-	-	-	-	8
<i>Myagrum perfoliatum</i>	32	-	-	48	-	40	35	10
<i>Convolvulus arvensis</i>	8	52	64	-	-	5	-	7
<i>Orobancha spp</i>	-	-	-	-	26	38	-	-
<i>Chenopodium album</i>	-	12	22	-	-	-	-	-
Diğer	7	5	6	4	2	5	2	1

\*Birden fazla şık işaretlendiğinden dolayı toplam %100'ü aşmaktadır

Ankete katılım gösteren bayilerin %88'i Şanlıurfa ili buğday ekim alanlarında en fazla yoğunlukta *A. sterilis*, %82'si *S. arvensis* ve %32'si *M. perfoliatum* yabancı ot türlerinin olduğunu belirtmişlerdir (Çizelge 3.4). Bayiler tarafından belirtilen buğday ekim alanlarında sorun olarak belirtilen yabancı ot türleri ile Tepe (2014), Gökalp ve Üremiş (2015), Gürbüz ve ark. (2018), Pala ve ark. (2018), Sırrı, (2019), Ücrak ve ark. (2019), Ateş ve Üremiş (2020) ve Özkan, (2022)'in yaptıkları çalışmalarda belirtilen yabancı ot türleri arasında paralellik belirlenmiştir. Bayiler mısır ekim alanlarında yoğunlukta, *S. halepense* (%80), *A. retroflexus* (%68) ve *C. arvensis* (%52) yabancı ot türlerinin olduğunu bildirmişlerdir (Çizelge 3.4). Arslan (2018), mısır alanlarında yoğun olarak *S. halepense* *P. oleracea*, *E. crus-galli* ve *X. strumarium*, Açıkgoz (2019), *S. halepense*, *P. oleraceae* ve *X. strumarium*, Yeşilayer ve ark. (2022), *S. halepense* ve *A. retroflexus* yabancı ot türlerinin olduğunu belirtmiştir. Bu da bayiler tarafından belirtilen mısır ekim alanlarında yoğunlukta bulunan yabancı ot türleri ile benzerlik taşımaktadır. Bayiler pamuk ekim alanlarında yoğunlukta, *S. halepense* (%70), *A. retroflexus* (%68) ve *C. arvensis* (%64) yabancı ot türlerinin olduğunu belirtmişlerdir (Çizelge 3.4). Elde ettiğimiz bulgular ile Turan (2019), Özkil ve ark., (2019) ve Şahin ve ark. (2020), pamuk ekim alanlarında yaptıkları surveyler sonucunda yoğun olarak tespit ettikleri yabancı ot türlerine benzerlik taşımaktadırlar.

Ankete katılım gösteren bayilerin %68'i arpa ekim alanlarında en fazla yoğunlukta *A. sterilis* yabancı ot türünün olduğunu belirtmişlerdir. Sonrasında sırasıyla en fazla yoğunlukta *S. arvensis* (%60) ve *M. perfoliatum* (%48) yabancı otların olduğunu bildirmişlerdir (Çizelge 3.4). Kordali ve Zengin (2009) ve Kordali ve Zengin (2011), yürüttükleri çalışmada arpa ekim alanlarında yoğun olarak rastlanılan yabancı ot türleri ile çalışmamızda elde ettiğimiz sonuçlar benzerlik taşımaktadır. Bayiler domates ekim alanlarında en fazla yoğunlukta, *S. halepense* (%30) ve *Orobancha* spp (%26) yabancı ot türlerinin olduğunu belirtmişlerdir (Çizelge 3.4). Domates ekim alanlarında yaptıkları çalışmada Sırrı ve Özaslan, (2020), en fazla yoğunlukta *P. oleracea*, *S. halepense* ve *O.crenata/O. aegyptiaca*, Akelma (2022), *S. halepense*, *C. arvensis* *X. strumarium*, *P. oleracea* ve *A. retroflexus*, Usanmaz Bozhüyük ve ark. (2022), ise *S. halepense*, *C. arvensis* ve *X. strumarium* yabancı ot türlerinin en fazla yoğunlukta olduğunu bildirmişlerdir. Bu da bayilerin domates ekim alanlarında yoğun olarak bildirdikleri yabancı ot türleriyle yüksek oranda paralellik göstermektedir. Bayilerin %76'sı mercimek ekim alanlarında en fazla yoğunlukta *A. sterilis* yabancı ot türünün en fazla yoğunlukta olduğunu ve bu yabancı otu *S. arvensis* (%72) ve *M. perfoliatum* (%40) yabancı ot türlerinin takip ettiğini belirtmişlerdir (Çizelge 3.4). bayilerin mercimek ekim alanlarında yoğun olarak belirttiği yabancı ot türleri ile Kordali ve Zengin (2009), Aksoy ve ark., (2014) ve Pala ve ark., (2018)'nin mercimek ekim alanlarında yoğun olarak tespit

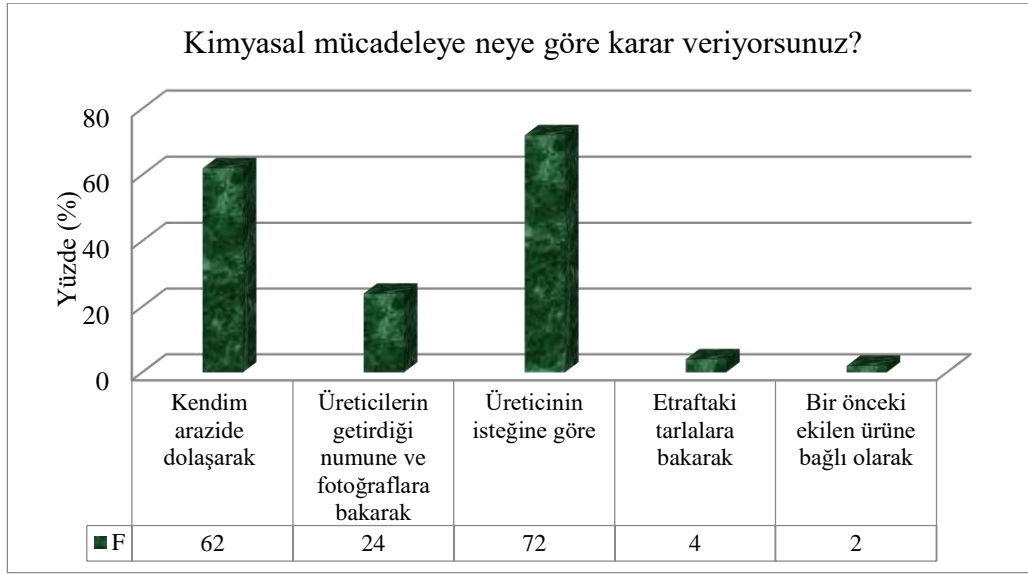
ettikleri yabancı ot türleri benzerlik taşımaktadır. Ankete katılım gösteren bayiler nohut ekim alanlarında en fazla yoğunlukta, *A. sterilis* (%64), *S. arvensis* (%44) ve *M. perfoliatum* (%35) yabancı ot türlerinin olduğunu bildirmişlerdir (Çizelge 3.4). Elde edilen bulgular ile Demir ve ark. (2001), yürüttüğü çalışmada nohut alanlarında yoğun olarak tespit ettiği yabancı ot türleri benzerlik taşımaktadır. Bayiler Şanlıurfa ilinde biber ekim alanlarında yoğun olarak *A. retroflexus* (%14), *S. halepense* (%12) ve *M. perfoliatum* (%10) yabancı ot türlerinin olduğunu belirtmişlerdir (Çizelge 3.4). Bayilerin biber ekim alanlarında yoğun olarak bulunuyor dedikleri yabancı ot türleri ile Ateş ve Uygur, (2013) ve Torun, (2022) biber ekim alanlarında yoğun olarak tespit ettikleri yabancı otlar benzerlik taşımaktadır. Bayilerin sorulan üretici size ne zaman gelir sorusuna verdikleri cevapların frekans ve yüzde (%) değerleri Şekil 3.2’de sunulmuştur.



\*Birden fazla şık işaretlendiğinden dolayı toplam %100’ü aşmaktadır

**Şekil 3.2.** Üretici size ne zaman gelir sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Bayilere yöneltilen üretici size ne zaman gelir? sorusuna, bayilerden %74’ü yabancı ot çıktıktan sonra, %48’i ekimden önce %42’si kültür bitkisi çıktıktan sonra, %24’ü ürünü ektikten sonra çıkış yapmadan önce ve %18’i yabancı ot istilasından sonra geldiklerini bildirmişlerdir (Şekil 3.2). Mardin ilinde bayilerle yapılan çalışmada bayilerin %60’ı yabancı ot çıktıktan sonra çiftçilerin bayilere geldiklerini bildirmişlerdir (Alptekin ve ark., 2022). Yabancı otlara karşı kimyasal mücadeleye nasıl karar veriyorsunuz sorusuna verilen cevapların frekans ve yüzde (%) değerleri Şekil 3.3’te verilmiştir.



\*Birden fazla şık işaretlendiğinden dolayı toplam %100'ü aşmaktadır

**Şekil 3.3.** Kimyasal mücadeleye nasıl karar veriyorsunuz sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Bayilere sorulan Kimyasal mücadeleye nasıl karar veriyorsunuz sorusuna, bayilerin %72'si üreticinin isteğine göre, %62'si kendim arazide dolaşarak, %24'ü üreticilerin getirdiği numune ve fotoğraflara bakarak, %4'ü etraftaki diğer tarlalara bakarak ve %2'si bir önceki ekilen ürüne bağlı olarak mücadeleye karar verdiklerini belirtmişlerdir (Şekil 3.3). Bayilere sorulan kimyasal mücadelenin yoğun olarak yapıldığı kültür bitkileri sorusuna verilen cevapların frekans ve yüzde (%) değerleri Çizelge 3.5'te sunulmuştur.

**Çizelge 3.5.** Herbisitlerin yoğun olarak kullanıldığı kültür bitkileri hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Kültür bitkisi	Frekans	Yüzde (%)
Arpa	24	24
Buğday	86	86
Mercimek	72	72
Mısır	84	84
Nohut	20	20
Pamuk	84	84
Diğer	12	12

\*Birden fazla şık işaretlendiğinden dolayı toplam %100'ü aşmaktadır

Bayilere yöneltilen “En fazla kimyasal mücadele yapılan kültür bitkileri ekim alanları hangileridir?” sorusuna, bayilerin %86'sı buğday ekim alanlarında herbisitlerin kullanıldığını belirtmişlerdir. Sonrasında bayilerin %84'ü pamuk, %84'ü mısır, %72'si mercimek, %24'ü arpa %20'si nohut ve %12'si diğer ekim alanlarında herbisitlerin kullanıldığını belirtmişlerdir (Çizelge



3,5). Yapılan araştırmada bayilere yöneltilen yabancı ot yoğunluğu bulunan kültür bitkisi ekim alanları sorusuna verilen yanıtlar ile kimyasal mücadelenin yoğunlukta yapıldığı tarım alanları sorusuna verilen cevaplar paralellik görülmektedir. Yetkin ve ark. (2013), yaptıkları çalışmada bayilere sordukları ilimizde en çok bitki koruma ürünü satışı yapılan kültür bitkilerinin oranı sorulduğunda %28'i pamuk, %23'ü buğday, %17'si mısır, %13 mercimek %10'nu Antep fıstığı %9'u sebze bitkilerinde olarak bildirdiklerini belirtmişlerdir. Ayrıca Mardin ilinde bayilerle yapılan çalışmada herbisitlerin en fazla yoğunlukta kullanıldığı kültür bitkilerin mısır (%80), pamuk (%77,5) ve buğday (%75) olduğunu belirtmişlerdir (Alptekin ve ark., 2022). Yukarıdaki çalışmalarda elde ettikleri sonuçlar ile çalışmamız paralellik göstermektedir. Herbisitlerin kültür bitkilerine göre uygulama dönemleri sorusuna verilen cevapların frekans ve yüzde (%) değerleri Çizelge 3.6'da verilmiştir.

**Çizelge 3.6.** Kültür bitkilerine göre herbisit uygulama dönemleri sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Kültür bitkisi	Çıkış öncesi		Çıkış sonrası		Çıkış öncesi+ çıkış sonrası	
	Frekans	Yüzde (%)	Frekans	Yüzde (%)	Frekans	Yüzde (%)
Arpa	1	1	78	78	-	-
Buğday	2	2	88	88	4	4
Diğer	2	2	4	4	-	-
Mercimek	64	64	74	74	58	58
Mısır	82	82	86	86	80	80
Nohut	-	-	18	18	-	-
Pamuk	86	86	80	80	78	78
Yonca-fiğ	-	-	24	24	-	-

\*Birden fazla şık işaretlendiğinden dolayı toplam %100'ü aşmaktadır

Araştırmaya katılım gösteren bayilerin %73'ü tarım alanlarında en fazla çıkış sonrası herbisitlerin kullanıldığını, %24'ü ise çıkış öncesi herbisitlerin kullanıldığını belirtmişlerdir. Ayrıca bayilerin %82'si hem çıkış öncesi hem de çıkış sonrası herbisitlerin birlikte kullanıldığını ve %18'i ise kullanılmadığını bildirmişlerdir. Araştırmaya katılan bayiler çıkış öncesi herbisit herbisitlerin en fazla pamuk (%86), mısır (%82) ve mercimek (%64) kültür bitkilerinde kullandıklarını belirtmişlerdir. En fazla çıkış sonrası herbisitleri ise buğday (%88), mısır (%86) ve pamuk (%80) kültür bitkilerinde kullandıklarını belirtmiştir. Hem çıkış öncesi hem de çıkış sonrası herbisit en fazla kullanıldığı 4 kültür bitkisi olduğunu ve bunlar sırasıyla mısır (%80), pamuk (%78), mercimek(%58) ve buğday (%4) bitkileri olduğunu bildirmişlerdir (Çizelge 3.6). Alptekin ve ark. (2022), En fazla çıkış sonrası herbisitlerin kullanıldığı, çıkış öncesi herbisitlerin en fazla pamuk

(%80) ve mısır (%75), çıkış sonrası herbisitlerin buğday (%82,5), pamuk (%80) ve mısır (%80), hem çıkış öncesi hem çıkış sonrası herbisitlerin mısır (%52) ve pamuk (%37,5) ekim alanlarında yoğun olarak kullanıldığını ifade etmişlerdir. Buda çalışmamızda elde ettiğimiz bulgulara paralellik göstermektedir. Bayilere yöneltilen yabancı ot mücadelesinde tarım alanlarında yoğun olarak kullanılan herbisitler hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri Çizelge 3.7’de verilmiştir.

**Çizelge 3.7.** Tarım alanlarında yabancı otlara karşı yoğun olarak kullanılan herbisitler hangileridir sorusuna verilen cevapların frekans ve yüzde (%) değerleri ve ruhsatlı olduğu ürünler

Akrif Madde	Kullanılan Ürün	Frekans	Yüzde (%)
280 g/l Dimethenamid-p + 250 g/l Terbutylazine	Mısır	88	88
225 g/L Isoxaflutole + 90 g/l Thiencarbazone-methyl + 150 g/L Cyprosulfamide	Mısır	64	64
30 g/L Mesosulfuron-methyl + 90 g/L Mefenpyr-diethyl	Buğday	72	72
450 gr / lt Pendimethalin	Soğan-Pamuk-Ayçiçeği - Mısır-Fasulye -Tütün-Havuç	90	90
37,5 g/l Mesotrione + 15 g/l Nicosulfuron	Mısır	18	18
%60 Dicamba + %15 Nicosulfuron	Mısır	4	4
45 g/l Tepraloxymid	Bağ-Pamuk-Soğan-Domates-Mercimek-Şeker Pancarı	42	42
116,2 g/l Clethodim	Pamuk-Domates-Kırmızı mercimek-Patates-Soğan-Şeker Pancarı	66	66
270 g/l Terbutylazine + 64 g/l Pendimethalin	Mısır	18	18
Diğer		24	24

\*Birden fazla şık işaretlendiğinden dolayı toplam %100’ü aşmaktadır

Ankete katılım gösteren bayilere yöneltilen Şanlıurfa ili tarım alanlarında yaygın olarak kullanılan herbisitler hangileridir sorusuna, bayiler çoğunlukta mısır ekim alanlarında ruhsatlı herbisitleri olduğunu bildirmişlerdir. Fakat bayilerin %90’ı tarım alanlarında en fazla soğan, pamuk, ayçiçeği, mısır, fasulye, tütün ve havuç ekim alanlarında ruhsatlı 450 gr / lt pendimethalin aktif maddeli herbisitini kullandığını belirtmişlerdir (Çizelge 3.7). Sonrasında bayilerin %88’i mısırdaki ruhsatlı 280 g/l dimethenamid-p + 250 g/l terbutylazine ve %66’sı ise pamuk, domates, kırmızı mercimek, patates, soğan ve şeker pancarı ekim alanlarında ruhsatlı 116,2 g/l clethodimin kullandığını bildirmişlerdir. Kaplan (2014), yaptığı anket çalışmasında en fazla kullanılan tarım ilacı sorusuna üreticiler GAP Bölgesi %46, Diyarbakır %55, Mardin %51 Şanlıurfa %34 oranlarında herbisit kullandıklarını belirtmişlerdir. Yapılan başka çalışmada tarım alanlarında en

fazla yabancı otların yoğun olarak bulunduğu mısır pamuk buğday ekim alanlarında ruhsatlı olan herbisitlerin kullanıldığı bildirmiştir (Alptekin ve ark., 2022) Bayilere sorulan herbisitler ile kontrol edilemeyen yabancı ot türleri var mı sorusuna verilen cevapların frekans ve yüzde (%) değerleri Çizelge 3.8’de verilmiştir.

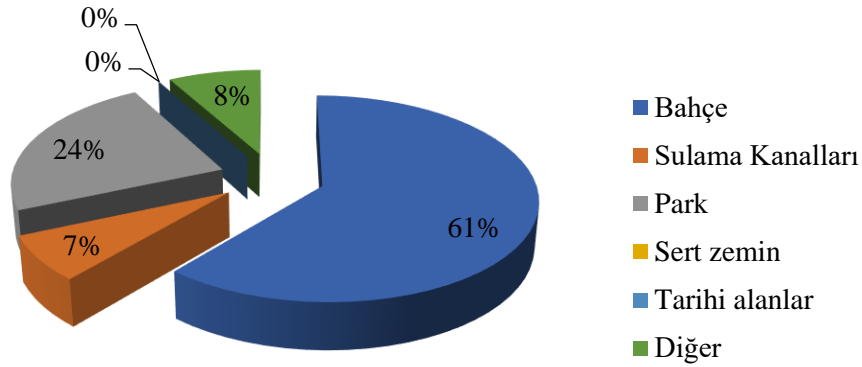
**Çizelge 3.8.** Herbisitler ile kontrol edilemeyen yabancı ot türleri var mı sorusuna verilen cevapların frekans ve yüzde (%) değerleri

Latince adı	Türkçe adı	Frekans	Yüzde (%)
<i>Alopecurus myosuroides</i> Huds.	Tilki kuyruğu	20	20
<i>Amaranthus retroflexus</i> L.	Kırmızı köklü horoz ibiği	13	13
<i>Avena sterilis</i> L.	Kısır yabancı yulaf	18	18
<i>Convolvulus arvensis</i> L.	Tarla sarmaşığı	22	22
<i>Cyperus rotundus</i> L.	Topalak	4	4
<i>Echinochloa crus-galli</i> (L.) P.Beauv.	Darıcan	5	5
<i>Myagrurn perfoliatum</i> L.	Gönül hardalı	26	26
<i>Sorghum halepense</i> (L.) Pers.	Kanyaş	58	58
Diğer		5	5

\*Birden fazla şık işaretlendiğinden dolayı toplam %100’ü aşmaktadır

Araştırmada bayilere yöneltilen “Herbisitleri kullanıldıktan sonra kontrol altına alınamayan yabancı ot türleri var mı?” sorusuna; bayilerin %78’i evet %22’si ise hayır olarak belirtmiştir. Yöneltilen soruda evet diyenlere herbisitlerin kullanıldıktan sonra hangi yabancı ot türlerini kontrol edilemediği sorusu yöneltilmiştir. Bu soruya bayilerin %58’i *S. halepense*, %26’sı *M. perfoliatum*, %22’si *C. arvensis*, %20’si *A. myosuroides*, %18’i *A. sterilis*, %13’ü *A. retroflexus*, %5’i *E. crus-galli* ve %4’ü *C. rotundus* yabancı ot türlerinin kontrol edilemediğini bildirmişlerdir (Çizelge 3.8). Ayrıca çalışmanın yürütüldüğü bayilerle görüşme sırasında herbisitlerin yoğun ve bilinçsizce kullanımından dolayı dayanıklılık probleminin her geçen gün daha da sorunlu hale geldiğini ve yabancı otların gün geçtikçe daha da kontrol edilemez hale geldiklerini belirtmişlerdir. Bayiler tarafından herbisitlerin etki etmediği olarak belirttikleri yabancı ot türleri Dünya’da *A. sterilis*, *A. myosuroides*, *S. halepense*, *C. arvensis*, *A. retroflexus* ve *E. crus-galli* Türkiye’de, ise *A. myosuroides*, *E. crus-galli* ve *A. sterilis* herbisitlere karşı dayanıklılık kazandıkları rapor edilmiştir (Heap, 2022). Bayilere sorulan total kimyasal mücadelenin yapıldığı alanlar hangileridir sorusuna verilen cevapların yüzde (%) değerleri Şekil 3.3’te verilmiştir.

Total kimyasal mücadelenin yapıldığı alanlar



Şekil 3.3. Total kimyasal mücadelenin yapıldığı alanlar

Araştırmaya katılan bayilere Total kimyasal yabancı ot mücadelesi yapıyor musunuz sorusuna, bayilerin %68'i yabancı otlara karşı total kimyasal mücadele yaptıklarını ve %32'si ise yapmadıklarını belirtmişlerdir. Bu soruya evet diyenlere “Hangi alanlarda total kimyasal yabancı ot mücadelesi yapıyorsunuz?” sorusu yöneltilmiştir. Bu soruya bayilerin %61'i bahçelerde, %22'si parklarda, %7'si sulama kanalları ve %8'i ise diğer alanlarda kimyasal mücadele yaptıklarını belirtmişlerdir (Şekil 3.3). Alptekin ve ark. (2022), Mardin ilinde bayilerle yaptıkları çalışmada bayilerin %30'u total yabancı ot mücadelesinin en fazla bahçelerde yaptıklarını bildirmişlerdir. Bayiler total kimyasal mücadelede en fazla kullanılan herbisitleri Kara demiryolu kenarları, havaalanları, fabrika bahçeleri, tarihi alanlar, tarla kenarları, banketler, su ve drenaj kanalları turuncgiller, bağ, fındık, meyve bahçeleri ve ekili olmayan alanlarda ruhsatlı glyphosate 1sopropylamin tuzu aktif maddeli herbisit olduğunu belirtmişlerdir.

#### 4. SONUÇ ve ÖNERİLER

Yabancı otlar tarım alanlarında verim ve kalite kayıplarına, tarım dışı alanlarında ise önemli sorunlara neden olmaktadır. Yabancı otlarla mücadele etmek için kullanılan herbisitler beraberinde önemli çevresel ve ekolojik sorunlara neden olmaktadır. Bu sorunların önüne geçebilmek için problem olan yabancı ot türlerini ve yaygın olarak kullanılan herbisitleri önceden bilmek önem taşımaktadır. Bu kapsamda Şanlıurfa ilinde yaptığımız çalışmada Ankete katılım gösteren bayilerin yarısına yakını tarım alanlarında yabancı otların ‘yoğun’ olduğunu ve yoğun olarak *S. halepense* (%80), *A. sterilis* (%78) ve *A. retroflexus* (%60) yabancı ot türlerinin olduğunu

bildirmişlerdir. Yabancı otların en fazla yoğunlukta olduğu kültür bitkilerin mısır, buğday ve pamuk ekim alanların olduğu ve bu kültür bitkileri ekim alanlarında yabancı otlara karşı yoğun olarak kimyasal mücadelenin yapıldığını ifade etmişlerdir. Ayrıca en fazla kullanılan herbisitlerin çıkış sonrası herbisitler olduğu ve bu kültür bitkilerinde ruhsatlı olan herbisitler olduğunu bildirmişlerdir. Kimyasal mücadeleyi üreticinin isteğine göre karar verdiklerini belirtmişlerdir. Bayiler kullanılan herbisitlerin en fazla *S. halepense*, *M. perfoliatum* ve *C. arvensis* gibi yabancı ot türlerini kontrol etmediğini ayrıca herbisitlerin yoğun olarak kullanıldığını ve dayanıklılık probleminin her geçen gün daha büyük problem olduğunu belirtmişlerdir. Bayiler Şanlıurfa ilinde total kimyasal mücadelenin en fazla bahçelerde yapıldığını ifade etmişlerdir. Sonuç olarak Şanlıurfa ilinde yabancı ot yoğunluğunun fazla olduğu ve ilde en fazla üretimi yapılan kültür bitkilerinde yabancı otların yoğunlukta olduğu ve yoğun bir şekilde yabancı otlara karşı herbisitlerin kullanıldığı bunun da yabancı otlarda herbisit dayanıklılığına neden olduğu sonucuna varılmıştır.

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**EFFECT OF MICROPLASTICS ON BARLEY (*Hordeum vulgare* L.) SEED  
GERMINATION RATE**

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**ABSTRACT**

Plastics, which we encounter in every field, cause pollution through domestic, industrial and medical wastes. Polymers that are long and difficult to dissolve in nature, the plastics in the structure turn into microplastics in various types and shapes when decomposed. These microplastics are transported to ecosystems by various ways and cause pollution. Microplastic pollution causes various damages due to both their presence in the environment and their accumulation in the bodies of living things. Little is known about the effects of microplastics on plants and terrestrial ecosystems. In this study, it was aimed to determine the effects of microplastics on barley (*Hordeum vulgare* L.) seed germination rate. 4x2 mm polyethylene mulch materials, which are widely used in farming and caused plastic pollution in fields, were used as microplastics. Microplastics were added to the soil at four different rates % 0, % 0.5, % 1.5 and % 2.5. Barley seeds were sterilized and planted in pots. Germination rates of barley seeds were recorded daily. Differences were determined in seed germination rates among experiment sets. The highest seed germination rate was found in pots containing 2.5% microplastic. The results indicated that occurrence of the microplastic in the soils proportionately increased the barley seed germination rates.

**Keywords:** Agriculture, barley, germination, microplastic, pollution.

## **1. INTRODUCTION**

Plastics are artificial polymers that are widely used today because they are flexible, insulating, light, economical and durable. Polyethylene (PE), polystyrene (PS), polypropylene (PP), polyvinyl chloride (PVC) and polyethylene terephthalate (PET) are some of the most used polymers in the making of plastic products today. Plastics are separated into their monomers by various mechanisms such as abrasion, fragmentation and human activities. These tiny plastic particles ranging in size from 1  $\mu\text{m}$  to 5 mm are called microplastics. Although microplastics are very small in size, they create an invisible pollution in the ecosystem where they are found. Thus, it harms all components of ecosystems.

Studies with microplastics have shown that microplastics are mostly composed of plastic (secondary microplastic) sources such as liquid soap, peeling and cleaning materials, which are called personal care products (Anbumani and Kakkar, 2018). Classification of microplastics is more difficult than the classification of visible waste. Therefore, they can be classified with the help of microscope and Fourier Transform Infrared Spectrophotometer (FD-IS) (Yurtsever, 2015). Different types of microplastics such as granules, fragments, pellets, spheroids, flakes, fibers or beads have been encountered in ecosystems (Güneş and Erçetin, 2020).

Since microplastics are easier to obtain in aquatic ecosystems, most of the studies have been carried out in aquatic ecosystems. Since the number of studies on terrestrial ecosystems and their effects on terrestrial organisms is very limited, there is not enough data.

In this study, it was aimed to determine the effects of microplastics on barley (*Hordeum vulgare* L.) seed germination rate. The effects of microplastics on barley, an important food crop all over the world, have importance for agriculture, economy and health of organisms and ecosystems.

## **2. MATERIAL AND METHOD**

Polyethylene mulch materials in size 4x2 mm, which are widely used in farming and caused plastic pollution in fields, were used as microplastics. The mulch was cut with scissors (Lozano et al., 2021). The experimental soils were collected from the top layer (0-20 cm) in Suluova, Amasya, Turkey. The soil was sieved with a 4x4 mm sieve and homogenized (Huang et al., 2020; Isari et al., 2021; Wang et al., 2021). The sieved soils were weighed 1200 g and mixed with the appropriate amount of microplastics and placed in 12x12x15 cm pots. Barley seeds were obtained from Republic of Turkey Ministry of Agriculture and Forestry Field Crops Central Research Institute and TARM 92 variety was used in the experiment.

The research was carried out in the greenhouse located in the garden of Amasya University Suluova Vocational School. Microplastics were added to the soil at four different rates: without the addition 0 % (CK), 0.5 % (6 g), 1.5 % (18 g) and 2.5 % (30 g). The amount of microplastic to be applied for pots was determined by literature review (de Souza Machado et al., 2018; Wu et al., 2019; Mohajerani and Karabatak, 2020; Li et al., 2020; Meng et al., 2021). A total of 48 pots are used, 12 of each dosage. After adding soil-MP mixture to the pots, 350 mL of tap water (field capacity) was added to each pot and incubated for 1 week (Wang et al., 2020). The soil was laid on a cover in the greenhouse in order to remove its wetness and was mixed periodically and dried until it became air dry. Barley seeds were sterilized with 20% NaClO for 10 min and washed with sterilized water for 5 times (Chen et al., 2020). After the seeds were sterilized, they were dried on filter paper and made ready for planting. 3 barley seeds were planted in each pot to increase the chance of germination. Seeds were sown on 20 June. For the germination of the seeds, each pot was watered with 100 mL of tap water once every 2 days. The amount of germinated seeds in the pots was counted and noted every day since the seeds were planted. SPSS 20.0 statistical software was used for statistical analyses and differences in means among treatments were determined by one-way ANOVA.

### **3. RESULTS AND DISCUSSION**

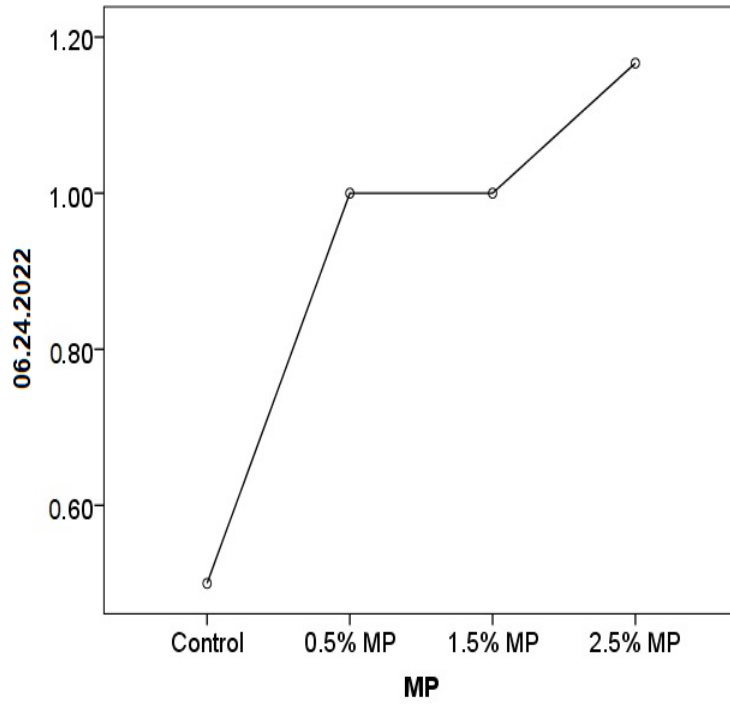
The mean number of germinated seeds and differences among treatments were shown in Table 1. Significant variations were determined in the number of germinated barley seeds among treatments (Table 2). The maximum numbers of germinated seeds were found in 2.5% microplastic added soil treatments. The number of the germinated barley seeds displayed three trends. At the beginning, numbers of first germinated seedlings were similar in all treatments and there was no significant difference (Figure 1). On the sixth days after sowing, the significant differences were determined in the number of seedlings between control groups and 2.5% microplastic added soil treatments (Figure 2). On the eleventh day, the variations in the number of seedlings between control groups and microplastic added soil treatments were clarified (Figure 3).

**Table 1.** Mean number of germinated seeds and differences among treatments.

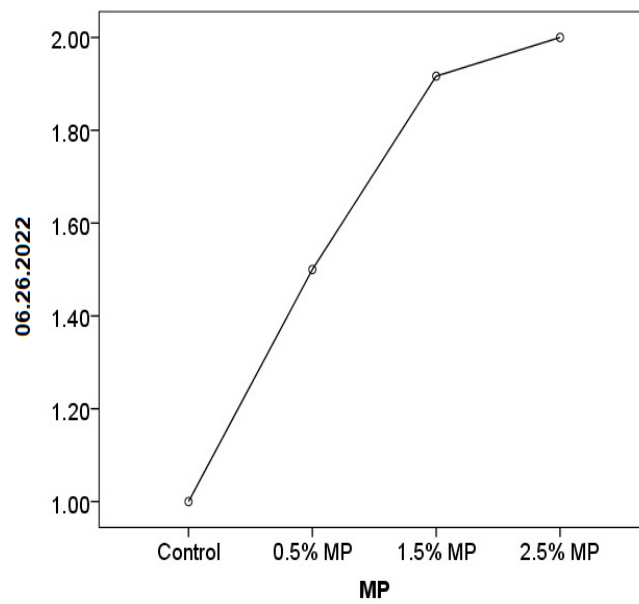
		N	Mean $\pm$ Std. Deviation
06/24/2022	Control	12	0.500 $\pm$ 0.798 a
	0.5% MP	12	1.000 $\pm$ 0.954 a
	1.5% MP	12	1.000 $\pm$ 1.045 a
	2.5% MP	12	1.167 $\pm$ 1.030 a
06/25/2022	Control	12	0.917 $\pm$ 0.900 a
	0.5% MP	12	1.250 $\pm$ 0.866 a
	1.5% MP	12	1.750 $\pm$ 0.754 a
	2.5% MP	12	1.833 $\pm$ 1.115 a
06/26/2022	Control	12	1.000 $\pm$ 0.853 a
	0.5% MP	12	1.500 $\pm$ 0.798 ab
	1.5% MP	12	1.917 $\pm$ 0.515 ab
	2.5% MP	12	2.000 $\pm$ 1.128 b
06/27/2022	Control	12	1.167 $\pm$ 0.718 a
	0.5% MP	12	1.833 $\pm$ 0.937 ab
	1.5% MP	12	2.000 $\pm$ 0.426 ab
	2.5% MP	12	2.0833 $\pm$ 0.996 b
06/28/2022	Control	12	1.167 $\pm$ 0.718 a
	0.5% MP	12	2.000 $\pm$ 0.853 ab
	1.5% MP	12	2.083 $\pm$ 0.515 b
	2.5% MP	12	2.083 $\pm$ 0.996 b
06/29/2022	Control	12	1.167 $\pm$ 0.718 a
	0.5% MP	12	2.083 $\pm$ 0.900 b
	1.5% MP	12	2.167 $\pm$ 0.577 b
	2.5% MP	12	2.167 $\pm$ 0.835 b
06/30/2022	Control	12	1.167 $\pm$ 0.718 a
	0.5% MP	12	2.083 $\pm$ 0.900 b
	1.5% MP	12	2.167 $\pm$ 0.577 b
	2.5% MP	12	2.167 $\pm$ 0.835 b
07/01/2022	Control	12	1.167 $\pm$ 0.718 a
	0.5% MP	12	2.000 $\pm$ 0.853 b
	1.5% MP	12	2.167 $\pm$ 0.577 b
	2.5% MP	12	2.167 $\pm$ 0.835 b

**Table 2.** ANOVA table of differences in mean number of germinated seeds among treatments.

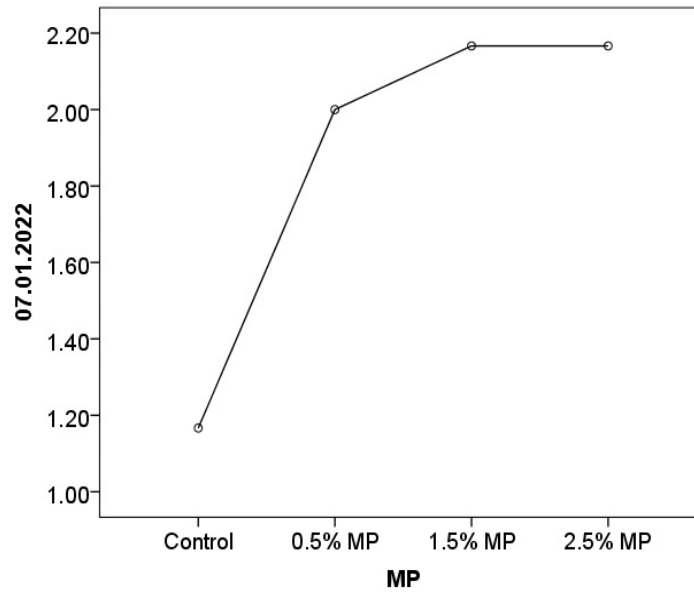
	Sum of Squares	df	Mean Square	F	Sig.
06/24/2022	3.000	3	1.000	1.082	0.367
06/25/2022	6.729	3	2.243	2.661	0.060
06/26/2022	7.563	3	2.521	3.475	0.024
06/27/2022	6.229	3	2.076	3.234	0.031
06/28/2022	7.167	3	2.389	3.822	0.016
06/29/2022	8.562	3	2.854	4.846	0.005
06/30/2022	8.562	3	2.854	4.846	0.005
07/01/2022	8.250	3	2.750	4.840	0.005



**Figure 1.** The number of germinated seeds at the beginning of germination.



**Figure 2.** The number of germinated seeds on the sixth day.



**Figure 3.** The number of germinated seeds on the eleventh day.

While polyethylene microplastic addition exhibited significant positive effect on barley germination rate. Zhang et al. (2021) reported that the polystyrene microplastics did not significantly affected the germination of rice seeds. Consistent with the current study, Bosker et al. (2019) determined that the microplastic addition did not alter the germination rate after 24 h of seed germination. Similar with the result of the current study, previous studies were reported that microplastic addition to the soil would alters the germination rate. In contrast, Boots et. al. (2019), Pflugmacher et al. (2020) and Li et al. (2021) determined that fewer seeds were germinated when microplastics were added to the soil. These differences in results of the studies may be resulted from type and of microplastics, soil structure or plant species. Because seeds need much water during the germination, microplastic addition would affect germination rates. Additionally, microplastics affect ecological functioning of soils such as microbial activity, microbial diversity and substance cycle (Zhou et al., 2021).

Some of the previous studies stated that high amount of microplastics may inhibit water absorption by blocking seed pores and retard germination. But, in contrast to these findings, Zhang et al., (2021) determined that low amount of microplastics promoted the germination rate in rice seeds, consistent with the results of the current study.

In this study, it was understood that microplastic additions not effective in early stages of barley seed germination. However, it significantly increased the seed germination gradually with time and microplastic concentrations. It was thought that the positive effect of microplastics to the seed germination is related with number of pores, water supply in the soils and nutrient uptake.





According to the current results of this study and the previous studies, effect of microplastics differ according to type and amount of microplastics, soil structure, plant species and time.

#### **ACKNOWLEDGEMENTS**

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## **TÜRKİYE'NİN TARIMSAL KURAKLIĞI ÖNLEME POLİTİKALARI**

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### **ÖZET**

Kuraklık, ne zaman meydana geleceği bilinmeyen ve ne kadar süreceği belli olmayan doğal bir afettir. Bir bölgede kuraklık meydana geldiğinde, su miktarındaki azalmadan kaynaklı olarak kısa süre içerisinde bertarafı da mümkün olmamaktadır. Günümüzde kuraklık, iklim değişikliğinin etkisinde çevresel etkilerini günden güne daha da arttırarak küresel bir problem halini almıştır. İçme ve kullanma suyu temin edilen su sistemlerinin kuraklıktan etkilenmesi durumunda bir kuraklık çeşidi olan meteorolojik kuraklık meydana gelmektedir. Su döngüsünde meydana gelen aksamaların devam etmesi ise tarım sektörünü olumsuz olarak etkilemektedir. Bir diğer kuraklık çeşidi olan tarımsal kuraklık oluşması durumunda Dünya genelinde gıda temini ve gıdaya ulaşma hususunda önemli aksamalar meydana gelmektedir. Çevresel ve sosyal etkileri bulunan kuraklık probleminden kaynaklanan olumsuzlukların tolere edilmesi yerküre genelinde oldukça karmaşıktır. Bölgesel olarak yapılacak çalışmalarda ise kuraklık yönetimi oldukça zor bir süreçtir. Bu hususta, kamu kurum ve kuruluşlarının birlikte çalışması kuraklık probleminin yönetilmesinde anahtar niteliğindedir. Bu çalışmada Türkiye'nin tarımsal kuraklık ile mücadele politikaları tartışılmıştır.

**Anahtar kelimeler:** Tarımsal kuraklık, iklim değişikliği, gıda güvenliği, çevre ve halk sağlığı, sürdürülebilirlik, Kuraklık önleme politikaları

## **TURKEY'S AGRICULTURAL DROUGHT PREVENTION POLICIES**

### **ABSTRACT**

Drought is a natural disaster that is unknown when it will occur and how long it will last. When drought occurs in a region, it is not possible to dispose of it in a short time due to the decrease in the amount of water. Today, drought has become a global problem by increasing its environmental effects day by day under the influence of climate change. Meteorological drought, which is a type of drought, occurs when the water systems that provide drinking and utility water are affected by drought. The continuation of the disruptions in the water cycle negatively affects the agricultural sector. In case of agricultural drought, which is another type of drought, significant disruptions occur in food supply and access to food throughout the world. Tolerating the negativities arising from the drought problem, which has environmental and social effects, is quite complex throughout the world. In regional studies, drought management is a very difficult process. In this regard, the cooperation of public institutions and organizations is key in the management of the drought problem. In this study, Turkey's agricultural drought-fighting policies are discussed.

**Keywords:** Agricultural drought, climate change, food security, environment and public health, sustainability, drought prevention policies

## **1. GİRİŞ**

Kuraklık, yavaş meydana gelen ve etkileri öngörülemeyen önemli doğal afetler arasında yer almaktadır (Partigöç ve Soğancı, 2019). Günümüzde olumsuz etkilerini sürdüren küresel ısınmaya bağlı sıcaklık artışları neticesinde toprak bünyesinde bulunan su, önceki dönemler ile kıyaslandığında daha fazla buharlaşma eğilimi göstermektedir. Aynı olumsuz durum kendisini sucul sistemlerde de göstermektedir (Öztürk, 2002). Sıcaklık artışlarının dünya genelindeki artışlarının devam etmesi durumunda ise ilerleyen zaman dilimlerinde daha da fazla bölgede kuraklık tehlikesi ile karşı karşıya kalınacaktır (Turan, 2018).

Dünya genelinde kuraklık ile mücadele politikaları sürekli olarak güncellenmektedir. Bu konuda yerel yönetimler tarafından uygun değerlendirmeler yapılarak kamu kurum kuruluşları, sivil toplum örgütleri ile birlikte çalışarak kuraklık ile mücadele çalışmalarını sürdürmektedir Ayrıca konusunda uzman araştırmacılar da kuraklık ile mücadele politikalarında katkı sağlamaktadır (Demirbaş ve Aydın, 2020). Bu hususta Türkiye uluslararası politikaları ve stratejileri takip ederek yasal mevzuatlar ile birlikte başta Birleşmiş Milletler olmak üzere çeşitli uluslararası ortamda gerekli katılımı gerçekleştirmektedir. Ülkemizde kuraklık öncesi, kuraklık sürerken ve kuraklık sonrasında yapılacak olan faaliyetler ile ilgili çeşitli yönetim planları ve politikaları teşkil edilmiştir. İlgili güncellemeler ise sürekli olarak sürdürülmektedir (Link 1).

Türkiye'nin kuraklık ile mücadelesi yer alan kamu kurum ve kuruluşları ile birlikte tüm paydaşlar bölge halkı ile birlikte çalışmalarını sürdürülmektedir. Alınacak kararlarda ve politikalarda verimin daha da artırılması için katkıda bulunabilecek tüm katılımcılar etkin bir şekilde destek olması gerekmektedir. Bu hususta ise özellikle tarımsal kuraklık ile mücadele çalışmalarında başta çiftçiler olmak üzere tüm bölge halkının verimli bir şekilde katkı sağlaması gerekmektedir (UKYS, 2017). Aksi halde ülkemizin tarıma elverişli topraklarında tarımsal faaliyetlerin sürdürülmesi gerçekleştirilemeyecek olup başta geçimini tarımdan sağlayan çiftçiler olmak üzere sistemde yer alan her etmen bu durumdan zarar görecektir. Bu çalışmada kuraklık probleminin meydana getireceği çevresel problemler özetlenmiştir. Ayrıca küresel iklim değişikliğinin kuraklığa etkisi incelenerek Türkiye'nin kuraklık ile mücadele politikaları değerlendirilmiştir.

## **2. KURAKLIK VE KURAKLIK ÇEŞİTLERİ**

Kuraklık, su miktarındaki azalma neticesinde ortaya çıkan iklimsel bir afettir. Özellikle günümüzde hidrolojik çevrimde meydana gelen aksamalar sebebiyle ülkemizin çeşitli bölgelerinde ve zaman dilimlerinde kuraklık problemi ilerleyen dönemlerde daha da sık bir şekilde yaşanacaktır. Ülkemizde yaşanan önemli kuraklıklardan bazıları 1971-1974, 1983-1984,

1989-1990, 2007-2008, 2013-2014, 2020-2021 yılları arasında geniş alanlarda ve şiddetlerde gerçekleşmiştir. Ülkemizde gerçekleşmiş olan kuraklık problemi neticesinde tarımsal ürün kayıpları, yer üstü ve yeraltı sularında azalmalar meydana gelmiş olup ülke genelinde içme ve kullanma suyu hususunda yetersizlikler ile sonuçlanmıştır Kuraklık çeşitleri meteorolojik, tarımsal ve hidrolojik olmak üzere üç çeşittir (Kapluhan, 2013; Kurnaz, 2014; Link 2; Link 3).

**Çizelge 1.** Kuraklık Çeşitleri (Kapluhan, 2013)

<b>Kuraklık Çeşidi</b>	<b>Tanımı</b>
Meteorolojik Kuraklık	Genellikle en az 30 yıllık zaman periyodunda normal meteorolojik şartlarda meydana gelen sapma olarak tanımlanmaktadır.
Tarımsal Kuraklık	Bitkinin yer aldığı toprakta yeterli nem bulunmaması neticesinde bitkinin gelişiminde meydana gelen aksama durumu olarak tanımlanmaktadır.
Hidrolojik Kuraklık	Uzun süre yağış yağmaması sebebiyle yeryüzü ve yer altı sularında bulunan mevcut suyun azalması olarak ifade edilmektedir.

Meteorolojik kuraklık neticesinde mevcut su miktarında gerçekleşen azalmalar yerini zaman içerisinde tarımsal kuraklık tehlikesi ile karşı karşıya bırakmaktadır. Tarımsal kuraklık oluşması durumunda tarımsal üretim düşerek geçimini tarımcılık faaliyetlerinden gerçekleştiren bireyler için olumsuz etkiler meydana gelecektir. Hidrolojik kuraklık meydana gelmesi sonucunda ise su sistemlerinde meydana gelecek olan azalmalar neticesinde içme ve kullanma suyu temininde aksamalar meydana gelecektir (Partigöç ve Soğancı, 2019).

### **3. TARIMSAL KURAKLIK**

Bitkinin büyümesi ve ürün vermesi için gerekli suya erişememesi durumunda tarımsal kuraklık meydana gelmektedir. Bitkilerin büyümesini etkileyen tarımsal kuraklık, ekinlerden alınan ürün miktarının azalması ve gıdaya erişim problemlerin meydana getirmektedir. Uzun süren kuraklık neticesinde ise bitki beslenemediğinden ekilen ürünlerin kuruması ile sonuçlanmaktadır (Partigöç ve Soğancı, 2019).

Tarımsal kuraklık probleminin olumsuz etkilerinin azaltılması aşamasında en büyük paydaş tarımcılık faaliyetleri ile uğraşan çiftçilere düşmektedir. Bölgeye uyumlu ve az su tüketen bol ürün veren ekinlerin seçimi ile su politikalarına destek olabileceklerdir. Ayrıca salma sulama yerine damlama sulama ya da daha modern seçimler gerçekleştirmek suretiyle daha az su tüketimi gerçekleştirebileceklerdir (Kapluhan, 2013).

Tarımsal kuraklık meydana gelmesi neticesinde bölgesel olarak başlayan su kıtlığı ve gıda temini zorluğu ilerleyen zamanlarda küresel boyutlara ulaşacaktır. İklim değişikliği etkisi ile birlikte ise

meydana gelecek tarımsal kuraklığın süresi uzayacağından etkin ürün ve yeterli gıda teminine erişim daha da kısıtlı bir hale gelecektir.

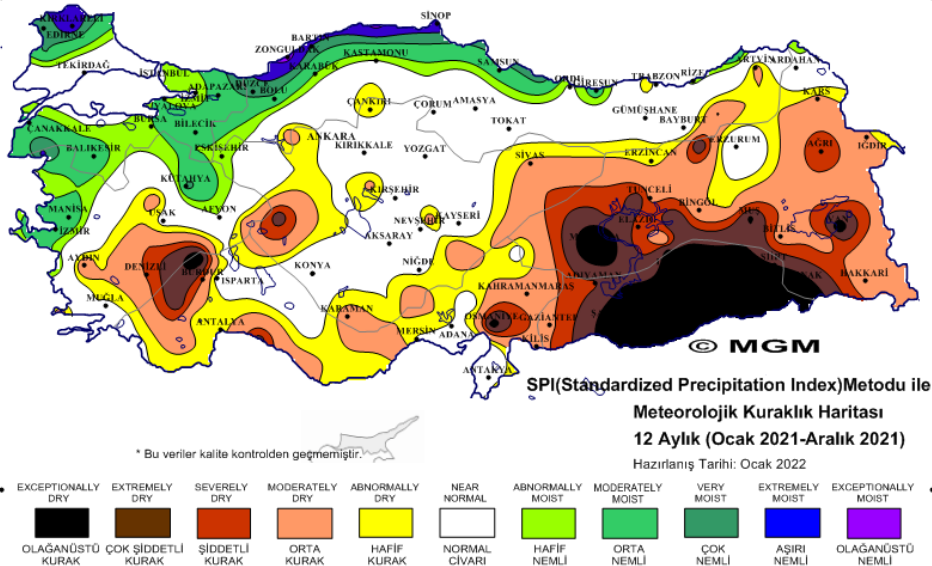
#### **4. TÜRKİYE’NİN SÜRDÜRDÜĞÜ KURAKLIK ÇALIŞMALARI VE TÜRKİYE’NİN TARIMSAL KURAKLIK ÖNLEME POLİTİKALARI**

Günümüzde ulusal düzeyde T.C. Tarım ve Orman Bakanlığı tarafından yürütülen kuraklık ile mücadele çalışmaları kapsamında sürdürülebilir kuraklık ile mücadele politikalarına devam etmektedir. Uluslararası düzeyde ise kuraklık ile ilgili çalışmalar 1998 yılında kabul edilmiş olan Birleşmiş Milletler Çölleşme ile Mücadele Sözleşmesi ile başlamıştır. Söz konusu sözleşmenin kuraklık yönetiminde önemi ise 196 ülke ile birlikte Avrupa Birliği’nde taraf olmuş olmasıdır. Günümüzde ise hâlihazırda kuraklık ile ilgili çalışmaların büyük bir kısmı tarımsal kuraklık alanında sürdürülmektedir (Link 1).

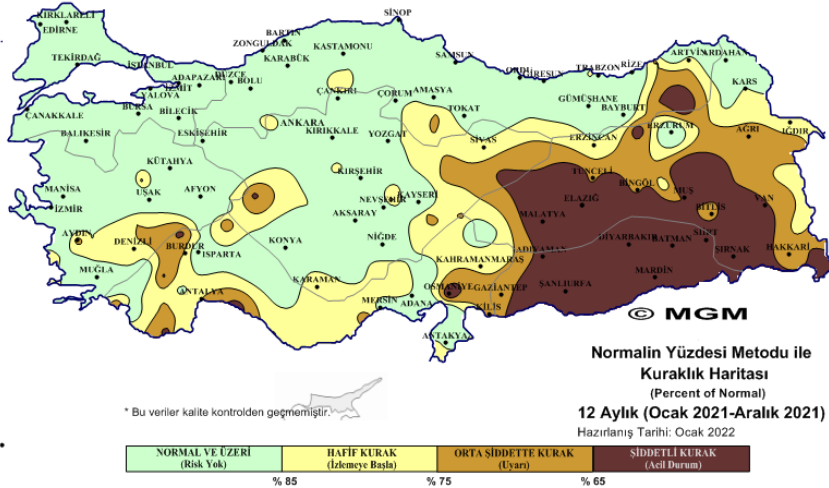
T.C. Tarım ve Orman Bakanlığı tarafından kuraklık ile mücadele aşamasında ulusal envanterler oluşturularak mevcut kuraklık problemlerini ve geçmişte yaşanmış olan olumsuz kuraklık felaketleri bilgi sistemleri vasıtasıyla güncel olarak işlenmektedir. Elde edilmiş olan güncel verilerin değerlendirilmesi neticesinde ise geleceğe yönelik tahminler yapılmakta ve kuraklıktan olası etkilenecek olan bölgeler belirlenmektedir. Bu aşamada ise ilgili bölge için alınması gereken tedbirler ve yönetim planları oluşturulmaktadır.

T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı Meteoroloji Genel Müdürlüğü tarafından sürdürülen çalışmalarda ise Türkiye için elde edilmiş olan meteorolojik veriler matematiksel eşitliklere veri olarak kullanılmaktadır. Standart Yağış İndeksi (Standardized Precipitation Index - SPI) ve Normalin Yüzdesi İndeksi (Percent of Normal Index - PNI) kullanılarak elde edilen kuraklık haritaları ise tüm ülkemiz tarafından elektronik ortam üzerinden ulaşabilmektedir. Şekil 1 ve 2’de T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı Meteoroloji Genel Müdürlüğü tarafından kullanılan matematiksel modellere ait 2021 yılı kuraklık çıktıları yer almaktadır (Link 4; Link 5).





Şekil 1. Standart yağış indeksi ile oluşturulmuş kuraklık haritası (Link 5)



Şekil 2. Normalin yüzdesi indeksi ile oluşturulmuş kuraklık haritası (Link 5)

Şekil 1 ve Şekil 2’de yer alan iki saptama yöntemi arasında bölgesel bazda bir takım değişiklikler gözlenmektedir. Aynı verinin farklı metotlar ile işlenilmesi neticesinde birden fazla senaryo aynı anda elde etmek mümkün olmaktadır. Elde edilen sonuçlar doğrultusunda ilgili bölgelere yönelik kısa, orta ve uzun vadeli politikalar sürdürmektedir. T.C. Tarım ve Orman Bakanlığı tarafından

kendi bünyesi ile birlikte diğer kamu kuruluşları ve araştırmalardan elde edilen verilerin değerlendirilmesi neticesinde ise Türkiye Kuraklıkla Mücadele Eylem Planı ve Türkiye'nin Tarımsal Kuraklık ile Mücadelesinde önemli rol oynayan strateji planları hazırlanmaktadır.

Söz konusu eylem planlarında ise kurumsal altyapının güçlendirilmesi, Devletimizin tüm sistemlerinin birlikte işleyebilmesi ve tarım sektörünün en az etkilenecek şekilde gerekli tüm planlamaların yapılması hedeflenmektedir.

Türkiye'nin tarımsal kuraklık ile mücadele stratejilerinin öncelikli adımını kuraklık risk tahminleri ve riskli bölgede gerçekleştirilecek olan yönetim faaliyetleri yer almaktadır. Riskli bölgelerin belirlenmesini takiben gerekli suyun hangi kaynaktan ve ne şekilde ulaştırılabileceği planlanırken aynı zamanda ilgili bölgede mevcut suyun tutulması ve sisteme girecek olan su girdilerinin korunması amacıyla planlar yapılmaktadır. Bölgede etkin bitki deseni ve tarımsal alanların belirlenmesi neticesinde ise uygun sulama metodu ve yönteminin planlanması ile birlikte güncel metotlar ile sulama işleminin sürdürülebilir olması yönünde politikalar belirlenmektedir. İlgili bölgede yapılacak olan eğitim ve araştırma faaliyetleri neticesinde ise alınan verimin artırılması sağlanarak bölge halkı ile birlikte sürdürülebilir yönetim politikaları daha güncel haline getirilmektedir. Son olarak ise mevcut kurum ve kuruluşların alt yapılarının güçlendirilmesi amacıyla gerekli güncellemeler planlanmaktadır. Ayrıca kuraklık ile mücadele hususunda önemli olan bir diğer çalışma kuraklık tahmin ve erken uyarı sistemleri olmaktadır. Bu hususta ise gerekli çalışmalar sürdürülmektedir.

## **5. SONUÇLAR**

Tarımsal kuraklık neticesinde önemli gıda krizleri meydana gelerek maddi olarak da bu alanda çalışan bireylere önemli zararlar verecektir. Bu hususta Ülkemizde yer alan çeşitli kurum ve kuruluşlar birlikte ortak çalışmalar sürdürmektedir. Türkiye'nin tarımsal kuraklık ile mücadelesinde ise en güçlü yanı tüm kamu kurum ve kuruluşlarının birlikte uyumlu bir şekilde süreci yönetmesidir. Ayrıca konusunda uzman araştırmacılar ile birlikte uluslararası kuraklık politikalarına uygun olarak yönetim planları oluşturulması neticesinde güncel ve işlevselliği yüksek planlar üretilebilmektedir.

Kamu kurum ve kuruluşlarının yürüttükleri kuraklık ile mücadele çalışmalarına sivil toplum kuruluşları da birlikte uyum içinde çalışmaktadır. Ayrıca ülkemizde tarımsal faaliyetlerinin sürdürüldüğü alan miktarının büyüklüğü teşkil edilmiş olan yönetim planlarının tam anlamıyla kontrol edilmesinde aksamalara sebep olması muhtemeldir. Bu hususta ise bölge halkının ve tarımcılık faaliyetlerine katılan tüm paydaşların gereken desteği ve özeni göstermeleri ile gerekli yönetim planlarının başarısı arttırılabilecektir.

Tarımsal kuraklık, su kaynaklarına ulaşım gücünü de beraberinde getireceği için özellikle tarımsal üretimin gerçekleştiği bölgelerde kuraklık esnasında su temin edilebilecek sistemlerin tahrip edilmemesi ve bir aksama durumunda yetkili kuruma bilgi verilmesi gerekmektedir. Daha az su tüketen sulama metotları ve ürün desenindeki uygun seçimler için gerekli eğitim faaliyetlerinin daha arttırılması ile kuraklık ile mücadele de verimi arttırmak mümkündür.

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**SUCUL SİSTEMLERİN SU KALİTESİNİN DEĞERLENDİRİLMESİNDE SU KALİTE İNDEKSLERİ**

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**ÖZET**

Sucul ekosistemler, içme ve kullanma suyu teminin yanı sıra rekreasyonel amaçlı olarak insanlar tarafından kullanılmaktadırlar. Bünyelerinde barındırdıkları canlılık açısından eşsiz olan sucul sistemlerin korunması ve mevcut su kalitelerinin belirlenmesi ise mevcut sistemin kontrol edilebilmesi açısından oldukça önemli bir husus olmaktadır. Su sistemlerinde kalitenin korunması ve sürdürülebilirliğin sağlanması amacıyla yerel yönetimler tarafından düzenli olarak numuneler alınarak pH, iletkenlik, askıda katı madde ve organik madde miktarının tespiti gibi çeşitli kirletici parametreler düzenli olarak takip edilmektedir. Bir su sisteminden alınan numuneler ile analizleri tamamlanan parametrelerin sayısının fazla olması ise değerlendirme ya da karşılaştırma açısından her zaman pratik olmamaktadır. Bu hususta ise sucul sistemlerden alınan numune sonuçlarının sunulmasında daha pratik bir çıktı ile sunulabilmesi önem kazanmaktadır. Bu hususta ise son yıllarda araştırmacılar ve yerel yönetimler tarafından çeşitli su kalite indeksleri kullanılmaya başlanmıştır. Bu çalışmada su kalitesi değerlendirmesinde kullanılan indeksler ve kullanılan indekslerin kapsadığı parametreler tartışılmıştır. Ayrıca su kalite indekslerinin birbirleri ile benzerlikleri ve farklılıkları değerlendirilmiştir.

**Anahtar kelimeler:** Su kalite indeksi, su kalitesi, sucul ekosistemler, su kirlenmesi

**WATER QUALITY INDEXES IN DETERMINATION OF WATER QUALITY OF  
AQUATIC SYSTEMS**

**ABSTRACT**

Aquatic ecosystems are used by humans for recreational purposes as well as for the supply of drinking and utility water. The protection of aquatic systems, which are unique in terms of the vitality they contain, and the determination of existing water qualities are very important issues in terms of controlling the existing system. In order to maintain quality and ensure sustainability in water systems, samples are taken regularly by local governments and various pollutant parameters such as pH, conductivity, suspended solids and organic matter are monitored regularly. The large number of samples taken from a water system and the parameters whose analyzes have been completed is not always practical in terms of evaluation or comparison. In this regard, it becomes important to present the results of samples taken from aquatic systems with a more practical output. In this regard, various water quality indices have been used by researchers and local governments in recent years. In this study, the indices used in water quality assessment and the parameters covered by the used indices are discussed. In addition, the similarities and differences of water quality indices with each other were evaluated.

**Keywords:** Water quality index, water quality, aquatic ecosystems, water pollution

## **1. GİRİŞ**

Yaşamın sürekliliği ve canlılık için gerekli su, sucul sistemler bünyesinde bulunmaktadır (Tunç Dede ve Sezer, 2017; Baştürk ve Alver, 2019). Sucul sistemler, tarımsal ve hayvancılık faaliyetleri için gerekli su temininin yanı sıra bünyesinde barındırdığı besin maddeleri açısından da canlılar için oldukça değerli bir kaynaktır (Varol ve Şekerci, 2018; Kılıç, 2020). Günümüzde temiz suya ulaşım güçlükleri ve kuraklık problemleri neticesinde ise değeri daha iyi anlaşılmıştır (Davraz ve Ünver, 2014; Kurt ve ark., 2022).

Günümüzde artan popülasyona bağlı olarak su temininde artışlar gerçekleşmekte olup aynı şekilde meydana gelen atıksu miktarın da artış meydana gelmektedir (Baştürk ve Alver, 2019; Boretti ve Rosa, 2019). Su sistemlerine arıtılmadan deşarj edilen atıksular ise alıcı ortamların kirlenmesine sebep olmaktadır (Güneş, 2019). Sucul sistemlerde meydana gelen kirlilik su sistemlerinden elde edilen verimin düşmesine sebep olurken bünyesinde yaşayan canlılara da zarar vermektedir (Mushtaq ve ark., 2020).

Bir su sisteminin işlevine uygun olarak kullanılması için mevcut su kalitesinin bilinmesi gereklidir (Maraşlıoğlu ve ark., 2018). Ülkemizde su sistemlerinin mevcut su kalitesinin anlaşılması ve ölçülmesi hususunda uygun yasal mevzuat bulunmaktadır (Bulut ve Birben, 2019). Fakat bir su sisteminin değerlendirilmesinde, birden fazla kalite parametresinin aynı anda yorumlanarak bir arada sunulması gerekmektedir (Baştürk ve Alver, 2019). Su kalite indeksleri kullanılarak veri grubu yükü tek veriye kadar indirgenmekte ve mevcut su kalitesinin daha kolay bir şekilde değerlendirilmektedir (Koç, 2018).

Bu çalışmada, sucul sistemlerin ekosistem için değeri hakkında bilgi verilmiştir. Su kalitesi ve su kalitesinin önemi hakkında değerlendirmeler gerçekleştirilmiştir. Ayrıca su sistemlerinde mevcut su kalitesinin yorumlanmasında kullanılan su kalite indeksleri ve bu indekslerin birbirleri arasındaki farklılıkları incelenmiştir.

## **2. SUCUL SİSTEMLER**

Deniz, göl, akarsu gibi yer üstü ve yer altı sularını kapsayan en geniş adlandırma sucul sistem tanımlaması olmaktadır (Link 1). Sucul sistemlerin bünyesinde bulunan suyun %97,5'i denizler ve okyanuslar'da %2,5'i akarsu ve göllerde tatlı su olarak bulunmaktadır. Yerkürenin %70'i su ile kaplı olup bu su kütesinin deniz ve okyanustaki kısmı tuzlu su niteliğindedir (Tunç Dede ve Sezer, 2017). Su sistemlerinin beslenmesi ve suyun diğer sistemler arasındaki etkileşimi hidrolojik döngü vasıtasıyla gerçekleşmektedir. Şekil 1.'de hidrolojik döngüye alt görsel yer almaktadır (Link 2).



Şekil 1. Hidrolojik döngü

Tüm Dünya’da bulunan su sistemleri Şekil 1’de yer alan döngü ile birbirlerine ilişki durumdadır. Hidrolojik çevrimin elemanlarından herhangi birinde meydana gelecek aksamalar belirli bir seviyeye kadar doğal olarak tolere edilebilmektedir. Fakat özellikle insanlardan kaynaklanan faaliyetler sonucunda su döngüsünde istenmeyen olumsuzlukların oluşması mümkündür. Bu duruma yerkürede mevcut ortam sıcaklığının sera gazları neticesinde artışı olan küresel ısınma örnek verilebilir (Bayazıt, 2011; Raimi ve ark., 2021).

Sucul sistemler, bünyesinde barınan canlılar için birer yuva görevi görmektedir. Eşsiz ekosistemleri bünyesinde barındıran sucul ortamlar, çevresinde yaşayan canlılar için su ve gıda temininde de katkı sağlamaktadır (Kocataş, 2012). Ayrıca tarım, hayvancılık ve endüstriyel faaliyetlerde de sucul sistemlerden fayda sağlanmaktadır (Erkek ve Ağırlioğlu, 2002).

### 3. SU KALİTESİ

Su, doğada katı, sıvı ve gaz halinde bulunan kimyasal formülü H<sub>2</sub>O olan kimyasal bir bileşiktir (Link 3). Su sistemlerinde doğaları gereği katı ve çözülmüş olarak çeşitli safsızlıklar yer almaktadır (Karpuzcu, 2009; Samsunlu, 1999). Ayrıca bünyelerinde yaşayan canlılar da bu ekolojik sistemin parçasıdır (Kocataş, 2012). Kalite kavramı ise kişiden kişiye değişmekte olan bir terim olup su sistemlerinin kalitesi yasal mevzuatlar ile düzenlenmektedir (Bulut ve Birben, 2019; Link 4). Su sistemlerinde kullanım amaçlarına uygun olarak su kalitesi kimyasal, fiziksel, biyolojik ve radyolojik parametreler ile izlenmektedir (İTAY, 2005; YSKY, 2012; YSKB, 2012). Su sistemlerinde meydana gelen tahribatlar ve çevresel problemler tüm dünya genelinde meydana gelmektedir (Maraşlıoğlu ve ark., 2018; Akkan ve Mutlu, 2022). Su sistemlerinin su kalitesi, insanlardan kaynaklı faaliyetler sonucunda oluşan atıksular ile kirlenmektedir. Ayrıca yağışlar ve



yüzeysel akışların etkisinde tarımsal alanlardan gelen sular vasıtasıyla çeşitli kirleticiler su sistemlerine ulaşmaktadır. Alıcı ortamlara ulaşan bu kirleticiler sucul sistemlerde organik, inorganik ve ısıl kirlilik olmak üzere çeşitli zararlar vermektedir (Aksever ve Büyükşahin, 2015; Güneş, 2019).

Sucul sistemlerin su kalitesinin belirlenmesi, çevresel yönetim planlarının hazırlanması aşamasında öncelikli unsurdur (Arkoç, 2016). Özellikle günümüzde sucul ortamlarda meydana gelen tahribatlardan kaynaklı olarak küresel ısınma etkisinde daha da ciddi sorunlar meydana gelmeden su sistemlerin korunması ve sürdürülebilirliğin sağlanması gerekmektedir (Taş ve ark., 2021). Bu hususta ise pH, elektriksel iletkenlik, organik madde muhtevası, askıda katı madde, çözülmüş oksijen, azot, fosfor gibi çeşitli parametreler su sistemlerinden alınan numunelerde uygun metotlar ile ölçülmektedir (Samsunlu, 1999).

#### **4. SU KALİTE İNDEKSLERİ**

Su kalite indeksleri, büyük veri gruplarının birkaç rakamdan oluşan basit bir ifadeye dönüştürülmesi vasıtasıyla yorumlanmaktadır. Su kalite indeksi, sucul sistemlerin su kalitesinin belirlenmesi amacıyla yapılan fiziksel, kimyasal ve biyolojik analizlerin ölçüm değerlerinin matematiksel modellere veri olarak kullanılması ile hesaplanmaktadır (Baştürk ve Alver, 2019). Su kalitesi modeli ilk Horton tarafından 1965 yılında geliştirilmiş olup zaman içerisinde çeşitli araştırmacılar ve resmi kurumlar tarafından kullanımı artış göstermiştir (Kılıç, 2020).

Dünya genelinde birden fazla su kalite indeksi bulunmaktadır (Koç, 2018; Küçükönder ve ark., 2022). Fakat küresel olarak kabul edilmiş bir su kalite indeksi bulunmamaktadır (Alver ve Baştürk., 2019). Su kalite indeksleri arasında yaygın olarak Horton İndeksi, Ulusal Sanitasyon Vakfı Su Kalite İndeksi, Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksi, Kolombiya Su Kalite İndeksi, İskoç Araştırma Geliştirme Departmanı İndeksi, Oregon Su Kalite İndeksi, Malezya Su Kalite İndeksi ve Baskaron İndeksi kullanılmaktadır (Alver ve Baştürk, 2019; Küçükönder ve ark., 2022).

Su sistemlerinde kirlilik durumunun tespiti için su kalite indeksi kullanılmadan önce hangi amaç ile çalışmanın gerçekleştirileceğinin belirlenmesi önemli bir husustur. Endüstriyel faaliyetler ile birlikte içme suyu eldesi ve ekosistem korumak amacıyla bir çalışma sürdürülecek ise Oregon ya da Kolombiya indeksleri kullanılabilir (Alver ve Baştürk, 2019). Ulusal Sanitasyon Vakfı Su Kalite İndeksinin kullanılması durumunda ise dokuz adet parametre (çözülmüş oksijen, fekal koliform, biyolojik oksijen ihtiyacı, nitrat, fosfat, pH, bulanıklık, toplam çözülmüş madde ve sıcaklık) için su analizi gerçekleştirilmesi gerekmektedir (Baştürk ve Alver, 2019). Kanada Çevre

Bakanlığı Konseyi Su Kalite İndeksinde, en az dört parametrenin ölçüm sonucu gerekmekte olup bu parametrelerin ise en az dört dönemine ait ölçüm sonucunun bulunması gerekmektedir (Küçükönder ve ark., 2022). Su kalite indekslerinde ayrıca su sisteminin kullanım amacına uygun olarak matematiksel modelde kullanılan su analizi parametresi değiştirilerek modifiye su kalite indeksi elde edilebilmektedir. Bu hususta ise su kalite indeksi sonuç çıktısının değerlendirilmesi aşamasında mevcut olan kalite sınıf aralığının yanlış yorumlanmamasına özen gösterilmesi gerekmektedir (Baştürk ve Alver, 2019).

Su kalite indeksi modellerinin kullanılmasında seçilmiş olan indekse göre farklı matematiksel eşitlikler bulunmaktadır. Örneğin Horton indeksinde içme suyu kalitesinin su kirliliğine etkisinin öncelik derecesinin belirlenmesi gerekmektedir (Şener ve Şener, 2022). Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksinde ise matematiksel model su kalite parametresi ya da zaman dilimi öncelikli olmayıp kirleticinin çevre koşullarına bağlı olarak konuma göre farklılık göstereceği kabul edilmektedir (Tunç Dede ve Sezer, 2017). Çizelge 1 ve 2’de sırası ile Horton indeksi ve Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksi hesaplamalarına göre elde edilen sonucun yorumlanmasında kullanılan sonuç çizelgeleri yer almaktadır (Tunç Dede ve Sezer, 2017; Şener ve Şener, 2022).

**Çizelge 1.** Horton indeksi (sol) hesaplamalarında kullanılan sonuç çizelgeleri

<b>Horton indeksi</b>		
<b>Su Kalite İndeksi</b>	<b>Durum</b>	<b>Muhtemel Kullanım</b>
0-25	Mükemmel	İçme, sulama ve endüstriyel
26-50	İyi	Evsel, sulama ve endüstriyel
51-75	Makul, uygun	Sulama ve endüstriyel
76-100	Kötü	Sulama
101-150	Oldukça Kötü	Sulama için sınırlı kullanım
>150	İçme suyu olarak uygun değil	Kullanım öncesi uygun arıtma

**Çizelge 1.** Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksi (sağ) hesaplamalarında kullanılan sonuç çizelgeleri

<b>Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksi</b>	
<b>Su Kalite İndeksi</b>	<b>Kullanım Durumu</b>
0-44,9	Kötü
45-64,9	Zayıf
65,79,9	Orta
80-90,4	İyi
95-100	Mükemmel

Çizelge 1 ve 2 incelendiği zaman Horton indeksi ile Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksi hesaplama sonuç çizelgelerin yorumlanma aşamasında farklılık gösterdiği görülmektedir.

Horton indeksine göre 60 değeri makul ve uygun durumu ifade ederken Kanada Çevre Bakanlığı Konseyi Su Kalite İndeksi için 60 değeri zayıf olarak değerlendirilmektedir. Bu durumda ise aynı su kalitesi indeksi ve matematiksel ifade de aynı parametrelerin kullanılması sonuçların başka çalışmalar ya da su sistemleri için değerlendirilmesinde önemli olmaktadır.

## **5. SONUÇLAR**

Su sistemlerinden alınan verimin tüm etmenler için sürdürülebilir olması için gerekli önlemlerin yerel yönetimler tarafından alınması gerekmektedir. Su sistemlerinin planlanması ve yönetimi aşamasında uygun su kalite indeksinin belirlenmesi gerekmektedir. Bu hususta en önemli etmen seçilen kirletici parametresi ve analiz sonucunun doğruluğudur. Ayrıca su sistemi üzerinde belirlenen numune alma ve izleme noktalarının sistemin tümünü yansıtması ve su sistemine etki drenajlar ile birlikte tüm olumsuz etmenleri içerecek şekilde belirlenmesidir.

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**THE TOXICITY LEVEL OF BORON DOSE AND FORM ON GERMINATION AND  
SEEDLING GROWTH IN SUGAR BEET**

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**ABSTRACT**

This study was focused on determining if there were the toxic effects of two boron forms ( $H_3BO_3$  and  $Na_2B_8O_{13}.4H_2O$ ) at different doses on the germination and seedling growth of sugar beet. In this experiment performed at the Seed Science and Technology Laboratory, Eskişehir Osmangazi University in 2022, the seeds of sugar beet cv. Kuno were germinated between filter papers moistened with 5, 10, 30, 60, and 90 ppm of two boron forms at 25°C in the dark for 14 days. Distilled water served as a control. The results showed that increasing boron doses did not affect germination percentage, mean germination time, and seedling dry matter. Shoot and root lengths were significantly reduced when B doses increased. Increased B levels resulted in shortening shoot length from 6.42 cm to 5.69 cm in boric acid and from 6.80 cm to 4.43 cm in sodium borate. Also, the fresh and dry weight of the sugar beet seedling reduced significantly at 60 and 90 ppm in sodium borate. It was concluded that the germination performance of sugar beet was not influenced by increasing boron dose and form, indicating that there were no toxic effects of B on seed germination; however, the inhibitory effect on seedling growth was identified at 60 and 90 ppm regardless of B forms.

**Keywords:** *Beta vulgaris* L., boron, germination, seedling growth, toxicity

## **INTRODUCTION**

Boron (B) is a microelement required for the development of growing plant parts such as roots and new leaves, as well as the development of the flower, seed, and fruit, the elongation of pollen tubes, and the production of plant hormones (Goldbach and Wimmer, 2007; Herrera-Rodriguez et al., 2010; Gupta, 2016). B transports water, macro- and micronutrients, and organic molecules to the plant's active growing parts. It promotes the delivery of sugars produced to active growth parts and developing fruits or seeds (Gupta et al., 1985; Goldbach et al., 2001). In most agricultural soils, B content changes between 1 and 467 mg kg<sup>-1</sup>, on average between 9 and 85 mg kg<sup>-1</sup>. However, B availability ranges from 0.5 to 5 mg kg<sup>-1</sup> (Gupta, 2016). In Turkey, which has 73% of the world's B reserves (Anonymous, 2022), it has been reported that 46.2% of the soil is insufficient, 31.1% sufficient, 19.4% high, and 3.3% excessive in terms of B levels (Killioğlu, 2022). B deficiency influences both vegetative and reproductive development of the plants such as root development (Dell and Huang, 1997; Gupta, 2016), leaf elongation (Huang et al., 1996), and inducing cell expansion restriction (Marchner, 1995). Because sugar beet is sensitive to B deficiency and needs high B requirement, insufficient B concentration causes the leaf petiole to exhibit a corky top surface (Bergmann, 1976). Its growth is delayed, and young leaves curl and turn black. Surface cracking, cupping, and curling are visible on the old leaves. On the other hand, B toxicity can inhibit the photosynthetic capability of sugar beet, limit the transfer of photosynthesis products, uptake active oxygen in cells, and cause oxidative stress, all of which can limit sugar beet plant growth (Hao et al., 2020). A lot of research on determining suitable B doses for sugar beet have been focused on seed yield, root yield, and sugar content (Dordas et al., 2007; Armin and Asgharipour, 2012; Nemeata Alla, 2017; Ghaly et al., 2019; Aly et al., 2020), and limited information about the toxicity or promoter effects of boron applications during germination and early seedling stage of sugar beet has been demonstrated. Hence, the present study was performed to evaluate two boron forms (H<sub>3</sub>BO<sub>3</sub> and Na<sub>2</sub>B<sub>8</sub>O<sub>13</sub>.4H<sub>2</sub>O) at different doses on the germination and seedling growth of sugar beet.

## **MATERIAL AND METHODS**

To investigate the effects of boron (B) sources on germination and seedling growth of sugar beet cv. Kuno, an experiment was designed at the Seed Science and Technology Laboratory, Eskişehir Osmangazi University, in 2022. Boron doses were arranged as 5, 10, 30, 60, and 90



ppm. Distilled water was used for the control treatment. Two boron sources, boric acid (17%  $H_3BO_3$ ) and Etidot-67 (20.9% disodium octaborate tetrahydrate;  $Na_2B_8O_{13} \cdot 4H_2O$ ), were used in the study. The standard germination test was conducted with four replicates of 50 seeds according to ISTA (2003) rules. The 50 seeds were placed in three-layer filter papers moistened with 21 mL of respective B solutions and they were rolled. And then, they were placed to a sealed plastic bag to prevent water evaporation. The germination test was performed in an incubator arranged at 25°C under dark conditions, and the seed with a 2 mm radicle was counted as germinated. Counting was performed every 24 h for 14 days. To assess the germination velocity, mean germination time (MGT) was computed by ISTA (2003). On the final day, ten seedlings from each B level were randomly sampled to measure shoot length (SL), root length (RL), seedling fresh weight (SFW), seedling dry weight (SDW), and dry matter (DM). The experiment made use of two factorials arranged in a Completely Randomized Design (CRD) with four replicates. The experimental data were analyzed by ANOVA and the differences were compared by the Least Significant Difference (LSD) test ( $P < 0.05$ ). For all investigated parameters, an analysis of variance was performed using the MSTAT-C computer software program (Michigan State University v.2.10).

## **RESULTS AND DISCUSSION**

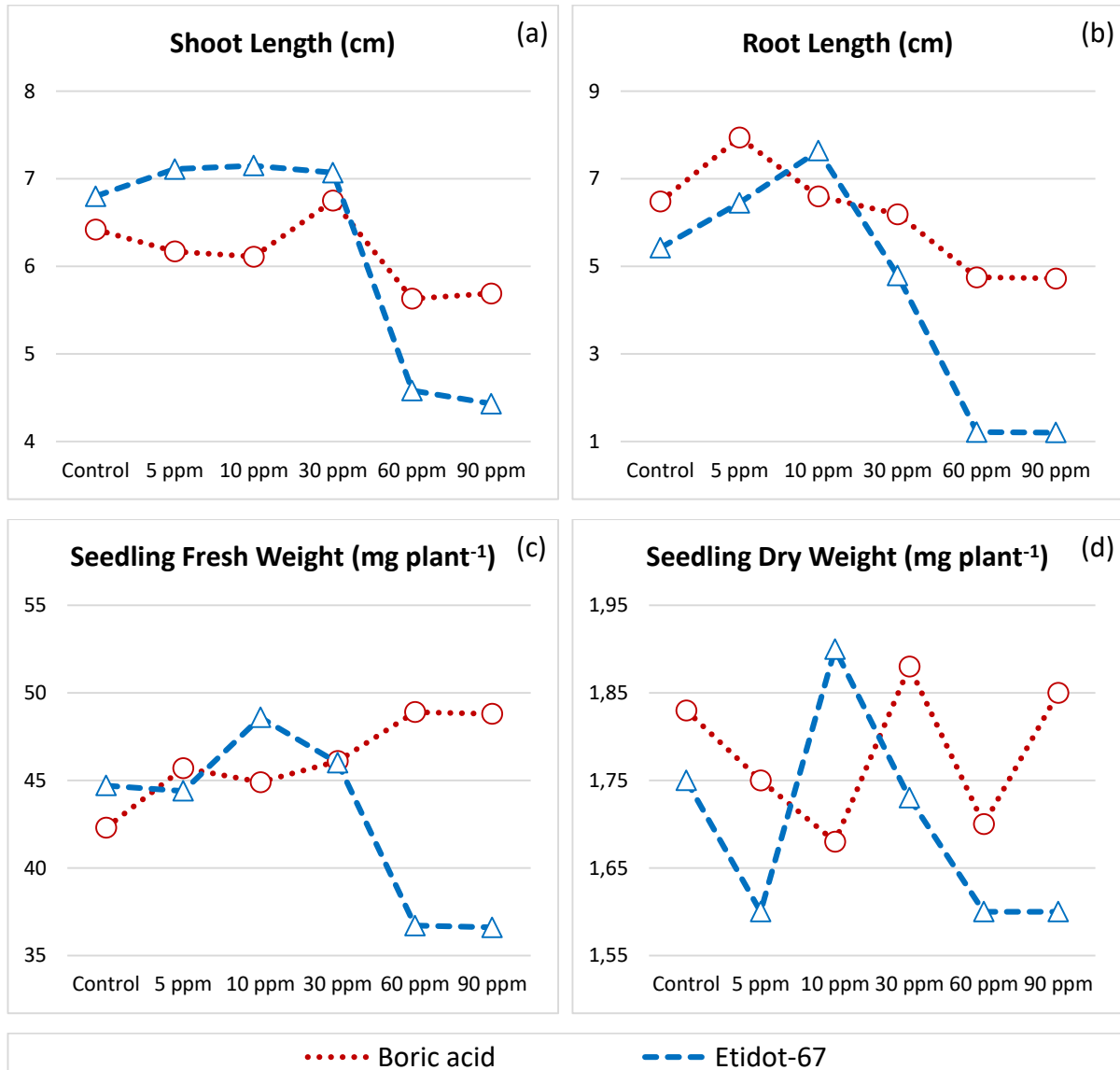
The increasing concentration of boron forms did not significantly influence germination percentage, mean germination time, and seedling dry matter (Table 1). GP was over 90% in all interactions between boron forms and doses. This result confirmed the findings of Shah et al. (2013), Muhmood et al. (2014), and Jokanovic et al. (2010), who found that increasing boron concentrations had no significant effects on germination percentages in maize and wheat. Contrarily, other researchers noted that boron adversely affects germination percentage in safflower (Ashagre et al., 2014a), wheat (Yau et al., 1995; Iqbal et al., 2017), and broccoli (Noorun Nisa et al., 2013). The MGT increased up to 10 ppm B, but higher levels led to decreasing it significantly. The lowest MGT was observed at control, 60, and 90 ppm B doses of both boron forms. Our findings showed a similarity to the results of Noorun Nisa et al. (2013). They determined that low boron doses reduced the MGT of broccoli. Shoot length (SL), root length (RL), seedling fresh weight (SFW), and seedling dry weight (SDW) were significantly reduced by increasing B levels. SL and SDW were inhibited at 60 ppm B level, while RL was 30 ppm B. Compared to the control treatment, SL and RL at 60 and 90 ppm of

sodium borate were approximately decreased by 35% and 80%, respectively (Figure 1). B primarily limits root development by reducing cell elongation (Brown et al., 2002). Nable et al. (1997) found that higher B levels depressed shoot and root development. According to Ashagre et al. (2014a) and Ashagre et al. (2014b), SL, RL, SFW, and SDW of safflower and wheat decreased as B concentrations were increased. The highest SL, RL, SFW, and SDW were recorded at the doses of 10 to 30 ppm B for two boron forms. The considerable enhancement in seedling growth at low boron concentrations could be explained due to its role in cell elongation, cell division, and meristematic growth (Khan et al., 2006).

Table 1. Effects of different boric acid and Etidot-67 levels on germination and seedling growth of sugar beet cv. Kuno

Factors	GP (%)	MGT (day)	SL (cm)	RL (cm)	SFW (mg plant <sup>-1</sup> )	SDW (mg plant <sup>-1</sup> )	DM (%)
<b>Boron (A)</b>							
Boric acid	94.8	2.11	6.13	6.11 <sup>a</sup>	46.1 <sup>a</sup>	1.78 <sup>a†</sup>	3.88
Etidot-67	94.3	2.07	6.19	4.45 <sup>b</sup>	43.8 <sup>b</sup>	1.70 <sup>b</sup>	4.01
<b>Dose (B)</b>							
Control	94.8	2.07 <sup>b</sup>	6.61 <sup>a</sup>	5.95 <sup>b</sup>	43.5	1.79 <sup>a</sup>	4.13
5 ppm	94.0	2.10 <sup>ab</sup>	6.64 <sup>a</sup>	7.19 <sup>a</sup>	45.0	1.68 <sup>b</sup>	3.78
10 ppm	93.0	2.18 <sup>a</sup>	6.63 <sup>a</sup>	7.12 <sup>a</sup>	46.7	1.79 <sup>a</sup>	3.83
30 ppm	95.0	2.09 <sup>b</sup>	6.91 <sup>a</sup>	5.49 <sup>b</sup>	46.0	1.80 <sup>a</sup>	3.91
60 ppm	95.0	2.03 <sup>b</sup>	5.10 <sup>b</sup>	2.98 <sup>c</sup>	42.8	1.65 <sup>b</sup>	3.92
90 ppm	95.5	2.07 <sup>b</sup>	5.06 <sup>b</sup>	2.96 <sup>c</sup>	42.7	1.73 <sup>ab</sup>	4.09
<b>Boron × Dose (A×B)</b>							
Boric acid × Control	96.0	2.08	6.42 <sup>abc</sup>	6.48 <sup>cd</sup>	42.3 <sup>b</sup>	1.83 <sup>a-d</sup>	4.33 <sup>ab</sup>
Boric acid × 5 ppm	93.0	2.12	6.17 <sup>bc</sup>	7.94 <sup>a</sup>	45.7 <sup>ab</sup>	1.75 <sup>a-e</sup>	3.85 <sup>cd</sup>
Boric acid × 10 ppm	92.5	2.25	6.11 <sup>bc</sup>	6.60 <sup>bc</sup>	44.9 <sup>ab</sup>	1.68 <sup>de</sup>	3.75 <sup>cd</sup>
Boric acid × 30 ppm	96.0	2.11	6.75 <sup>ab</sup>	6.19 <sup>cd</sup>	46.1 <sup>ab</sup>	1.88 <sup>ab</sup>	4.07 <sup>abc</sup>
Boric acid × 60 ppm	96.0	2.02	5.63 <sup>c</sup>	4.75 <sup>e</sup>	48.9 <sup>a</sup>	1.70 <sup>cde</sup>	3.47 <sup>d</sup>
Boric acid × 90 ppm	95.5	2.07	5.69 <sup>c</sup>	4.72 <sup>e</sup>	48.8 <sup>a</sup>	1.85 <sup>abc</sup>	3.80 <sup>cd</sup>
Etidot-67 × Control	93.5	2.06	6.80 <sup>ab</sup>	5.42 <sup>de</sup>	44.7 <sup>ab</sup>	1.75 <sup>a-e</sup>	3.94 <sup>bc</sup>
Etidot-67 × 5 ppm	95.0	2.09	7.11 <sup>a</sup>	6.45 <sup>cd</sup>	44.4 <sup>ab</sup>	1.60 <sup>e</sup>	3.71 <sup>cd</sup>
Etidot-67 × 10 ppm	93.5	2.11	7.15 <sup>a</sup>	7.64 <sup>ab</sup>	48.6 <sup>a</sup>	1.90 <sup>a</sup>	3.91 <sup>c</sup>
Etidot-67 × 30 ppm	94.0	2.08	7.07 <sup>a</sup>	4.79 <sup>e</sup>	46.0 <sup>ab</sup>	1.73 <sup>b-e</sup>	3.75 <sup>cd</sup>
Etidot-67 × 60 ppm	94.0	2.04	4.58 <sup>d</sup>	1.21 <sup>f</sup>	36.7 <sup>c</sup>	1.60 <sup>e</sup>	4.37 <sup>a</sup>
Etidot-67 × 90 ppm	95.5	2.07	4.43 <sup>d</sup>	1.20 <sup>f</sup>	36.6 <sup>c</sup>	1.60 <sup>e</sup>	4.37 <sup>a</sup>
<b>Analysis of Variance</b>							
A	ns	ns	ns	**	**	**	ns
B	ns	*	**	**	ns	*	ns
A×B	ns	ns	**	**	**	**	**

†: Means followed by the same letter(s) in each factor are not significantly different at P <0.05. \*, \*\*: significant at P <0.05 and 0.01 respectively, ns: nonsignificant. GP: Germination percentage, MGT: Mean germination time, SL: Shoot length, RL: Root length, SFW: Seedling fresh weight, SDW: Seedling dry weight, DM: Dry matter.



**Figure 1.** Effects of different levels of boric acid and Etidot-67 on shoot length (a), root length (b), seedling fresh weight (c), and seedling dry weight (d).

## CONCLUSION

This study revealed that increased boron doses did not cause any toxic effects on seed viability performance such as germination percentage and mean germination time. However, seedling growth of sugar beet was considerably inhibited when B doses were increased. At 60 and 90 ppm of sodium borate, the fresh and dry weights of sugar beet seedlings reduced dramatically. It was concluded that B had no toxic effects on seed germination but its inhibitory effects on seedling growth were identified at 60 and 90 ppm regardless of B form.

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## **SULAMA SAHALARININ PERFORMANSININ DEĞERLENDİRİLMESİ**

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### **ÖZET**

Küresel ısınma sonucu ortaya çıkan iklim değişikliği, hayatın her alanında etkisini göstermektedir. İklim değişikliği sonucu yaşanan kuraklık, özellikle su kaynakları üzerinde olumsuz etkiler meydana getirmektedir. Kuraklıkla birlikte iyi kaliteli suya erişim de güçleşmektedir. Öte yandan, sektörler arasında suyu en fazla kullanan tarımsal üretim alanıdır. Tarımsal üretimin artırılmasında diğer etkenlerin yanı sıra sulamanın payı çok büyüktür. Yerel sulama organizasyonları, sulama kooperatifleri, halk sulamaları (özel sulamalar), sulama birlikleri, kamu sulama vb. organizasyonlar ile geniş sahalarda bitkisel üretim yapılabilmektedir. Söz konusu organizasyonların sahip oldukları sahalarda sulama amaçlı kullanılan suyun yüksek randıman ile beklenen hedeflere ulaşması son derece önemlidir. Sulama birlikleri gibi geniş alanlardaki sulama organizasyonlarının, sulama performansının belirlenmesi su kaynaklarının yönetimi açısından son derece önemli bir konudur. Suyun iletimi, dağıtımı ve uygulaması sırasında muhtemel hataların/yanlışlıkların araştırılıp tespit edilmesi gerekir. Bu konuyla ilgili olarak, sulu tarımda suyun verimli ya da ne derece faydalı kullanıldığını belirlemek için kimi parametrelerin gözlem ve ölçümlerinin yapılması gerekmektedir. Böylece sulama sahalarının performans analizi yapılmış olabilecektir. Bunun sonucunda, gözlem ve ölçümlere dayalı elde edilen değerler veya göstergeler ile bir sulama sahasındaki sulamanın performansı belirlenip izlenebilecektir. Sulama sahalarının performans analizi için farklı değerlendirme yöntemleri geliştirilmiştir. Bu çalışmada sulama performans analiz yöntemleri ve değerlendirme sistemleri ele alınmıştır. Çalışma sonucunda, küçük ve/veya geniş bitkisel üretim sahaları için sulama performans yöntem ve analizlerinin önemi ortaya konulmuştur.

**Anahtar kelimeler:** Sulama Yönetimi, Sulama Organizasyonları, Sulama Birliği, Sulama Performans Göstergeleri.



**ASSESSMENT OF PERFORMANCE OF IRRIGATION AREAS****ABSTRACT**

The climate change that has arisen due to global warming has shown its impact on every area of life. The drought experienced due to climate change has negative effects, especially on water resources. Access to good quality water is also becoming difficult with the drought. On the other hand, it is agriculture that consumes the most water among all sectors. The share of irrigation, among other factors, in increasing agricultural production is very big. Plant production can be carried out in large areas with organizations such as local irrigation organizations, irrigation cooperatives, private irrigation, irrigation districts, public irrigation etc. The water used for irrigation purposes in the fields owned by these organizations must reach the expected targets with high efficiency. Determining the irrigation performance of these irrigation organizations in large areas is an extremely important issue in water resource management. Possible errors/inaccuracies should be examined and identified during the distribution and application of water. For this purpose, observations and measurements of some parameters are needed to determine how efficiently or beneficially water is used in irrigated agriculture. Thus, the performance analysis of irrigation fields can be performed. As a result, the performance of irrigation in an irrigation field can be determined and monitored with the values or indicators obtained based on these observations and measurements. Different evaluation methods have been developed for the performance analysis of irrigation fields. This study discussed irrigation performance analysis methods and evaluation systems. As a result of the study, the importance of irrigation performance methods and analyzes for small and/or large crop production areas was revealed.

**Keywords:** Irrigation Management, Irrigation Organizations, Irrigation District, Irrigation Performance Indicators.

## **1. GİRİŞ**

Su insan, hayvan ve bitki sisteminin içinde yer aldığı tüm canlıların yaşam faaliyeti için en temel gereksinimdir. Su olmadan yaşam olmayacaktır. Dünya nüfusundaki artış ile birlikte küresel ısınma sonucu yaşanan iklim değişikliği su kaynakları üzerinde olumsuz sonuçlar doğurmaktadır. İklim değişikliği sonucu ortaya çıkan kuraklık tüm su kullanıcı sektörlerini derinden etkilemektedir.

Su kullanıcı sektörler arasında tarım en fazla paya sahip olduğundan, iklim değişikliği sonucu ortaya çıkan kuraklıktan daha çok etkilenmektedir. Örneğin, Türkiye’de DSİ 2018 yılı faaliyet raporuna göre toplam su potansiyelinin 2018 yılı gerçekleşmesi 54 milyar m<sup>3</sup> olarak bildirilmiştir (DSİ, 2019). Sözkonusu miktarın çeşitli maksatlara yönelik olarak 40 milyar m<sup>3</sup>’ü (%74.08) sulama suyu, 7 milyar m<sup>3</sup>’ü (%12.96) içme-kullanma ve 7 milyar m<sup>3</sup>’ü (%12.96) ise sanayi suyu olarak kullanıldığı tespit edilmiştir (DSİ, 2019).

Yine DSİ raporuna göre Türkiye, sanılanın aksine, su zengini bir ülke değildir (DSİ, 2019). Türkiye halihazırda kişi başına düşen 1366 m<sup>3</sup>’lük su miktarı ile “su kısıtı yaşan” bir ülke kabul edilmektedir (DSİ, 2019). Türkiye genelinde yıllık ortalama yağış miktarı yaklaşık 643 mm (DSİ, 2006: Çiçek ve Ataol, 2009’dan) iken 574 mm’ye (DSİ, 2019) gerilmiştir.

Yukarıdaki bilgilerinden de anlaşılacağı üzere Türkiye için yıllık ortalama kullanılabilir suyun büyük çoğunluğu (yaklaşık dörtte üçü) tarım sektöründe kullanılmaktadır. Bu nedenlerle, kullanıcıları tarafından yapılan uygulamaların, özellikle tarıma ayrılan suyun, genel anlamda performans analizlerinin yapılması gerekmektedir.

## **2. SULAMA PERFORMANSININ DEĞERLENDİRİLMESİ**

Bitkisel üretimde sulama uygulamalarının randımanlı ya da ne derece faydalı kullanıldığını belirlemek için kimi parametrelerin gözlem ve ölçümlerinin yapılması bir zorunluluktur. Burada gözlem ve ölçümlere dayalı elde edilen değerler veya göstergelerle sulama alanlarındaki kullanıcıların sulamanın performansı belirlenip izlenebilecektir. Bu amaçla, farklı ülke ve bölgeler için sulama sistemlerinin performansının belirlenmesinde çok sayıda göstergeler geliştirilmiştir.

Sulama performans analizleri için özellikle Uluslararası Sulama ve Drenaj Teknoloji ve Araştırma Programı (IPTRID: International Programme for Technology and Research in Irrigation and Drainage) tarafından drenaj ve sulama sistemlerinde performansların mukayeseli olarak değerlendirilmesi için çeşitli yöntemler tavsiye edilmiştir (Malano ve Burton, 2001).

Buna ilave olarak, Uluslararası Su Yönetimi Enstitüsü (IWMI: International Water Management Institute) tarafından da sulama sistemlerinin performanslarının ölçümü için geliştirilen performans göstergeleri mevcuttur. IWMI tarafından geliştirilen karşılaştırmalı performans göstergelerinin yanında çeşitli araştırmacıların önerdikleri performans göstergeleri de sulama sistemlerinin performansını değerlendirmede kullanılabilir (Ateşal, 2022). Bunlar sulama oranı ve sulama randımanının da içinde yer aldığı 10 adet göstergeden oluşmaktadır (Rao, 1993; Bos, 1997; Beyribey ve ark., 1995; Hamdy, 2000). Tüm bu bilgilerin ışığında sulama performans analizleri genel olarak aşağıda maddeler halinde belirtilen göstergelerde değerlendirilmelidir (Öztürk, 2021):

- Su iletim performansı,
- Finansal performans,
- Tarımsal etkinlik ve üretim performansı,
- Kurumsal etkinlik performansı.

Sulama performans analizlerinde genel olarak; proje alanı eşdeğer brüt üretim değeri, fiilen sulanan alan eşdeğer brüt üretim değeri, saptırılan suya karşılık eşdeğer brüt üretim değeri, su temini oranı, sulama oranı gibi göstergeler bunlara örnek olarak verilebilir (Çakmak, 2001).

Sulama sahalarının sistem performansının belirlenmesine yönelik araştırmalar ve değerlendirmeler neticesinde aşağıda belirtilen hedeflere ulaşmak mümkün olabilecektir (Öztürk, 2021):

- ✓ Toprak ve su kaynaklarının etkin kullanımı,
- ✓ İşletmeleri sürdürülebilir kılma,
- ✓ Devir çalışmalarının amacına erişip erişmediğinin tespiti,
- ✓ Hem çiftçinin sulama gereksinimlerinin karşılanabilmesi hem de işletmecilik sorunlarına çözüm getirilmesi,
- ✓ Tarımsal üretimde verimliliği ve istihdamı artıracak, sosyal ve ekonomik açıdan büyük oranda olumlu bir getiri sağlaması,
- ✓ Sistemin mevcut başarı düzeyinin saptanması.

### **3. SONUÇ VE DEĞERLENDİRME**

Tarımsal üretimin arttırılmasında diğer etkenlerin yanı sıra sulamanın payı oldukça büyüktür. Diğer taraftan, kuraklık su kaynaklarının kullanımını olumsuz etkilemektedir. Bununla birlikte nüfus, sanayi ve kentsel kullanım için suya olan talep gün geçtikçe artmaktadır. Bunlara ilave

olarak, suyun en büyük kullanıcı sektörü tarımdır. Dolayısıyla, kuraklık söz konusu olduğunda suyun kullanımının kısıtlanacağı ilk yer tarım olmaktadır. Bundan dolayı tarımda kullanılan suyun en verimli bir şekilde kullanılması önemli araştırma konuları arasında kendine yer bulmaktadır. Suyun verimli kullanılıp kullanılmadığını belirlemek için çeşitli göstergelerden faydalanılabilir. Bunların başında sulama randımanı ve sulama birliklerinin sulama performansının değerlendirilmesi gelmektedir. Sulu tarımda suyun verimli ya da ne derece faydalı kullanıldığını belirlemek için kimi parametrelerin gözlem ve ölçümlerinin yapılması gerekmektedir. Gözlem ve ölçümlere dayalı elde edilen değerler ve/veya göstergeler ile bir sulama sahasındaki sulamanın performansı belirlenip izlenebilecektir.

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## **YARI ISLATMALI VE GELENEKSEL KISINTILI SULAMA**

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### **ÖZET**

Bitkisel üretimde verimin arttırılmasında diğer etkenlerin yanı sıra sulamanın payı çok büyüktür. Su diğer bütün canlılar için olduğu gibi, bitki yetiştiriciliğinde de en temel öğedir. Öte yandan, dünyada yaşamı en çok etkileyen sorunların başında küresel ısınma ve buna bağlı olarak ortaya çıkan iklim değişikliği gelmektedir. İklim değişikliği sonucu yağış rejiminde düzensizlikle birlikte kuraklık meydana gelmektedir. Türkiye'nin kurak ve yarı kurak iklim kuşağı içerisinde bulunması nedeniyle, küresel ısınma sonucu meydana gelen kuraklıktan önemli ölçüde etkilenmektedir. Kuraklık son yıllarda etkisini şiddetli bir biçimde göstermekte ve bunun sonucunda günümüzde önemli boyutlarda tarımsal kuraklık yaşanmaktadır. Buna ilave olarak suyun kullanımında daha çok sanayi ve kentsel kullanıma öncelik verilmesiyle, bitkisel üretim için ayrılan su giderek azalmaktadır. Bu nedenle bitkisel üretimde sulama suyundan tasarruf sağlayabilecek ve sulama randımanı yüksek olabilecek uygulamalar son derece önemlidir. Bu durumda, verimde azalma olmaksızın, hatta verimi artırıcı yeni sulama uygulamalarının araştırılması gerekmektedir. Bu çalışmada, verimde azalma olmaksızın ve yeni olduğu değerlendirilebilecek yarı ıslatmalı sulama (partial root-zone drying) uygulaması ele alınmıştır. Yarı ıslatmalı sulama uygulamasında bitki kök bölgesinin bir yarısı görece olarak sulanırken, geriye kalan diğer yarısı yine görece olarak kuru bırakılmaktadır. Yarı ıslatmalı sulama uygulaması bir kısıntılı sulama uygulaması gibi değerlendirilebilmektedir. Geleneksel kısıntılı sulama uygulamaları ile sulama suyundan önemli oranlarda tasarruf sağlanabilmektedir. Bu çalışma sonucunda, geleneksel kısıntılı sulamadan farklı olarak yarı ıslatmalı sulama uygulaması altında, bitkisel üretimin veriminin daha yüksek olabileceği öngörülebilmektedir.

**Anahtar kelimeler:** Su-Verim İlişkisi, Sulama Randımanı, Bitki Su Tüketimi, Verim.

**PARTIAL ROOT-ZONE DRYING AND CONVENTIONAL DEFICIT IRRIGATION****ABSTRACT**

The share of irrigation in increasing the yield in crop production, among many other factors, is very large. As for all other living things, water is the most basic element in plant cultivation. On the other hand, global warming and the resulting climate change are among the problems that affect life the most in the world. As a result of climate change, drought occurs along with irregularity in the precipitation regime. Since Turkey is located in an arid and semi-arid climate zone, it is significantly affected by drought caused by global warming. The drought has been showing its effects severely in recent years and as a result, there has been a significant agricultural drought. In addition, the water used in crop production is gradually decreasing because priority is given to industrial and urban use of available water. For this reason, applications that can save irrigation water in crop production and have high irrigation efficiency are extremely important. In this case, it is necessary to investigate new irrigation practices that increase yield even without a decrease in yield. In this study, the application of partial root-zone wetting, which can be evaluated as a new method which does not cause any decrease in yield, is discussed. In partial root-zone wetting application, one-half of the plant root zone is watered relatively, while the other half is left relatively dry. The partial root-zone wetting application can be considered a partial irrigation application. Significant savings can be achieved from irrigation water with traditional deficit irrigation practices. As a result of this study, it can be predicted that the yield of crop production may be higher under partial root-wetting irrigation application, unlike traditional deficit irrigation practices.

**Keywords:** Water-Yield Relationship, Irrigation Efficiency, Plant Water Consumption, Yield.

## 1. GİRİŞ

Küresel ısınma sonucu yaşanan iklim değişikliği birçok sorunu beraberinde getirmektedir. Bunların en başında kuraklığın meydana gelmesidir. Sıcaklık artışı, yağışların azalması ve düzensizliği ile meydana gelen kuraklık hayatın tüm alanlarını büyük oranda olumsuz etkilemektedir. Kuraklık özellikle bitkisel üretimde daha sert biçimde etkisini göstermektedir. Çünkü, su ihtiyacı karşılanamayan bitkide önemli oranlarda zararlanma ve büyük miktarlarda verim kaybı yaşanabilmektedir. Bununla birlikte, dünyada 2050 yılında 9.1 milyar olması beklenen nüfusu beslemek ve ihtiyaçlarını karşılamak için küresel gıda üretiminin 2005/07 ile 2050 yılları arasında yaklaşık %70 oranında artması gerektiği bildirilmiştir (FAO, 2009: Slamini ve ark., 2022'den).

Türkiye ve dünyanın birçok yerinde iyi kaliteli suyun varlığı ve erişimi sorunuyla karşı karşıya kalınmaktadır. Slamini ve ark. (2022) bildirdiğine göre FAO (2017), tarımın büyük ölçüde sulamaya bağlı olduğu dünyanın birçok yerinde bitkisel üretim için mevcut suyun yaklaşık %70'inin kullanıldığını belirlemiştir. Türkiye'de de tarım sektörü mevcut kullanılabilir suyun yaklaşık %74.08'ini sulama suyu amaçlı olarak kullanmaktadır (DSİ, 2019). Ancak dünyada gıda üretimi; yüksek verim potansiyeline sahip tohum çeşitleri, iyi ve doğru bir sulama uygulaması, iyi bir bitki besleme programı, hastalık ve haşere kontrolü dahil olmak üzere çeşitli faktörlerin katkısıyla istikrarlı bir şekilde artmaktadır (FAO, 2004: Slamini ve ark., 2022'den). Esasında, yağmurla beslenen bitkisel üretimde, sulama uygulamasıyla verimde iki kat artış sağlanabileceği bildirilmiştir (Sepaskhah ve Ahmadi, 2010: Slamini ve ark., 2022'den). Bu durum sulama uygulamasının bitkisel üretimde verim artışına çarpan etkisi yaptığını ortaya koymaktadır. Bu nedenle sulama uygulaması bitkisel üretim için son derece önemlidir.

Sulama uygulamalarında; (1) sulama zamanı, (2) sulama yöntemi ve (3) sulama suyu miktarı hangi oranda doğru bir şekilde belirlenmişse, sulama yönetimi de aynı oranda başarıyla gerçekleşecektir. Söz konusu üç temel soru/konu için özellikle kurak ve yarı kurak bölgelerde yüksek bir düzeyde başarıya ulaşmak daha da zor olabilecektir. Çünkü, kurak ve yarı kurak bölgelerde yeterli miktarlarda sulama suyu olmayacaktır. Dolayısıyla kısıntılı sulama uygulamaları altında (1) sulama zamanı, (2) sulama yöntemi ve (3) sulama suyu miktarının en doğru bir şekilde belirlenmesi daha zor olabilecektir. Kısıntılı sulama uygulaması da genel olarak bitkinin ihtiyacı olan suyun tam olarak karşılanamaması şeklinde ifade edilebilir.



## **2. GELENEKSEL KISINTILI SULAMA**

Kurak ve yarı kurak iklim bölgeleriyle sulamaya ayrılan suyun az ve yetersiz olduğu koşullarda verimde azalma olmayacak şekilde sulama uygulama stratejileri araştırılmalı ve geliştirilmelidir. Esasında anılan koşullar için kısıntılı sulama uygulaması tanımlanabilir. Sözkonusu kısıntılı sulama uygulamasında bitkinin ihtiyacı olan sulama suyu miktarı belirli oranlarda azaltılır. Geleneksel olarak uygulanan kısıntılı sulama; (1) bitkinin yetişme sezonu boyunca her sulamada sulama suyu miktarının belirli oranda azaltılması, ya da (2) yine bitkinin yetişme sezonu boyunca sulama aralığı arttırılarak sulama uygulama sayısı azaltılması biçiminde olmak üzere iki şekilde gerçekleştirilebilir. Ancak, geleneksel kısıntılı sulama uygulamasında su kullanımının azaltılması mümkün olabilmekte; öte yandan, meyve verimi ve kalitesinde önemli oranda düşmeler meydana gelebilmektedir (Kirda ve ark., 1999). Bu koşullar altında bitkide zararlanmaya yol açmayacak ve ürün veriminde de nispeten azalmaya neden olmayacak yeni sulama uygulamalarının/yönetiminin araştırılması son derece önemli olmaktadır.

Geleneksel kısıntılı sulamaya benzer bir biçimde sulama suyunun azaltılabildiği diğer bir sulama tekniği de “**YARI ISLATMALI SULAMA**” uygulamasıdır.

## **3. YARI ISLATMALI SULAMA**

Yarı ıslatmalı sulama tekniği altında geleneksel sulamalarda uygulanan su miktarı belirli bir oranda azaltılarak su, bitki kök bölgesine verilir. Ancak, yarı ıslatmalı sulama uygulama tekniği altında bitki bölgesinin görece olarak bir yarısı sulanırken yine geriye kalan diğer yarısı görece olarak kuru bırakılır (Kaman, 2002; Kaman, 2007). Yarı ıslatmalı sulama uygulama tekniğinde bitki kök bölgesinin görece olarak sulanan ve kuru bırakılan kısımları belirli sulamalarda yer değiştirilebilir. Diğer bir ifadeyle, örneğin ilk sulamada görece olarak sulanan ve kuru bırakılan kısımlar, bir sonraki sulamada sulama suyu bitkinin kuru (bir önceki sulamada görece olarak sulama suyu uygulanmayan) kısmına verilir ve bir önceki sulamada görece olarak sulanan kısım kuru bırakılır. İlave olarak, tüm yetişme mevsimi boyunca bitki kök bölgesinin bir yarısı görece olarak sulanır ve geriye kalan diğer yarısı yine görece olarak kuru bırakılması şeklinde de yarı ıslatmalı sulama tekniği uygulanabilir (Özbek ve Kaman, 2018; Kaman ve Özbek, 2016; Kaman ve ark., 2022).

Yarı ıslatmalı sulama uygulaması altında bitki kök bölgesinin periyodik olarak yarısının ıslatılmasıyla, bilinen geleneksel kısıntılı sulama uygulamasına kıyasla su kullanım

randımanının daha yüksek olabileceği gösterilmiştir (Chaffey, 2001; Kaman ve ark., 2011). İlave olarak, geleneksel tam sulama uygulamasına kıyasla, yarı ıslatmalı sulama uygulaması altında sulama suyu kullanım randımanının daha yüksek bulunduğu birçok araştırma da mevcuttur (Kirda ve ark., 2004; Kaman ve ark., 2006; Kirda ve ark., 2007; Topcu ve ark., 2007; Kaman ve ark., 2011). Dolayısıyla, yarı ıslatmalı sulama tekniği altında suyun kıt ve pahalı olduğu bölgelerde geleneksel kısıntılı sulamaya benzer şekilde, daha az su uygulayarak, mevcut su kaynaklarından daha etkin bir şekilde yararlanılması amaçlanır (Kang ve ark., 1998).

Slamini ve ark. (2022) yarı ıslatmalı sulama tekniğinin üstünlüklerini aşağıdaki maddelerde verildiği şekilde belirtmiştir:

- Su kullanım randımanını artırdığı tespit edilmiş,
- Verimde önemli bir azalma olmaksızın sulama suyundan %50'ye varan tasarruf sağlandığı bildirilmiş,
- Bitkilerin daha iyi koşullarda kontrollü bir şekilde daha iyi bir büyüme ve kök gelişimi sağladığı ortaya çıkmış,
- Birçok bitki türünün meyve kalitesinde iyileşme belirlenmiş,
- Bitkinin su ve besin elementi alımında gelişme görülmüş.
- Kirleticilerin yer altı sularına sızmasını en az düzeye indirdiği saptanmış,
- Çevre dostu bir teknoloji olarak ifade edilmiş.

Yine, Slamini ve ark. (2022) yarı ıslatmalı sulama tekniğinin eksikliklerini de aşağıdaki maddelerde verildiği şekilde açıklamıştır:

- Sulama ve bitkisel üretimde üst düzey yönetim becerilerine ihtiyaç duyulduğu ifade edilmiş,
- Kötü sulama ve bitkisel üretim yönetiminin, bitki gelişimini olumsuz etkileyeceği ve toprakta tuzlanma riskine yol açabileceği bildirilmiş.

#### **4. SONUÇ VE DEĞERLENDİRME**

Küresel ısınma ve bunun sonucu meydana gelen iklim değişikliği kuraklığa yol açmaktadır. Öte yandan bitkisel üretimde sulama uygulaması çarpan etkisi oluşturduğu bilinen bir gerçektir. Bu koşullar altında, artan dünya nüfusuyla birlikte gıda gereksinimindeki yükseliş birim alanda verimde düşüş olmaksızın, ancak kullanılan sulama suyu miktarını azaltarak bitkisel üretim

yapmak amaçlanmalıdır. Mevcut arařtırmalar sonucu, sulama suyundan tasarruf saęlayabilecek uygulamanın “**Yarı Islatmalı Sulama**” teknięi olduęu ortaya çıkmaktadır. Sonuç olarak, özellikle kurak ve yarı kurak bölgelerde, sulama suyundan kısıntıya gidilmesi durumunda bitkilerin sulanmasında sulama suyu kullanım randımanının yüksek olabileceęi öngörülen aynı zamanda önemli oranlarda verimde azalma olmaksızın uygulanabilecek “**Yarı Islatmalı Sulama**” teknięinin kullanılması önerilir.

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**AFYONKARAHİSAR'IN YÖRESEL BİR ÜRÜNÜ OLAN VELENSENİN  
GLUTENSİZ ÜRETİMİ VE PIŞME ÖZELLİKLERİ**

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**ÖZET**

Afyonkarahisar, 3. Gastronomi şehri olup birçok yöresel ürünü bulundurmaktadır. Bunlardan biri de velensedir. Velense, buğday unundan yapılan bir çeşit makarnadır. Bu makarnanın üretiminde, buğday unu, yumurta ve su karıştırılarak elde edilen hamur oklava ile açılır ve üçgen şeklinde kesilmektedir. Bu çalışmanın amacı, yöresel bir ürün olan velenseyi tanıtmak ve sayısı gün geçtikçe artan çölyak hastalarına raf ömrü uzun ve besleyici kalitesi yüksek yeni bir ürün kazandırmaktır. Bu çalışmada glutensiz olan chia, kinoa ve nohut unu kullanılmıştır. Buğday unundan kontrol örneği hazırlanmıştır. Üretimde bu hammadelerin yanında sıcak su kullanılmıştır. Bunun nedeni nişasta jelatinizasyonunu sağlayarak dağılmayan bir hamur oluşturmaktır. Elde edilen hamurlar açılarak bıçakla kesilmiştir. Kurutma, oda sıcaklığında 1 gün boyunca sürmüştür. Kurutulmuş velenseye pişme süresi, pişme kaybı, su absorpsiyonu ve hacim artışı analizleri yapılmıştır. Glutensiz undan yapılan velense makarnaların pişme kaybı kontrole kıyasla artmış, su absorpsiyonu ve hacim artışı değerleri azalmıştır. Literatürdeki glutensiz makarnalara ait veriler incelendiğinde bu değerlerin kabul edilebilir düzeyde olduğu belirlenmiştir.

**Anahtar kelimeler:** Velense, glutensiz, chia, kinoa, nohut

**GLUTEN-FREE PRODUCTION AND COOKING PROPERTIES OF VELENSE,  
A LOCAL PRODUCT OF AFYONKARAHİSAR****ABSTRACT**

Afyonkarahisar is the 3rd city of gastronomy and has many local products. One of them is velense. Velense is a type of pasta made from wheat flour. In the production of this pasta, the dough obtained by mixing wheat flour, egg and water is rolled out with a rolling pin and cut into triangles. The aim of this study is to introduce velense, a local product, and to provide a new product with a long shelf life and high nutritional quality to celiac patients, the number of which is increasing day by day. In this study, gluten-free chia, quinoa and chickpea flours were used. A control sample was prepared from wheat flour. In addition to these raw materials, hot water was used in production. The reason for this is to form a dough that does not fall apart by providing starch gelatinization. The dough obtained was rolled out and cut with a knife. Drying took place for 1 day at room temperature. Cooking time, cooking loss, water absorption and volume increase analyzes were performed on the dried velense. Cooking loss of velense pasta made from gluten-free flour increased compared to control, and water absorption and volume increase values decreased. When the data of gluten-free pasta in the literature were examined, it was determined that these values were at an acceptable level.

**Keywords:** Velense, gluten-free, chia, quinoa, chickpea

## 1. GİRİŞ

Protein ve enerji kaynağı olarak beslenmemizde büyük bir yeri olan hububat ve hububat ürünleri, bazı kişilerde hastalıklara neden olabilmektedir. Çölyak hastalığı da bunlardan biri olup glutene karşı hassasiyet yüzünden oluşan bir bağırsak emilim bozukluğudur. Genel bir kural olarak çölyak hastalarının buğday, çavdar, arpa, tritikale ve yulaftan kaçınmaları gerekir. Diğer tahıllar (mısır, pirinç, millet ve sorgum gibi) ve tahıl benzerleri (pseudo-tahıllar: amarant, quinoa) güvenilir hammaddeler arasındadır. Glutensiz bir diyet çölyak hastalığının tedavisinde etkin rol oynamaktadır (Anand ve ark., 1978; Campbell, 1982; Janatuinen ve ark., 1995; Luchetti ve DeVincenzi, 1995; Hallert ve ark., 1999).

Bu beş tahılın çölyak hastaları üzerine etkisi ince bağırsakta olmaktadır. İnce bağırsağın epitelyumundaki çıkıntılar (villi) absorplamanın yapılacağı yüzeyi arttırmaları. Buğday ürünleri başta olmak üzere bu tahılların vücuda alınmasıyla villiler kısalmaya başlamakta ve absorplamanın yapılacağı yüzeyin küçülmesiyle absorplanan besin miktarı azalmaktadır. Çölyak hastalığının henüz bilinen bir tedavisi mümkün değildir. Ancak glutensiz bir diyet tedavide etkin rol oynamaktadır. Diyetteki gluten uzaklaştırıldığında ise bağırsak mukozası yeniden düzelmektedir (Lorenz ve Lee, 1977; Anand ve ark., 1978; Luchetti ve DeVincenzi, 1995).

Son yıllarda gıda üreticileri çölyak hastalarının beslenme gereksinimlerini karşılayabilmek için gluten içermeyen gıdaların üretimine yönelmişlerdir. Gluten içermeyen amarant gibi pseudo-tahıllar, mısır unu, pirinç unu, patates unu ve nişastası, soya ve diğer baklagil unları gıda formülasyonlarında bu amaçla kullanılabilir. Ancak bu kezde bu tip gıdalarda gerekli ağ yapının oluşmasını sağlayan gluten fraksiyonunun yerine formülasyona girecek, alışılmalı kaliteyi sağlayan ve aynı zamanda ekonomik olan hammaddelerin aranması gündeme gelmektedir.

Ülkemizde çölyak hastaları genellikle ev yapımı glutensiz gıdalarla beslenmektedir. Bu gıdalar çoğunlukla gluten içermeyen ve protein içeriği açısından buğdaya çok benzeyen pirinç ve mısır kaynaklıdır. Oysa bugün birçok ülkede bu hasta grubu için ekmek, makarna gibi ticari hububat ürünlerine rastlamak mümkündür. Türkiye'de uzun süre ihmal edilen Çölyak hastaları için gıda üretiminde ilk atılımlar günlük tüketimi daha çok olan ekmek üzerine olmuştur. Ekmeğin bayatlama sürecinin kısa olduğu düşünülürse sadece üretimin yapıldığı merkezin yakınındaki çölyaklı bireyler üretilen bu ekmekten faydalanabilmektedir. Bu hastalar için geliştirilen ürünlerin kontrollü koşullarda üretilmesinin gerekliliği başka merkezlerde üretimi



güçleştirmektedir. Buna karşın birçok ülkede çölyak hastaları için makarna, erişte ve bisküvi gibi ticari olarak üretilen diğer bazı gıdalar da mevcuttur.

Glutensiz eriştenin raf ömrünün uzun olması ve kontrollü şekilde bir merkezde üretilerek diğer bölgelere rahatlıkla ulaştırılabilme olanağı ile Çölyaklı bireylerin beslenmesinde iyi bir seçenek oluşturmaktadır. Ancak bu ürünler için formülasyon geliştirilirken asıl hammadde olan buğday ununun tamamen terk edilme zorunluluğu istenilen gluten ağ yapısının yerini tutacak yeni hammadde veya katkıların araştırılmasını zorunlu kılmaktadır. Ancak buğday dışındaki pirinç, mısır, sorgum gibi gluten içermeyen tahıllardan yapılan ürünlerde vizkoelastik bir hamur elde edilememekte ve hamur dağılmaktadır. Mevcut sorunları gidermek amacıyla bu tahıllardan elde edilen unlara ısıtma işlemi uygulanmakta veya çeşitli gıdalar ilave edilmektedir.

Erişte yapımında hammadde olarak pirinç unu kullanıldığında, bir miktar nişasta jelatinizasyonuna ihtiyaç duyulmaktadır. Çünkü pirinç proteini ile buğday gluteni farklı özelliktedir. Elde edilen hamurların reolojik özellikleri farklıdır. Pirinç unundan bütünlük gösteren (kohesif) homojen bir hamur elde edilemez. Buradaki jelatinize nişastanın rolü bağlayıcı ajan olmasıdır. Erişteelerde yüzey jelatinizasyonu oluşturmak için kaynar suya daldırma veya buhar tutma işlemi uygulanmaktadır. Erişteye gam gibi stabilizatörler ve emülsifiye edici ajanlar da eklenebilmektedir. Bu maddelerin kullanım nedeni, eriştede sıkı yapı eldesi, yapışkanlığın azalması ve nişastanın yapıda daha iyi tutulmasını sağlamaktır (Lai, 2001). Bir çalışmada amilotip mısır nişastasası ile mumsu mısır nişastasası kullanılarak bu nişastaların makarna pişme kalitesi üzerine etkisi araştırılmıştır. Amilotip mısır nişastasasının makarnada daha sıkı yapı oluşturduğu, mumsu mısır nişastasasının ise makarnada istenen tekstürü sağlamadığı gözlenmiştir (Dexter ve Matsuo, 1979). Bir çalışmada pirinç makarnasının kalitesi üzerine pirinç özellikleri ve emülsifiye edici ajanların etkisi araştırılmıştır. Çalışmada iki çeşit pirinç unu (yüksek amiloz içerikli pirinç unu, düşük amiloz içerikli pirinç unu) kullanılmıştır. Emülsifiye edici ajan olarak GMS (gliseril monostearat) ve ticari emulgatör (KM3000) kullanılmıştır. Bunun için pirinç unu bir gece suda bekletilerek %40 neme çıkarılmış daha sonra pirinç ununa 85°C'de 10 dakika buharla ısıtma işlemi uygulanmış ve emülsifiye edici ajan ilave edilmiştir. Daha sonra hamura makarna şekli verilip 50°C'de 1 saat ardından da 35°C'de 6 saat süreyle kurutulmuştur. Bu şekilde üretilen makarnaların kalite özellikleri incelenmiştir. GMS, yüksek amiloz içerikli makarnanın pişme özelliklerini geliştirmiş, pişme kaybını düşürüp, pişme ağırlığını artırmıştır. Pirinç makarnasına kurutmadan önce buhar uygulanması da pişme özelliklerini geliştirmiştir. Düşük amiloz içerikli pirinç unundan hazırlanan makarnada ise iyi

sonuç alınmamıştır. GMS katılan makarnanın renginin krem renginde, KM3000 katılan makarnanın renginin ise sarımsı renkte olduğu gözlenmiştir. Bunlara buhar uygulandığında renk koyulaşmıştır. GMS kullanımı makarnada yapışkanlığı da azaltmıştır (Lai, 2001).

Marti et al. (2010), 50°C'de geleneksel ve 115°C'de sıcaklıkta ekstrüzyon pişirmenin pirinç makarnasının kalite parametreleri üzerine etkilerini araştırdı. Bu çalışmada, ekstrüzyon pişirme ile hazırlanan pirinç makarnasının geleneksel yolla üretilen pirinç makarnasından daha düşük pişirme kaybı ve daha yüksek sertlik gösterdiği belirlenmiştir. Yalçın ve Basman (2008a), pirinç unundan glutensiz erişte üretmiş ve bu eriştelerin kalite karakteristikleri üzerine ksantan ve keçiyoynuzu gamının etkisini araştırmıştır. Ksantan gam içeren pirinç eriştesi daha iyi pişirme ve duysal özellikler göstermiştir. Keçiyoynuzu gamı içeren erişte, daha yüksek sertlik değeri göstermiştir. Yalçın ve Basman (2008b) mısır eriştesinde duysal ve pişirme kalitesi üzerine %80 jelatinizasyon seviyesinin daha iyi sonuç verdiğini göstermiştir. Yalçın (2021) karabuğday unundan erişte üretmiş, nişasta oranı arttıkça eriştelerin pişme kalitesinin arttığı belirlenmiştir.

## **2. MATERYAL VE METOT**

### **2.1. Materyal**

Çalışmada kinoa, chia taneleri ve nohut ve buğday unu kullanılmıştır. Bunlar marketten alınmıştır. Taneler, kahve değirmeninde (Bosch) öğütülmüş ve elenmiştir.

### **2.2. Üretim**

100 g una 10 g yumurta 50 ml sıcak su ilave edilmiş ve yoğurma makinasında (Essenso, Türkiye) 5 dak yoğurulmuştur. Elde edilen hamur oklava ile açılmıştır. Açılan hamur üçgen şeklinde kesilmiştir. Oda sıcaklığına 1 gün boyunca kurutulmuştur.

### **2.3. Analiz**

10 g velense örnekleri 100 ml kaynar suda pişirilerek pişme süresi belirlenmiştir. Bu amaçla ısıtıcı kullanılmıştır.

## **3. SONUÇ**

Farklı unlar kullanılarak elde edilen glutensiz velense örnekleri pişerken dağılmamış ve buğday unundan yapılan velense örneğine yakın kalite özellikleri göstermiştir.

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**MANDA SÜTÜ VE KAYMAĞI KULLANILARAK ÜRETİLEN BİSKÜVİLERİN  
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**ÖZET**

Afyonkarahisar’da manda yetiştiriciliği oldukça yaygın olduğundan bu durum şehrin yöresel ürünlerine de yansımıştır. Burada manda sütü birçok üründe kullanılmaktadır. Bu çalışmanın amacı besleyici kalitesi yüksek olan manda sütünü inek sütü yerine ve manda kaymağını yağ yerine bisküvi üretiminde kullanmak ve yeni bir ürün geliştirmektir. Bu çalışmada bisküvi üretiminde manda sütü ve yağ yerine 3 farklı oranda manda kaymağı kullanılarak bisküvi üretilmiş ve bu örneklerin ağırlığı, kalınlığı, çapı, yayılma oranı ve duyusal analizi belirlenmiştir. Ayrıca bu örneklerden elde edilen değerler inek sütü ve bitkisel yağ kullanılarak üretilen kontrol örneği ile kıyaslanmıştır. Duyusal analiz bu konuda eğitim almış 10 kişi tarafından gerçekleştirilmiştir. Duyusal analizde görünüm, şekil, lezzet, yapı, kırılma, çiğneme ve genel kabul incelenmiştir. 5 puanlı hedonik test, 1'den (aşırı derecede beğenmeme) 5'e (aşırı derecede beğenme) kadar sıralanmıştır. Panelistlerin verdiği puanların ortalaması alınarak grafik çizilmiştir. Bu grafiğe göre manda sütü ve yağın tümü yerine manda kaymağı (%100) kullanılarak üretilen bisküvi en yüksek puanı almıştır. Bütün örneklerin puanı 3 den yüksek olduğundan hepsi kabul edilebilir düzeydedir.

**Anahtar kelimeler:** Bisküvi, duyusal, kaymak, süt, yağ

**SENSORY CHARACTERISTICS OF BISCUITS PRODUCED USING BUFFALO MILK AND CREAM****ABSTRACT**

Since buffalo breeding is quite common in Afyonkarahisar, this situation is also reflected in the local products of the city. Here, buffalo milk is used in many products. The aim of this study is to use buffalo milk with high nutritional quality instead of cow's milk and buffalo cream instead of fat in the production of biscuits and to develop a new product. In this study, biscuits were produced by using buffalo milk and 3 different ratios of buffalo cream instead of fat, and the weight, thickness, diameter, spread ratio and sensory analysis of these samples were determined. In addition, the values obtained from these samples were compared with the control sample produced using cow's milk and vegetable fat. Sensory analysis was carried out by 10 people trained in this field. In sensory analysis, appearance, shape, flavor, structure, fracture, chewiness and overall acceptance were examined. The hedonic test with 5 point scale ranged from 1 (dislike extremely) to 5 (like extremely). The graph was drawn by taking the average of the scores given by the panelists. According to this graph, the biscuit produced by using buffalo milk and buffalo cream instead of whole fat (100%) got the highest score. Since all samples have a score higher than 3, all of them are at an acceptable level.

**Keywords:** Biscuit, sensory, cream, milk, fat

## 1. GİRİŞ

Manda sütü, enerji açısından yüksek yağ içeriği nedeniyle inek sütüne göre daha değerlidir (Coroian ve ark., 2019). Manda sütü, inek sütüne kıyasla daha yüksek yağ, laktoz, protein (özellikle kazeinler) ve kalsiyum, magnezyum ve inorganik fosfat gibi mineraller içerir (Ahmad ve ark., 2008). Manda sütü, anti-kanserojen olarak kabul edilen ve obezite, damar sertliği ve diyabet gibi sağlık sorunları üzerinde yararlı etkileri olan linolenik asidi daha yüksek oranda içerir (Lopes Oliveira, 2004). Manda sütü daha yüksek viskoziteye, pıhtılaşmaya ve pH'a sahiptir (Ganguli, 1992).

Yağ bisküvilerin tekstür, aroma ve algısından sorumlu olan önemli bir katkıdır (Zoulias ve ark., 2002). Bisküvi üretiminde kullanılan yağ yüksek oranda doymuş yağ asitleri içerdiğinden yapıya katılık vermektedir. Fakat sağlık sorunlarında dolayı bisküvide düşük oranda doymuş yağ istenmektedir (Tarancon ve ark., 2015). Yüksek yağ içeriği obezite, kanser, kolesterol ve kalp rahatsızlıkları gibi hastalıklara neden olmaktadır (Akoh, 1998). Bu sebepten dolayı bisküvide yağ ikame ediciler kullanılabilir. Bisküvide yağ ikame ediciler kullanılabilmektedir.

Sudha ve ark. (2007) yağ ikame edicilerin bisküvi kalitesine etkisini araştırmıştır. Bisküvideki yağ %6, 8, 10 ve 20 oranlarında azaltılmıştır. Bisküvi yağının azaltılması bisküvi testürünü olumsuz yönde etkilemiştir. Bisküvi yağı yerine maltodekstrin kullanıldığında bisküvi tekstürü gelişmiştir. Swanson ve Munsayac (1999) kurabiyeye yağ yerine meyve püresi ilave edince yayılma oranının azaldığını bildirmiştir. Swanson (1998), yağ ikame maddeleri (oatrim, karışım, polidekstroz) ile hazırlanan kurabiyelerin kontrolden daha az kırılabilir ve daha yumuşak olduğunu bildirmiştir. Adair ve ark. (2001) kurabiyeye yağ yerine maş fasulyesi ezmesi katmış, bunun kurabiye yayılmasını azalttığını bildirmiştir. Tarancón ve ark. (2015) bisküvi formülasyonunda doymuş yağ yerine zeytinyağı veya ayçiçek yağı kullanmış ve bisküvilerin duyusal özellikleri üzerindeki etkisi araştırmıştır. Yağ ikamesi, az yağlı bisküvilerde (%10,6) kabul edilebilirlikte azalmaya neden olurken, yüksek yağlı bisküvilerde (%15,6) kabul edilebilirlikte önemli değişikliklere neden olduğu bildirilmiştir. Tüketicilerin %48'i doymuş yağ içeren bisküviyi tercih ederken, %24'ü hem zeytinyağı hem de doymuş yağ içeren bisküvileri ve tüketicilerin %28'i bitkisel yağlı bisküvileri tercih etmiştir. Tarancón ve ark. (2014) zeytinyağı veya ayçiçek yağı içeren bisküvilerin etiket bilgileri sağlıklı algısını artırmış ve daha yüksek hedonik sonuç vermiştir. Biguzzi ve ark. (2014), bisküvilerde şeker ve yağ azaltımının yemek yeme algısı ve beğenisi üzerindeki etkisini araştırmışlardır. Bisküvilerde yağ azaltımının şeker azaltımına göre daha kabul edilebilir olduğu bildirilmiştir. Zoulias ve ark.

(2002) yağın %50'sini karbonhidrat bazlı veya protein bazlı yağ ikame maddeleri ile değiştirdi ve bu değiştirmenin kurabiyelerin tekstürel özellikleri üzerindeki etkisini araştırmıştır. Yağ ikamesi kurabiyelerin sertliğini ve kırılma dayanıklılığını artırmıştır. Yalçın (2017) bisküvideki yağ içeriğini azaltmak için bisküvi formülasyonunda yağ yerine öğütülmüş sarı haşhaş tohumunu kullanmış (%25, %50, %75 veya %100) ve bisküvilerin fiziksel özellikleri ve toplam fenolik içerikleri üzerindeki etkisini incelemiştir. Yağ ikame edici oranı arttıkça bisküvilerin ağırlığı, yayılma oranı ve toplam fenolik madde içeriği artmıştır.

## **2. MATERYAL VE METOT**

### **2.1. Materyal**

Buğday unu, karbonat, tuz, esmer şeker, pudra şekeri, margarin, süt ve kaymak marketten alınmıştır.

### **2.2. Bisküvi Hazırlanışı**

0.6 g karbonat, 0.5 g tuz, 12.8 g pudra şekeri, 4 g esmer şeker, 9.2 ml süt ve 16 g margarin yoğurucuda (Essenso, Türkiye) 3 dak karıştırılır. 40 g un ilave edilerek 1 dak karıştırılır. Kontrol örneği elde edilir. Hamur oklava ile açılık ve kalıp ile yuvarlak şekil verilir. Fırında 205 C de 9 dak. Pişirilir. Diğer örneklerde margarin yerine %25, 50, 75 ve 100 oranında kaymak katılmıştır.

### **2.3. Duyusal analiz**

Duyusal analiz bu konuda eğitim almış 10 kişi tarafından gerçekleştirilmiştir. Duyusal analizde bisküvilerin görünüm, şekil, lezzet, yapı, kırılma, çiğneme ve genel kabul edilebilirlik özellikleri incelenmiştir.

## **3. SONUÇ**

Bisküvide kaymak oranı arttıkça puanlar artmıştır. Sonuçlara göre manda sütü ve yağın tümü yerine manda kaymağı (%100) kullanılarak üretilen bisküvi en yüksek puanı almıştır. Bütün örneklerin puanı 3 den yüksek olduğundan hepsi kabul edilebilir düzeydedir.

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**AKSARAY EKOLOJİK KOŞULLARINDA YETİŞTİRİLEN BAZI KURU FASULYE  
GENOTİPLERİNİN KALİTE ÖZELLİKLERİNİN BELİRLENMESİ ÜZERİNE BİR  
ARAŞTIRMA**

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**ÖZET**

Güney Amerika orjinli olan kuru fasulye, insan beslenmesinde içermiş olduğu yüksek protein içeriği ile önemli bir baklagil bitkisidir. Yemelik baklagiller içinde dünyada ekim alanı ve üretim bakımından ilk sırada yer alan kuru fasulyede ülkemizde ekim alanları ve üretim bakımından ise ciddi düşüşler yaşanmaktadır. Yetiştiriciliğini yaptıkları kuru fasulyede çiftçiler için alınacak yüksek verim önemli olsa da son yıllarda üreticiye kalite içeriği yüksek ürünlerin sunulması da önem arz etmeye başlamıştır. Nitekim verimi yüksek çeşitlerin geliştirilmesi yanında kalite içeriği yüksek çeşitlerin de geliştirilmesi ıslah çalışmalarında yer almaya başlamıştır. Yürütülen bu araştırmada 5 adet kuru fasulye çeşidi (Yunus 90, Göynük 98, Önceler 98, Zülbiye, Akman 98) ile Orta Kızılırmak Vadisi'nden toplanılarak saf hat seleksiyon yöntemi ile ileri düzeye kadar getirilmiş 25 adet kuru fasulye genotipi olmak üzere 30 adet kuru fasulye genotipinin 2020 yılında Aksaray ekolojik koşullarında kalite özellikleri (su alma kapasitesi, su alma indeksi, şişme kapasitesi, şişme indeksi, kabuk oranı ve protein oranı) açısından karşılaştırılması amacıyla yürütülmüş olup yürütülen çalışma, tesadüf blokları deneme desenine göre dört tekerrürlü olarak kurulmuştur. Yapılan varyans analizi sonuçlarına göre ele alınan kalite özellikleri içinde şişme kapasitesi ve şişme indeksi hariç tüm özellikler bakımından kuru fasulye genotipleri arasında istatistiksel anlamda önemli farklılıklar belirlenmiştir. Yürütülen çalışmada en yüksek protein oranı %24.87 ile G.237/4 kuru fasulye genotipinde belirlenirken en düşük protein verimi ise %21.55 ile G.215/1 kuru fasulye genotipinde belirlenmiştir.

**Anahtar Kelimeler:** Aksaray, Kuru fasulye, Genotip, Kalite, Protein

**A RESEARCH ON THE DETERMINATION OF THE QUALITY  
CHARACTERISTICS OF SOME DRY BEAN GENOTYPES GROWN IN AKSARAY  
ECOLOGICAL CONDITIONS****ABSTRACT**

Dry beans originating from South America is an important legume plant with its high protein content in human nutrition. Among the edible legumes, dry beans, which ranks first in the world in terms of cultivation area and production, are experiencing serious decreases in terms of cultivation areas and production in our country. Although the high yield to be obtained for the farmers in the dry beans they grow is important, it has become important to offer products with high quality content to the producers in recent years. As a matter of fact, in addition to the development of high-yielding varieties, the development of varieties with high quality content has started to take place in breeding studies. In this research, 30 dry beans, including 5 dry bean varieties (Yunus 90, Göynük 98, Önceler 98, Zülbiye, Akman 98) and 25 dry bean genotypes collected from the Middle Kızılırmak Valley and brought to an advanced level by pure line selection method. genotype in Aksaray ecological conditions in 2020 in terms of quality characteristics (water absorption capacity, water absorption index, swelling capacity, swelling index, seed coat ratio and protein ratio). The study was set up in a randomized block design with four replications. According to the results of the analysis of variance, statistically significant differences were determined between the dry bean genotypes in terms of all characteristics except swelling capacity and swelling index among the quality characteristics. In the study carried out, the highest protein rate was determined in the G.237/4 dry bean genotype with 24.87%, while the lowest protein yield was observed in the G.215/1 dry bean genotype with 21.55%.

**Keywords:** Aksaray, Dry bean, Genotype, Quality, Protein

## 1. GİRİŞ

İnsan beslenmesinde, hayvansal proteinler önemli olmasına rağmen gerekli olan hayvansal proteinin sağlanamadığı yerlerde biyolojik olarak tamamlayacak bitkisel proteinlere gerek duyulmaktadır. Ayrıca hayvansal proteinler önemli protein kaynakları olmalarına rağmen yüksek maliyetli olmaları, saklanmalarının zor olması ve çabuk bozulmaları ile bazı bölgelerde insanların et yememeleri gibi bazı nedenler kolay üretilip saklanabilen ve ucuza mal edilebilen bitkisel proteinlerin önemini ortaya çıkarmaktadır.

Dünyanın en geniş üç familyasından birisi olan baklagiller (*Leguminosae*), besin kaynaklarının ve özellikle de enerji, protein, vitamin ve mineral yönünden zengin olması nedeniyle dünyadaki açlığa, yeterli ve dengeli beslenmeye çözüm olarak görülmektedir. Baklagiller diyetel lifler içermekle beraber yemeklik tane baklagiller arasında en fazla kuru fasulyede %28 oranında diyetel lif bulunmaktadır. Kuru fasulyenin lifli yapıda olması sindirimi kolaylaştırır, kabızlık şikâyetlerine iyi gelir. Bu durum diyet listelerinin vazgeçilmezi olmasının yanında vejetaryen beslenmesinde de protein sağladığı için tercih edilir olmuştur.

Baklagiller içerisinde yer alan kuru fasulye, dünyada en fazla ekim alanına sahip ürün olmasının yanı sıra dünyada 126 ülkede yetiştirilmektedir. Daha çok Asya ve Amerika kıtasında yetiştirilen kuru fasulye ekim alanları 1980-2000 yılları arasında 25 milyon ha düzeyinde iken son 20 yılda %33 artış göstererek 33 milyon ha düzeyine ulaşmıştır. Kuru fasulye; 2021 yılı itibariyle yemeklik tane baklagil ekim alanlarının %43.6'sını, üretimin ise %37.3'ünü oluşturmakta olup 2021 yılı itibariyle 33 milyon ha alanda 28.9 milyon ton kuru fasulye üretilmiştir. Buna karşın ülkemizde toplam 24.3 milyon hektar olan tarım alanının yaklaşık 900 bin hektarında yemeklik tane baklagil ekilmekte olup bunun karşılığında yaklaşık 1.25 milyon ton üretim yapılmaktadır. Ülkemizde en fazla ekilen yemeklik tane baklagiller sırasıyla nohut, mercimek, kuru fasulye, bakla, börülce ve bezelye olmuştur (Anonim 2021). 2021 yılı üretim döneminde Türkiye'de kuru fasulye üretimi yaklaşık 102 bin ha alanda gerçekleşmiş olup bu alanların yaklaşık %51'ini İç Anadolu Bölgesi ile %7.4'ünü Doğu Anadolu Bölgesi izlemektedir. Buna karşın üretim bakımından 265 bin ton olarak gerçekleşen Türkiye kuru fasulye üretiminin %65.2'si İç Anadolu Bölgesi'nden karşılanmaktadır (Anonim, 2021).

Kalite içeriği yüksek tane verimini ortaya koymak, yemeklik tane baklagiller içinde yer alan tüm türlerde temel amaç olarak görülmektedir. Bu temel amacı ortaya koyabilmek içinde bölge iklim şartlarına uygun koşullarda agronomik çalışmaları iyi uygulayarak verimi yüksek çeşit/çeşitler yetiştirilmek zorunda olmakla birlikte Aksaray ilini de içine alan İç Anadolu

Bölgesi'nde sertifikalı tohum kullanımının az olduğu buna karşın daha çok yerel popülasyonların kullanıldığı aşikârdır.

Yemelik tane baklagillerde besleme değeri bakımından kalite bileşenleri üç ana başlıkta toplanabilir ki bunlar sırasıyla tüketicinin dikkate aldığı faktörler, besleme değerini olumlu yönde etkileyen faktörler ve besleme değerini olumsuz yönde etkileyen faktörlerdir (Pekşen ve Artık, 2005). Beslenme açısından taşıdığı önem nedeniyle yetiştirildiği bölgelerin iklim ve toprak özelliklerine adapte olabilecek, verimi ve teknolojik özellikleri bakımından daha iyi olan kuru fasulye çeşitlerinin geliştirilip ortaya çıkarılması ülkemiz insanının beslenmesi açısından önem taşımaktadır.

Bu çalışma ile Tarımsal Araştırma Enstitüleri tarafından tescil ettirilmiş olan kuru fasulye çeşitleri ile TAGEM projesi kapsamında Orta Kızılırmak Vadisi'nden toplanarak ileri düzeye kadar getirilmiş kuru fasulye genotiplerinin kalite parametrelerinin belirlenmesi amaçlanmıştır.

## **2. MATERYAL ve METOT**

Araştırmanın tarla denemeleri, 2020 yılı kuru fasulye vejetasyonu döneminde Aksaray il merkezinde yer alan Koçaş Tarım İşletmesi Müdürlüğü'nün ıslah araştırmaları deneme arazisinde yürütülmüştür. Araştırma yerinin denizden yüksekliği 980 m olup 38° 28' kuzey enlem ve 33° 50' doğu boylam dereceleri arasında yer almaktadır.



**Şekil 1.** Araştırmanın yürütüldüğü deneme arazisi

### **2.1. MATERYAL**

Araştırmada, Kırşehir Ahi Evran Üniversitesi tarafından 2016 yılında TAGEM'e sunulan ve TAGEM/16 /AR-GE/55 kod numarası ile kabul edilen "Orta Kızılırmak Vadisi Yerel Kuru Fasulye Popülasyonlarının Morfolojik ve Moleküler Karakterizasyonu İle Kök Lezyon Nematoduna Karşı Dayanımlı Genotiplerin Belirlenmesi" isimli proje kapsamında 8 ilin (Aksaray, Ankara, Çankırı, Kayseri, Kırıkkale, Kırşehir, Nevşehir, Sivas) ilçe, belde ve

köylerinden toplanarak morfolojik karakterizasyonları ve tanımlamaları gerçekleştirilmiş 661 yerel kuru fasulye alt örneği içinden saf hat seleksiyon yöntemi ile seçilmiş 25 adet yerel kuru fasulye genotipi ile ülkemizde Tarımsal Araştırma Enstitüleri tarafından tescil ettirilmiş 5 adet kuru fasulye çeşidi olmak üzere 30 adet kuru fasulye genotipi kullanılmıştır. Çalışmada yer alan yerel kuru fasulye genotiplerinin toplandığı il, ilçe ve köylere ait bilgiler ile yine araştırmada kullanılan standart çeşitlere ait bazı bitkisel özellikler Çizelge 1 ve 2’de verilmiştir.

**Çizelge 1.** Yerel kuru fasulye genotiplerinin toplandığı il, ilçe ve köyler

Genotip No	Yerel Kuru Fasulyelerin Toplandığı			Genotip No	Yerel Kuru Fasulyelerin Toplandığı		
	İl	İlçe	Belde/Köy		İl	İlçe	Belde/Köy
G-009	Nevşehir	Avanos	Paşalı	G-119	Kırşehir	Kaman	Aydınlar
G-014	Nevşehir	Gülşehir	Gülpınar	G-146	Sivas	Şarkışla	Merkez
G-015	Nevşehir	Gülşehir	Dadağı	G-186/1	Sivas	Merkez	Merkez
G-016/2	Nevşehir	Gülşehir	Kızılkaya	G-203/1	Sivas	Gemerek	Sızır
G-017/2	Nevşehir	Gülşehir	Gülpınar	G-204	Sivas	Gemerek	Çepni
G-033	Aksaray	Sarıyahşi	Boğazköy	G-205/3	Sivas	Gemerek	Çepni
G-057	Kayseri	Felahiye	İsabey	G-215/1	Kayseri	Felahiye	İsabey
G-071	Kayseri	Sarıoğlan	Merkez	G-217	Sivas	Gemerek	Kartalkaya
G-076	Kayseri	Sarıoğlan	Muratbeyli	G-219/1	Sivas	Gemerek	Sızır
G-079	Kayseri	Özvatan	Kavaklı	G-227/3	Sivas	Yıldızeli	Topalyurdu
G-080/5	Kayseri	Özvatan	Küpeli	G-237/4	Sivas	Yıldızeli	Aşağiekekik
G-095/5	Kırşehir	Kaman	Başköy	G-277	Kırıkkale	Keskin	Kavurgalı
G-117	Kırşehir	Kaman	Çağırğan				

**Çizelge 2.** Araştırmada kullanılan kuru fasulye çeşitlerine ait bazı bitkisel özellikler

ÇEŞİTLER	YUNUS 90	ÖNCELER 98	GÖYNÜK 98	AKMAN 98	ZÜLBİYE
Tescil Yılı	1990	1998	1998	1998	2002
Çeşit Sahibi Kuruluş	GKTAE (Eskişehir)	GKTAE (Eskişehir)	GKTAE (Eskişehir)	GKTAE (Eskişehir)	KTAE (Samsun)
Bitki Boyu (cm)	55-60	40-50	45-55	60-70	40-50
Yüz Tane Ağırlığı (g)	53.0-55.0	40.5-41.0	53.5-55.0	34.0-35.0	49.5-51.5
Bitkide Bakla Sayısı (adet)	18-30	14-25	22-35	26-40	16-34
Verim (kg/da)	220-260	280-300	220-250	280-300	190-220
Tohum Şekli	horoz	barbunya	horoz	horoz	horoz
Tohum Rengi	beyaz	Bej zemin üzerine alacalı	beyaz	beyaz	beyaz

## 2.2. DENEME ALANININ İKLİM ve TOPRAK ÖZELLİKLERİ

### *İklim Özellikleri*

Aksaray ili merkezinde yer alan Koçaş Tarımsal İşletme Müdürlüğünün kuru fasulye yetiştirme dönemine ait uzun yıllar ortalaması (2005-2019) ile araştırmanın yürütüldüğü 2020 yılının meteorolojik değerleri Çizelge 3’de verilmiştir.

**Çizelge 3.** Aksaray iline ait uzun yıllar (2005-2019) ile 2020 yılına ait iklim değerleri

Aylar	Ortalama Sıcaklık (°C)		Toplam Yağış (mm)		Ortalama Nispi Nem (%)	
	2005-2019	2020	2005-2019	2020	2002-2019	2020
Mayıs	16.1	16,8	37.3	43,5	51.4	50.1
Haziran	19.7	21.0	31.4	18.00	47.5	47.3
Temmuz	23.3	21.9	2.9	0	48.9	46.3
Ağustos	23.4	24.6	5.2	0	47.1	44.1
Eylül	19.1	22.1	11.00	8.00	47.3	45.7
Toplam	-	-	87.9	69.5	-	-
Ortalama	20.3	21.3			48.4	46.7

Çizelge 3 incelendiğinde uzun yıllar ortalaması ile 2020 yılına ait aylık sıcaklık ortalamaları arasında aylar bazında büyük bir farkın olmadığı görülmektedir. Uzun yıllar ortalaması en düşük aylık sıcaklık ortalamasının 16.1 °C ile Mayıs ayında, en yüksek aylık sıcaklık ortalamasının ise 23.4 °C ile Ağustos ayında olduğu görülmektedir. 2020 yılına ait deneme periyodunda bu değerler sırasıyla 16.8 °C ile Mayıs ve 24.6 °C ile Ağustos aylarında görülmüştür. Bununla birlikte 2020 yılı aylık toplam yağış değerlerinde Mayıs (43.5 mm) ayı toplam yağış miktarının uzun yıllar ortalamasının üstünde olduğu diğer ayların ise uzun yıllar ortalamasının altında seyrettiği, aylık ortalama nispi nem değerlerine bakıldığında ise uzun yıllar ortalama değerleri ile 2020 yılının birbirine yakın değerler gösterdiği görülmektedir.

### *Toprak özellikleri*

Toprak yüzeyinin temizlenmesiyle açılan “v” şeklindeki çukurdan 5 cm kalınlığında 30 cm’lik toprak deneme arazisini temsil edecek şekilde farklı yerlerden alınarak harmanlanmış ve harmanlanan toprak örneğinden 1.5 kg toprak bir torba içinde Tarım İşletmeleri Genel Müdürlüğü Toprak Analiz Laboratuvarında analiz ettirilmiştir. Deneme arazisinin kimyasal ve fiziksel yapılarına ilişkin toprak özellikleri Çizelge 4’de verilmiştir. Araştırmanın yürütüldüğü deneme arazisinin toprak özellikleri değerlendirildiğinde deneme yeri toprağının hafif alkali, organik maddesinin az, alınabilir fosfor ve potasyum bakımından yeterli, tuz içeriğinin tuzlu ve kireç içeriğinin ise kireçli olduğu belirlenmiştir.

**Çizelge 4.** Deneme yeri toprağına ait fiziksel ve kimyasal özellikleri

Yıllar	Derinlik	pH	Toplam Tuz (%)	Kireç (% CaCO <sub>3</sub> )	Organik Madde (%)	Fosfor (P <sub>2</sub> O <sub>5</sub> )	Potasyum (K <sub>2</sub> O)
2020	0-30 cm	7,83	0,07	15,43	1,01	8,02	163,29

### 2.3. METOT

Araştırmanın yürütüldüğü Koçaş Tarım İşletmesi Müdürlüğüne ait deneme arazisinin ön bitkisi arpa olup arpanın hasadı sonrasında deneme arazisi sonbaharda pullukla sürülerek kış yağmurlarına bırakılmıştır. Ekimler gerçekleştirilmeden önce çalışmanın yürütüldüğü deneme arazisine önce diskaro sokularak yabancı otlardan temizlenmiş ardından rotovator aleti ile ekim için hazırlanmıştır. Yürütülen araştırma, tesadüf blokları deneme deseninde 4 tekerrürlü olacak şekilde kurulmuş olup parseller 5.0 m x 2.0 m= 10.0 m<sup>2</sup> ebatlarına sahiptir. 25 adet yerel kuru fasulye genotipi ile 5 adet standart çeşit olmak üzere toplam 30 adet genotipin parsellere dağıtımını tesadüfi olarak gerçekleştirilmiştir. Denemenin ekimleri 12 Mayıs 2020 tarihinde tavlı toprağına gerçekleştirilmiştir. Ekimler 50 cm sıra aralığında 8-10 cm sıra üzerinde markörle açılan sıralara 3-5 cm derinliğe elle yapılmıştır. Her parsel 4 sıradan oluşmuştur. Yabancı otlarla mücadele etmek üzere ekim sonrası çıkış öncesi aktif maddesi “*pendimethalin*” olan etkili yabancı ot ilacı uygulanmış ve vejetasyon süresince gerekli duyulduğu kadar el çapası yapılmıştır. Denemenin sulama ihtiyacını karşılamak üzere damlama sulama sistemi kurulmuş ve tüm vejetasyon boyunca ihtiyaç duyulduğu dönemlerde sulama gerçekleştirilmiştir.

Deneme alanına ekimle beraber dekara 15 kg DAP (2.7 kg N/da ve 6.9 kg P<sub>2</sub>O<sub>5</sub>/da) gübresi uygulanmıştır. Araştırmanın yürütüldüğü deneme alanındaki genotiplerin hasadı, hasat uygunluğuna ulaştıkları dönem aralığı olan 25 Ağustos - 15 Eylül tarihleri arasında el ile yapılmıştır. Dörder sıradan oluşan her bir genotipten seçilerek hasat edilen bitkiler ayrı ayrı çuvallara konulup etiketlenerek hasat-harman sonrası gerekli ölçümler ve analizler yapılmak üzere Kırşehir Ahi Evran Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümüne ait laboratuvara getirilmiştir. Hasat ve harman işlemleri yapıldıktan sonra her bir kuru fasulye genotipine ait 100'er adet tohumda laboratuvar koşullarında su alma kapasitesi (g/tane), su alma indeksi (%), şişme kapasitesi (ml/tane), şişme indeksi (%), kabuk oranı (%) ve protein oranı (%) olmak üzere 6 adet teknolojik parametre değerlendirilmiştir.

Araştırmadan elde edilen deneme sonuçları “JUMP 5.0” istatistik paket programında varyans analizine tabii tutulmuş olup önemlilik gösteren özelliklere ait ortalamaların karşılaştırılmasında “LSD Çoklu Karşılaştırma” testi kullanılmıştır.



### **3. ARAŞTIRMA VE BULGULAR**

#### **3.1. Su Alma Kapasitesi (g/tane)**

Farklı kuru fasulye genotiplerine ait su alma kapasitesi ortalamaları ile istatistik gruplandırmalar Çizelge 5’de verilmiş olup varyans analiz sonuçları değerlendirildiğinde kuru fasulye genotiplerinin su alma kapasitesi arasında ki farklar istatistiksel olarak çok önemli bulunmuştur. Çizelge 5 incelendiğinde kuru fasulye genotiplerine ait su alma kapasitesine ait değerlerin 0.281-0.487 g/tane arasında değişim gösterdiği görülmüş olup G-237/4 genotipinde su alma kapasitesi bakımından en yüksek (0.487 g/tane) değer elde edilmiştir. Bu genotipi sırayla Akman 98 (0.476 g/tane) ve G-277 (0.463 g/tane) genotipleri izlemiştir. G-076 genotipi ise 0.281 g/tane su alma kapasitesi değeri ile tüm genotipler içinde en son sırada yer alırken tüm genotiplerin su alma kapasite ortalamasının ise 0.4079 g/tane olduğu belirlenmiştir. Bu kalite parametresi üzerine yürütülen diğer çalışmalarda Cengiz (2007) 0.168-0.487 g/tane; Kınacı ve ark. (2008) 0.18-0.48 g/tane; Yılmaz ve ark. (2011) 0.14-1.25 g/tane, Özbekmez (2015) 0.146-0.809 g/tane ve Elkoca ve Çınar (2015) 0.179-1.144 g/tane değerlerine ulaşmışlardır. Su alma kapasitesi üzerine elde ettiğimiz bulguların verilen literatürlerle karşılaştırıldığında benzerlik gösterdiği görülmektedir. Su alma kapasitesi çimlenme için çok önemli bir özellik olduğundan üzerinde durulması gereken konuların başında gelmektedir.

**Çizelge 5.** Kuru fasulye genotiplerinin de saptanan teknolojik özelliklere ilişkin ortalama değerler ve oluşan istatistiksel gruplar

Genotip No	Genotip Adı	Su Alma Kapasitesi	Su Alma İndeksi	Şişme Kapasitesi	Şişme İndeksi	Kabuk Oranı	Protein Oranı
1	G-009	0,402 f	1,01 klm	0,428 k	1,88 h	9,25 b	24,12 de
2	G-014	0,369 h <sub>1</sub>	1,03 k	0,416 l	1,86 h <sub>1</sub>	8,43 gh	24,22 d
3	G-015	0,452 c	1,16 d	0,491 e	2,27 c	8,89 d	24,68 abc
4	G-016/2	0,431 de	1,09 h	0,475 g	2,13 ef	9,16 bc	23,37 h
5	G-017/2	0,302 l	0,79 u	<b>0,317 u</b>	1,40 n	8,09 i	22,83 j
6	G-033	0,327 jk	0,88 s	0,328 t	1,38 no	7,87 k	22,33 lmo
7	G-057	0,435 d	1,14 e	0,482 f	2,21 d	8,51 g	24,03 e
8	G-071	0,392 g	0,93 p	0,411 m	1,66 jk	7,75 l	22,81 jk
9	G-076	<b>0,281 mn</b>	0,81 t	0,376 qr	1,54 l	8,15 ij	22,91 ij
10	G-079	0,458 bc	1,1 g	<b>0,547 a</b>	2,34 b	8,81 de	23,19 ı
11	G-080/5	0,361 ı	0,99 l	0,384 p	1,61 k	7,02 ö	22,37 lm
12	G-095/5	0,331 j	0,94 o	0,393 opr	1,69 j	7,23 n	22,7 jkl
13	G-117	0,447 cd	1,07 ı	0,462 h	2,11 ef	9,36 ab	23,08 ii
14	G-119	0,377 h	0,98 m	0,379 q	1,60 kl	8,21 ı	22,66 k
15	G-146	0,432 de	1,06 i	0,458 h <sub>1</sub>	1,95 g	7,93 j	23,71 fg
16	G-186/1	0,356 ij	0,91 q	0,347 ş <sub>t</sub>	1,44 mn	7,14 o	22,41 l
17	G-203/1	0,339 ij	0,96 n	0,398 o	1,74 ij	8,36 h	23,67 g
18	G-204	0,314 k	0,83 ş	0,395 op	1,77 i	7,55 mn	21,79 n
19	G-205/3	0,291 m	<b>0,77 v</b>	0,363 s	1,46 m	8,17 ii	23,51 gh <sub>1</sub>
20	G-215/1	0,343 i	0,9 r	0,351 ş	<b>1,36 nop</b>	7,81 kl	<b>21,55 o</b>
21	G-217	0,416 ef	1,03 k	0,401 no	1,81 ii	8,01 ij	22,11 m
22	G-219/1	0,346 ij	1,02 kl	0,372 r	1,58 kl	<b>6,94 p</b>	22,05 mn
23	G-227/3	0,421 e	1,07 ı	0,406 n	1,83 ı	7,62 m	23,01 i
24	G-237/4	<b>0,487 a</b>	1,18 c	0,538 b	2,32 bc	8,73 e	<b>24,87 a</b>
25	G-277	0,463 b	1,13 f	0,51 d	2,15 e	8,58 fg	24,51 b
26	Yunus 90	0,433 d	1,18 c	0,432 j	2,03 fg	9,01 cd	24,39 cd
27	Önceler 98	0,455 bcd	<b>1,24 a</b>	0,506 de	2,29 c	8,54 fgh	24,73 ab
28	Göynük 98	0,425 def	1,04 j	0,481 f	2,23 d	<b>9,41 a</b>	24,44 c
29	Akman 98	0,476 ab	1,17 cd	0,518 c	<b>2,40 a</b>	8,62 f	23,55 gh
30	Zülbiye	0,445 cde	1,22 b	0,455 ı	2,06 f	9,07 c	23,87 f
Ortalama		0,4079	1,021	0,427	1,87	8,274	23,32
Önemlilik		**	*	*	**	**	**
CV(%)		5.17	4.62	4.08	4.76	4.49	3.87

### 3.2. Su Alma İndeksi (%)

Su alma indeksi su alma kapasitesi ile birlikte değerlendirilmesi gereken önemli bir özellik olup tohumun suyu ne hızda aldığı çimlenme ve çıkış için önemlidir. Bitkinin toprak içinde uzun süre kalarak zarar görmemesi için bunun bilinmesi ve buna göre agronomik işlemlerin yapılması gerekir. İncelenen bu değer ıslah çalışmalarında kullanılacak bir karakter olarak karşımıza çıkmaktadır. Bu kapsamda farklı kuru fasulye genotiplerine ait su alma indeksi

ortalamaları ile istatistik gruplandırmalar Çizelge 5’de verilmiş olup su alma indeksi (%) değerlerine ilişkin varyans analiz sonuçları değerlendirildiğinde kuru fasulye genotiplerinin su alma kapasitesi arasında ki farklar istatistiksel olarak önemli bulunmuştur ( $P<0.05$ ). Kuru fasulye genotiplerine ait su alma indeksi değerlerinin %0.77-1.24 arasında değişim gösterdiği görülmüş olup ortalama su alma indeks değerinin ise %1.021 olduğu tespit edilmiştir. Önceler 98 genotipi su alma indeks değeri bakımından ilk sırada yer alırken bu genotipi Zülbiye (%1.22), G-237/4 (%1.18) ve Yunus 90 (%1.18) genotipleri izlemiş olup G-205/3 genotipinin ise %0.77 su alma indeks değeri ile tüm genotipler içinde son sırada yer aldığı ortaya konulmuştur. Su alma indeksinin belirlenmesi üzerine yürütülen diğer çalışmalarda da %0.257-1.390 aralığında değerlere ulaşılmış (Doğan ve ark., 2005; Shimelis ve Rakshit, 2005; Cengiz, 2007; Elkoca ve Çınar, 2015 ve Türkmen, 2020) olup çalışmada elde ettiğimiz bulguların yukarıda ifade edilen literatür değerleri ile büyük oranda uyum içerisinde olduğu görülmekle birlikte küçük farklılıklarının ise çeşit ve çevre koşullarının farklılık göstermesinden kaynaklandığı söylenebilir.

### **3.3. Şişme Kapasitesi (ml/tane)**

Şişme kapasitesi tohumun suyu almasıyla tohumun bünyesinde bulunan enzimleri aktive ederek biyolojik faaliyetleri çalıştırması açısından önemlidir. Bu kapsamda farklı kuru fasulye genotiplerine ait şişme kapasitesi ortalamaları ile istatistik gruplandırmalar Çizelge 5’de verilmiştir. Çizelge değerlendirildiğinde kuru fasulye genotiplerinin şişme kapasitesi arasında ki farklar istatistiksel olarak önemli bulunmuştur ( $P<0.05$ ). Çalışmada yer alan kuru fasulye genotiplerine ait şişme kapasite değerlerinin 0.317-0.547 ml/tane arasında değişim gösterdiği tespit edilmiştir. G-079 nolu genotip şişme kapasitesi bakımından tüm genotipler içinde ilk sırada yer alırken bu genotipi G-237/4 (0.538 ml/tane), Akman 98 (0.518 ml/tane) ve G-277 (0.510 ml/tane) genotipleri izlemiştir. G-017/2 nolu genotip ise şişme kapasitesi değeri olan 0.317 ml/tane ile son sırada kendine yer bulurken tüm genotiplere ait şişme kapasite ortalamasının ise 0.427 ml/tane olduğu ortaya konulmuştur. Kuru fasulyede 100 tane ağırlığı, yaş ağırlık ve su alma kapasitesi arasında sıkı bir ilişkinin olduğu, bu değerlerin artması ile birlikte şişme kapasitesinin de arttığı görülmektedir (Atlı ve ark., 1994). Farklı çeşit ve ekolojilere bağlı olarak yürütülen diğer çalışmalarda şişme kapasite değerlerinin 0.05-1.1 ml/tane arasında değiştiği ifade edilmekte (Cengiz (2007); Özçelik ve Sözen (2009); Çiftçi ve ark. (2011) ve Yılmaz ve ark. (2011)) olup şişme kapasitesi üzerine çalışmamızda elde edilen bulgular araştırmacıların elde ettiği bulgular ile benzerlik göstermektedir.

### **3.4. Şişme İndeksi (%)**

Farklı kuru fasulye genotiplerine ait şişme indeksi ortalamaları ile istatistik gruplandırmalar Çizelge 5’de verilmiştir. Çizelge değerlendirildiğinde kuru fasulye genotiplerinin şişme indeksi arasında ki farklar istatistiksel olarak çok önemli bulunmuştur ( $P<0.01$ ). Çalışmada yer alan kuru fasulye genotiplerine ait şişme indeks değerlerinin %1.36-2.40 arasında değişim gösterdiği görülmüştür. Bir standart çeşit olan Akman 98, %2.40 şişme indeksi değeri ile ilk sırada yer alırken bu genotipi sırayla G-079 (%2.34), G-237/4 (%2.32), Önceler 98 (%2.29) ve G-015 (%2.27) izlemiş olup tüm genotiplere ait şişme indeksi ortalamasının ise %1.87 olduğu belirlenmiştir. Bunun yanında G-215/1 nolu genotip ise almış olduğu %1.36 şişme indeksi değeri ile tüm genotipler içinde son sırada yer almıştır. Genel olarak değerlendirildiğinde tüm genotipler için şişme indeksi değerinin yüksek olduğu görülmekle beraber çalışmada yer alan genotiplerin bu özellik bakımından oldukça ümitvar olmaları yürütülecek ıslah çalışmaları için oldukça önemlidir. Bu özellik üzerine yürütülen araştırmalarda Shimelis ve Rakshit (2005) %0.311-1.743; Cengiz (2007) %0.33-1.74; Özçelik ve Sözen (2009) %1.35-2.69; Yılmaz ve ark. (2011) %1.3-2.6; Çiftçi ve ark. (2011) %0.17-1.55 ve Türkmen (2020) %1.78-2.11 şişme indeksi değerlerine ulaşmışlardır. Elde ettiğimiz bulgular araştırmacıların elde ettiği bulgularla benzerlik göstermektedir.

### **3.5. Kabuk Oranı (%)**

Farklı kuru fasulye genotiplerine ait kabuk oranı ortalamaları ile istatistik gruplandırmalar Çizelge 5’de verilmiş olup Çizelge değerlendirildiğinde kuru fasulye genotiplerinin kabuk oranı arasında ki farklar istatistiksel olarak çok önemli bulunmuştur ( $P<0.01$ ). Kuru fasulye genotiplerinden elde edilen kabuk oranı değerleri %6.94-9.41 arasında değişim göstermiş olup en yüksek kabuk oranı değeri Göynük 98 çeşidinden (%9.41) elde edilirken bu genotipi sırayla G-117 (%9.36), G-009 (%9.25) ve G-016/2 (%9.16) nolu genotipler izlemiş olup tüm genotiplere ait şişme indeksi ortalamasının ise %8.274 olduğu belirlenmiştir. Bunun yanında G-219/1 nolu genotip ise almış olduğu %6.94 şişme indeksi değeri ile tüm genotipleri içinde son sırada yer almıştır. Kuru fasulye tanesinde kabuk oranı önemli bir kalite kriteri olup değişen çevre koşullarında farklılıklar gösterebilmektedir. Nitekim bu kalite parametresi üzerine yürütülen diğer çalışmalarda ise Akçin (1974) %7.78-9.77; Bozoğlu ve Gülümser (2000) %8.44-9.16; Sözen (2006) %6.7-17.2 ve Özçelik ve Sözen (2009) %7.01-11.02 değerlerinde kabuk oranlarına ulaşmışlardır. Kabuk oranı üzerine elde ettiğimiz bulgular araştırmacıların elde ettiği bulgularla uyumluluk göstermektedir.

### **3.6. Protein Oranı (%)**

Farklı kuru fasulye genotiplerine ait protein oranı ortalamaları ile istatistik gruplandırmaların verildiği Çizelge 5 değerlendirildiğinde kuru fasulye genotiplerinin protein oranı arasında ki farklar istatistiksel olarak çok önemli bulunmuştur ( $P<0.01$ ). Yürütülen araştırmada ele alınan kuru fasulye genotiplerine ait protein oranı değerlerinin %21.55-24.87 arasında değişim gösterdiği tespit edilmiştir. Protein oranı en yüksek G-237/4 genotipinden elde edilirken bu genotipi bir standart çeşit olan Önceler 98 (%24.73), G-015 (%24.68) ve G-277 (%24.51) nolu genotipler izlemiş olup tüm genotiplere ait protein oranı ortalamasının ise %23.32 olduğu belirlenmiştir. Buna karşın G-215/1 nolu genotipin ise %21.55 protein oranı değeri ile tüm genotipler içinde son sırada yer aldığı görülmüştür. Kuru fasulye genotiplerinin protein oranlarının çeşitli faktörlere bağlı olarak değiştiği ifade edilmekte olup bu faktörlerin başında iklim ve toprak faktörleri ile kültürel uygulamalar ve yetiştirme şartları gelmektedir. Aynı zamanda değişik şartlarda yetiştirilen kuru fasulyelerin protein oranlarının farklı olduğu belirtilmektedir (Önder, 1992). Yürütülen başka bir çalışmada ise Akçin (1998) protein oranının gübreleme, sulama, iklim ve toprak yapısına göre değişiklik gösterdiğini söylemiştir. Protein oranı üzerine yürütülen diğer araştırmalarda Karasu (1988) %22-36; Önder (1992) %20.04-27.12; Yılmaz ve Elmalı (2002) %20.48-23.93; Cengiz (2007) %19.25-23.66; Kahraman (2008) %20.11-28.59; Karaca (2010) %20.78-26.27; Varankaya (2011) %18.57-26.80; Atıcı (2013) %21.11-25.47; Özbekmez (2015) %18.50-26.64 ve Türkmen (2020) %20.41-22.14 değerlerine ulaşmışlardır. Protein oranı üzerine elde ettiğimiz bulgular yukarıda ifade edilen literatürlerle paralellik göstermektedir.

## **4. SONUÇ**

Farklı kuru fasulye genotiplerinin bazı teknolojik parametrelerinin belirlenmesi amacıyla yürütülen araştırma sonucunda su alma indeksi ile şişme kapasitesi hariç bütün teknolojik özellikler bakımından kuru fasulye genotiplerinin arasında %1 düzeyinde önemli farklılıklar bulunmuştur. Araştırma içinde yer alan bu kuru fasulye genotiplerinde ortaya konulan bu farklılıkların genotiplerin genetik özelliklerinin yanında yetiştiriciliği yapılan bölgelerin ekolojik özelliklerinden de kaynaklanabileceği tahmin edilmektedir. Bu bakımdan bir baklagil

bitkisi olan kuru fasulyede çeşit/çeşitler adaylarını tespit edebilmek için yapılacak ıslah çalışmalarında kalite içeriklerine göre aday/adaylar tercih edilirken değişebilecek cansız (abiyotik) faktörlerin de göz önüne alınması zorunludur. Bunun yanında özellikle pişme süresini etkileyen ve kalite özellikleri içinde önemli sayılabilecek kabuk oranı özelliğinin de üzerinde durulması gerekmektedir.

Yürütülen araştırmada birçok kalite özelliklerinden dolayı G-079, G-219/1, G-237/4 ve G-277 nolu kuru fasulye genotiplerinin standart çeşitler dahil olmak üzere tüm genotiplere nazaran öne çıktıkları ortaya konulmuştur. Bu kapsamda kalite özellikleri bakımından öne çıkabilecek yerel kuru fasulye genotiplerinin gen havuzuna alınması büyük önem arz etmektedir.

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**BAZI KURU FASULYE GENOTİPLERİNDE KALİTE PARAMETRELERİ  
ARASINDAKİ İLİŞKİLERİN BELİRLENMESİ ÜZERİNE BİR ARAŞTIRMA**

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**ÖZET**

Aksaray ekolojik koşullarında yetiştiriciliği yapılan kuru fasulye çeşit ve hatlarında kalite özellikleri arasındaki ilişkilerin korelasyon ve path analizi şeklinde ortaya konulmasını amaçlayan bu çalışma 2021 yılında kuru fasulye vejetasyonunda 1 yıl süre ile tarla ve laboratuvar koşullarında yürütülmüştür. Yürütülen çalışmada Orta Kızılırmak Vadisi'nden toplanarak saf hat seleksiyon yöntemiyle ileri düzeye kadar getirilmiş 25 adet kuru fasulye hattı ile 5 adet (Zülbiye, Yunus 90, Göynük 98, Önceler 98 ve Akman 98) tescilli kuru fasulye çeşidi olmak üzere 30 adet kuru fasulye genotipi kullanılmıştır. Yürütülen çalışmada korelasyon ve path analizinin ortaya konulması amacıyla incelenen kalite özellikleri olarak su alma kapasitesi (g/tane), su alma indeksi (%), şişme kapasitesi (ml/tane), şişme indeksi (%), kabuk oranı (%), protein oranı (%) ve yüz tane ağırlığı gibi 7 adet kalite özelliği incelenmiştir. Kuru fasulye genotipleri üzerinden yürütülen çalışmada elde edilen sonuçlara göre yüz tane ağırlığı ile şişme indeksi (0.467\*\*) ve kabuk oranı (0.482\*\*) arasında olumlu ve çok önemli ilişkiler tespit edilmiştir. Bunun yanında yine yüz tane ağırlığı ile şişme kapasitesi (0.314\*) ve protein oranı (0.509\*) arasında ise önemli ve olumlu ilişkiler ortaya konulmuştur. Sonuç olarak yürütülen çalışmada protein ve kabuk oranı ile şişme kapasitesinin kuru fasulye bitkisinde önemli kalite ölçütleri olarak değerlendirilmesi ön görülmüştür.

**Anahtar Kelimeler:** Aksaray, kuru fasulye, genotip, korelasyon, path analizi

**A RESEARCH ON THE DETERMINATION OF THE RELATIONSHIPS BETWEEN  
QUALITY PARAMETERS IN SOME DRY BEAN GENOTYPES****ABSTRACT**

This study, which aims to reveal the relationships between quality characteristics of dry bean varieties and lines grown in Aksaray ecological conditions, in the form of correlation and path analysis, was carried out in field and laboratory conditions for 1 year in dry bean vegetation in 2021. In the study, 30 dry bean genotypes, including 25 dry bean lines collected from the Middle Kızılırmak Valley and brought to an advanced level by pure line selection method, and 5 (Zülbiye, Yunus 90, Göynük 98, Önceler 98 and Akman 98) registered dry bean varieties used. In order to reveal the correlation and path analysis in the study carried out, water absorption capacity ( $\text{g grain}^{-1}$ ), water absorption index (%), swelling capacity ( $\text{ml grain}^{-1}$ ), swelling index (%), crust ratio (%), protein ratio (%) and 7 quality characteristics, including 100 grain weight, were examined. According to the results obtained in the study conducted on dry bean genotypes, positive and very important relationships were determined between 100 seed weight and swelling index ( $0.467^{**}$ ) and seed coat ratio ( $0.482^{**}$ ). In addition, significant and positive relationships were found between 100 seed weight and swelling capacity ( $0.314^{*}$ ) and protein ratio ( $0.509^{*}$ ). As a result, in the study carried out, it was foreseen to evaluate the protein and shell ratio and swelling capacity as important quality criteria in the dry bean plant.

**Keywords:** Aksaray, dry bean, genotype, correlation, path analysis

## 1. GİRİŞ

*Leguminosae* familyasının *Phaseolus* cinsinde yer alan kuru fasulye (*Phaseolus vulgaris* L.)  $2n=22$  kromozom sayısına sahip tek yıllık ve kendine döllen bir baklagil bitkisidir (Çiftçi ve ark., 2011). Güney ve Orta Amerika'dan orijin alan kuru fasulye sıcak ve ılıman iklimlere uyum sağlamış olup insan beslenmesinin önemini yanında havadaki serbest azotu toprağa bağlayabilme özelliğinden dolayı ekim alanı her geçen yıl dünyada artış göstermektedir (Şehirli, 1988). Beslenme özelliklerinin yanında son zamanlarda sağlık adına faydaları konusunda dikkatlerin artmasına bağlı olarak dünya ülkeleri kapsamında ihtiyaçları çoğaltmakta olup Birleşmiş Milletler Gıda ve Tarım Örgütü (FAO), sağlığa olan faydalı etkileri, obeziteyi aşağıya çekmek, diyabet, kalp hastalıkları ve kanser gibi önemli hastalıkları önlemek ve bu hastalıkları kontrol altına almak için gerekli olan sağlıklı beslenmenin önemli bir parçası olarak bakliyat tüketimi önerilmektedir. Kuru fasulye, yüksek oranda protein (%18-35) içeriğine sahip olmasının yanında triptofan ve lysine gibi esansiyel aminoasitler bakımından da oldukça yüksek değerlere sahip olup ayrıca vitamin (A, B, C ve D) ve mineral (Ca, P, Fe ve K) maddelerince de zengindirler.

Kuru fasulyenin de içinde bulunduğu yemeklik baklagil tanelerinin insan beslenmesinin yanı sıra taneleri ile hasat sonrası geriye kalan sapları, aynı zamanda hayvan beslenmesinde de kullanılmaktadır. Yürütülen bilimsel çalışmalarda bir ton baklagilin sapında yaklaşık 140 kg protein bulunmasına karşılık bir ton tahıl sapında ise yaklaşık 70 kg protein bulunmaktadır. Ayrıca yemeklik tane baklagiller, toprakta azot fiksasyonunu tedarik edebildikleri gibi toprakta oluşturdukları organik maddelerce zengin kanallarda mikro organizma çalışmasını yüksek derecede hızlandırarak toprak canlılığının kök bölgesinde artmasını sağlayabilmelerinin yanında derin kök kanalları da açarak toprağın sıkışmasını önleyebilirler (Uysal, 2002).

Yemeklik tane baklagiller içinde yaklaşık 34.8 milyon ha ekim alanı ve 27.5 milyon ton üretimi ile dünyada ilk sırada yer alan kuru fasulye ülkemizde ise 102 bin ha ekim alanı ve yaklaşık 280 bin ton üretimi ile nohut ve mercimekten sonra ancak üçüncü sırada yer almaktadır. Dünya ülkelerinde kuru fasulyede verim ortalaması hektara yaklaşık 792 kg iken ülkemizde ise bu değer 2715 kg civarındadır (Anonim, 2020).

Kuru fasulye yetiştiriciliğinde yüksek verim alınmasının yanında besin içerikleri açısından kaliteyi artırmak da temel amaç olup yürütülecek araştırmalarda ortaya konulacak sonuçların pratik uygulamalarda bir anlam ifade edebilmesi için de ortaya konulacak tane verimi ve besin içeriği yüksek kaliteli çeşit/çeşitlerin yetiştiriciler tarafından biliniyor olması da üretimin

devamlılığı bakımından oldukça önemlidir. Yürütülecek ıslah çalışmaları kapsamında gerçekleştirilecek korelasyon ve path analizleri bitki ıslahında kalite gibi özelliklerin yorumlanmasında veya bu özelliklerin doğrudan/dolaylı olarak etkilerinin belirlenmesinde uygulanabilmektedir (Hiltbrunner ve ark., 2007). Tane verimi ile kalite özelliklerinin birbirleri ile doğrudan/dolaylı olacak şekilde etkileri olup bu etkiler içinde doğrudan olanlara korelasyon testi uygulanırken dolaylı olanlara ise path analizi uygulanmaktadır (Karadavut, 2009). Özellikler arasındaki ilişkilerin yönü pozitif (olumlu) ya da negatif (olumsuz) olabildiği gibi doğrudan (direkt) ya da dolaylı etkide söz konusu olabilmektedir (Kakde ve ark., 2005). Aksaray ekolojik koşullarında bazı kuru fasulye genotiplerinin kalite özellikleri arasındaki gerek doğrudan gerekse dolaylı etkilerin belirlenmek istenmesi bu araştırmanın amacını oluşturmaktadır.

## **2. MATERYAL ve METOT**

2020 yılında kuru fasulyenin yetiştiriciliği boyunca Aksaray ili ekolojik koşulları altında yürütülen araştırma Aksaray il merkezinde yer alan Koçaş Tarım İşletmesi Müdürlüğü'nün ıslah araştırmaları deneme arazisinde yürütülmüştür. Araştırma yerinin denizden yüksekliği 980 m olup 38° 28' kuzey enlem ve 33° 50' doğu boylam dereceleri arasında yer almaktadır.



**Şekil 1.** Araştırmanın yürütüldüğü deneme arazisi

Araştırmanın yürütüldüğü arazinin değişik yerlerinden alınarak harmanlanmış toprak örneğinde yapılan analiz sonucuna göre toprağın hafif alkali, organik maddesinin az, alınabilir fosfor ve potasyum bakımından yeterli, tuz içeriğinin tuzlu ve kireç içeriğinin ise kireçli olduğu belirlenmiştir (Çizelge 1).

**Çizelge 1.** Deneme yeri toprağına ait fiziksel ve kimyasal özellikleri

Yıllar	Derinlik	pH	Toplam Tuz (%)	Kireç (% CaCO <sub>3</sub> )	Organik Madde (%)	Fosfor (P <sub>2</sub> O <sub>5</sub> )	Potasyum (K <sub>2</sub> O)
2020	0-30 cm	7,83	0,07	15,43	1,01	8,02	163,29

Aksaray ili merkezinde yer alan Koçaş Tarımsal İşletme Müdürlüğü'nün kuru fasulye yetiştirme dönemine ait uzun yıllar ortalaması (2005-2019) ile araştırmanın yürütüldüğü 2020 yılının meteorolojik değerleri Çizelge 2'de verilmiştir.

**Çizelge 2.** Aksaray iline ait uzun yıllar (2005-2019) ile 2020 yılına ait iklim değerleri

Aylar	Ortalama Sıcaklık (°C)		Toplam Yağış (mm)		Ortalama Nispi Nem (%)	
	2005-2019	2020	2005-2019	2020	2002-2019	2020
Mayıs	16.1	16,8	37.3	43,5	51.4	50.1
Haziran	19.7	21.0	31.4	18.00	47.5	47.3
Temmuz	23.3	21.9	2.9	0	48.9	46.3
Ağustos	23.4	24.6	5.2	0	47.1	44.1
Eylül	19.1	22.1	11.00	8.00	47.3	45.7
Toplam	-	-	87.9	69.5	-	-
Ortalama	20.3	21.3			48.4	46.7

Çizelge 2 incelendiğinde uzun yıllar ortalaması ile 2020 yılına ait aylık sıcaklık ortalamaları arasında aylar bazında büyük bir farkın olmadığı görülmektedir. Uzun yıllar ortalaması en düşük aylık sıcaklık ortalamasının 16.1 °C ile Mayıs ayında, en yüksek aylık sıcaklık ortalamasının ise 23.4 °C ile Ağustos ayında olduğu görülmektedir. 2020 yılına ait deneme periyodunda bu değerler sırasıyla 16.8 °C ile Mayıs ve 24.6 °C ile Ağustos aylarında görülmüştür. Bununla birlikte 2020 yılı aylık toplam yağış değerlerinde Mayıs (43.5 mm) ayı toplam yağış miktarının uzun yıllar ortalamasının üstünde olduğu diğer ayların ise uzun yıllar ortalamasının altında seyrettiği, aylık ortalama nispi nem değerlerine bakıldığında ise uzun yıllar ortalama değerleri ile 2020 yılının birbirine yakın değerler gösterdiği görülmektedir.

Araştırmada, Kırşehir Ahi Evran Üniversitesi tarafından 2016 yılında TAGEM'e sunulan ve TAGEM/16 /AR-GE/55 kod numarası ile kabul edilen "Orta Kızılırmak Vadisi Yerel Kuru Fasulye Popülasyonlarının Morfolojik ve Moleküler Karakterizasyonu İle Kök Lezyon Nematoduna Karşı Dayanıklı Genotiplerin Belirlenmesi" isimli proje kapsamında 8 ilin (Aksaray, Ankara, Çankırı, Kayseri, Kırıkkale, Kırşehir, Nevşehir, Sivas) ilçe, belde ve köylerinden toplanarak morfolojik karakterizasyonları ve tanımlamaları gerçekleştirilmiş 661 yerel kuru fasulye alt örneği içinden saf hat seleksiyon yöntemi ile seçilmiş 25 adet yerel kuru fasulye genotipi ile ülkemizde Tarımsal Araştırma Enstitüleri tarafından tescil ettirilmiş 5 adet

kuru fasulye çeşidi olmak üzere 30 adet kuru fasulye (Yunus 90, Önceler 98, Göynük 98, Akman 98 ve Zülbiye) genotipi kullanılmıştır. Yürütülen araştırma, tesadüf blokları deneme deseninde 4 tekerrürlü olacak şekilde kurulmuş olup parseller 5.0 m x 2.0 m= 10.0 m<sup>2</sup> ebatlarına sahiptir. 25 adet yerel kuru fasulye genotipi ile 5 adet standart çeşit olmak üzere toplam 30 adet genotipin parsellere dağıtımını tesadüfi olarak gerçekleştirilmiştir. Denemenin ekimleri 12 Mayıs 2020 tarihinde tavlı toprağa gerçekleştirilmiştir. Ekimler 50 cm sıra aralığında 8-10 cm sıra üzerinde markörle açılan sıralara 3-5 cm derinliğe elle yapılmıştır. Her parsel 4 sıradan oluşmuştur. Yabancı otlarla mücadele etmek üzere ekim sonrası çıkış öncesi aktif maddesi “*pendimethalin*” olan etkili yabancı ot ilacı uygulanmış ve vejetasyon süresince gerekli duyulduğu kadar el çapası yapılmıştır. Denemenin sulama ihtiyacını karşılamak üzere damlama sulama sistemi kurulmuş ve tüm vejetasyon boyunca ihtiyaç duyulduğu dönemlerde sulama gerçekleştirilmiştir. Deneme alanına ekimle beraber dekara 15 kg DAP (2.7 kg N/da ve 6.9 kg P<sub>2</sub>O<sub>5</sub>/da) gübresi uygulanmıştır. Araştırmanın yürütüldüğü deneme alanındaki genotiplerin hasadı, hasat olgunluğuna ulaştıkları dönem aralığı olan 25 Ağustos - 15 Eylül tarihleri arasında el ile yapılmıştır. Dörder sıradan oluşan her bir genotipten seçilerek hasat edilen bitkiler ayrı ayrı çuvallara konulup etiketlenerek hasat-harman sonrası gerekli ölçümler ve analizler yapılmak üzere Kırşehir Ahi Evran Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümüne ait laboratuvara getirilmiştir. Hasat ve harman işlemleri yapıldıktan sonra her bir kuru fasulye genotipine ait 100'er adet tohumda laboratuvar koşullarında su alma kapasitesi (g/tane), su alma indeksi (%), şişme kapasitesi (ml/tane), şişme indeksi (%), protein oranı (%) ve kabuk oranı (%) gibi teknolojik parametreler değerlendirilmiştir. Araştırma sonucunda elde edilen verilerden değişkenlerin aralarındaki doğrusal ilişkiler için korelasyon analizi ve dolaylı etkiler için ise path analizi yapılmış olup (Düzgüneş ve ark., 1987) bu işlemler JUMP 5.01 istatistik paket programında gerçekleştirilmiştir.

### **3. ARAŞTIRMA VE BULGULAR**

Aksaray ekolojik koşullarında yürütülen araştırmada 25 adet yerel kuru fasulye genotipi ile ülkemizde Tarımsal Araştırma Enstitüleri tarafından tescil ettirilmiş 5 adet kuru fasulye çeşidi olmak üzere 30 adet kuru fasulye genotipinde ele alınan ve incelenen 7 adet kalite özelliği arasındaki korelasyon katsayıları belirlenerek özellikler arası ilişkilerin yönü ve önemlilik seviyeleri Çizelge 3'de verilmiştir.

**Çizelge 3. Kalite özellikleri arası korelasyon katsayıları**

İncelenen Parametreler	Yüz Tane Ağırlığı	Su Alma Kapasitesi	Su Alma İndeksi	Şişme Kapasitesi	Şişme İndeksi	Kabuk Oranı	Protein Oranı
Yüz Tane Ağırlığı	1.000	0.111	0.139	0.314*	0.467**	0.482**	0.509*
Su Alma Kapasitesi		1.000	0.481**	0.319**	0.476**	0.205	0.281
Su Alma İndeksi			1.000	0.241*	0.173	-0.146*	0.322*
Şişme Kapasitesi				1.000	0.455**	-0.281	0.297
Şişme İndeksi					1.000	-0.327*	0.303**
Kabuk Oranı						1.000	0.407*
Protein Oranı							1.000

Çizelge incelendiğinde yüz tane ağırlığı ile şişme indeksi ( $r=0.467^{**}$ ) ve kabuk oranı ( $r=0.482^{**}$ ) arasında olumlu ve çok önemli ilişkiler tespit edilmiştir. İlişkinin derecesi yüz tane ağırlığının her iki parametreyi çok önemli derecede etkilediği ve yüz tane ağırlığında ortaya konulacak artışların bu iki özellik üzerinde de önemli ve pozitif yönde etki yapabileceğini ortaya koymaktadır. Çiftçi ve Şehirali (1984), 105 genotip ile yürüttükleri çalışmada yüz tane ağırlığı açısından genotipler arasında önemli farklılıklar bulunduğunu ve söz konusu özelliğin bir seçim kriteri olarak dikkate alındığı durumlarda genotiplere göre değişik sonuçlar elde edilebileceğini bildirmişlerdir. Yürütülen çalışmada yine yüz tane ağırlığı ile şişme kapasitesi ( $r=0.314^*$ ) ve protein oranı ( $r=0.509^*$ ) arasında olumlu ve önemli ilişkiler belirlenirken su alma kapasitesi ( $r=0.111$ ) ve su alma indeksi ( $r=0.139$ ) arasında ise sadece olumlu fakat önemsiz ilişkiler tespit edilmiştir.

Su alma kapasitesi ile su alma indeksi ( $r=0.481^{**}$ ), şişme kapasitesi ( $r=0.319^{**}$ ) ve şişme indeksi ( $r=0.476^{**}$ ) arasında çok önemli ve olumlu ilişkiler ortaya konulurken kabuk ( $r=0.205$ ) ve protein oranı ( $r=0.281$ ) ile ise önemsiz ancak olumlu ilişkiler tespit edilmiştir. Aydoğan ve ark. (2020), Konya ekolojik koşullarında bazı kuru fasulye genotiplerinin kalite üzerine etkilerini araştırdıkları çalışmalarında su alma kapasitesi ile şişme kapasitesi ( $0.5466^{**}$ ) ve şişme indeksi arasında ( $0.8661^{**}$ ) çok önemli ve olumlu ilişkiler bulmuşlardır.

Su alma indeksi ile şişme kapasitesi ( $r=0.241^*$ ) ve protein oranı ( $r=0.322^*$ ) arasında önemli ve olumlu ilişkiler ortaya konulurken şişme indeksi ( $r=0.173$ ) ile olumlu fakat önemsiz ilişkiler ortaya konulmuş olup buna karşın kabuk oranı ile ise ( $r=-0.146^*$ ) önemli fakat olumsuz ilişkiler belirlenmiştir. 2014 yılında Polonya'da Bitki Yetiştirme ve İklimlendirme Enstitüsünde 2'si çeşit 22'si değişik ülkelerden getirilmiş yerel kuru fasulye popülasyonu olmak üzere 24 adet kuru fasulye genotipinin kalite parametrelerinin belirlenmesi üzerine yürütülen çalışmada şişme



kapasitesi ile şişme indeksi arasında ( $r=0.044^*$ ) önemli ve pozitif; protein oranı ( $r=0.04$ ) ile önemsiz ve pozitif ilişkiler ortaya konulurken tohum kabuk oranı ( $r=-0.08$ ) ile ise önemsiz fakat negatif bir ilişkinin ortaya konulduğu Boros ve Wawer (2018) tarafından belirtilmiştir. Şişme kapasitesi ile şişme indeksi ( $r=0.455^{**}$ ) arasında çok önemli ve olumlu ilişkiler görülürken protein oranı ile ise ( $r=0.297$ ) önemsiz fakat olumlu ilişkiler belirlenmiştir. Bunun yanında kabuk oranı ile ( $r=-0.281$ ) ise önemsiz fakat olumsuz ilişkiler belirlenmiştir.

Şişme indeksi ile protein oranı ( $r=0.303^{**}$ ) arasında çok önemli ve olumlu ilişkiler belirlenirken kabuk oranı ( $r=-0.327^*$ ) ile olumsuz fakat önemli ilişkiler tespit edilmiştir.

Kabuk oranı tohumların yeterli miktarda su alarak şişmesi yönünde önemli bir özellik olup yürütülen çalışmada kabuk oranı ile protein oranı arasında ( $r=0.407^*$ ) ise önemli ve olumlu ilişkiler ortaya konulmuştur. Dört adet fasulye çeşidinin Akdeniz ekolojik koşullarında verim ve kalite özellikleri üzerindeki etkisinin belirlendiği çalışmada tohumun kabuk oranı ile protein oranı arasında önemsiz fakat olumlu ilişkilerin ortaya koyulduğu Kazai (2019) tarafından rapor edilmiştir.

Yürütülen araştırmada yapılan path analizi sonucunda incelenen parametrelerin negatif katsayıya sahip olmaları o parametrenin negatif yönde, pozitif katsayıya sahip olmaları ise parametrenin pozitif yönde etkileneceğini belirtmektedir. İncelenen kalite özelliklerinin yüz tane ağırlığı üzerine doğrudan ve dolaylı etkileri incelenmiş ve sonuçlar Çizelge 4’de gösterilmiştir.

Çizelge incelendiğinde su alma kapasitesinin yüz tane ağırlığına doğrudan etkisi 0.242 ile pozitif yönlü olurken en yüksek dolaylı etkiyi su alma indeksi üzerinden (0.218) göstermiştir. Etki payları incelendiğinde su alma kapasitesinin yüz tane ağırlığına doğrudan %29.24’lük bir oranla etki ederken en yüksek dolaylı etkiyi su alma indeksinin ardından şişme kapasitesi (%21.55) ile şişme indeksi (%15.56) üzerinden yapmıştır.

Su alma indeksinin yüz tane ağırlığına doğrudan etki katsayısı 0.304 olarak bulunmuş olup etki miktarı %28.56 olarak belirlenmiştir. Su alma indeksi en yüksek dolaylı etkiyi %23.34 ile su alma kapasitesi üzerinden göstermiştir. Bu özelliği ise %16.33 ile şişme kapasitesi üzerinden yapılan dolaylı etki izlemiştir.

Şişme kapasitesinin yüz tane ağırlığı üzerine doğrudan etki katsayısı 0.181 olurken bunun oransal etki miktarı %20.44 olarak belirlenmiştir. Bunun dışındaki dolaylı etkiler de su alma kapasitesi, su alma ve şişme indeksi özellikleri dışında düşük olmuştur. Şişme kapasitesi en yüksek dolaylı etkiyi %28.66 ile su alma kapasitesi üzerinden göstermiş olup bu özelliği su

alma indeksi (%26.53) ve şişme indeksi (%13.31) üzerinden yapılan dolaylı etkiler takip etmiştir.

Şişme indeksi bakımından incelendiğinde doğrudan etki katsayısının 0.164 gibi orta düşük bir katsayıya sahip olduğu görülmüş olup oransal etkisi %18.24 olarak belirlenmiştir. Dolaylı etki bakımından ise en yüksek değerleri su alma kapasitesi (%27.09) ve su alma indeksi (%21.19) özellikleri takip etmiştir. Su alma kapasitesinin artması ya da azalması şişme indeksinin belli bir noktaya kadar artmasına ya da azalmasına neden olmaktadır. Bu nedenle bu özellik her zaman için önemli ve üzerinde çalışılması gereken kalite ögesi olarak değerlendirilmelidir.

Kabuk oranının yüz tane ağırlığına doğrudan etki katsayısı 0.111 ile pozitif yönde olurken en yüksek dolaylı etkiyi şişme indeksi üzerinden (0.241) göstermiştir. Etki payları incelendiğinde kabuk oranının yüz tane ağırlığına doğrudan %9.32'lik bir oranla etki ederken en yüksek dolaylı etkiyi %23.25 ile şişme indeksi, %22.86 ile su alma indeksi ve %21.47 ile şişme kapasitesi özellikleri üzerinden yapmıştır.

Kalite parametreleri içinde en önemli özelliklerden bir tanesi olan protein oranının yüz tane ağırlığı üzerine doğrudan etkisi 0.303 (%30.51) olarak tespit edilirken protein oranı üzerinden yüz tane ağırlığı üzerine kabuk oranı %21.21 ile ilk sırada dolaylı etki göstermiştir. Bu dolaylı etkiyi şişme kapasitesi (%19.41) ve şişme indeksi (%17.04) izlemiştir.

**Çizelge 4. Kalite özelliklerinin yüz tane ağırlığına doğrudan ve dolaylı etkileri ile oranları**

<b>Doğrudan Etki</b>	<b>Dolaylı Etki</b>	<b>P</b>	<b>Etki Oranı (%)</b>	<b>r</b>
<b>Su Alma Kapasitesi</b>		<b>0.242</b>	<b>29.24</b>	<b>0.111</b>
	Su Alma İndeksi	0.218	24.17	
	Şişme Kapasitesi	0.205	21.55	
	Şişme İndeksi	0.147	15.56	
	Kabuk Oranı	0.075	6.39	
	Protein Oranı	0.032	3.09	
<b>Su Alma İndeksi</b>		<b>0.304</b>	<b>28.56</b>	<b>0.139</b>
	Su Alma Kapasitesi	0.217	23.34	
	Şişme Kapasitesi	0.174	16.33	
	Şişme İndeksi	0.158	15.32	
	Kabuk Oranı	0.114	10.19	
	Protein Oranı	0.081	6.26	
<b>Şişme Kapasitesi</b>		<b>0.181</b>	<b>20.44</b>	<b>0.314*</b>
	Su Alma Kapasitesi	0.288	28.66	
	Su Alma İndeksi	0.241	26.53	
	Şişme İndeksi	0.155	13.31	
	Kabuk Oranı	0.093	7.24	
	Protein Oranı	0.038	3.82	
<b>Şişme İndeksi</b>		<b>0.164</b>	<b>18.24</b>	<b>0.467**</b>
	Su Alma Kapasitesi	0.276	27.09	
	Su Alma İndeksi	0.214	21.19	
	Şişme Kapasitesi	0.193	19.14	
	Kabuk Oranı	0.134	10.08	
	Protein Oranı	0.058	4.26	
<b>Kabuk Oranı</b>		<b>0.111</b>	<b>9.32</b>	<b>0.482**</b>
	Su Alma Kapasitesi	0.147	14.45	
	Su Alma İndeksi	0.236	22.86	
	Şişme Kapasitesi	0.218	21.47	
	Şişme İndeksi	0.241	23.25	
	Protein Oranı	0.102	8.65	
<b>Protein Oranı</b>		<b>0.303</b>	<b>30.51</b>	<b>0.509*</b>
	Su Alma Kapasitesi	0.061	4.61	
	Su Alma İndeksi	0.092	7.22	
	Şişme Kapasitesi	0.206	19.41	
	Şişme İndeksi	0.153	17.04	
	Kabuk Oranı	0.216	21.21	

#### **4. SONUÇ**

Yürütülen çalışma ile bir baklagil bitkisi olan kuru fasulyede kalite arařtırmaları üzerine etkili olabilecek kalite özelliklerinin çeşitlilik gösterdiği görülmüş olup yürütülecek ıslah arařtırmalarında çeşitlerin geliştirilmesi için kalite özellikleri de baz alınarak başta kuru fasulye olmak üzere baklagil bitkilerinin seleksiyon aşamalarında farklılıklar gösteren ekolojik faktörlerin mutlaka göz önüne alınması gerekmektedir. Kuru fasulyede değerlendirmeye tabi tutulan genotiplerin ıslah aşamalarında önemli sayılabilecek kalite öğeleri içinde yer alan yüz tane ağırlık özelliği başta olmak üzere protein ile tohumların su alım hızlarını artırıp azaltabilen bir özellik olan kabuk oranının da üzerinde durulması büyük önem taşımaktadır. Bu tür ıslah çalışmalarında yalnızca korelasyon katsayıları dikkate alınarak 100 tane ağırlığının ortaya konulmasında tüm kalite özelliklerinin etki oran değerlerini ve bu özelliklerin olumlu yada olumsuz yönlerini tam olarak belirlemek mümkün olmamakla birlikte kuru fasulye üzerine yürütülecek ıslah aşamalarının bir parçası olan seleksiyon çalışmalarında ıslah aşamaları olarak göz önüne alınacak özelliklerin tespit edilmesinde path analizlerinin de daha etkili olduğu bilinmekte olup ayrıca kalite unsurlarının yorumlanmasında 100 tane ağırlığının göz önüne alınmasının yanı sıra hem yüksek hem de pozitif dolaylı etkilerinden dolayı su alma ve şişme kapasitesi özelliklerinin de ortaya konulması gerekliliği belirlenmiştir.

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### **ÖZET**

Tarımsal alanlarda tuzluluğun artması toprağın yapısını bozmakta bununla birlikte bitkisel ürün kalitesi ve verimini önemli ölçüde azaltmaktadır. Stres şartlarında beklenmedik şekilde değişiklik üreticiye ve ülke ekonomisine büyük kayıplar vermektedir. Tuz stresi, bitkilerde çeşitli gelişim süreçlerinin yanında morfolojik, hüresel, fizyolojik ve moleküler seviyede pek çok aksaklıklara neden olmaktadır. Topraktaki tuzluluk, su potansiyelindeki değişiklikler nedeniyle bitki su emilimini azaltarak bitkilerde azot alımını da bozabilir. Bitki besin maddeleri arasında bulunan azot (N), bitki büyümesini etkileyen en önemli besin maddelerindendir. Bitkilerin hem morfolojik hem de fizyolojik tepkileri ile gelişmelerini ve büyümelerini manipüle etmek azot ihtiyacına bağlıdır. Bu nedenle, bitkilerin tüm yaşamsal döngülerini tamamlaması için azot ihtiyacı vardır. Azot (N) amino asitler, proteinler ve amidler, kuarterner amonyum birleşikleri ve farklı mekanizmalar yoluyla bitki tuz toleransında yer alan poliaminler gibi birçok bileşiğin hayati bir bileşenidir. Yapılan birçok çalışmada, azot gübre ilavelerinin tuzluluğun bitkiler üzerindeki zararlı etkisini bir dereceye kadar hafiflettiği hipotezini ortaya koymasına karşın, tuzluluk, azot (N) ilişkileri karmaşık bir konu olup henüz açıklık kazanmamıştır. Bu derlemede, genel olarak bitkilerde azotun tuz stresine etkilerine yönelik çalışmalar ele alınmış olup, derlemenin bundan sonra bu konuda çalışacak araştırmacılara toplu bir kaynak olma niteliği sağlaması amaçlanmıştır.

**Anahtar kelimeler:** azot, dayanım, iyon dengesi, tuz stresi

## **SALT STRESS AND NITROGEN IN PLANTS**

### **ABSTRACT**

The increase in salinity in agricultural areas deteriorates the structure of the soil and significantly reduces the quality and yield of plant products. Unexpected changes in stress conditions cause great losses to the producer and the country's economy. Salt stress causes many disruptions at the morphological, cellular, physiological and molecular levels in addition to various developmental processes in plants. Salinity in the soil can also impair nitrogen uptake in plants by reducing plant water absorption due to changes in water potential. Accordingly, Nitrogen (N), a plant nutrient and one of the most important nutrients affecting plant growth determines manipulating both the morphological and physiological responses of plants, as well as their development and growth. Therefore, plants need nitrogen to complete their entire life cycle. Nitrogen (N) is a vital component of many compounds such as amino acids, proteins and amides, quaternary ammonium compounds and polyamines involved in plant salt tolerance through different mechanisms. Although many studies hypothesize that nitrogen fertilizer additions alleviate the detrimental effects of salinity on plants to some extent, the salinity-nitrogen (N) relationships are a complex issue and have not yet been clarified. In this review, studies on the effects of nitrogen on salt stress in plants in general are discussed, and it is aimed to provide a collective resource for researchers who will work on this subject from now on.

**Keywords:** nitrogen, tolerance, ion balance, salt stress

## GİRİŞ

Dünya’da biyotik ve abiyotik stres faktörleri bitki üretimini önemli oranda etkilenmektedir. İklim koşullarının değişimi ve çevresel koşullar nedeniyle Dünya’nın birçok bölgesinde tarımsal üretim üzerine çevresel stres faktörlerinin olumsuz etkisinin artacağı bildirilmektedir (Denby ve Gehring, 2005). Tuz stresi de bu stres faktörlerinden biridir. Toprak tuzluluğu, birçok bitki türünün büyümesini ve verimliliğini olumsuz yönde etkileyen ciddi bir çevre sorunudur (Sevgin ve Uzal, 2020). Tuzluluk, başta kurak ve yarı kurak bölgeler olmak üzere dünyanın hem sulanan hem de sulanmayan topraklarında tarımsal üretimi olumsuz yönde etkilemektedir (Ashraf, 2010). Tuz birikimi, son yıllarda en yakın tarımsal tehditlerden biri haline gelmiştir. Küresel olarak ekili alanların yaklaşık %20’sinin ve sulanan tarım arazilerinin %33’ünün etkilendiği tahmin edilmektedir (Munns ve ark. 2008) ve bu yüzdelerin çeşitli nedenlerle (aşırı buharlaşma, yanlış sulama veya yetersiz yağış gibi) yıllık olarak artması beklenmektedir. Tuzdan etkilenen ekilebilir tarım arazilerinin miktarının 2050 yılına kadar %50’ye ulaşacağını tahmin edilmektedir (Jamil ve ark. 2011). Patates, domates, Pirinç, mısır ve baklagiller gibi tarımsal açıdan önemli birçok ürünün tuzluluğa oldukça duyarlı olduğu düşünüldüğünde çok daha tehlikeli boyutta olacaktır (Muchate ve ark. 2016). Ayrıca, 2050 yılına kadar insan nüfusunun 9 milyarı aşacağını tahmin edilmektedir. Bu da gıda üretimindeki artış talebini %70’e kadar yükseltecektir (Davies ve ark. 2016). Tüm bu tahminler, Dünya’daki insan yaşamının sürdürülebilirliği için artan tarımsal verimliliğin önemini bir kez ortaya koymaktadır.

Bitkilerde genel olarak tuz zararı; yaprak alanında ve sayısında azalma meydana gelmekle birlikte bitkide büyümede yavaşlama şeklinde etkisini göstermektedir. Bitki yaş ve kuru ağırlığında azalma, meyve tat, kalitesinde bozulma ve buna bağlı olarak verimde düşüş tuz stresinin ortaya çıkardığı etkiler arasında yer almaktadır (Ashraf, 2004; Yu ve ark., 2012). Bitkiler yüksek tuzluluk koşullarında, negatif su dengesi nedeniyle veya spesifik iyonların metabolizma üzerindeki etkisi stres yanıtı olarak gelişmelerini ve büyümelerini yavaşlatırlar (Yasar, 2003; Yasar ve ark., 2013). Yüksek tuz konsantrasyonlarında bitki hücrelerinin iyon dengesini bozabilir ve hücrelerdeki Na<sup>+</sup> ve K<sup>+</sup> dağılımlarını etkileyebilir. Tuz stresi altındaki bitkiler için hücrelerde iyon dengesinin yeniden sağlanması gereklidir (Niu ve ark.,1995). Topraktaki tuzluluk, su potansiyelindeki değişiklikler nedeniyle bitki su emilimini azaltarak bitkilerde azot alımını da bozabilir. Tuz stresi altındaki bitkilerin hayatta kalması ve büyümesi iyon taşıma ve dağılımlarında, uyumlu çözünen sentezi ve birikimi gibi adaptif süreçlerin bir



sonucudur. Çözünen maddelerin çoğu, betainler ve amino asitler gibi azot içeren birleşiklerdir, bu sebeple azot metabolizması tuz toleransı için hayati öneme sahiptir (Lauchli ve ark., 2002). Dünya çapında, azot tarım ürünlerinde yoğun olarak kullanılan bir besin maddesidir. (Khan ve ark., 2014;Wajid ve ark., 2015;Hafiz ve ark., 2016; Yousaf ve ark., 2016). Azot, ışığın kesilmesi ve kullanılması, fotosentez için yaprak gölgelik büyümesini oluşturmak için gereklidir (Barraclough ve ark., 2010). Bundan dolayı, mahsuller hem morfolojik hem de fizyolojik tepki için gelişmelerini ve büyümelerini manipüle etmek için azot ihtiyacına bağlıdır (Pavlikova ve ark., 2012). Bu nedenle, tüm yaşamsal döngülerini tamamlamak için azot ihtiyacı vardır (Zahoor ve ark., 2014). Bitki yapraklarındaki renk, klorofilin önemli bir birleşeni olduğu, vejetatif büyümeden sorumlu olduğu için bitkinin azot durumunu doğrudan gösterir (Wiedenfled ve ark., 2009). Çözünebilir azot gübresi, bitkilerin büyümesi sırasında alımı ve asimilasyonu kolaydır (Hooda ve ark., 2000). Atmosferik azotun küçük bir miktarı bitkiye uygun forma dönüştürülür, ancak toprağın fiziksel ve kimyasal özelliklerindeki farklılıklardan dolayı çevresel faktörlere bağlı olarak değişir (Giller ve ark., 2009). Aslında, bitkiler organik ve inorganik azota (nitrat ve amonyak ) ihtiyaç duyarlar, fakat inorganik form bitkiler için hazır formdur. Azot gübresinin diğer biçimleri nitrik, amino asit ve üre vardır (Mokhele ve ark., 2012). Yüksek üretim için düşük girdi maliyetleri ve sürdürülebilir yoğunlaştırma, birçok ülkede agronomistler tarafından yıllardır önerilmiştir. Ayrıca gübrenin kaynağı, uygulama şekli, miktarı ve zamanı, çeşit ve çevre koşulları sebebiyle gübreleme yönetimi zordur (Orcen ve ark., 2013).

Topraktaki tuzluluk, su potansiyelindeki değişiklikler nedeniyle bitki su emilimini azaltarak bitkilerde azot alımını da bozabilir. Yapılan birçok çalışma, örneğin, Abdelgadir ve ark., (2005); Ehltng ve ark. (2007); Zakery-Asl ve ark. (2014), toprak çözeltisinde bulunan tuz iyonlarının ozmotik etkilerinin, su emilimini ve köklere azot dahil olmak üzere besin maddelerinin kütle akışını azalttığını ve ardından bitkiler tarafından alımında belirgin bir azalmaya sebep olduğunu bildirmiştir. Azot alımını sınırlamanın yanı sıra iyonik antagonizma ve azalan su mevcudiyeti ve absorpsiyon, tuzluluk, nispi büyüme oranındaki belirgin bir azalma nedeniyle bitki azot talebini azaltarak azot alımını da kısıtlayabilir (Kafkafi ve Bernstein, 1996). Diğer bazı çalışmalar, örneğin, Touraine ve ark.,(1994) ve Van Hoorn ve dark., (2001), fotosentezdeki azalmaya bağlı olarak bitkilerin nispi büyüme hızındaki tuzluluğun neden olduğu değişikliklerin, bitkilerin iç azot talebini etkilediğini ve böylece azot'un bitki kökleri tarafından alınma oranını belirlediğini bulmuşlardır. Toprağın bitkilere azot katkısı da tuzluluk

stresi altında azalmış, bu da azot fiksasyonu yoluyla biyolojik aktivite ve organik azot'un dönüşümü ile topraktaki mineral azot üretimi üzerindeki tuzluluğun etkilerini göstermektedir. Özetle, tuz iyonları, özellikle  $\text{Na}^+$  ve  $\text{Cl}^-$ , azot ile etkileşime girer, iyon antagonizmi, taşıyıcının inaktivasyonu, sınırlı su absorpsiyonu ve/veya dahili azot talebinde azalma yoluyla alımını azaltır.

Bitkilerde tuzluluğun varlığı, ekinlerin mineral beslenmesine yeni bir karmaşıklık düzeyi ekler. Tuzluluk, azot (N) ilişkileri bahçe bitkilerinde açıkça karmaşıktır. Bitki besin maddeleri arasında bulunan azot (N) bitki büyümesini etkileyen en önemli besin maddelerindendir. Çünkü azot (N) amino asitler, proteinler ve amidler, kuaterner amonyum birleşikleri ve farklı mekanizmalar yoluyla bitki tuz toleransında yer alan poliaminler gibi birçok bileşiğin hayati bir bileşenidir (Kamel, 2012; Rais ve ark., 2013; Zaki, 2016). Azot metabolizmasının yeterli düzeyde düzenlenmesi, bitkinin tuzluluğa toleransı için büyük önem taşımaktadır; ancak aradaki ilişki tuzluluk ve azot metabolizması, tuz stresinin derecesine, bitki türüne, bitki büyüme aşamasına, rizosferdeki azot miktarına, türüne ve biçimine bağlı olarak çok karmaşık bir ağıdır (Munns ve Tester., 2008; Chen ve ark., 2010; Dai ve ark., 2015; Teh ve ark., 2016). Bitkiler tarafından emilen azot toplam mineral besin maddelerinin yaklaşık %80'ini oluşturur (Marschner, 1995). Tuzlu ortamda  $\text{Cl}^-$  nin bitki kısımlarına alım ve yer değiştirme sırasında  $\text{NO}_3^-$  ile rekabet ettiği bilinmektedir. (Abdelgadir ve ark., 2005) ve bundan dolayı bitkide azot birikimi azalabilir. Yapılan başka bir çalışmada  $\text{Cl}^-$  kaynakları ve  $\text{CaCl}_2$  den gelen  $\text{Cl}^-$  nin KCl değil, Cucumismelo ve Solanumlycopersium L. de bitkilerin tarla altında maruz kalabileceği bir aralıkta  $\text{NO}_3^-$  alımını engelleyebileceğini bulmuştur (Kafkafi ve ark., 1992). Yine kurak bölge topraklarında, toprakta nitrat ( $\text{NO}_3$ ) olarak nitrojenin varlığı, bitkilerin alım sisteminde önemli bir tuzluluk görevi olan klorür (Cl) ile antagonistiktir (Marschner, 1995; Mengel ve Kirkby, 2001). Bundan dolayı azot gübreleme, klorür alımını baskılayabilir ve bitkinin tuz stresine karşı toleransını artırabilir. Ayrıca yetersiz nitrojen, tarım topraklarında çoğu zaman büyüme sınırlandıran beslenme stresidir. Sonuç olarak, azot ilavesi, mahsulün tuz stresini olup olmadığını bakılmaksızın, genellikle verimi ve bitki büyümesini artırır.

Aşağıda genel olarak bitkilerde azotun tuz stresine etkilerine yönelik çalışmalar ele alınmıştır; Shen ve ark.,(1994)'da Azot (N) beslenmesinin arpa bitkilerinin tuzluluk koşullarında fotosentez ve su ilişkileri üzerine etkisinin araştırmak için serada saksı denemeleri yapılmıştır. Azot sürgünlerde potasyum (K) içeriği arttırmış sodyum (Na) içeriğini azaltmıştır. Fotosentez hızı yapraklardan eklenen azot ile 0'dan 100 mg N/kg toprakta önemli ölçüde arttı. Yüksek

tuzlu bitkilerin yapraklarında ribuloz 1,5 bifosfatkarboksilazın aktivitesi kontrol bitkilerine göre daha düşük, düşük tuzlu bitkilerin yapraklarında daha yüksek çıkmıştır. Sodyum klorür fotosentez hızı düşürüldü, birim yaprak alanı başına toplam çözünür protein ile önemli ölçüde ilişkiliydi. Azotun her seviyesi, yapraklardaki stoma iletkenliği tuz ile önemli ölçüde azaltılmıştır. Artan azot düzeyi ile yaprakların prolin içeriği artmıştır. Tuzla yapılan işlem görmüş bitkilerin yapraklarında kontrol bitkilerine göre daha yüksek çıkmıştır. Artan azot ile yaprakların ozmotik potansiyeli azalmış ve tuzlu koşullarda yüksek azot bitkilerin turgur basıncı daha yüksek kalmıştır.

Frechilla ve ark.(2001), iki farklı azot besleme kaynağının (amonyum veya nitrat), bezelye bitkilerinin orta düzeyde bir tuzlu su stresine (30 mM NaCl) tepkisi üzerindeki etkisi incelemiştir. Büyümenin, tuzlu su stresi altında azaldığı, ancak nitratla beslenen bitkiler tuzluluğa amonyumla beslenen bitkilerden daha az duyarlı olduğu belirlenmiştir. Bu farklı hassasiyet, esas olarak nitratla beslenen bitkilerde kök büyümesinin daha iyi korunmasından kaynaklandığı üzerinde durulmuştur. Organik azot içeriği, amonyumla beslenen bitkilerin köklerinde önemli ölçüde azalmıştır. Su ilişkileri, tuzlu su stresi altında hafifçe değişmiştir ve bu, nitrojen kaynağından bağımsız olarak karbon asimilasyon oranlarındaki düşüşle ilişkilendirilen stoma iletkenliğinde azalmaya yol açmıştır. Tuzluluk, azot kaynağına bağlı olarak çeşitli besinlerin alınımını farklı şekilde etkilemiştir. Böylece, klorür esas olarak nitratla beslenen bitkilerde, nitratın yerini alarak birikirken, sodyum esas olarak amonyum ile beslenen bitkilerde, özellikle köklerde, amonyum ve potasyum gibi diğer katyonların yerini alarak birikmiştir. Araştırma sonunda azot kaynağının (amonyum veya nitrat), tuzlu su stresine tepkileri etkileyen önemli bir faktör olduğu, bitkilerin amonyum kaynağı kullanıldığında daha duyarlı olduğu sonucuna varılmıştır.

Hindistan’ da yapılan bir başka çalışmada; büyüme ortamına eklenen farklı dozlarda uygulanan azot (N) ve giberellin (GA<sub>3</sub>)’ in, tuz stresinin bitki metabolizması üzerindeki olumsuz etkilerinin hafifletip hafifletmeyeceğini belirlemek için yapılan uygulamalarda, büyüme ve fizyo-biyokimyasal özellikler, sürgün uzunluğu, yaprak alanı, taze ve kuru ağırlık, fotosentez hızı, stoma iletkenliği, malondialdehit konsantrasyonu, elektrolit sızıntısı, toplam klorofil konsantrasyonu, yaprak/azot (N), potasyum (K) ve sodyum (Na) konsantrasyonu ve K/Na oranı NaCl yapılan uygulamalardan etkilenmiştir. Fakat azot ve GA<sub>3</sub>’ ün tek başına ve kombinasyon halinde uygulanmasının, tuz stresinin büyüme ve fizyobiyo kimyasal üzerindeki olumsuz

etkilerini hafifletmede faydalı olduğu, GA<sub>3</sub> ile uygulanan N' nin daha etkili olduğu tespit edilmiştir (Siddiqui ve ark.,2008).

Uygur ve Yetişir (2009)' da Su kabağı anacı (Lagenariasiceraria) üzerine aşılı karpuz [Citrulluslanatus (Thunb.) Matsum ve Nakai] çeşidinin fosfor (p) ve azot (N) alımı, bazı büyüme parametreleri 30 gün boyunca beş farklı tuzlu su koşulu üzerine çalışılmış olup, tuzluluk stresi, elektrik iletkenliği (EC) 0, 4, 5, 8, 12, 16 dS/m olan tuzlu su ile sürekli sulama ile indüklenmiştir. Aşılı karpuzlar aşısız karpuzlara göre daha iyi büyüme göstermiştir. Tuzluluk stresi, sürgünlerde fosfor (P) içeriği iki katta kadar artışa sebep olmuştur. Su kabaklarında aşılı ve aşısız karpuz sürgünlerinin toplam azot (N) alımı kademeli şekilde 8 dS/m tuzluluğun üzerine düşmüştür. Çalışmada, aşılı bitkilerin aşısız karpuz çeşidine göre daha iyi olduğu görüşmüş olup özellikle Lagenaria türü su kabakları, tuzlu koşullarda karpuz için anaç olarak kullanılabilir.

1 yıllık Gül (Rosa spp.) bitkilerine 0, 5, 15, 25, 35, 45, 55, 65 mol/m<sup>3</sup> NaCl ve 7 mol/m<sup>3</sup> NO<sub>3</sub><sup>-</sup> içeren besin solüsyonu uygulanmıştır. NO<sub>3</sub><sup>-</sup> alımı ilk 24 saat boyunca ölçülmüştür. NO<sub>3</sub><sup>-</sup> alımı, besin çözeltisinde NaCl varlığı ile ciddi şekilde inhibe edilmiştir. 5 mol/m<sup>3</sup> NaCl ile karşılaştırıldığında 25, 45 ve 65 mol/m<sup>3</sup> NaCl' de %23, %38 ve %50 azalmıştır. Cl<sup>-</sup> tarafından uygulanan antagonistik etki ile NO<sub>3</sub><sup>-</sup> emilimini inhibe ettiği belirlenmiştir (Massa et al.,2009).

Manzer ve ark. (2010)' da Tuza duyarlı (ev. Chuutki) ve tuza dayanıklı (ev. Radha) Haldal genotiplerinin tuz stresine tepkinin olumsuz etkilerinin üstesinden gelmek için farklı besin uygulama stratejileri üzerine yapmış oldukları çalışmada, büyüme ortamına eklenen farklı azot (N) dozu seviyelerinin tuz stresinin fotosentetik kapasite ve ozmoprotektan ve besinlerin birikimi üzerindeki olumsuz etkilerinin hafifletip hafifletemeyeceğini belirlemek için yaptıkları araştırmada, Tuzluluk stresi koşullarında, azot (N) uygulamasın her iki genotip üzerinde önemli bir iyileştirici etkiye sebep olmuştur. Büyüme özelliklerine taze, kuru ağırlık ve fizyo-biyokimyasal parametrelere yüzde su içeriği, net fotosentez oranı, stoma iletkenliği, toplam klorofil, karbon anhidraz aktivitesi, malondialdehit (MDA), nitrojen (N), potasyum (K) , sodyum (Na) içerikleri, K/Na oranı ve verim özellikleri (bakla/ bitki sayısı, tohum/bakla ve tohum verimi/bitki ). Tuza dayanıklı genotip, tuza duyarlı genotipten 60 mg N kg-1 kumda büyüme, fizyo-biyokimyasal ve verim özellikleri için maksimum değer tespit edilmiştir.

Bybordi ve Ebrahimian, (2011) kanola bitkisinde farklı tuzluluk düzeylerinin (0, 50, 100, 150 ve 200 mM NaCl) nitrat redüktaz, asit fosfataz ve asit fosfataz üzerindeki etkilerini inceledikleri çalışmada kanola yapraklarında alkalın fosfataz aktivitesinin yanı sıra nitrat ve fosfat alımı ve

toplam azot içeriği belirlenmiştir. Nitrat redüktaz aktivitesinin 100 mM NaCl ile muamele edilmiş bitkilerde arttığını, aksine 150 ve 200 mM NaCl' ye maruz kalan bitkilerde kontrollere kıyasla kademeli olarak azalmıştır. Tuzluluk stresi ve nitrat alımına bağlı olarak nitrat redüktaz aktivitesinde azalma ve bunları takip eden toplam azot içeriği aynı anda meydana gelmiştir. Yüksek tuzluluk seviyeleri nedeniyle nitrat redüktaz aktivitesinde, nitrat içeriğinde ve toplam azot içeriğinde azalma, kanolada büyüme ve ekstra biyokütleyi azaltmak için fizyolojik bir yanıt olabildiğine değerlendirilmiştir. Ancak tuzluluk stresinin hem asit fosfataz hem de alkalın fosfataz aktivitesinde artışa neden olduğu görülmüştür. Yapraklardaki fosfat seviyelerinde tuzluluk stresi altında fosfat seviyelerinin önemli ölçüde azaldığı belirlenmiştir. Bu sonuçlar, tuz stresi altında asit fosfataz ve alkalın fosfataz indüksiyonunun fosfor eksikliğinden kaynaklanabileceğini düşündürmüştür.

Doğan (2012), iki hassas (TR-47882, TR-47815), iki toleranslı (TR-68516, TR-55711) ve bir yabancı (PI-899-01) olmak üzere toplam 5 domates genotipi ile yapmış olduğu çalışmada 150 mM NaCl tuz stresi ve zamana bağlı olarak farklı konsantrasyonda yapraktan azot (N) %0.5 ve %1 uygulanmıştır. Uygulama sonrasında toleranslı ve hassas genotiplerinden tuz stresinden farklı oranlarda etkilendiğini bulunmuştur. Antioksidant enzim aktivitelerinden süperoksitdismutaz (SOD: EC 1.15.1.1), askorbatperoksidaz (APX: EC 1.11.1.11), katalaz (CAT: EC 1.11.1.6), glutatyonredüktaz (GR: EC 1.6.4.2)MDA ve klorofil miktarları ölçülmüş, enzim aktiviteleri hassas genotiplerde azalmış, toleranslı genotiplerde ise artmıştır. Enzim aktiviteleri MDA ve klorofil sonuçlarında pozitif yönde desteklenmiştir. Çıkan sonuçlara göre azot uygulamasına bağlı olarak toleranslı genotipler tuz stresinden etkilenmediği, hassas genotipler ise tuz stresinde yüksek oranda etkilenmiştir. Çıkan sonuçlara göre %1.0' lik azot dozunun tuz stresinden korunmada kritik bir rol oynadığı ve toleransı artırıcı bir etki yaptığı sonucuna varılmıştır.

Balliu ve ark. (2015)'nin yaptıkları çalışmada 30 günlük fideler (inoküle edilmemiş ve Arbuscular mikorizal mantarlar ile aşılansmış) ayrı ayrı, besine doymuş vermikülit ile doldurulmuş ve 37 gün boyunca 0, 50 ve 100 mM NaCl' ye maruz bırakılmış plastik kaplara nakledilmiştir. Tuzluluk, aşısız olanlarda yaprak N konsantrasyonunda %40 ve %38, bağıl N alım oranında %49 ve %43, N konsantrasyonunda %34 ve %111, bağıl N alım oranında %27 ve %50 azalmaya neden olmuştur.

Hussien Ibrahim ve ark. (2016)' da Argine, Elnilein, Xumai 30 ve Yang buğday çeşitleri de tuzluluk koşullarında fide çıkışı ve büyümesi üzerindeki azot etkisi ile ilgi Çin'de yapmış oldukları çalışmada; 0, 100, 150 ve 200 mM NaCl çözeltisi ve üç azot (N) dozu gübre seviyeleri (N0=0, N1=105, N2=210 kg N/h). Çıkış yüzdesi ve erken büyüme belirlenmiştir. Çıkış yüzdesi sürgün ve kök uzunluğu, kuru ağırlık, tuz tolerans indeksi, fide canlılık indeksi için tuzluluk ve azot (N) seviyeleri arasında önemli farklılıklara varılmıştır. Elnilein çeşidi diğer çeşitlere göre daha iyi çıkış yüzdesi, sürgün ve kök uzunluğu, kuru ağırlık, tuz tolerans indeksi ve fide canlılık indeksine sahip çıkmıştır. Elnilein çeşidi tuzlu topraklar için tavsiye edilmiştir.

Kanagaraj ve Desingh (2017)'da PAIYUR-1, SVPR-1, TMV-3, TMV-4, TMV-5, VIR-1 ve VIR-2 gibi yedi susam çeşidinde tuz stresinin bazı fizyolojik özellikler üzerindeki etkilerini araştırmak için bir saksı kültürü uygulaması üzerine yaptıkları çalışmada, Farklı tuzluluk (NaCl) konsantrasyonlarında kontrol, 40 mM, 80 mM, 120 mM' deki tüm uygulamalar için, Kontrol ve tuzluluk ile muamele edilmiş bitkilerden 15. gün, 30.gün ve 45. gün genç ve tamamen olgunlaşmış yapraklar alınmıştır. Tüm örnekleme günlerinde yedi susam çeşidinin yapraklarında artan tuzluluk seviyesi ile fotosentez, fotosentetik enzim aktivitesi, yaprak azotu ve ABA içeriğinde azalma oranı daha düşük olduğu tespit edilmiştir. 45. günde, fotosentetik enzim aktivitesinde, yaprak azotunda, ABA içeriğinde 120 mM tuzlulukta TMV-3'te kontrol bitkilerine göre önemli ölçüde daha yüksek artış gözlenirken, 120 mM tuzlulukta PAIYUR-1'de kontrol bitkilerine göre daha düşük artış fark edilmiştir. Fotosentetik enzimlerin, yaprak azotunun, ABA içeriğinin orta düzeyde artışı, kontrol bitkilerine kıyasla 45. günde 120 mM tuzluluk ile VIR-2 çeşidinde izlendi. TMV-3, artan fotosentez hızı ve fotosentetik, yaprak azotu aktiviteleri ile değerlendirildiğinde tuzluluk stresi altında daha yüksek adaptasyon potansiyeli sergilediği ve TMV-4 ve PAIYUR-1'i VIR-1 ile yakından takip etmiştir. VIR-2 çeşidini SVPR-1 ve TMV-5 izledi.

Shao ve ark. (2020) yaptıkları çalışmada, hafif tuz konsantrasyonları (50 mM, 100 mM) altında yıllık çavdar fidelerinin beslenmesinde azot gereksinimindeki değişiklikleri ve bunun altında yatan azaltma mekanizmasını araştırmış, sonuçlar, nispeten düşük bir N seviyesinde (2.0 mM değil 5.0 mM) bitki boyundaki ve biyokütledeki artıştan gözlemlendiği gibi, düşük tuz konsantrasyonunun N gereksinimini azalttığını göstermiştir. Tuz stresi altında, orta derecede düşük N uygulaması, NR (nitrat redüktaz) ve GS (glutamin sentetaz) kodlayan genlerin ekspresyonunu nispeten stabil bir seviyede tutabilmiş, ancak tespit edilen NRT (nitrat taşıyıcı) geninin ekspresyonu üzerinde hiçbir etkisi olmamıştır. 2.0 mM N' uygulanan fideler aynı

zamanda en yüksek CAT ve POD antioksidan enzim aktivitesini ve en düşük MDA içeriğini düşük tuz uygulaması altında göstermişlerdir. Bu sonuçlar, yıllık çavdar fidelerinin hafif tuzla ortamlarda N ihtiyacını azaltabileceğini, orta derecede düşük N uygulamasının ise fotosentezi düzenleyerek, ROS kaynaklı (reaktif oksijen türleri) hasarını hafifleterek ve N metabolizmasını koruyarak büyümelerini destekleyebileceğini gösterdiğine değinilmiştir.

## **SONUÇ**

Yapılan bazı çalışmalarda azot uygulamalarının tuzluluğun bitkiler üzerindeki zararlı etkisini bir dereceye kadar hafiflettiği hipotezini ortaya koymasına karşın, tuzluluk, azot (N) ilişkileri karmaşık bir konu olup henüz açıklık kazanmamıştır. Yukarıda verilen araştırma sonuçlarının birlikte değerlendirilmesi ile azotun bir ya da daha fazla mekanizmayla membranların dayanıklılığına katkıda bulunduğu, onarıcı proteinler ürettiği yada gelişmeyi hızlandırarak özellikle tuz stresi ile alınan toksik iyonları seyrelttiğinden kaynaklı olduğu söylenebilir.

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## **ÇİFTLİK HAYVANLARINDA ÇEVRESEL ZENGİNLEŞTİRME VE HAYVAN REFAHI AÇISINDAN ÖNEMİ**

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### **ÖZET**

Günümüz hayvancılık işletmelerinde, sürü yönetim programlarının kullanım düzeyine ve hayvan refahı uygulamalarına bağlı olarak hayvanlarda türe özgü normal davranışlar gözlenebilmektedir. Entansif yetiştirme ve taşıma sistemlerinin uygun olmadığı koşullarda ise hayvanlar tepkilerini davranışsal olarak gösterirler. Çok sık görülen bu davranışsal değişiklikler ya da anomaliler arasında; fiziksel yaralanmalar, akut ve kronik strese dayalı oluşan ve bağışıklık sistemini etkileyebilen fizyolojik değişiklikler, döl verimindeki aksaklıklar, bazı metabolizma değişiklikleri ve diğer sağlık sorunları yer almaktadır. Sonuçta istenmeyen bu davranış değişiklikleri işletmelerde kimi zaman verim azalması kimi zaman da ölümle sonuçlanan önemli ekonomik kayıplara yol açabilmektedir. Bu tür sorunların başlıca çözüm yolu çevresel zenginleştirmedir. Çevresel zenginleştirme, türe özgü davranışları gösterme fırsatlarını artıran ve böylece biyolojik işlevlerini ve yaşam kalitelerini iyileştiren fiziksel ya da sosyal yönlerin kullanımı yoluyla kontrol altında tutulan hayvanların mevcut ortamının değiştirilmesi olarak tanımlanır. Çevresel zenginleştirme, hayvanın davranışsal ve fizyolojik zorluklarla başa çıkma yeteneğini artırarak türe özgü davranış şekillerini genişletir. Bir başka deyişle, hayvanlara çevrelerini tanıma ve onunla etkileşim kurmanın yanı sıra duyuş gelişmeyi artırma olanağı verir. Bu durum, anormal davranışların gelişmesini önler. Son olarak da üretim sisteminin ekonomisini iyileştirir. Bunun gerçekleşebilmesi için yapılacak zenginleştirmelerin hayvanın biyolojisini bozmadan, kolay ve ekonomik olması oldukça önemlidir. Hayvanlarda çevresel zenginleştirmenin ya da çevresel zenginleştirmenin birçok çok yolu olmakla birlikte bilimsel olarak kabul edilen beş esas şekli vardır. Bunlar sırasıyla; sosyal, fiziksel, duyuş ve beslenme etmenli zenginleştirmelerdir. Belirtilen her bir etmen, çiftlik hayvanlarının refahına farklı yönlerden katkılar sağlayabilmektedir. Hayvancılık işletmelerinde çevrenin zenginleştirilmesi amacıyla kullanılan alet-ekipmanlar, hayvanların kendilerine özgü davranışları gösterebilmesine, zararlı sosyal davranışlarının ise azaltmasına olanak verir. Böylece özellikle entansif hayvancılıkta hem üretkenliğin hem de refahın artırılması sağlanır. Hayvanlara çevresel zenginleştirme sağlamada güvenlikle ilgili olanların yanı sıra birçok yönden sorunlarla karşılaşmaktadır. Bu çalışmada, çiftlik hayvanlarında çevresel zenginleştirme uygulamaları hayvan refahı yönünden ayrıntılı olarak ele alınmış ve bu uygulamalarda karşılaşılan sorunların çözümüne ilişkin somut öneriler üzerinde durulmuştur.

**Anahtar kelimeler:** Entansif yetiştirme, davranış, sürü yönetimi, barındırma, verim.

## **IMPORTANCE FOR ENVIRONMENTAL ENRICHMENT AND ANIMAL WELFARE OF FARM ANIMALS**

### **ABSTRACT**

Depending on the level of application of herd management programmes and animal welfare procedures in modern livestock farms, species-specific normal behaviours can be seen in animals. In conditions where intensive rearing and transport systems are not suitable, animals show their reactions behaviorally. Species-specific normal behaviours can be observed in animals, depending on how herd management programmes and animal welfare protocols are implemented on contemporary livestock farms. As a result, these undesirable behavioral changes can lead to significant economic losses, sometimes resulting in decreased productivity and sometimes death in livestock farms. The main solution to such problems is environmental enrichment. Environmental enrichment is defined as the alteration of the existing environment of controlled animals using of physical or social aspects that increase their opportunities to display species-specific behaviors and thereby improve their biological function and quality of life. Environmental enrichment expands species-specific patterns of behavior by increasing the animal's ability to cope with behavioral and physiological challenges. In other words, it gives animals the ability to recognize and interact with their environment, as well as increase sensory development. This prevents abnormal behavior from developing. The production system's economy is also improved. It is crucial for this to occur that the modifications be simple to implement, affordable, and don't alter the animal's biology. There are numerous methods for enhancing or improving the environment for animals, but only five are generally recognised by science. These are the social, physical, sensory, and dietary elements, in that order. The welfare of farm animals can be influenced by all of the aforementioned aspects in various ways. farms allow animals to show their unique behaviors and to reduce harmful social behaviors. As a result, especially in intensive animal farms, it is ensured that both productivity and welfare are increased. Other than safety-related issues, problems can arise while giving animals with environmental enrichment. In this study, environmental enrichment techniques for farm animals are thoroughly examined in terms of animal welfare, and specific solutions to the issues raised by these techniques are highlighted.

**Keywords:** Intensive breeding, behavior, herd management, housing, yield.

## **1.GİRİŞ**

Çevresel zenginleştirme ya da iyileştirme, hayvan refahı ve sürdürülebilirliğin önemli bir kısmını oluşturur (Alonso ve ark. 2020). Hayvanlarda yapılacak bu zenginleştirme, aynı zamanda üretim maliyetlerinin azaltılmasının yanı sıra çiftlik hayvanlarında barınak planlanmasında ayrı bir rol oynar. Bir başka deyişle bazı çiftlik hayvanlarında kötü sürü yönetimi ve strese bağlı olarak gözlenen anormal davranışların azaltılmasında önemli bir katkı sağlar (Schütz ve ark. 2020). İşletmelerde çevresel zenginleştirmelerle hayvan sağlığı ile ilgili sorunlar da görece de olsa azalır. Kapalı barınaklarda çevresel zenginleştirmelerin sağlanması, büyük ölçüde artan kamu bilinci ve hayvan refahına yönelik endişe) ve zenginleştirmelerin hayvan refahını iyileştirdiği algısı (Grunert ve ark. 2018) nedeniyle bu yaklaşım giderek daha yaygın hale gelmektedir. Nitekim son yıllarda Avustralya’da onaylı tarım planları (RSPCA Australia, 2021) gibi refah akreditasyon programları tarafından zenginleştirme sağlanmasının düzenlenmesi sağlanmıştır. Hayvancılık işletmelerinde bazı çevresel zenginleştirmenin sağladığı yararlar rağmen, uygulanan kimi zenginleştirme programlarının çok az etkisi olduğu ya da hayvan refahını olumsuz yönde etkileyebileceği gösterilmiştir (Gordon ve Forbes, 2002). "Çevresel zenginleştirme" terimi, ya acıyı önleyen, acı çekmenin ötesinde bir ortam sağlayan (Boissy ve ark. 2007) ya da türe özgü çevreyi ifade eden kaynak veya ortamları tanımlamak için kullanılmıştır. Bununla birlikte, basitçe ifade etmek gerekirse, zenginleştirme terimi hayvansal üretimde bir "zenginleştirme" anlamına gelir (Merriam-Webster, 2021). Bu nedenle, zenginleştirme sağlanmasından sonraki gelişmeler mutlaka ölçülmeli ve doğru bir şekilde değerlendirilmelidir. Bu yaklaşım, zenginleştirmelerin sağlanması yoluyla hayvan refahında sürekli zenginleştirmeleri daha fazla destekler. Bir başka deyişle, hayvanların içinde yaşadığı koşulların toplumsal kabulü ve kalitesi değişse bile, refah anlamında yapılacak zenginleşme, görece olarak kabul edilebilir (Edgar ve ark. 2006). Çevresel zenginleştirme kavramı, hayvan refahında sürekli gelişmelere olanak veren aşamalı bir sürecin sonucunu yansıtır (Dawkins, 2008). Zenginleştirme teriminin bu şekilde yeniden tanımlanması netliği, beklentileri ve sonuçta hayvan refahı adına yapılacak zenginleştirme programlarının etkisini iyileştirecektir. Ayrıca, işletmelerde hayvan refahı zenginleştirme programlarının "etkili" olduğunu kabul edilmeden önce diğer birçok paydaşın da bu konuda yapacağı değerlendirmelerin de dikkate alınmasında yarar vardır. Bu yaklaşım, bir zenginleştirme uygulamasının yalnızca hayvan refahını zenginleştirmesi değil, aynı zamanda hayvancılık endüstrisi için pratik ve ekonomik olması gerektiği önermesine dayanmaktadır. Refah için yapılacak zenginleştirme kriterlerini



karşılamaayan çevresel zenginleştirmeler ya da düzenlemeler, hayvan refahını iyileştirip zenginleştirmedigine bakılmaksızın uygulanmamalıdır Örneğin, bir zenginleştirmenin hayvan refahı üzerinde olumlu bir etkisi olmasına karşılık olası bir atık yönetimi çözümü yoksa (bazı ticari domuz çiftliklerinde saman için durum böyledir), bu zenginleştirmenin uygulanabilirliği söz konusu değildir ve bu nedenle beklenildiği kadar olumlu bir etki oluşturmaz. Ancak, yapılacak bir çevresel zenginleştirme uygulaması, pratikse ve maliyeti düşük, ancak hayvan refahını olumlu yönde etkilemiyorsa, önemli bir zenginleşme ölçütü olarak kabul edilemez (Aguayo-Ulloa ve ark., 2014).

Bu çalışmada, çiftlik hayvanlarında çevresel zenginleştirme uygulamaları hayvan refahı yönünden ayrıntılı olarak ele alınmış ve bu uygulamalarda karşılaşılan sorunların çözümüne ilişkin somut öneriler üzerinde durulmuştur.

### **1.1. Çevresel Zenginleştirme ve Önemi**

Çevresel zenginleştirme beş ayrı alt grupta incelenir (Hemsworth ve Coleman, 2010). Bunlar sırasıyla; sosyal, yetiştirme, fiziksel, duyuşsal ve beslemedir. Bu gruplardan her birinin katkısı ayrı bir öneme sahiptir. Örneğin, sosyal zenginleşme; buzağuların çevrelerindeki stres veya durumlarla daha iyi başa çıkmalarına yardımcı olur (De Paula Vieira ve ark. 2012). Ancak yapılacak fiziksel zenginleştirme ise gerek doğum bölmesinde gerekse gezinme alanı ya da duraklarda daha rahat etmesine olanak verecektir. Her bir kategorinin hayvanın refahına olan katkısını değerlendirirken çok dikkat edilmelidir. Her zenginleştirme parametresi ve buna ait yöntemin altında yatan sistem çok faktörlü olabilir (Costa ve ark. 2019). Yapılacak her zenginleştirme tipinin kısa ya da uzun süreli etkileri olabilir. Bir başka deyişle serbest ağız sütü ya da kolostrum tüketmek, yavrularda yaşamın erken evrelerinde daha iyi gelişmelerine neden olacaktır (Bach, 2012). Her çevresel zenginleştirme yöntemi, üretim döngüsünün farklı aşamalarında değişik düzeylerde katkıda bulunabilir. Bu durum buzağı ve kuzularda gelişmiş bilişsel gelişimin yanı sıra ile sosyal izolasyon sırasında stresin azalması ile yakından ilişkilidir. Refahın zenginleştirilmesinde yer alacak olan her bir uygulamanın hayvanın refahına olan katkısı farklı mekanizmalarla açıklanabilir. Bireysel yetiştirilen buzağı ya da kuzulara oranla çift halinde yetiştirilen hayvanların yaşadığı stresin azalması, hem daha iyi öğrenme yeteneklerine izin veren gelişmiş bilişsel gelişimle hem de yalnızca bir türün varlığıyla açıklanabildiği gibi bazı refah zenginleştirme yöntemleri de belirli bir zaman aralığı ile sınırlıdır (Mandel ve ark. 2016).

## 1.2. Çevresel Zenginleştirmenin Hayvan Refahı Açısından Sonuçları

Çevresel zenginleştirmenin etkili olabilmesi için hayvan refahının da zenginleştirmesi gerekir. Ancak, yapılacak zenginleştirmeler biraz zor olabilir. Hayvan refahını değerlendirmede en uygun yaklaşım üzerine fazlaca tartışılmıştır. Bu tartışmalarda hayvan refahının tek bir göstergesi olmadığı kabul edilmekte, ancak yapılacak değerlendirmede refahı en iyi şekilde gösteren bir yöntem/ölçüt kullanılması ve bu değerlendirmenin basit ama sağlam bir yaklaşımı içermesi gerektiği ifade edilmektedir (Endres ve ark. 2005). Dawkins (2008) hayvan refahının; “Hayvanlar fiziksel olarak sağlıklı mı ve istediklerine sahipler mi?” şeklinde değerlendirilmesini önermiştir. Bu nedenle, uygulanacak belirli bir zenginleştirmenin hayvanı daha sağlıklı yapıp yapmadığı sorgulanmalıdır (Fraser ve ark. 2013). Çevresel zenginleştirmenin hayvan refahı sonuçları üzerindeki etkisini belirlemek için sağlık göstergeleri ile hayvan istekleri birlikte ele alınmalıdır. Konuyla ilgili refah ölçütleri ve buna ilişkin yaklaşımlar Çizelge 1’de verilmiştir

**Çizelge 1.** Hayvan refahına ait göstergeler ve bu ilişkin yaklaşımlar (Fraser ve ark. 2013)

Değerlendirme yaklaşımı	Refah Ölçütleri/Kriterleri
Sağlık ve biyolojik işlevler açısından	-Stres fizyolojisi (TSH, kortizol vb) -Sağlıklı olma durumu (Gelişme, ölüm oranı ya da bağışıklık sistemi) -Yaralar, kesikler
Olumsuz etki durumu	-Olumsuz etki (Korku vb) -Anormal ve saldırganlık, tüy yolma, kuyruk ısırma vb
Olumlu etki durumu	-Pozitif etkiler (Serotonin salgısı vb) -Pozitif mod (Bilişsel önyargı)
Davranışsal gereksinimler	-Yaşama ait davranışlar (yeme, içme vb) -Temel davranışsal gereksinimler -Stresi azaltmak amacıyla yapılan davranışlardaki başarısızlık
Davranışsal istekler	-Fırsatçılığın açığa vuran davranışlar -Fırsat verilmediği halde artan stres yanıtına karşı bir şey yapmak istemeyen hayvanlarda ortaya çıkan davranışlar

Bir çevresel zenginleştirmenin etkili olabilmesi için yapılan uygulamanın mutlaka kolay uygulanabilir olması gerekir. Bir başka deyişle zenginleştirmelerin tüm hayvanlar için erişilebilir olması ve/veya uygun zaman/yaş ve sıklıkta sağlanması gibi bazı özelliklere sahip olması istenir (Hemsworth ve Coleman, 2011). Bu bağlamda çevresel zenginleştirmenin pratikliği ile ilgili olarak dikkate alınması gereken üç ana parametre söz konusudur. Bunlar; i) uygulamada, zenginleştirmeden kaynaklanan doğrudan veya dolaylı atıkların nasıl giderilebileceği, ii) biyogüvenlik riskleri, iii) standart uygulamalarda yaşanan sorunların iyi

irdelenmemesidir (Mateuffel ve ark. 2009). Uygulamaya yönelik bu tür sorunlar, zenginleştirme programlarının oluşturulmasında araştırmacılar ile düzenleyici kurumlar tarafından ayrıntılı olarak ele alınmalıdır.

### **1.3. Çevresel Zenginleştirmedeki Sınırlamalar ve Dikkate Alınması Gereken Hususlar**

Hayvan refahının zenginleştirilmesi için çevresel zenginleştirmenin etkinliğini değerlendirmede, çevre bir kılavuz rolü görür. Ancak bu değerlendirme yaklaşımının çeşitli sınırlamaları vardır. Çevre, hayvanlar arasındaki bireysel farklılıkları hesaba katmaz ve grup düzeyinde refah zenginleştirmelerini amaçlar. Zenginleştirmenin kullanımı ve dolayısıyla etkinliği, bireysel farklılıklarla ya da kazanılan deneyim, mizaç veya genetikteki farklılıklardan kaynaklanır (de Azevedo ve ark. 2007). Sıkışık biçimde barındırılan hayvanların standart ortamlarında sürekli zenginleştirmeler yapıldığından, sosyal normların gelişmesine yardımcı olur (Popescu ve ark. 2013). Bir hayvanın önceki deneyimleri daha sonraki yaşamındaki tepkisi üzerinde bir etkiye sahip olabileceğinden, zenginleştirmenin etkisi, bir hayvanın yaşamı/üretim sistemi boyunca yaşayabileceği tüm barınma koşulları genelinde değerlendirilmelidir (Cardoso ve ark. 2016).

### **1.4. Çevresel Zenginleştirmenin Ekonomik Yönü**

Çevresel zenginleştirme uygulamada ve hayvan refahı üzerinde olumlu sonuçlar göstermesine karşın ekonomik yönüyle de değerlendirilmesi gerekir. Çevresel zenginleştirmenin ekonomik yönü ise, refah sonuçlarının doğası ve zenginleştirme uygulamasının maliyeti ile ilgilidir (Rault, 2012). Zenginleştirme uygulamasının maliyeti yalnızca zenginleşmenin kendisi değil, aynı zamanda işletmenin büyüklüğü, coğrafi konumu ve barınak sistemi üzerinde etkili olup ve dolayısıyla değerlendirmede her bir unsurun dikkate alınması gerekmektedir. Yapılacak yatırımın getirisini, hayvanlarda yaşanacak refah düzeyine yansıtılması göz ardı edilmemelidir. Üretim her zaman hayvan refahındaki zenginleştirmelerle ilişkili olmasa da, fizyolojik stres yanıtının gerek ürün kalitesini gerekse de ürün miktarını etkileyebileceği yaygın olarak kabul edilmektedir (Hemsworth ve Coleman, 2011). Bir hayvanın temel ihtiyaçlarının iyileştirilmesine yol açan zenginleştirmelerin, üretkenlikteki gelişmeler nedeniyle olumlu bir ekonomik getiri elde etme olasılığı uzun vadede de olsa yüksek olacaktır (Young, 2003). Örneğin, işletmede sağlığı zenginleştirmeye yönelik olarak yapılan zenginleştirmeler, artan döl ve süt verimi gibi verim özelliklerini doğrudan etkileyecektir. Bununla birlikte, kârlı bir üretim için, üretkenlikteki zenginleştirme, sağlık-koruma giderlerinin maliyetini dengelemeye yeterli olmalıdır.

Refah gibi hayvanın temel ihtiyaçlarının ötesinde gerçekleştirilen zenginleştirmeler karşısında bir hayvanın olumlu etki göstermesine karşın hayvanın biyolojik işleyişinin “normal” seviyelerin ötesine geçmesi beklenmez. Bu nedenle, yetiştirici desteklenmediği sürece refah zenginleştirmelerini uygulama maliyeti sağlayacağı faydalarından daha yüksek olabilir. Böyle bir yaklaşımın uygulanabilir olması için tüketicilerin bir prim ödemesi gerekebilir (Fraser, 2013). Bununla birlikte, tüketicilerin refah için “temel ihtiyaçlar” ve “temel ihtiyaçların ötesinde” kavramları hakkında bilgi sahibi olup olmadığı veya bunlardan biri veya her ikisi için daha fazla ödemeye istekli olup olmadığı bilinmemektedir. Halkın 'temel ihtiyaçlar' ve 'temel ihtiyaçların ötesinde' algısı ve bu tür ürünler için ödeme yapma istekliliği hakkında daha fazla araştırma yapılması, hayvan refahında bilime dayalı zenginleştirmelerin yapılmasını sağlamak için gereklidir. Zenginleştirmenin üreticiler tarafından uygulaması ekonomik olarak mümkündür (Gonzales ve ark. 2013). Hayvan zenginleştirme uygulamasının ekonomik fayda-maliyet değerlendirmesi, üreticiler için daha geniş faydaları da dikkate almalıdır. Ayrıca etkili zenginleştirmelerin benimsenmesi, tüketicilerin giderek daha fazla değer verdiği tarımsal işletmelerin sosyal lisansını kazanmalarına/sürdürmelerine katkıda bulunabilir. Son olarak, finans kurumları hayvancılık için yatırım kararlarını hayvan refahı gibi sürdürülebilir üretim süreçlerine (Strappini ve ark. 2021) giderek daha fazla dayandırdığından, hayvancılık işletmeleri zenginleştirme uygulamaları için finansmana daha kolay erişim yoluyla ödüllendirilebilir.

## **2. ÇEVRESEL ZENGİNLEŞTİRME UYGULAMALARI**

Avrupa Komisyonu, yasal çerçeveyi basitleştirmek ve hayvan yetiştiricilerinin rekabet gücünü artırmak için bilime dayalı hayvan refahı göstergelerinin kullanılmasını vurgulamaktadır. Hayvan temelli önlemlere dayanan ilk refah değerlendirme protokolleri; çiftlik hayvanları için Welfare Quality® projesi tarafından geliştirilmiştir. Bu proje, hayvan refahının tüm yönlerini kapsamak için gerekli olduğu düşünülen, hayvanların ihtiyaçlarının dört ilke ve on iki kriter ile ilişkili olduğu bir şema geliştirmiştir (Şekil 1). Bu yaklaşım, çiftlik düzeyinde refah değerlendirmesi üzerine gelecekteki araştırmalar için bir temel oluşturmuştur. Bu bağlamda çiftlik hayvanları için barındırma, sürü yönetimi ve besleme açısından çevresel zenginleştirme çalışmaları yapılarak hayvanların yaşam şartları ilgili refah kriterlerine uygun hale getirilmelidir.



Şekil 1. Refah İlkeleri ve Kriterleri (Welfare Quality® Protocol, 2009).

## 2.1. Barındırma Açısından Çevresel Zenginleştirme

Bir hayvancılık işletmesinde barındırılan hayvanın konforu (refahı), temiz, kuru ve hava akımı olmayan bir ortamda bulunması, kendine uygun bir zeminde yürümesi ve yatması, rahat hareket edebileceği kadar bir alana sahip olması, bol ve kaliteli hava soluyabilmesi, yem ve suya kolayca ulaşabilmesi, sağımın uygun alet ve ekipmanla yapılmasını gerektirmektedir. Bu işlevselliği sağlayacak barındırma altyapısı; örneğin bir süt sığırcılığı işletmesinde çeşitli yaş gruplarındaki (buzağı, dana, kuzu, çepiç, vb.) ve farklı statülerdeki (kuruda, sağmal, hasta vb.) hayvanları barındıracak şekilde düzenlenmiş üniteleri içermeli, sığırlar için uygun bir çevre oluşturmalı, insan ve hayvanların güvenliğini sağlamalı, yem ve suya ulaşmayı kolaylaştırmalı, sağım kolay ve temiz yapılmasını sağlamalı, gübreleri zamanında ve kolaylıkla uzaklaştırılabilir, yemin hazırlama ve dağıtımını kolaylaştırmalı, sürü yönetim uygulamalarının (hayvanların yakalanması, sürüden ayrılması, tartılması, aşılanması vb.) kolayca yapılabilmesini sağlamalı, işgücü ihtiyacını en aza indirmeli, oluşacak kirliliğin çevreye vereceği olumsuzlukları en aza indirilecek şekilde kontrolüne imkân vermeli ve ilgili yasal düzenlemelerde istenen koşulları sağlamalıdır (Akman, 2012).

Barındırma yönünden çevresel zenginleştirme için atılacak ilk adım hayvan barınaklarının, türün gereksinimlerine uygun ve hayvan refah ilkelerini sağlayan bir tasarıma sahip olmasıdır (Şekil 2). Bu bağlamda hayvan barınaklarının tasarım hedefleri; sağlıklı çevre koşulları sağlamak, işgücü etkinliğini artırırken ilk yatırım masraflarını düşürmek ve yavru hayvanların gelişimini optimize etmektir. Bu kapsamda hayvanlar açısından en önemli tasarım hedefleri; stresi minimize etmek, temiz kuru ve rahat dinlenme alanları sağlamak, yeterli yeme ve suya sürekli ve kolay ulaşım sağlamak ve özellikle genç hayvanları ekstrem hava koşullarının

etkilerinden korumak şeklinde sıralanmaktadır (Cook ve Nordlund, 2004; Graves ve ark., 2006; Cook ve Nordlund, 2009; Holmes ve ark. 2013).



Şekil 2. Çiftlik hayvanları barınakları

Hayvan barınaklarında gübre yönetimi hayvan sağlığı ve hayvan refahı açısından son derece önemli bir unsurdur. Barınak içinde biriken gübreden yayılan gazlar ve hayvanların gübre ile temas halinde olan vücut bölmelerinde oluşabilecek enfeksiyonlar hayvan sağlığını ve verimini tehdit olumsuz yönde etkilemektedir. Bu yüzden barınak içinde modern bir gübre yönetim sistemi ve altyapısının bulunması şarttır. Gübre yönetiminin ilk aşaması olan gübre toplama işlemi, hidrolik, zincirli veya halatlı sıyırıcı sistemler veya basınçlı su ile yıkama uygulaması ile yapılmaktadır (Şekil 3).



Şekil 3. Gübre toplama sistemleri

## **2.2. Sürü Yönetimi Açısından Çevresel Zenginleştirme**

Sürünün devamını sağlamak, amacıyla, sürü düzeyinde yapılması gereken uygulamalar sürü yönetimi olarak tanımlanmaktadır. Hayvancılık işletmesinin karlı bir üretim yapması, başarılı bir sürü yönetimine bağlı olmaktadır (Akman, 1998). Sürü büyüklüğü, mera alanının genişliği, verimliliği, yetiştiricinin ayırabileceği sermaye, sürü yöneticisi temini, yeteneği ve bilgi durumu, elde edilecek ürünlerin fiyatları ve pazarlama olanakları gibi etmenlere göre belirlenmelidir. Ayrıca yetiştiriciliği yapılan hayvanlar çeşitli yaş grupları (yavru, genç vb.) ve fizyolojik özelliklerine (sağılan, kuruda vb.) göre gruplandırılmalı ve her bir grup uygun alanlarda (barınak içi bölmeler veya ayrı barınaklar) barındırılmalıdır.

Etkin bir sürü yönetimi için yetiştiricilik süresince hastalık ve yaşlılık gibi nedenlerle hayvanların bir bölümünün her yıl ayıklanarak sürüden uzaklaştırılması gerekmektedir. Topallık, ayak bozukluğu, alt ya da üst çenenin kısa olması gibi kalıtsal kusurlar, iki yıl üst üste kısır kalan, doğum yaptığı halde yavrularına iyi bakmayan, yavrusu zayıf doğan ve hızlı gelişmeyen, çabuk kuruya çıkan ve/veya süt verimleri düşük olan, çabuk hastalanan ve düşük yapan, yaşlanan (6-8 yaş) hayvanlar sürüden ayıklanmalıdır. Söz konusu niteliklerdeki hayvanların sürüden ayıklanması ile sürü yenileme oranı yaklaşık %20 olmalıdır (Erdem ve ark., 2021).

## **2.3. Besleme Açısından Çevresel Zenginleştirme**

Yıl boyunca değişen besin gereksinimleriyle birlikte, başarılı bir sürü performansı için çiftlik hayvanlarının düzenli ve dengeli beslemek hayati önem taşımaktadır. Hayvanların besin gereksinimleri, üretim döngüsü boyunca önemli ölçüde değişiklik göstermektedir. En iyi verim performansı ve sağlığı sağlamak için beslemenin hayvan vücudundaki etkilerinin bilinmesi ve göz ardı edilmemesi gerekmektedir. Çiftlik hayvanlarının yıl içerisinde gösterdikleri farklı fizyolojik durumlarına göre doğru miktarda ve türde yem sunmak, kârlı bir yetiştiriciliğin esasıdır. Yavru kayıplarının önlenmesi, süt, et ve döl veriminin artması çiftlik hayvanlarının uygun bir rasyon ile beslenmesine bağlıdır.

Yeni doğan yavrulara annesinde ya da başka anneden mutlaka kolostrum (ağız sütü) sağlanmalıdır. Kolostrum, meme bezinin ilk salgısıdır ve üretimi normal olarak doğumdan önce bazen de hamileliğin son haftalarında başlamaktadır. Kolostrum, yeni doğan hayvanların beslenmesinde yüksek besin içeriği ile iyi bir enerji sağlayan gıda olması, belirli minerallerin (özellikle magnezyum) varlığı nedeniyle laksatif bir etkiye sahip olması ve yoğun miktarda

maternal antikorlar içererek hastalığa karşı bağışıklığın şekillenmesini sağlaması ile oldukça önemli bir besin kaynağıdır.

Yaşamın ilk birkaç haftasında bir yavrunun beslenmesi için ihtiyaç duyduğu tek şey annesinin sütüdür. Bu aşama normalde 5 veya 6 hafta sürer. Yavru, sütle beslenir. Bu süt, annesinden veya diğer annelerden temin edilebilir veya bir süt ikame yemi olabilir. Yavrular doğumdan hemen sonra katı yiyecekleri kemirmeye başlamasına rağmen yaşamının bu aşamasında diğer yem türlerini sindiremezler ancak 4 ila 6 haftalık olduklarında, besin alımlarının %50'sini anne sütü dışındaki kaynaklardan alıyor olabilirler.

Sağmal çiftlik hayvanlarında (koyun, keçi, sığır) beslenme, sütün kalitesini etkileyen önemli bir faktördür. Beslenme, süt yağı ve toplam protein sentezini ve salgılanma oranlarını doğrudan etkiler ve ayrıca mineral ve vitamin konsantrasyonlarını da etkileyebilir. Sağmal hayvanlara verilen aromatik bileşikler veya zehirli maddeler süte geçebilir. Beslenme sütün somatik hücre sayısını ve mikrobiyal konsantrasyonunu da etkileyebilir. Bu nedenle beslenme, sütün pıhtılaşma özellikleri, peynir verimi, olgunlaşma süresi, peynirin muhafaza edilebilirliği ve lezzeti dâhil olmak üzere sütün işleme performansının tüm yönlerini etkilemektedir. Sütteki yağ ve protein miktarını artırmak için rasyonlar hem kalite hem de rumende parçalanabilirlik açısından dengeli bir enerji/protein oranına sahip olarak ayarlanmalıdır. Rasyonlarda minimum lif seviyesi %30-32 NDF olmalıdır. Rasyon lifinin bir kısmı (en az üçte biri), selüloz fermantasyonu ve optimal ruminal pH seviyelerinin devamı için yeterli partikül uzunluğuna (2-3 mm) sahip olmalıdır. Düşük lifli-yüksek konsantre yem içeren yoğun rasyonlar kullanıldığında ruminal pH'daki hızlı değişimleri önlemek için gün boyunca besleme sıklığı arttırılmalıdır. Özellikle rumende kolayca fermente ediliyorsa, idrardaki nitrojen kayıplarını azaltmak için aşırı proteinden kaçınılmalıdır. Süt üre konsantrasyonu (MUN), protein tüketiminin bir göstergesi olarak rutin bir şekilde izlenmelidir. Sütteki somatik hücre ve bakteri sayısını azaltmak için; koyunları mastitise yatkın hale getirebilecek ani rasyon değişikliklerinden kaçınılmalıdır. Meme bezinin doğal bağışıklık cevabını uyarmak için rasyona vitamin A ve vitamin E takviyeleri yapılmalıdır. Kötü tat ve kokuları süte geçebilecek maddeler içeren yem maddelerini koyun ve keçilerin rasyonuna kullanmaktan kaçınılmalıdır. Anormal fermantasyona uğramış silaj gibi fermente yemleri kullanmaktan kaçınılmalıdır (Erdem ve ark., 2022).



### **3. SONUÇ ve ÖNERİLER**

Bu çalışmada, hayvan refahı odaklı çevresel zenginleştirmenin kapsamı ve uygulamaları ayrıntılı olarak incelenmiştir. Çevresel zenginleştirme uygulamalarının yaygınlaştırılması ve hedeflenen başarının sağlanabilmesi için öncelikle hayvansal üretime ilişkin bilimsel esasların, hayvan refahı mevzuatının ve destekleme programlarının geliştirilmesini ve uygulanmasını gerektirmektedir. Zenginleştirme ya da zenginleştirmenin etkisi, amaçtan çok konunun odak noktası olup konuya gerek tür gerekse yaş ve fizyolojik özellik bakımından sistematik yaklaşılmalıdır. Özellikle çevresel zenginleştirmeye ilişkin oluşturulacak ilke ve esasların belirlenmesinde mutlaka uygulanabilir ve ekonomik olmasına dikkat edilmelidir. Hayvansal üretim adına yapılacak bu zenginleştirmenin hayvancılık sektörüne ilgili olmasını sağlamak için araştırmacıların ve düzenleyici kurumların endüstri ile etkileşime girmesini sağlanmalıdır. Sonuç olarak hayvansal üretimde çevresel zenginleştirme adına yapılacak işlerde yer alacak olan tüm paydaşların zenginleştirme uygulamalarının hayvan refahı üzerindeki etkilerini başta tüketiciler olmak üzere herkese iletmesi, zenginleştirmelerin daha iyi anlaşılmasına yardımcı olacaktır.

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## **TÜRKİYE’ DE YÜKSEKÖĞRETİMDE TOHUMCULUK EĞİTİMİ**

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### **ÖZET**

Bitkisel üretimin temelini tohum oluşturmaktadır. Başarılı bir yetiştiricilik, kaliteli tohum kullanmak ve modern tarım tekniklerini devreye sokmakla doğrudan bağlantılıdır. Bu nedenle tohumculukta eğitimin önemi kavranmalı ve eğitim programlarının yaygınlaşmasına ve eğitimde kalitenin artırılmasına gayret gösterilmelidir. Burada sunulan çalışmada, Türkiye’ de yükseköğretimde tohumculuk eğitiminin mevcut durumunun ortaya konulması amaçlanmıştır. Bu amaçla, tohumculuk eğitimi ön lisans, lisans ve lisansüstü düzeyde olmak üzere 3 alt başlık altında değerlendirilmiştir. Her düzeyde (ön lisans, lisans ve lisansüstü) tohumculukla ilgili verilen ders adları, derslerin verildikleri bölüm / anabilim dalı / programlar, derslerin statüleri (seçmeli veya zorunlu), AKTS ve kredi bilgileri (teorik saat + uygulama saat) detaylı olarak sunulmuştur. Türkiye’ de yükseköğretimde tohumculuk eğitimi lisans düzeyinde Ziraat Fakültelerinde, önlisans düzeyinde ise fakülterle bağlı Meslek Yüksekokullarında verilmektedir. Ülkemizde eğitimini sürdürmekte olan 36 adet Ziraat Fakültesinin tümünde tohumculukla ilgili farklı adlarla açılmış dersler verilmektedir. Verilen derslerden % 48’ inin zorunlu, % 48’ ini seçmeli, % 4’ ünün ise seçmeli veya zorunlu statüde olduğu saptanmıştır. Tohumculuk derslerinin % 38’ inin uygulaması bulunurken, % 62’ sinin sadece teorik olarak verildiği saptanmıştır. Lisansüstü düzeyde ise verilen derslerin tamamının seçmeli ders statüsünde olduğu belirlenmiştir. Önlisans düzeyinde ise 84 adet meslek yüksek okulunda tohumculukla ilgili derslerin verildiği saptanmıştır. Derslerinin % 67’ sinin zorunlu, % 33’ ünün ise seçmeli ders statüsünde olduğu, verilen derslerin % 49’ unun uygulamalı, % 51’ inin ise sadece teorik olarak verildiği tespit edilmiştir. Lisans ve lisansüstü düzeyinde tohumculuk eğitiminde Bahçe Bitkileri ve Tarla Bitkileri Bölüm/Anabilim Dallarının ön plana çıktığı, ön lisans düzeyinde ise tohumculukla ilgili derslerin büyük çoğunluğunun Organik Tarım programında verildiği saptanmıştır. Burada sunulan bilgilerin bundan sonraki yükseköğretimde tohumculuk eğitim faaliyetlerinin şekillendirilmesi açısından faydalı olacağı düşünülmektedir.

**Anahtar kelimeler:** Eğitim, lisans, lisansüstü, önlisans, tohum

**SEED EDUCATION AT HIGHER EDUCATION IN TURKEY****ABSTRACT**

Seed is the basis of plant production. Successful crop production is directly related to using quality seeds and using modern agricultural techniques. For this reason, the importance of education in seed cultivation should be understood and efforts should be made to expand education programs and increase the quality of education. In the study presented here, it is aimed to reveal the current situation of seed education at higher education in Turkey. For this purpose, seed education was evaluated under 3 sub-titles as associate, undergraduate, and graduate degree. At each degree (associate, undergraduate, and graduate), the names of the courses related to seed, the departments / programs where the courses are given, the status of the courses (optional or compulsory), ECTS and credit information (theoric hours + practice hours) are presented in detail. Seed education in higher education in Turkey is given at undergraduate level in Agricultural Faculties, and at associate degree level in Vocational Schools affiliated to these faculties. In all of the 36 Agricultural Faculties continuing education in Turkey, courses related to seed growing under different names are given. It has been determined that 48% of the courses given are compulsory, 48% are optional, and 4% are optional or compulsory. It has been determined that 38% of the seed courses have practical hours, while 62% are given only theoretically. It has been determined that all of the courses given at the graduate level are in the status of optional courses. At the associate degree level, it was determined that courses related to seed growing were given in 84 vocational high schools. It has been determined that 67% of the courses are compulsory and 33% are optional courses, 49% of the courses are practically and 51% are given only theoretically. Horticulture and Field Crops Departments are in the first place in seed education at undergraduate and graduate level. At the associate degree level, it was determined that the majority of the courses related to seed growing were given in the Organic Farming program. It is thought that the information presented here will be useful in shaping the seed education activities in higher education.

**Keywords:** Education, undergraduate, graduate, associate degree, seed

## 1. GİRİŞ

Türkiye’ de yükseköğretimde tohumculuk eğitimi, lisans düzeyinde üniversitelerin Ziraat Fakültelerinde, önlisans düzeyinde ise Ziraat Fakülteleri bünyesindeki Meslek Yüksekokullarının ilgili bölümlerinde verilmektedir. Türkiye’de tarım öğretiminin, başlangıcı çok eskilere uzanmaktadır. İlk Tarım Yüksekokulu 1846 yılında İstanbul-Yeşilköy Ayamama Çiftliğinde kurulmuş, ancak çalışmalarını iki yıl sürdürebilmiştir. Daha sonra 1891 yılında Halkalı Yüksek Ziraat Okulu açılmıştır (Demirel ve Doğanay, 2011). Bu okul 1928 yılına kadar eğitim ve öğretimini sürdürerek ziraat mühendisi yetiştirmiştir. Bu okulun kapatılmasıyla meydana gelen boşluğu doldurmak amacıyla 1930 yılında Ankara Yüksek Ziraat Okulu açılmıştır. Alman Ziraat Fakülteleriyle aynı eğitim sistemini benimseyen bu okul daha mezun vermeden üç yıl sonra 30 Ekim 1933’ de Yüksek Ziraat Enstitüsü’ne dönüştürülmüştür. Bu Enstitü daha sonra, 1946 yılında kurulan Ankara Üniversitesi bünyesine 1948 yılında dahil edilerek ülkemizdeki ilk Ziraat Fakültesi kurulmuştur. 1948 yılında kurulan Ankara Üniversitesi Ziraat Fakültesinde ilk tohumculuk eğitimi vermeye başlanmıştır.

1955 yılına kadar Türkiye’de tek Ziraat Fakültesi olarak eğitimini sürdüren Ankara Üniversitesi Ziraat Fakültesini daha sonra sırası ile Ege Üniversitesi (1955), Atatürk Üniversitesi (1957) ve Çukurova Üniversitesi (1973) Ziraat Fakülteleri izlemiştir (Çiftçi, 2016). Ankara Üniversitesi Ziraat Fakültesi desteği ile kurulan bu üniversitelerde de tohumculuk eğitimi benzer şekilde sürdürülmüştür.

Bu çalışmada, Türkiye’ de yükseköğretimde tohumculuk eğitiminin mevcut durumunun ortaya konulması amaçlanmıştır. Burada sunulan bilgilerin yükseköğretimde tohumculuk eğitim faaliyetlerinin şekillendirilmesi açısından faydalı olacağı düşünülmektedir.

## 2. MATERYAL YÖNTEM

Çalışmada, Yükseköğretim kurumlarının bağlı olduğu YÖK kayıtlarından ve üniversitelerin internet sitelerinden yararlanılmıştır. Bu amaçla internet üzerinden yapılan araştırmalar sonucu elde edilen veriler kullanılmıştır (Anonim 2022).

## 3. ARAŞTIRMA BULGULARI

Günümüzde Yükseköğretimde “Tohumculuk Eğitimi” Ön lisans (Meslek Yüksek Okulları), Lisans (Ziraat Fakülteleri) ve Lisansüstü düzeylerde verilmektedir. Bu nedenle burada sunulan bilgiler 3 alt başlık altında değerlendirilmiştir.

### 3.1. Lisans Düzeyinde Tohumculuk Eğitimi

Günümüzde son durum itibarıyla toplam 40 adet Ziraat Fakültesi bulunmaktadır. Bu fakültelerin 4' ünde henüz eğitim verilmemektedir. Ziraat Fakültelerinde tohumculukla ilgili verilen ders adları, derslerin verildikleri bölümler, derslerin statüleri (seçmeli veya zorunlu), AKTS ve kredi bilgileri (teorik saat + uygulama saati) Çizelge 1' de sunulmuştur.

**Çizelge 1.** Ziraat Fakültelerinde lisans düzeyinde tohumculuk eğitimi

No	Üniversite	Dersin Adı	Bölüm	Statü	AKTS
1	Akdeniz	Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+0)=3
2	Ankara	Sebze Tohum Teknolojisi	BB	Z	(1+2)=3
		Tohumluk ve Teknolojisi	TB	Z	(2+2)=3
3	Atatürk	Sebze Tohum Teknolojileri	BB	Z	(2+0)=3
		Tohumluk Bilimi	TB	Z	(1+2)=4
4	Aydın Adnan Menderes	Bahçe Bitkilerinde Tohumculuk	BB, TB	Z, S	(2+2)=4
		Tohumluk Bilgisi	TB, TBY	Z, S	(2+2)=6, (2+2)=3
		Tohumculukta Biyoteknoloji	TBY	Z	(2+0)=4
		Tohum Biyolojisi ve Çimlenme	TBY	S	(3+0)=4
5	Bilecik Şeyh Edebali	Sebze Tohumculuğu	BB	Z	(2+2)=4
		Tohumluk Kontrol ve Sertifikasyon	BB, TB	S	(3+0)=3, (3+0)=5
		Tohumluk Bilimi	TB	Z	(2+2)=5
6	Bingöl	Tohumluk Bilimi ve Teknolojisi	TB, BK	Z, S	(2+2)=4
		Tohumculuk Tekniği	BB	Z	(2+2)=4
7	Bolu Abant İzzet Baysal	Sebze Tohumculuğu	BB	Z	(2+2)=4
		Tohumluk Bilimi ve Teknolojisi	TB, TBT	Z	(2+2)=4, (2+0)=3
		Tohum Yetiştiriciliğinin İlkeleri	TBT	Z	(2+0)=3
		Vejetatif Yöntemlerle Tohumluk Üret. Te.	TBT	Z	(2+2)=5
		Meyvelerde Tohumluk Üretim Teknikleri	TBT	Z	(2+2)=5
		Süs Bitkilerinde Tohumluk Üretim Teknik.	TBT	Z	(2+2)=5
		Tohum Tedarik ve Pazarlama	TBT	Z	(2+0)=4
		Tohumluk Tescil ve Sertifikasyonu	TBT	Z	(2+0)=4
		Sebzelerde Tohumluk Üretim Teknikleri	TBT	Z	(2+2)=5
		Tarla Bitkilerinde Tohumluk Üret. Teknik.	TBT	Z	(2+2)=5
		Tohumluk Depolama Teknikleri	TBT	Z	(2+2)=5
Dünya Tohum Sektöründeki Gelişmeler	TBT	S	(2+0)=3		
8	Bursa Uludağ	Sebze Tohumculuğu	BB	S	(2+0)=4
		Tohum Bilimi ve Teknolojisi	BB	S	(1+2)=4
		Tohumluk Bilimine Giriş	TB	Z	(1+2)=4
		Ekim Öncesi Tohum Uygulamaları	TB	S	(2+0)=3
		Tohum Patolojisi	BK	S	(2+2)=4



**Çizelge 1 (Devam)**

No	Üniversite	Dersin Adı	Bölüm	Statü	AKTS
9	Çanakkale 18 Mart	Sebze Tohum Teknolojisi	BB	S	(1+2)=5
		Tohum ve Fide Yetiştirme Teknikleri	BK, TBY	S	(3+0)=3
		Tohumluk Bilimi ve Teknolojisi	TB, TBY, TBBB	S	(2+0)=4 (3+0)=3
10	Çukurova	Sebze Tohumculuğu	BB	S	(2+0)=3
		Tohumluk Kontrol ve Sertifikasyon	TB, TBBB	S	(2+0)=3
		Tarla Bitkilerinde Tohumculuk	TB	S	(2+0)=3
11	Dicle	Sebze Tohumculuğu ve Çoğaltma Teknik.	BB	Z	(2+0)=3
		Tohum Kontrol ve Sertifikasyon	TB	S	(2+0)=3
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+0)=2
12	Düzce	Tohum Teknolojisi	BK	S	(3+0)=4
		Tohumluk Fizyolojisi	TB, TBY	S	(3+0)=4
		Tohumluk Üretimi	TB	S	(3+0)=4
		Tohum Kontrol ve Sertifikasyon	TB	Z	(2+2)=3
13	Ege	Tohum Bilimi	BB	S	(2+0)=3
		Sebze Tohumculuğu	BB	Z	(2+1)=3
		Tohumluk	TB	Z	(2+0)=3
		Tohum Biyolojisi Üretimi ve Kalitesi	TB, BK, PM, ST, TE, ZT, TM, TYS	S	(3+0)=4
		Tohumluk Kontrol ve Sertifikasyon	TB	S	(2+0)=6
14	Erciyes	Sebze Tohum Teknolojisi	BB	S	(2+0)=3
		Tohumluk Teknolojisi	TB	Z	(2+0)=4
15	Eskişehir Osmangazi	Bahçe Bitkilerinde Tohumluk ve Sertifika.	BB	S	(2+0)=3
		Tohum ve Tohumluk Biyoteknolojisi	TBY	Z	(2+2)=5
		Tohumluk ve Teknolojisi	TB	Z	(2+2)=5
16	Harran	Sebze Tohumculuğu	BB	Z	(2+0)=2
		Serada Sebze Tohum Üretimi	BB	S	(2+0)=3
		Tohum Bilimi ve Teknolojisi	TB	Z	(2+0)=2
		Tarla Bitkilerinde Tohumluk Üretimi	TB	S	(2+0)=3
		Tohumluk Kontrol ve Sertifikasyon	TB	S	(2+0)=3
17	Hatay Mustafa Kemal	Tohum Üretim Teknikleri	BB	S	(2+0)=3
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+2)=4
		Tohumluk Fizyolojisi	TB	S	(2+0)=4
		Tarla Bitkileri Tohumluk Üretim Teknik.	TB	S	(2+2)=4
18	İğdır	Sebze Tohumculuğu	BB	S	(3+0)=4
		Tohum Bilimi	BB	S	(2+0)=4
		Tohumluk Bilimi ve Teknolojisi	TB, BK	Z	(3+0)=4
19	Isparta Uygulamalı Bilimler	Tohum Bilimi ve Teknolojisi	BB*, TB*, TBY, TE, TBBB, BK	Z, S	(3+0)=3 (3+0)=4
		Sebze Tohumu Üretim Tekniği	BB	Z	(2+0)=2

**Çizelge 1 (Devam)**

No	Üniversite	Dersin Adı	Bölüm	Statü	AKTS
20	Kahramanmaraş Sütçü İmam	Tohumculuk Tekniği	BB	Z	(2+0)=2
		Tohumluk Üretim ve Teknolojisi	TB	Z	(2+0)=4
21	Kırşehir Ahi Evran	Tohum Teknolojisi	BB	S	(2+0)=5
		Tohum Patolojisi	BK	S	(3+0)=4
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+0)=3
		Tohumluk Kontrol ve Sertifikasyon	TB	S	(2+0)=3
22	Kilis 7 Aralık	Sebze Tohumculuğu	BB	Z	(2+1)=6
23	Kocaeli	Tohum Teknolojileri	BB	Z	(2+1)=3
		F1 Hibrit Tohum Islahı	BB	S	(2+0)=3
		Tohum Patolojisi	BK	S	(2+0)=3
24	Malatya Turgut Özal	Tohumluk Bilimi	BB	Z	(2+0)=3
25	Ondokuz Mayıs	Sebze Tohumculuğu ve Çoğaltma Tekniği	BB	Z	(1+2)=6
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+0)=4
		Tohum Kontrol ve Sertifikasyon	TB	S	(1+2)=3
		Tohumculukta Biyoteknoloji	TBY	S	(2+2)=6
26	Ordu	Sebze Tohumculuğu	BB	Z	(2+0)=3
		Tohumluk Sertifikasyonu	BB, BK, PM	S	(2+0)=3
27	Recep Tayip Erdoğan	Bahçe Bitkileri Tohumculuğu	BB	S	(3+0)=4
		Genel Tohumculuk	BB, TB	S	(3+0)=4
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(3+0)=4
		Tohumluk Kontrol ve Sertifikasyon	TB	Z	(1+2)=3
28	Sakarya Uygulamalı Bilimler	Sebze Tohumculuğu	BB, TB, BK, PM	S	(3+0)=5
		Tohumluk Sertifikasyonu	BB, BK, PM	S	(3+0)=5
		Tohumluk ve Teknolojisi	TB	Z	(3+1)=5
		Tohum Patolojisi	BK, PM	S	(3+0)=5
29	Selçuk	Sebze Tohumculuğu ve Sertifikasyonu	BB	S	(2+0)=4
		Tohumculuk ve Sertifikasyon	TB	Z	(3+0)=4
30	Siirt	Bahçe Bitkilerinde Tohumculuk	BB	Z	(2+2)=4
		Tohumculuk Bilimi ve Teknolojisi	TB	Z	(3+2)=4
		Tohumluk Kontrol ve Sertifikasyon	TB	Z	(2+2)=4
		Tohumculukta Biyoteknoloji	TBY	Z	(3+0)=4
31	Şırnak	Tohumculuk Tekniği	BB	Z	(2+0)=4
		Tohum Fizyolojisi	TB	S	(2+0)=3
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+0)=3
32	Tekirdağ Namık Kemal	Sebze Tohumculuğu	BB	Z	(1+2)=2
		Sebzelerde Tohum Üretimi, Teknolojisi	BB	S	(2+2)=3
		Tohum Depolama İlkeleri	BB	S	(3+0)=3
		Tohumluk Teknolojisi	TB	Z	(2+2)=3
		Tohumluk Bilimi ve Teknolojisi	TBY	S	(2+2)=5
		Tohum Patolojisi	BK	S	(2+0)=3

Çizelge 1 (Devam)

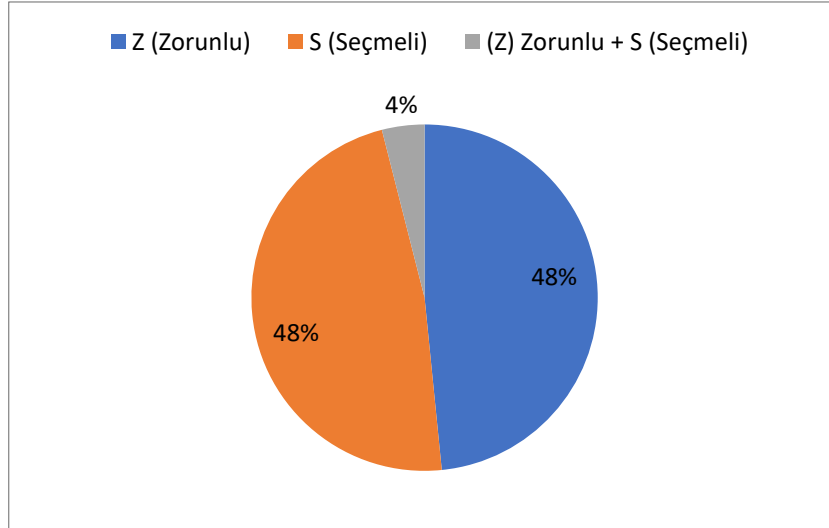
No	Üniversite	Dersin Adı	Bölüm	Statü	AKTS
		Yem Bitkileri Tohumculuğu	TB, ZT, TBB, BK, TE, TBY	S	(2+0)=3
33	Tokat Gaziosmanpaşa	Sebze Tohumculuğu	BB, TB,	S	(2+0)=4
		Tohumluk Bilimi ve Teknolojisi	TB, TBBB, BK	Z, S	(2+2)=4, (2+0)=3
		Tarla Bitkilerinde Tohumluk Üret. ve Sert.	TB	Z	(2+2)=5
34	Uşak	Sebze Tohum Teknolojisi	BB	Z	(2+1)=3
		Tohumculuk	BB, TB, BK	S	(3+0)=3
		Tohumluk Kontrol ve Sertifikasyon	BB	S	(2+2)=5
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(2+2)=3
		Tohum Patolojisi	BK	S	(2+1)=4
		Sebze Tohumculuğu	BK, ZT	S	(2+0)=3
35	Van Yüzüncü Yıl	Tohumculuk Bilimi ve Teknolojisi	TB, TE	Z	(2+2)=4
		Tohumluk Kontrol ve Sertifikasyon	TB	S	(2+0)=3
		Tohum Sitolojisi	TB	S	(2+0)=3
		Bahçe Bitkilerinde Tohumculuk	BB, TE	Z	(2+0)=3
36	Yozgat Bozok	Tohumluk Endüstrisi	BB, TB, TE	S	(2+0)=2
		Bahçe Bitkilerinde Tohumluk ve Sertifika.	BB	S	(3+0)=3
		Sebze Tohum Teknolojisi	BB	S	(2+0)=2
		Tohumluk Bilimi ve Teknolojisi	TB	Z	(3+0)=3

BB: Bahçe Bitkileri, TB: Tarla Bitkileri, TBY: Tarımsal Biyoteknoloji, TBT: Tohum Bilimi ve Teknolojisi, BK: Bitki Koruma, TBBB: Toprak Bilimi ve Bitki Besleme, PM: Peyzaj Mimarlığı, ST: Süt Teknolojisi, TE: Tarım Ekonomisi, ZT: Zootekni, TM: Tarım Makinaları, TYS: Tarımsal Yapılar ve Sulama, S: Seçmeli, Z: Zorunlu.

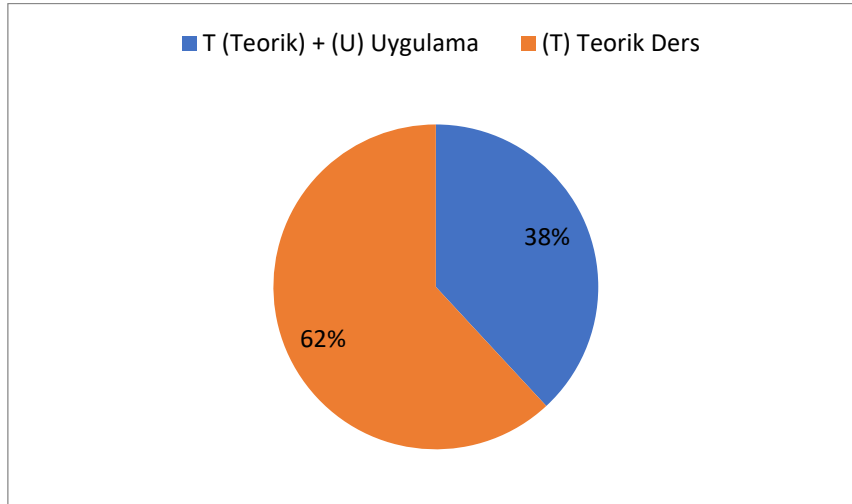
Hali hazırda eğitimini sürdürmekte olan 36 adet Ziraat Fakültesinin tümünde tohumculukla ilgili farklı adlarla açılmış dersler (toplam 126 adet) verilmektedir. Verilen derslerden 61' inin (% 48) zorunlu (Z), 60' inin (% 48) seçmeli (S), 5' inin (% 4) ise seçmeli (S) veya zorunlu (Z) statüde olduğu saptanmıştır (Çizelge 1) (Şekil 1). Bunun yanısıra, 126 adet dersten 48' inin uygulaması (% 38) bulunurken, geriye kalan 78 adet dersin (% 62) sadece teorik olarak verildiği belirlenmiştir (Çizelge 1, Şekil 2).

Ziraat Fakültelerinde lisans düzeyinde tohumculukla ilgili dersler farklı bölümlerde verilmektedir. Tohumculuk dersleri en çok Tarla Bitkileri (59 adet) ve Bahçe Bitkileri (50 adet) Bölümlerinde verilirken, bu bölümleri sırasıyla Bitki Koruma (18 adet), Tarımsal Biyoteknoloji (12 adet), Tohum Bilimi ve Teknolojisi (11 adet), Tarım Ekonomisi (6 adet), Peyzaj Mimarlığı (5 adet), Toprak Bilimi ve Bitki Besleme (4 adet), Zootekni (3 adet), Süt Teknolojisi (1 adet),

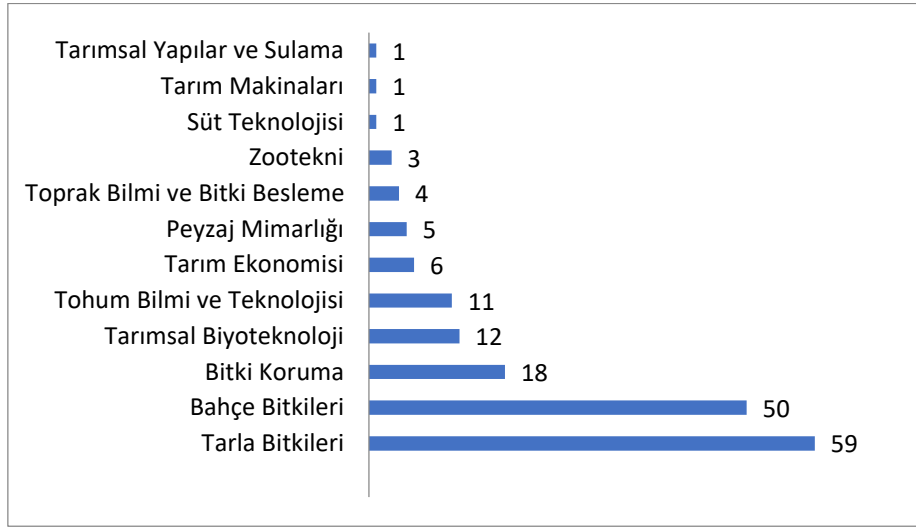
Tarım Makinaları (1 adet), Tarımsal Yapılar ve Sulama (1 adet) Bölümlerinin izlediği belirlenmiştir (Çizelge 1, Şekil 3) (Çizelge 1, Şekil 3) (Çizelge 1, Şekil 3).



**Şekil 1.** Lisans düzeyinde tohumculuk derslerinin statüleri



**Şekil 2.** Lisans düzeyinde teorik ve uygulamalı tohumculuk derslerinin dağılımı



**Şekil 3.** Lisans düzeyinde bölümler bazında verilen tohumculuk ders sayıları

### **3.2. Önlisans Düzeyinde Tohumculuk Eğitimi**

Önlisans düzeyinde tohumculukla ilgili dersler meslek yüksek okullarında verilmektedir. Ders adları, derslerin verildikleri programlar, statüleri (seçmeli veya zorunlu), AKTS ve kredi bilgileri (teorik saat + uygulama saat) Çizelge 2’ de verilmiştir.

**Çizelge 2.** Meslek yüksek okullarında önlisans düzeyinde tohumculuk eğitimi

No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
1	Adıyaman	Kahta	TB	Tohumluk Kontrol ve Sertifikasyon	Z	(2+0)=2
			TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=2
2	Ağrı İbrahim Çeçen	Meslek Yüksekokul	OT	Tohum Teknolojileri	Z	(2+2)=4
3	Akdeniz	Elmalı	BT	Sebze Tohum Teknolojisi	S	(2+0)=3
			S	Sebze Tohum Teknolojisi	S	(2+0)=3
		Finike	BT	Sebze Tohum Teknolojisi	S	(2+0)=3
		Korkuteli	BT	Sebze Tohum Teknolojisi	S	(2+0)=3
		Kumluca	BT	Sebze Tohum Teknolojisi	S	(2+0)=3
			S	Sebze Tohum Teknolojisi	S	(2+0)=3
Teknik Bilimler	OT	Organik Tohumculuk ve Uygulama Tek.	Z	(2+1)=3		
4	Aksaray	Teknik Bilim.	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=2
5	Amasya	Suluova	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=4
			T	Bitki ve Tohum Fizyolojisi	Z	(2+0)=2
				Sebze Tohumluğu Üretim Teknikleri	Z	(2+1)=4
				Tahıllarda Yemelik ve Tane Baklagillerde Tohum Üretim Teknikleri	Z	(2+1)=4
				Yem Bitkilerinde Tohumluk Üretim Tek.	Z	(2+1)=2
				Tohumluk Kontrol ve Sertifikasyon	Z	(2+0)=2
				Meyvecilikte Tohumluk Üretim Teknikleri	Z	(2+0)=3
				Tohum İşleme ve Muhafazası	Z	(2+0)=2
				Endüstri Bitkilerinde Tohumluk Üret. Tek.	Z	(2+0)=3
				Sebze Tohumluğu Üretim Teknikleri 2	Z	(2+1)=4
				Tohumculukta Biyoteknoloji	Z	(2+0)=2
				Tohumculukta İşletmecilik ve Pazarlama	Z	(2+0)=2
				Tıbbi Bitkilerde Tohumluk Üretim Tek.	Z	(2+0)=2
Süs Bitkilerinde Tohumluk Üretim Tek.	Z	(2+1)=4				
6	Aydın Adnan Menderes	Çine	OT	Organik Tohumculuk	Z	(2+0)=3
			TAB	Tohumluk ve Teknolojisi	Z	(2+2)=3
		Sultanhisar	OT	Tohum Teknolojisi	S	(2+0)=2
			TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=2
7	Balıkesir	Altınoluk	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=3

**Çizelge 2 (Devam)**

No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
8	Bartın	Bartın	OT	Tohum Teknolojileri	Z	(2+1)=4
9	Batman	Sason	OT, TAB	Tohum Teknolojisi	Z	(2+0)=2
10	Bilecik Şeyh Edebali	Pazaryeri	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	S	(2+1)=4
11	Bingöl	Bingöl Teknik Bilimler	BT	Tohumculuk	S	(2+1)=5
			TB	Tohumluk Kontrol ve Sertifikasyon	Z	(2+0)=2
		Genç	OT	Tohum ve Teknolojileri	Z	(2+2)=4
		Gıda, Tarım ve Hayvancılık	BT	Tohumculuk	S	(2+0)=3
			OT	Tohum ve Teknolojileri	Z	(2+0)=3
TB	Tohumluk Bilimi ve Teknolojisi	Z	(2+0)=3			
12	Bolu Abant İzzet Baysal	Mudurnu Süreyya Astarıcı	OT	Tohum Teknolojileri	S	(2+1)=4
			TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=2
		Seben İzzet Baysal	BT	Tohum Teknolojileri	Z	(2+0)=2
13	Burdur Mehmet Akif Ersoy	Teffeni	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+0)=3
14	Bursa Uludağ	Gemlik Asım Kocabıyık	BT	Tohumculuk Tekniği	Z	(2+0)=4
			OT	Organik Tohumculuk	S	(2+0)=3
		Mustafa Kemal Paşa	OT	Organik Tohumculuk	S	(2+0)=3
			TT	Tohumluk Kontrol ve Sertifikasyon	Z	(2+0)=5
				Tohum Depolama Teknikleri	Z	(2+0)=2
			Sebze Tohumları Tohum Üretim	Z	(2+2)=3	
			Tohumluk Teknolojisi	Z	(3+2)=4	
			Endüstri Bitkileri Tohum Üretim Teknik.	Z	(3+2)=4	
			Tohumculuk Politikaları	S	(2+0)=3	
			Tohumluk Pazarlama	S	(2+0)=3	
			Yemliklik Baklagil Bitkileri Tohum Üretim Teknolojisi	S	(2+0)=3	
			Yem Bitkileri Tohum Üretim Teknolojisi	S	(2+0)=3	
		Tahıl Bitkileri Tohum Üretim Teknikleri	S	(2+0)=3		
Yenişehir İbrahim Orhan	BK	Tohumculuk	S	(2+0)=3		
15	Çanakkale Onsekiz Mart	Lapseki	OT	Organik Tohumculuk	Z	(2+0)=2
16	Çankırı Karatekin	Yapraklı	TB	Tohumluk Bilgisi	S	(2+0)=2

**Çizelge 2 (Devam)**

No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
17	Çukurova	Karaisalı	S	Tohumculuk Tekniği	S	(3+0)=4
			TAB	Tohumluk Bilimi ve Genetik	S	(2+0)=3
		Kozan	BT	Tohumluk Kontrol ve Sertifikasyon	Z	(2+0)=4
		Pozantı	BT	Tohumluk Kontrol ve Sertifikasyon	S	(2+0)=3
18	Dicle	Bismil	OT	Tohum Teknolojileri	Z	(2+1)=4
			TT	Tohumluk Bilimi ve Teknolojisi	Z	(2+0)=3
		Diyarbakır Tarım	TT	Endüstri Bitkilerinde Tohumluk Üretimi	Z	(2+2)=4
			TT	Sebzelerde Tohumluk Üretimi	Z	(2+2)=4
			TT	Tahıllarda Tohumluk Üretimi	Z	(2+2)=4
			TT	Yemlik Baklagillerde Tohumluk Üretim.	Z	(2+2)=4
			TT	Tohumculukta Karantina Önlemleri	Z	(2+0)=3
			TT	Tohumluk Kontrol ve Sertifikasyon	Z	(2+0)=3
			TT	Tohum Fizyolojisi	S	(2+0)=3
			TT	Yem Bitkilerinde Tohumluk Üretimi	S	(2+0)=3
			TT	Kademeli Tohumluk Üretimi	S	(2+0)=3
19	Dokuz Eylül	İzmir	Tİ	Tohumculuk	S	(2+0)=3
20	Düzce	Çilimli	OT	Organik Tohumculuk	S	(2+0)=3
			TAB	Tohum Bilimi ve Teknolojisi	S	(2+0)=3
				Tıbbi ve Aromatik Bitkiler Tohumculuğu	S	(2+0)=3
				Endüstri Bitkileri Tohumluk Üretimi	S	(2+0)=3
21	Ege	Ödemiş	OT	Organik Tohumculuk	Z	(2+2)=3
			TT	Tohumlarda Kalite Kontrol Kriterleri	Z	(2+0)=2
				Bitki ve Tohum Fizyolojisi	Z	(2+0)=2
				Sebzelerde Tohumluk Üretimi I	Z	(2+2)=4
				Yemlik Dane Baklagiller Tohumluk Üre	Z	(2+2)=4
				Tohumluk Teknolojisi	Z	(2+2)=4
				Tahıllarda Tohumluk Üretimi	Z	(2+2)=4
				Tohumlukta Karantina İşlemleri	Z	(2+2)=4
				Bitki ve Tohum Hastalıkları	Z	(2+2)=3
				Sebzelerde Tohumluk Üretimi II	Z	(2+2)=4
				Endüstri Bitkileri Tohumluk Üretimi	Z	(2+2)=4
				Çim ve Yem Bitkilerinde Tohumluk Üret.	Z	(2+2)=4
				Tohumluk Tescil ve Sertifikasyon	Z	(2+2)=4
				Süs Bitkilerinde Tohumluk Üretimi	Z	(2+2)=4
22	Fırat	Baskil	BT	Tohumculuk Tekniği	Z	(2+2)=4
			OT	Organik Tohumculuk	Z	(3+0)=3
23	Gaziantep	Nurdağı	PSB, OT, TAB	Tohum Teknolojileri	S	(2+2)=3
			Z	Tohumluk Bilimi ve Genetik	Z	(2+2)=4
		Islahiye	OT	Tohum Teknolojileri	S	(2+0)=3
		Araban	OT	Tohum Teknolojileri	Z	(3+0)=3



Çizelge 2 (Devam)

No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
24	Giresun	Espiyе	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuđu	Z	(2+0)=2
			OT	Organik Tohumculuk	Z	(2+2)=4
25	Gümüşhane	Kelkit Aydın Dođan	OT	Tohumculuk	S	(3+0)=3
			ÇATY	Tohumluk Teknolojisi	Z	(2+2)=4
26	Hakkari	Çölemerik	BT	Tohumculuk	S	(2+0)=2
		Yüksekova	OT	Tohum Teknolojileri	Z	(3+0)=4
27	Harran	Akçakale	OT	Organik Tohumculuk	Z	(3+0)=4
		Ceylanpınar Tarım	TT	Tohum ve Bitki Fizyolojisi	Z	(2+0)=3
				Tohumluk İşleme Teknolojisi	Z	(2+4)=6
				Hasat Sonrası Tohum Biyolojisi	Z	(2+2)=6
				Tarla Bitkileri Tohumluk Üretimi I	S	(2+2)=4
				Tohumluk Depolama Teknikleri	Z	(2+4)=6
				Tohumluk İlaçlama/Ambalajlama	Z	(2+2)=4
				Tohumluk Pazarlama	Z	(2+2)=4
				Tarla Bitkileri Tohumluk Üretimi I	S	(2+2)=4
				Tohumluk İşleme Aletleri Kalşbrasayon Bakım ve Onarımı	S	(2+2)=2
28	Isparta Uygulamalı Bilimler	Atabey	TAB	Tıbbi ve Aromatik Bitkilerde Tohumluk Üretim Teknikleri	S	(2+1)=3
			T	Tohumluk Üretiminin Genel İlkeleri	Z	(2+1)=3
				Tohum Fizyolojisi	Z	(2+1)=3
				Sebze Tohumluđu Üretim Teknikleri	Z	(2+0)=3
				Tohumluk Kontrol ve Sertifikasyonu	Z	(2+0)=3
				Tohumlarda Kaliteyi İyileştirici Uygulamalar ve Kalite Kontrol Kriterleri	Z	(2+0)=3
				Tohum İşleme ve Depolama Teknikleri	Z	(2+0)=4
				Endüstri ve Yem Bitkilerinde Tohumluk Üretim Teknikleri	S	(2+1)=3

				Süs Bitkilerinde Tohumluk Üretim Teknik	S	(2+1)=3
				Tohumculukta Deneme Tekniği	S	(2+1)=3
				Tohumla Taşınan Hastalıklar ve Tanılan.	S	(2+1)=3
				Tohumculukta Mekanizasyon	S	(2+1)=3
				Tohumluk Pazarlaması	Z	(2+0)=3
				Bitki ve Tohum Hastalık-Zararlıları ve Mücadelesi	Z	(3+0)=3
				Organik Tohum Üretimi	S	(2+1)=3
				Meyve Türlerinde Tohumluk Üretim Tek.	S	(2+1)=3
				Tahıl ve Dane Baklagillerde Tohumluk Üretim Teknikleri	S	(2+1)=3
				Tohumculukta Biyoteknoloji	S	(2+1)=3
				Tohum Kimyası	S	(2+1)=3

Çizelge 2 (Devam)

No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
				Tıbbi ve Aromatik Bitkilerde Tohumluk Üretim Teknikleri	S	(2+1)=3
29	İstanbul Cerrahpaşa	Ormancılık	PSB	Tohum ve Bitki Islahı	Z	(2+0)=3
30	K. Maraş Sütçü İmam	Andırın	BT	Tohum ve Fidanlık Tekniği	S	(2+1)=3
		Göksun	OT	Sebze Tohumculuğu	S	(2+1)=3
		Türkoğlu	TAB	Tohumculuk Tekniği	Z	(3+0)=3
31	Karamanoğlu Mehmet Bey	Ermenek	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu ve Teknolojisi	Z	(2+2)=4
		Teknik Bilimler	S	Tohumculuk	Z	(3+0)=3
32	Kırıkkale	Kırıkkale	OT	Organik Tohum Teknolojileri	Z	(3+0)=4
33	Kırşehir Ahi Evran	Çiçekdağı	TT	Tohumculuk Politikası	S	(2+0)=3
				Tohum Depolama Teknikleri	Z	(2+0)=2
				Tohumculuk İşletme Analizi	S	(2+1)=3
				Sebze Bitkileri Tohum Üretim Teknikleri	Z	(2+2)=4
				Tohumluk Teknolojisi	Z	(2+2)=4
				Tohumluk Pazarlama	Z	(2+0)=2
				Tahıl Bitkileri Tohum Üretim Teknikleri	Z	(3+1)=4
				Endüstri Bitkileri Tohum Üretim Teknik.	Z	(3+2)=5
Tohumluk Kontrol ve Sertifikasyon	Z	(3+0)=4				

				Yem Bitkileri Tohum Üretim Teknikleri	S	(3+0)=3
		Teknik Bilimler	OT	Tohum Teknolojileri	S	(2+1)=3
34	Kilis 7 Aralık	Teknik Bilimler	BT	Tohumculuk	Z	(2+1)=3
			TAB	Tohumluk Bilimi	S	(2+0)=3
35	Kütahya Dumlupınar	Altıntaş	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuk Teknolojisi	S	(3+0)=4
		Gediz	T AB	Tıbbi ve Aromatik Bitkiler Tohumculuk Teknolojisi	S	(3+0)=4
		Simav	OT	Organik Tohum Teknolojileri	S	(3+0)=4
36	Malatya Turgut Özal	Battalgazi	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	S	(3+0)=3
37	Manisa Celal Bayar	Alaşehir	OT	Organik Tohumculuk	Z	(2+0)=2
		Köprübaşı	Tİ	Tohumculuk	S	(2+0)=2
38	Mersin	Silifke	OT	Tohum Teknolojileri	S	(2+1)=3
		Gülhar Mustafa Baysan	FY	Tohum Bilimi	Z	(2+0)=2

Çizelge 2 (Devam)

No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
39	Mardin Artuklu	Kızıltepe	OT	Organik Tohumluk Üretimi	Z	(2+2)=4
			TAB	Tıbbi Bitkiler Tohumluk Üretimi	Z	(2+0)=3
			TT	Tahıllarda Tohum Üretimi	Z	(2+2)=4
				Sebze Bitkilerinde Tohum Üretim Tekniği	Z	(2+2)=4
				Endüstri Bitkileri Tohumluk Üretimi	Z	(2+2)=4
				Yemlik Dane Baklagil Bitkileri Tohumluk Üretimi	Z	(2+2)=4
				Yem Bitkileri Tohum Üretim Tekniği	Z	(2+2)=4
				Tohumculuk Kontrol ve Sertifikasyon	Z	(2+0)=3
				Tohumculuk İşleme ve Depolama	Z	(2+0)=3
	Vejetatif Tohumluk Üretimi	Z	(2+0)=2			
40	On Dokuz Mayıs	Bafra	OT	Tohumculuk ve Teknolojisi	S	(2+0)=3
41	Ordu	Teknik Bilimler	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+1)=3
42	Pamukkale	Tavas	OT	Tohum Teknolojileri	Z	(2+1)=3
		Çal	OT	Organik Tohum, Fide ve Fidan Yet.	Z	(2+2)=4
43	Recep Tayyip Erdoğan	Pazar	OT	Tohum Teknolojileri	Z	(2+2)=4
			TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(1+2)=3
44	Sakarya Uygulamalı Bilimler	Akyazı	PSB	Bahçe Bitkileri Islahı ve Tohumculuk	S	(2+0)=3
45		Çumra	OT	Organik Tohum Teknolojileri	Z	(3+1)=4

	Selçuk	Sarayönü	TAB	Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(3+1)=4	
			TT	OT	Organik Tohum Teknolojisi	Z	(3+1)=4
				Sebzecilikte Tohum Üretim Tekniği	Z	(3+1)=4	
				Hibrit Tohum Üretim Tekniği	Z	(3+1)=4	
				Tıbbi ve Aromatik Bitkiler Yetiştir. ve Tohum Üret. Tek.	Z	(2+1)=3	
				Tohumculukta Doku Kültürü ve Biyoteknoloji	Z	(2+1)=3	
				Süs Bit. ve Meyvecilikte Tohum Üret. Tek.	Z	(3+1)=4	
				Tohum İşlemesi ve Kalite Kriterleri	Z	(1+1)=2	
				Yem ve Yemelik Bit. Yetiştir. ve Tohum Üret. Tek.	Z	(2+1)=3	
				Tohumculuk Kontrol ve Sertifikasyon	Z	(2+0)=2	
				Tohum Depolama, Paketleme ve Pazar.	Z	(2+0)=2	
			Endüstri Bit. Yetiştir. ve Tohum Üret. Tek.	Z	(3+1)=4		

Çizelge 2 (Devam)

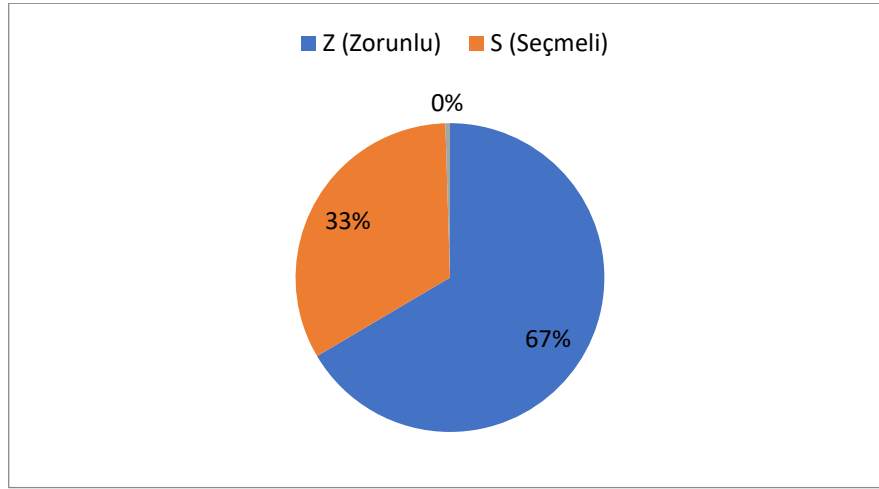
No	Üniversite	Meslek Yüksek Okulu	Program	Dersin Adı	Statü	AKTS
46	Siirt	Eruh	OT	Tohum Teknolojileri	S	(3+1)=4
47	Sivas Cumhuriyet	Sivas Teknik Bilimler	OT	Organik Tohumluk Üretimi	Z	(2+1)=3
			TAB	Tıbbi ve Aromatik Bitkiler Tohum Üretimi	Z	(2+1)=3
		Yıldızeli	BT	Bitki Islahı ve Tohumculuk	Z	(3+2)=7
		Zara Ahmet Çuhadaroğlu	OT	Organik Tarımda Tohum Teknolojileri	Z	(2+0)=2
48	Tekirdağ Namık Kemal	Teknik Bilimler	S	Sebze Tohumculuğu	S	(2+0)=2
49	Trakya	Havsa	S, PSB	Tohum ve Bitki Islahı	S	(2+0)=2
50	Van Yüzüncü Yıl	Başkale	OT	Tohumluk ve Teknolojisi	Z	(2+0)=3
		Gevaş	OT	Tohumluk ve Teknolojisi	Z	(2+1)=3
		Özalp	TB	Tohumluk Kontrol ve Sertifikasyon	Z	(3+0)=3
51	Zonguldak Bülent Ecevit	Çaycuma Gıda ve Tarım	TABB	Tohumluk Fizyolojisi	S	(2+0)=3
				Tıbbi ve Aromatik Bitkiler Tohumculuğu	Z	(2+1)=3

BT: Bahçe Tarımı, OT: Organik Tarım, TAB: Tıbbi ve Aromatik Bitkiler, TABB: Tıbbi ve Aromatik Bitkiler Tohumculuğu, TB: Tarla Bitkileri, S: Seracılık, PSB: Peyzaj ve Süs Bitkileri, TT: Tohumculuk Teknolojisi, Tİ: Tarımsal İşletmecilik, FY: Fidan Yetiştiriciliği, T: Tohumculuk, BK: Bitki Koruma, ÇATY: Çim Alan Tesisi ve Yönetimi, Z: Zorunlu, S: Seçmeli.

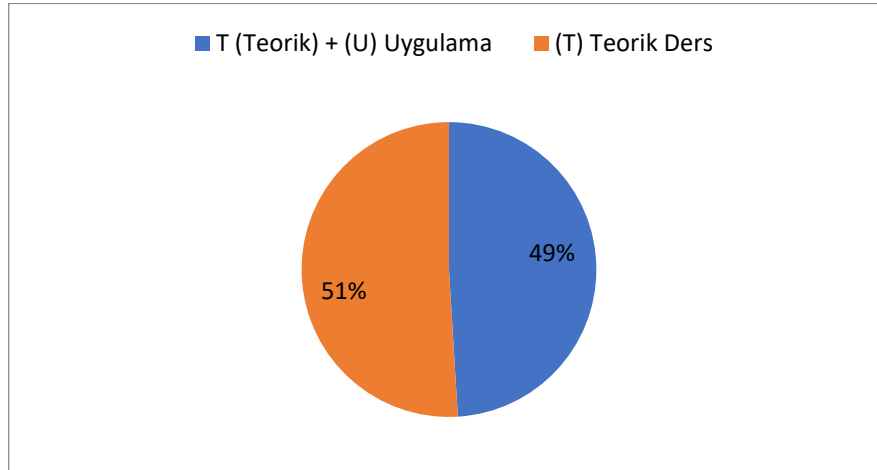
Yapılan arařtırmalar sonucunda 51 adet üniversite bünyesinde toplam 84 adet meslek yüksekokulunda tohumculukla ilgili derslerin verildiđi tespit edilmiřtir (Çizelge 2).

Önlisans düzeyinde verilen tohumculuk derslerinin 139' unun zorunlu (Z) (% 67), 69' unun seçmeli (S) (% 33) ders statüsünde olduđu (Şekil 4), verilen 208 adet dersten 102' sinin (% 49) uygulamalı, 106' sının (% 51) ise sadece teorik olarak verildiđi saptanmıřtır (Şekil 5).

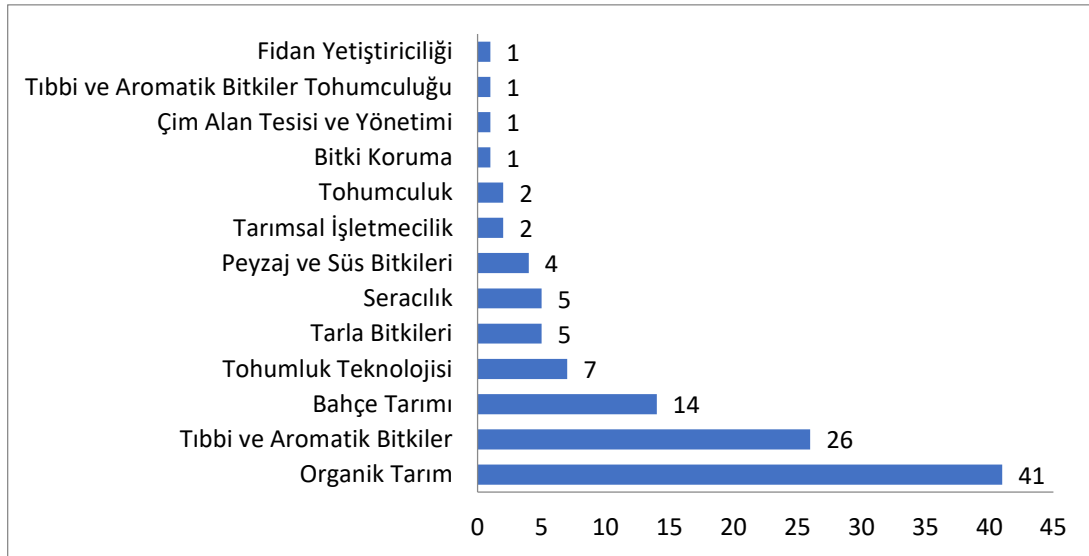
Meslek yüksekokullarında önlisans düzeyinde tohumculukla ilgili dersler Bitkisel ve Hayvansal Üretim Bölümlerinin farklı programlarında verilmektedir. Meslek yüksekokullarında tohumculuk dersleri en çok Organik Tarım (41 adet) ve Tıbbi ve Aromatik Bitkiler (26 adet) programlarında verilirken, bu programları sırasıyla Bahçe Tarımı (14 adet), Tohumculuk Teknolojisi (7 adet), Tarla Bitkileri (5 adet), Peyzaj ve Süs Bitkileri (4 adet), 2' Őer adet dersle Tohumculuk ve Tarımsal İřletmecilik programları, 1' er adet dersle Bitki Koruma, Tıbbi ve Aromatik Bitkiler Tohumculuđu, Çim Alan Tesisi ve Yönetimi ile Fidan Yetiřtiriciliđi programları izlemektedir (Çizelge 2, Şekil 6).



Şekil 4. Önlisans düzeyinde tohumculuk derslerinin statüleri



Şekil 5. Önlisans düzeyinde teorik ve uygulamalı tohumculuk derslerinin dağılımı



Şekil 6. Önlisans düzeyinde tohumculuk derslerinin verildiği programlar

### 3.3. Lisansüstü Düzeyinde Tohumculuk Eğitimi

Lisansüstü düzeyde tohumculukla ilgili dersler üniversitelere bağlı Fen Bilimleri Enstitülerinin ilgili anabilim dallarında verilmektedir. Ders adları, derslerin verildikleri anabilim dalları, statüleri (seçmeli veya zorunlu), AKTS ve kredi bilgileri (teorik saat + uygulama saat) Çizelge 3' de verilmiştir.

**Çizelge 3.** Lisansüstü düzeyde tohumculuk eğitimi

No	Üniversite	Anabilim Dalı	Dersin Adı	Statü	AKTS
1	Akdeniz	Bahçe Bitkileri	Sebze Tohumculuk Tekniği	S	3
			Sebze Tohumlarında Kontrol ve Sertifikasyon	S	8
		Tarla Bitkileri	Tarla Bitkilerinde Tohumluk Üretim Teknikleri	S	6
			Yem Bitkileri Tohumculuğu ve Ekolojisi	S	8
2	Ankara	Bahçe Bitkileri	Tohum Fizyolojisi	S	8
			Tohum Teknolojisinin Temel Bileşenleri	S	8
			Sebze Tohum Belgelendirme Sistemleri	S	8
			Açık Tozlanan Hibrit Çeşitlerde Sebze Tohum Üretim Yöntemleri	S	8
			Tohum Geliştirici Tedaviler	S	10
			Sebzelerde Tohum Kaplama Teknikleri	S	10
		Tarla Bitkileri	Endüstriyel Tesisler Tohum ve Tohum Tekno.	S	8
			Hububat Besin ve Bakliyatların Tohum Bilimi ve Teknolojisi	S	8
			Yağ Bitkileri Tohum ve Tohum Teknolojisi	S	8
3	Atatürk	Bahçe Bitkileri	Sebze Tohum Depolama İlkeleri	S	6
			Sebze Tohumculuğu ve Tohumculuk Kalitesi	S	6
			Sebzelerde Tohumluk Üretim Teknikleri	S	6
		Tarla Bitkileri	Tohumluk Patates Yetiştiriciliği	S	6
			Tohumluk ve Teknolojisi	S	6
			Yem Bitkilerinde Tohumluk Üretimi	S	6
4	Adnan Menderes	Bahçe Bitkileri	Sebzecilikte Tohum Kontrol ve Sertifikasyon	S	8
		Tarla Bitkileri	Tarla Bitkilerinde Tohumluk Tekniği ve Sertifikasyon	S	8
			Yem Bitkilerinde Tohumluk Üretimi	S	8
		Tarımsal Biyoteknoloji	Tohumculukta Laboratuvar Testleri	S	8
			Tohumda Priming Uygulamaları	S	8
5	Bilecik Şeyh Edebali	Tarla Bitkileri	Tohumluk Bilimi ve Teknolojisi	S	7.5
6	Bingöl	Bahçe Bitkileri	Tohum Fizyolojisi	S	6
		Tarla Bitkileri	Tohumluk Bilimi ve Teknolojisi	S	6
			Tohumluk Fizyolojisi	S	6

Çizelge 3. (Devam)

No	Üniversite	Anabilim Dalı	Dersin Adı	Statü	AKTS
			Tohumluk Bilimi ve Teknolojisi	S	6
			Tohumluk Fizyolojisi	S	6
			Tohumluk Patates Yetiştiriciliği	S	6
			Yağ Bitkilerinde Tohumluk Üretim Teknikleri	S	6
			Yem Bitkilerinde Tohumluk Üretim Teknolojisi	S	6
			Endüstri Bitkilerinde Tohumluk Üretim Tekno.	S	6
			Tahıllarda Tohumluk Üretim Teknolojisi	S	6
7	Bolu Abnat İzzet Baysal	Bahçe Bitkileri	Sebze Tohum Teknolojisinin Temel Esasları	S	7.5
			Tarla Bitkileri	Tohumluk Tekniği	S
		Tahıl ve Yemelik Baklagiller Tohumculuğu ve Teknolojisi		S	7.5
		Tahıllarda Tohumluk Üretim Teknolojisi		S	7.5
		Tohum Bilimi ve Teknolojisi	Endüstri Bitkilerinde Tohumluk Üretim Tekno.	S	7.5
			Tohumluk Fizyolojisi	S	7.5
			Tarla Bitkileri Tohumlarının Muhafaza Tekniği	S	7.5
			Tohumluk Üretim İşlemlerinde İş Güvenliği	S	7.5
			Bahçe Bitkileri Tohumlarının Muhafaza Teknik.	S	7.5
			Tohumluk Üretiminde İleri Bitki Fizyolojisi	S	7.5
			Tohumların Fiziksel ve Mekaniksel Özellikleri	S	7.5
			Tohumluk Teknolojisi	S	7.5
		Tohumluk Üretiminde Mikroçoğaltım	S	7.5	
8	Uludağ	Bahçe Bitkileri	Bahçe Bitkilerinde Tohum Fizyolojisi	S	6
			Sebze Tohum Muhafaza Teknikleri	S	6
			Bahçe Bitkileri Tohum Teknolojisi	S	6
			Organik Tarım Ve Fide Üretimi	S	6
			Sebze Tohum Üretimi	S	6
			Sebze Tohumlarının Kontrol ve Sertifikasyonu	S	6
		Tarla Bitkileri	Tohumluk ve Teknolojisi	S	6
			Yem Bitkileri Tohumculuğunun Esasları	S	6
			Yabancı Tozlanan Bitkilerin Tohum Üretimi	S	6
			Tohumculuk Mevzuatı	S	6
9	Çanakkale Onsekiz Mart	Bahçe Bitkileri	Sebzeçilikte Tohum ve Fide Yetiştirme Teknik.	S	7.5
			Organik Tarımda Sebze Tohum ve Fide Ürt. Tek.	S	7.5
		Tarla Bitkileri	Tohumculuk Tekniği	S	7.5
			Tahıllarda Tohumluk Üretimi	S	7.5
			Melez Tohumluk Üretimi	S	7.5



10	Dicle	Bahçe Bitkileri	İleri Sebze Tohumculuğu	S	6
		Tarla Bitkileri	Yem Bitkilerinde Tohumluk Üretim Teknikleri	S	6
			Yemeklik Tane Baklagillerde Tohumluk Ürt. Tek.	S	6
			Endüstri Bitkilerinde Tohumluk Üretim Tekno.	S	6
			Tohumculuk Mevzuatı	S	6
			Tarla Bitkilerinde Tohumluk Üretim Teknolojisi	S	6
			Tohumluk Fizyolojisi	S	6

Çizelge 3. (Devam)

No	Üniversite	Anabilim Dalı	Dersin Adı	Statü	AKTS
			Yağlı Tohum Teknolojisi	S	6
11	Ege	Bahçe Bitkileri	Tohum Depolamanın Temel İlkeleri	S	6
			Tohum Biyolojisi	S	6
			Tohumda Kaliteyi İyileştirici Uygulamalar	S	6
			Tohumlarda Kalite Kontrol Yöntemleri	S	6
			Organik Tohum ve Fide Üretimi	S	6
		Tohumluk Bilimi ve Teknolojisi	Tohumluk Üretiminde Deneme Desenleri ve Veri Yöneticisi	S	8
			Tohum ve Fide Fizyolojisi	S	7
			Tohumculuk Sektöründe Proje Geliştirme ve Takdiri	S	7
			Tarla Bitkilerinde Tohumluk Üretimi	S	8
			Sebzelerde Tohum Üretim Teknikleri	S	7
			Tohumluk Mevzuatı	S	7
			Tohumluk Kayıt Sistemleri ve Sertifikasyon	S	
			Tıbbi ve Aromatik Bitkiler Tohumluk Üretimi	S	7
			Moleküler Tohum Patolojisi	S	6
			Tohum İşleme	S	7
			Tohumluk Üretiminde Mekanizasyon	S	8
			Tohumculukta Hasat Sonrası Mekanizasyon İşlemleri	S	8
			Tohum Depolama	S	7
			Tohum Tedarik Ve Pazarlanması	S	7
Tarla Bitkileri	Tohumluk Tekniği	S	8		
12	Erciyes	Bahçe Bitkileri	Sebzecilikte Tohum Teknolojileri	S	7.5
13	Eskişehir Osmangazi	Bahçe Bitkileri	Sebze Tohum Üretimi	S	7.5
		Tarla Bitkileri	Tohum Fizyolojisi	S	7.5
			Yem Bitkilerinde Tohum Üretiminin Temel Esas.	S	7.5
14			Sebze Tohumculuk Tekniği	S	6

	Harran	Bahçe Bitkileri	Sebze Tohumlarının Kontrol ve Sertifikasyonu	S	6
			Organik Sebze Tohum ve Fide Üretimi	S	6
		Tarla Bitkileri	Tahıllarda Tohumluk Üretim Tekniği	S	6
			Endüstri Bitkilerinde Tohumluk Teknolojisi ve Çeşit Ayrım Yöntemleri	S	6
			Endüstri Bitkilerinde Tohumluk Fizyolojisi	S	6
			Endüstri Bitki. Kısırlık ve Melez Tohum Üretimi	S	6
			Çeşit Tescil ve Tohumluk Sertifikasyonu	S	6
			Yem Bitkileri Tohumluk Üretim Teknolojisi	S	6
			Heterosis ve Melez Tohum Üretimi	S	6
			Yemlik Dane Baklagil Tohumluk Teknolojisi	S	6
15	Hatay Mustafa Kemal	Bahçe Bitkileri	Sebze Tohumculuk Tekniği	S	8
Süs Bitkilerinde Tohumculuk Tekniği	S		8		
Sebze Tohumlarının Kontrol ve Sertifikasyonu	S		8		

Çizelge 3. (Devam)

No	Üniversite	Anabilim Dalı	Dersin Adı	Statü	AKTS
			Sebze Tohum Fizyolojisi	S	8
			Sebzelerdeki Tohum Uyg. Gelişmeler	S	8
			Tohum Gücü Test Teknikleri	S	8
		Tarla Bitkileri	Tohumculuk Mevzuatı	S	8
			Yem Bitkilerinde Tohum Üretim Teknolojisi	S	8
			Yumur ve Kök Bitkileri Tohumculuğu	S	8
			Tohumluk Fizyolojisi	S	8
			Yağ Bitkilerinde Tohumluk Üretim Teknolojisi	S	8
			Lif Bitkileri Tohumluk Üretim Teknolojisi	S	8
			Tahıllarda Tohumluk Üretim Teknolojisi	S	8
16	Iğdır	Bahçe Bitkileri	Tohum Depolama İlkeleri	S	6
Sebze Tohum Üretimi			S	6	
Biyosistem Mühendisliği		Tohum Depolama İlkeleri	S	6	
		Sebze Tohum Üretimi	S	6	
Bitki Koruma		Tohum Depolama İlkeleri	S	6	
		Sebze Tohum Üretimi	S	6	
Tarım Ekonomisi		Tohum Depolama İlkeleri	S	6	
		Sebze Tohum Üretimi	S	6	
Tarla Bitkileri		Tohum Depolama İlkeleri	S	6	
		Sebze Tohum Üretimi	S	6	
Toprak Bilimi ve Bitki Besleme	Tohum Depolama İlkeleri	S	6		
	Sebze Tohum Üretimi	S	6		
17	Isparta Uygulamalı Bilimler	Bahçe Bitkileri	Tohum Fizyolojisi	S	6
Sebze Tohumluklarının Tescil ve Sertifikasyonu			S	6	
Tohumlarda Kalite Kontrol Kriterleri			S	6	

			Tohumlarda Kaliteyi İyileştirici Uygulamalar	S	6	
		Tarla Bitkileri	Yem Bitkileri Tohumculuğu ve Teknolojisi	S	6	
			Tohum Bilimi	S	6	
			Tarla Bitkilerinde Tohum Üretimi	S	6	
18	K. Maraş Sütçü İmam	Bahçe Bitkileri	Tohum Fizyolojisi	S	6	
				Sebze Tohumculuk Tekniği	S	4
				Seralarda Tohum Üretimi	S	6
				Organik Tohum ve Fide Üretimi	S	6
				Pamuk Tohumunun İşlenmesi Ve Kullanımı	S	6
			Tarla Bitkileri	Serin İklim Tahıllarında Tohum Kontrol ve Serf.	S	6
				Yem Bitkileri Tohumculuğu	S	6
				Yemeklik Dane Baklagillerin Tohumluk Üretimi	S	6
19		Kırşehir Ahi Evran	Tarla Bitkileri	Yemeklik Tane Baklagil Tohum. ve Depo. Tek.	S	7.5
					Şeker Bitkilerinin Tohumculuğu ve Teknolojisi	S
				Tohumluk Tescil ve Sertifikasyon	S	7.5
				Yağ Bitkileri Tohumluk Üretimi ve Teknolojisi	S	10
				Tohum Performansı ve Geliştirilmesi	S	10
				Yem Bitkilerinde Tohumculuk Tekniği	S	10

Çizelge 3. (Devam)

No	Üniversite	Anabilim Dalı	Dersin Adı	Statü	AKTS	
			Yağ Bitkilerinde Tohumculuk Tekniği	S	10	
20	Kilis 7 Aralık	Bahçe Bitkileri	Standart ve F1 Hibrit Tohumculuk Tekniği	S	7.5	
				Sebze Tohumlarının Kontrol ve Sertifikasyon	S	7.5
21	Konya Gıda ve Tarım	Bitkisel Üretim Teknolojileri	Tohum Fizyolojisi	S	5	
				Tohumluk Kontrol ve Sertifikasyon	S	5
				Tohum Teknolojisi	S	5
				Sebzelerde Tohum Üretimi	S	5
22	On Dokuz Mayıs	Bahçe Bitkileri	Organik Sebze Tohum Üretim	S	7.5	
				Tohumluk Kontrol ve Sertifikasyon	S	7.5
				Sebze Tohumu Muhafazası Tekniği	S	7.5
				Sebze Tohumculuğunda Yeni Gelişmeler	S	7.5
				İleri Sebze Tohumculuğu	S	7.5
				Organik Tohum Üretimi Yönetmeliği	S	7.5
			Tarla Bitkileri	Tohumluk Bilim ve Teknolojisi	S	7.5
				Tahıllarda Tohumluk Üretim Teknolojisi	S	7.5
			Yem Bitkilerinde Tohumculuk Tekniği	S	7.5	
23	Ordu	Bahçe Bitkileri	Sebze Tohumlarında Kalite Kontrol Yöntemleri	S	6	
				Tohum Biyolojisi	S	6
			Tarla Bitkileri	Yem Bitkilerinde Tohumluk Üretimi	S	6
				Tohumluk Tekniği	S	6

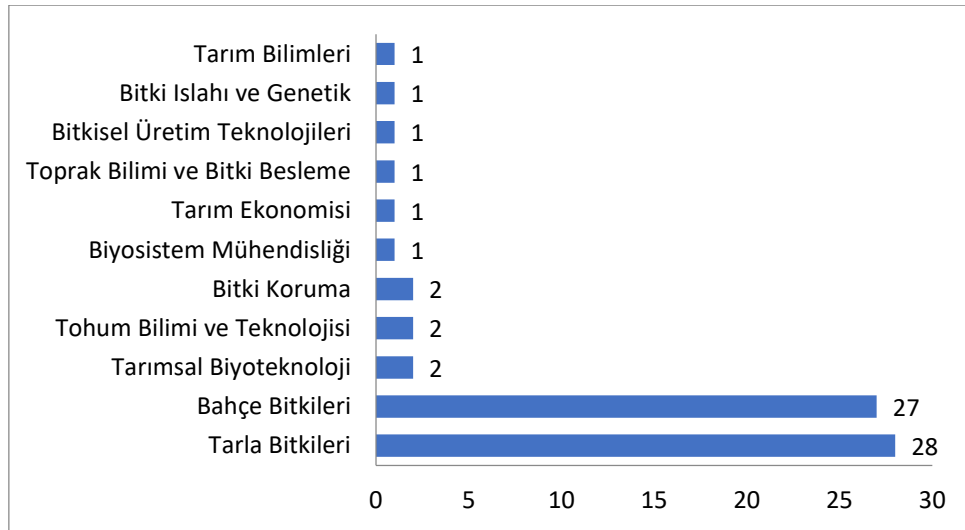
			Endüstri Bitkilerinde Tohumluk Üretim Teknoloji	S	6
24	Recep Tayyip Erdoğan	Tarla Bitkileri	Tohumluk Kontrol ve Sertifikasyon	S	3
			Genel Tohumculuk	S	4
			Bahçe Bitkileri Tohumculuğu	S	4
25	Sakarya Uygulamalı Bilimler	Bahçe Bitkileri	Çim Bitkilerinde Tohumluk Kontrol Teknikleri	S	6
		Tarla Bitkileri	Tohumculuk Mevzuatı	S	6
			Tahıllarda Tohumluk Üretim Teknolojisi	S	6
			Yem Bitkileri Tohumculuğu ve Teknolojisi	S	6
26	Selçuk	Bahçe Bitkileri	Sebzecilikte Tohumculuk Tekniği	S	5
			Sebze Tohumculuğunda Depolama Teknikleri	S	5
		Bitki Islahı ve Genetik	Tohumluk Kontrol ve Sertifikasyon	S	5
		Tarla Bitkileri	Patates Islahı Tohumculuğu ve Islahı	S	5
			Şeker Pancarı Üretimi ve Tohumculuğu	S	5
			Ayçiçeği Islahı, Tohumculuğu ve Sertifikasyon	S	5
			Yem Bitkilerinde Tohumluk Üretim Teknikleri	S	5
			Yağ Bitkileri Tohumluk Üretim Teknikleri	S	5
27	Siirt	Bahçe Bitkileri	Sebze Tohumculuğu	S	5
			Sebze Tohumluklarının Tescil Kontrol ve Sertif.	S	5
		Tarla Bitkileri	Tohumculuk Bilimi ve Teknolojisi	S	4
			Tohumculuk Teknolojisi	S	5
			Yağ Bitkilerinde Tohumluk Üretim Tekniği	S	5
			İleri Tohumluk Tekniği	S	5

Çizelge 3. (Devam)

No	Üniversite	Anabilim Dalı	Dersin Adı	Statü	AKTS
			Endüstri Bitkilerinde Tohumluk Üretim Teknolo.	S	5
			Tahıl ve Yemlik Baklagil Tohumculuğu Tek.	S	5
			Endüstri Bitkileri Tohumculuğu	S	5
			Yem Bitkilerinde Tohumluk Üretim Teknolojisi	S	5
28	Şırnak	Tarla Bitkileri	Yem Bitkileri Tohumculuk Teknolojisi	S	4
			Tohumculuk Mevzuatı	S	3
29	Tekirdağ Namık Kemal	Bahçe Bitkileri	Sebze Tohumlarında Kalite Kontrol Yöntemleri ve Depolama Esasları	S	5
			Tohum Biyolojisi ve Fizyolojisi	S	5
		Tarla Bitkileri	Yağ Bitkilerinde Tohumluk Üretim ve Teknoloji.	S	5
			Yem Bitkileri Tohumculuğu	S	5
			Yumru ve Kök Gövdeli Bitkilerin Tohumluk Üretim Teknikleri	S	5

			Geleneksel ve Organik Tohumluk Teknolojisi	S	5
30	Gaziosmanpaşa	Bahçe Bitkileri	Sebze Tohumculuğu Üretim Teknolojisi	S	7.5
			Tarla Bitkileri	Endüstri Bitkileri Tohumculuğu	S
			Tahıllarda Tohumluk Üretimi	S	7.5
			Yem Bitkileri Tohumluk Üretimi	S	7.5
31	Van Yüzüncü Yıl	Bahçe Bitkileri	Sebze Tohumluklarının Tescil, Kontrol ve Sertifikasyonu	S	5
			Bitki Koruma	Endüstri Bitkileri Tohumculuğu	S
		Tohumluk Tekniği		S	5
		Tohum Fizyolojisi		S	5
		Tarımsal Biyoteknoloji	Sebzelerde Hibrit Islahı ve Tohumluk Üretimi	S	5
Tohum Fizyolojisi	S		5		
32	Yozgat Bozok	Bahçe Bitkileri	Tohum Fizyolojisi	S	7
			Tarım Bilimleri	Tohum İşleme ve Muhafazası	S
		Tarla Bitkileri	Tohumluk Bilimi ve Teknolojisi	S	6
			Yem Bitkileri Tohumluk ve Üretimi	S	6

Çizelge 3’deki verilere göre 32 adet üniversitenin Fen Bilimleri Enstitüsüne bağlı ilgili anabilim dallarında lisansüstü düzeyde tohumculuk eğitiminin verildiği tespit edilmiştir. Tohumculukla ilgili derslerin anabilim dallarına göre dağılımı Şekil 7’de verilmiştir. Tohumculuk derslerinin en çok Tarla Bitkileri (28 adet) ve Bahçe Bitkileri (27 adet) Anabilim Dalında verildiği (Şekil 7), lisansüstü düzeyde verilen derslerin tamamının seçmeli (S) ders statüsünde olduğu belirlenmiştir (Çizelge 3)



Şekil 7. Lisansüstü düzeyinde tohumculuk derslerinin anabilim dallarına göre dağılımı

#### **4. TARTIŞMA VE SONUÇ**

Bu çalışmada, ülkemizdeki yükseköğretimdeki tohumculuk eğitiminin mevcut durumu ortaya konulmaya çalışılmıştır. Yapılan araştırmalar sonucunda, lisans düzeyinde eğitim verilen Ziraat Fakültelerinin (36 adet) tamamında tohumculukla ilgili dersler verildiği saptanmıştır. Günümüze kadar toplam 84 adet meslek yüksek okulunda tohumculukla ilgili derslerin verildiği program olduğu saptanmıştır. Ancak meslek yüksekokullarında farklı adlarla açılmış olan tohumculuk derslerinin (organik tohumculuk ve tıbbi aromatik bitkiler tohumculuğu programları hariç) birçoğunun, ders içerikleri incelendiğinde lisans düzeyinde verilen tek bir tohumculuk derslerine karşılık geldiği görülmüştür. Bu durumun tohumculuk sektörüne bir kazanım sağlamayacağı, gerek meslek yüksek okullarında gerekse Ziraat Fakültelerinde teorik derslerin yanı sıra, uygulamalı derslere de ağırlık verilmesi gerektiği bilinmektedir. Bu nedenle meslek yüksekokullarındaki bu derslerin, ders içerikleri zenginleştirilmeden, derslerin uygulama saatleri artırılmadan farklı adlarla benzer içerikli derslerin açılmasına ihtiyaç bulunmamaktadır.

Ülkemizde ara eleman yetiştirmek amacıyla kurulan ve sayıları hızla artan meslek yüksek okullarında eğitim kalitesini artırabilmek amacıyla sayılarının kontrol altına alınması gerekmektedir. Aynı durum lisans eğitiminin yapıldığı ve sayıları giderek artan Ziraat Fakülteleri için de geçerli olmaktadır. Alt yapıyı iyileştirmeden Ziraat Fakültelerine ve Meslek Yüksek okullarına alınan öğrenci sayılarını artırmakla tohumculuk sektörünün istediği elemanları yetiştirmek maalesef mümkün olamamaktadır. Bunun yanı sıra tarımın her sektöründe olduğu gibi tohumculuk sektörünün de güçlü olabilmesi açısından tohumculukta eğitim kalitesinin artırılması gerekmektedir. Sadece kaliteli öğretim elemanı ile kaliteli eğitim sürdürülemez. Uygulamanın ön plana çıktığı tohumculuk sektöründe alt yapı ve teknik donanım da son derece önemli olmaktadır. Bu nedenle tohumculuk eğitiminde kaliteyi artırabilmek için, gerek Ziraat Fakülteleri gerekse Meslek Yüksek Okullarının alt yapı, öğretim elemanı ve teknik donanımının bir bütün olarak değerlendirilmesi ve güçlendirilmesi gerekmektedir.

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## **TÜRKİYE İHRACATINDA ÖNDE GELEN BAZI TARIMSAL ÜRÜNLER**

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### **ÖZET**

Tarım, geçmişten günümüze dünyanın dikkat çeken sektörleri arasındadır. Özellikle nüfusun beslenme ihtiyacının karşılanmasında önemli bir yere sahiptir. Ayrıca tarımın, farklı alanlarda ülke ekonomisine olan katkısı da yadsınamaz. Tarımın; nüfus, işgücü, toplumun beslenmesine olan katkısı, sanayi, milli gelir ve dış ticaret katkısı bulunmaktadır. Ülkelerin dünya piyasalarında rekabet gücünün yüksek olması ihracat potansiyelini artırmaktadır. Bu çalışmanın amacı, Türkiye ihracatında önde gelen bazı tarımsal ürünlerini incelemektir. Araştırmada belirlenen ürünlere ait ikincil veriler incelenmiştir. Bu kapsamda Türkiye'nin ihracatta önde gelen bazı tarım ürünleri ekim alanı, üretim miktarı, verim ve dış ticaret değerleri (ihracat, ithalat) ortaya konularak değerlendirilmiştir. Türkiye ihracatında fındık, üzüm, domates, tütün, kayısı ve incir gibi tarım ürünleri ön plandadır. Türkiye İhracatçılar Meclisi (TİM) verilerine göre 2021 yılı tarım sektörü ihracatı 29 milyar doların üzerindedir. Bu değer Türkiye'nin toplam ihracatının yaklaşık %13'ünün tarımdan elde edildiğini göstermektedir. Tarımsal faaliyetler mikro düzeyde katkısının yanı sıra, makro düzeyde de ülke ekonomisini desteklemektedir. Sadece hammadde olarak değil, tarımsal ürünlere katma değer kazandırılması, mamul ve yarı mamul olarak dünya piyasalarında Türkiye'nin daha fazla yer edinebileceği düşünülmektedir.

**Anahtar kelimeler:** Tarım, Ticaret, İhracat, Ekonomi, Türkiye.



## **SOME LEADING AGRICULTURAL PRODUCTS IN TURKEY'S EXPORT**

### **ABSTRACT**

Agriculture is one of the most notable sectors of the world from the past to the present. In particular, it has an important place in meeting the nutritional needs of population. In addition, the contribution of agriculture to the country's economy in different subjects is also undeniable. It has a support to the population, labor force, nutrition of the society, industry, national income and foreign trade. The high competitiveness of countries increases the export potential in market. The aim of this study is to examine the some leading agricultural products in Turkey's export. In research, secondary data of the determined products were examined. In this context, some of Turkey's leading export products were evaluated by revealing the cultivation area, production amount, yield and foreign trade values (export, import). Products such as hazelnuts, grapes, tomatoes, tobacco, apricots and figs are at the forefront in Turkey's exports. According to the data of Turkish Exporters Assembly (TIM), the export of the agricultural sector is over 29 billion dollars in 2021. This value shows that approximately 13% of Turkey's total exports are obtained from agriculture. Agricultural activities not only contribute to the micro level, but also support the country's economy at the macro level. It is necessary to add value to agricultural products, not only as raw materials. It is thought that Turkey could gain more space as finished and semi-finished products in world markets.

**Keywords:** Agriculture, Trade, Export, Economy, Turkey.

## **GİRİŞ**

Tarım, bitkisel ve hayvansal üretimin iç içe olduğu bir sektördür. Dünya'nın en stratejik sektörleri arasında olup, insan ve hayvan beslenmesinde önemli bir yere sahiptir. Bu sebeple tarım, ekonomi ve kalkınma bakımından vazgeçilmezdir. Uzundumlu (2012) tarım; ülke ekonomisini nüfus, işgücü, dış ticaret, sanayi, milli gelir ve toplum beslenmesine katkı gibi değişik şekillerde desteklemektedir.

Türkiye, konumu itibariyle, elverişli iklim koşulları ve toprak yapısına sahip tarımsal faaliyetlere uygun bir ülkedir. Ancak tüm dünyada arazi, kıt olan üretim faktörleri arasında olduğundan, artırılması mümkün değildir. Artan nüfusun ihtiyaçlarının giderilmesi ve gıdaya olan talebin karşılanması bakımından tarımda verimliliğin artırılması ve ülkeler arası yapılan ticaretin geliştirilmesi önemlidir.

Ülkelerin aynı anda ya da tek başlarına tüm gıdaları üretmeleri mümkün olmadığından, dış ticaretin önemi her geçen gün artmaktadır. Dış ticaret kapsamında ithalat ve ihracat kavramları ön plana çıkmaktadır. İhracat (dışsatım), ülkelerin kendi sınırları içerisinde ürettikleri malları diğer ülkelere satması; ithalat (dışalım) ise yurt dışında üretilen ürünlerin bir başka ülke tarafından satın alınmasıdır. Ayrıca ihracat ve ithalat değerleri arasında oluşan farklar ise dış ticaret açığı ya da fazlası yaratarak kendini göstermektedir. Bir ülkenin yaptığı ihracat, ithalattan fazla olduğunda dış ticaret fazlası ortaya çıkarken; ithalatın ihracattan fazla olduğunda ise dış ticaret açığı meydana gelmektedir. Türkiye'nin son 10 yıllık verilerine göre ihracat, yıllar itibariyle dalgalı bir seyir izlemektedir (Koşar, 2018). Bu nedenle küresel ölçekte yaşanan finansal krizler, gelişmiş ve gelişmekte olan ülkelerin büyüme modellerine dikkat çekmiştir (Mohan, 2009). Türkiye ekonomisi, küresel finansal krizin etkisiyle; 2009 yılında %4.7 oranında küçülürken, 2010-2019 yılları arasında ise yıllık ortalama %5.8 oranında büyüme göstermiştir. Türkiye'nin kriz döneminde uluslararası piyasalarda rekabet gücünü arttırması, bir taraftan ihracat hacmini yükseltirken diğer yandan da yeni dış pazarlara açılarak pazar çeşitliliğini genişletmesini sağlamıştır. Türkiye İstatistik Kurumu (TÜİK) 2020 yılı verilerine göre, Türkiye 2017 yılında 157 milyar dolar, 2018 yılında 168 milyar dolar, 2019 yılında ise 172 milyar dolar ihracat hacmine ulaşmıştır. Ayrıca Türkiye İhracatçıları Meclisi 2020 yılı verilerine göre, Türkiye'nin 2017, 2018 ve 2019 yıllarında ihracat yaptığı ülke sayısı sırasıyla 210, 214 ve 226'ya ulaşmıştır. 10 milyon dolar üzerinde ihracat yapılan ülke sayısı 2017 yılında 155'e, 2018 yılında 170'e, 2019 yılında ise 175'e yükselmiştir. Türkiye son yıllarda ihracatı ve ihracat yaptığı ülke sayısını arttırmış olsa da bugün gelinen noktada toplam

ihracatı istenilen seviyede değildir. Küresel Covid-19 salgını sonrası ülkelerin ihracat pazarlarının yapısında yeni oluşum beklenmektedir (Bolat ve Kaplan, 2021). İhracatın artırılması ve sürdürülebilir olması için ihracatta ürün ve pazar çeşitliliği önemli konular arasındadır. Bu kapsamda yapılan birçok makroekonomik çalışma bulunmaktadır. Kösekahyaoğlu (2007); Doğan ve Soyyiğit Kaya (2011) Gümrük Birliği Anlaşması'nın Türkiye'nin ihracatında ürün ve ülke çeşitliliğini arttırdığını; Çınar ve Göksel (2010) Türkiye'nin ihracattaki büyümesi, ürün çeşitlendirmesinin sektör ihracatını istikrarlı hale getirdiğini; Dalgıç ve Fazlıoğlu (2015) uluslararası ticaretteki ürün ve ülke çeşitlenmesinin, ihracatçı firmaların sermaye yoğunluklarının ürün/ülke çeşitlendirmesinde önemli bir faktör olduğunu; Ateş ve Seymen (2019) Türkiye'nin imzaladığı serbest ticaret anlaşmalarının yeni ihracat pazarları kazandırarak, Türkiye'nin ihracatında ülke çeşitlendirmesi yarattığını ortaya koymuştur.

Bu çalışmanın amacı, Türkiye ihracatında önde gelen tarımsal ürünleri inceleyerek yıllar itibariyle değişimini ve gelişimini ortaya koymaktır.

## **MATERYAL VE YÖNTEM**

Araştırmanın ana materyalini FAO veri tabanından elde edilen ikincil veriler oluşturmaktadır. Araştırmada; Türkiye'nin tarımsal ihracatında önde gelen fındık, üzüm, tütün, domates, kayısı ve incir gibi ürünler incelenmiş olup, bu ürünlerin yıllar itibariyle değişimi ve gelişimi değerlendirilmiştir. Bu kapsamda ürünlere ait üretim (ekim alanı, üretim miktarı, verim) ve dış ticaret değerleri (ihracat miktarı, ihracat değeri, ithalat miktarı, ithalat değeri) incelenerek Türkiye açısından önemi değerlendirilmiştir. Verilerin yıllar itibariyle değişiminin belirlenmesinde basit indeks yöntemi kullanılmış olup, belirtilen ürünlerin son yıllardaki durumu ile gelişimi rakam ve yüzde olarak yorumlanmıştır.

## **BULGULAR**

Araştırma kapsamında; Türkiye'de fındık, üzüm, tütün, domates, kayısı ve incir gibi ürünlerin mevcut potansiyelini ortaya koyan üretim (ekim alanı, üretim miktarı ve verim) ve dış ticaret değerlerinin (ihracat-ithalat miktarı ve değerleri) yıllar itibariyle değişimi tablo olarak verilmiştir.

### 1. Fındık

Türkiye’de fındık üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte önemli oranda artış söz konusudur. FAO verilerine göre, 2011 yılında 429 955 ha olan ekim alanı, 2020 yılında 734 538 ha olarak gerçekleşerek, son 10 yılda %71 oranında artış göstermiştir. Fındık üretim miktarı 2011-2020 yılları arasında %55 oranında artmış olup, 2020 yılında 665 000 tona ulaşmıştır. Fındık verimi ise 2020 yılında %9 azalarak 91 kg/da olarak gerçekleşmiştir (Tablo 1). Fındık üretim miktarındaki artış üzerinde ekim alanı etkili olmakla birlikte, üretim miktarının ekim alanı ile aynı oranda artmadığı görülmektedir. Bu durumun belirtilen yıllar arasında iklim vb. sebeplerden kaynaklanan verim azalmasından olduğu düşünülmektedir.

**Tablo 1.** Türkiye’de fındık üretiminin yıllar itibariyle değişimi

Yıl	Ekim alanı (ha)	İndeks (2011=100)	Üretim miktarı (ton)	İndeks (2011=100)	Verim (kg/da)	İndeks (2011=100)
2011	429955	100	430000	100	100	100
2012	422765	98	660000	153	156	156
2013	422501	98	549000	128	130	130
2014	423261	98	450000	105	106	106
2015	434119	101	646000	150	149	149
2016	705445	164	420000	98	60	60
2017	706667	164	675000	157	96	96
2018	728381	169	515000	120	71	71
2019	734409	171	776046	180	106	106
2020	734538	171	665000	155	91	91

**Kaynak:** FAO, 2022

Türkiye’nin fındık dış ticaret değerleri incelendiğinde, ihracat miktarı ve ihracat değerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, önemli oranda bir azalma söz konusudur. Fındık ihracat miktarında 2011-2020 yılı verilerinde göre %36 oranında azalma olduğu görülmüştür. 2011 yılında 559 ton olan ihracat miktarı, 2020 yılında 359 tona gerilemiştir. Buna bağlı olarak fındık ihracat değerleri de %35 azalarak, 2020 yılında 1 238 000 dolar olarak gerçekleşmiştir. Yıllar itibariyle ithalat miktarında ve ithalat değerlerinde gözle görülür bir değişim olmamakla birlikte, ithalat yok denecek kadar azdır (Tablo 2).

**Tablo 2.** Türkiye fındık dış ticaretinin yıllar itibariyle değişimi

Yıl	İhracat miktarı (ton)	İndeks (2011=100)	İhracat değeri (bin \$)	İndeks (2011=100)	İthalat miktarı (ton)	İthalat değeri (bin \$)
2011	559	100	1899	100	0	0
2012	1488	266	4457	235	0	0
2013	1067	191	3387	178	33	93
2014	549	98	2528	133	-	-
2015	225	40	1250	66	-	-
2016	366	65	1522	80	0	0
2017	677	121	2134	112	5	31
2018	1163	208	3304	174	14	49
2019	733	131	2263	119	44	122
2020	359	64	1238	65	0	0

**Kaynak:** FAO, 2022

Türkiye’de kabuklu fındık fiyatında (₺/kg) son yıllarda artış görülmekle birlikte; fındık fiyatı 2020 yılında ₺23.35, 2021 yılında ₺25.29, 2022 yılında ₺34.89 olarak belirlenmiştir (Anonymous, 2022b). 2022/23 kabuklu fındık alım fiyatları ili ve cinsine göre farklılık göstermekle birlikte, %50 sağlam iç esasına göre tüm türlere ait fiyat ortalaması ₺50.5 olarak belirlenmiştir (TMO, 2022).

## 2. Üzüm

Türkiye’de üzüm üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, 2011-2020 yılları arasında ekim alanında bir miktar azalma, üretim miktarında ise pek bir değişim görülmemiştir. FAO verilerine göre, 2011 yılında 472 545 ha olan ekim alanı, 2020 yılında 400 998 ha olarak gerçekleşerek, son 10 yılda %15 oranında bir azalma göstermiştir. Üzüm üretim miktarı 2011-2020 yılları arasında %2 oranında azalarak, 2020 yılında 4 208 908 tona gerilemiştir. Üzüm verimi ise, 2020 yılında %15 artarak 1.050 kg/da olarak gerçekleşmiştir (Tablo 3). Üzüm ekim alanlarındaki azalışın etkisi üretim miktarı üzerinde etkili olsa da, verimdeki artış ile birlikte üretim miktarına etkisi pek hissedilmemiştir.

**Tablo 3.** Türkiye’de üzüm üretiminin yıllar itibariyle değişimi

Yıl	Ekim Alanı (ha)	İndeks (2011=100)	Üretim miktarı (ton)	İndeks (2011=100)	Verim (kg/da)	İndeks (2011=100)
2011	472545	100	4296351	100	0.909	100
2012	462296	98	4234305	99	0.916	101
2013	468792	99	4011409	93	0.856	94
2014	467093	99	4175356	97	0.894	98
2015	491956	104	3650000	85	0.790	87
2016	435227	92	4000000	93	0.919	101
2017	416907	88	4200000	98	1.007	111
2018	417041	88	3933000	92	0.943	104
2019	405439	86	4100000	95	1.011	111
2020	400998	85	4208908	98	1.050	115

Kaynak: FAO, 2022

Türkiye üzüm dış ticaret değerlerinde 2011-2020 yılları arasında, yıllar itibariyle dalgalanmalar görülmekle birlikte önemli oranda bir azalma olduğu belirlenmiştir. Üzüm ihracat miktarı 2011 yılında 239 577 ton olarak gerçekleşirken, 2020 yılında 212 309 tona gerileyerek %11 oranında azalmış olup, ihracat değeri 157 876 000 dolar olarak gerçekleşmiştir. Belirtilen yıllar arasında üzüm ithalat miktarında ve değerinde de önemli ölçüde azalmalar mevcuttur (Tablo 4).

**Tablo 4.** Türkiye üzüm dış ticaretinin yıllar itibariyle değişimi

Yıl	İhracat miktarı (ton)	İndeks (2011=100)	İhracat değeri (bin \$)	İndeks (2011=100)	İthalat miktarı (ton)	İndeks (2011=100)	İthalat değeri (bin \$)	İndeks (2011=100)
2011	239577	100	175325	100	771	100	829	100
2012	209525	87	162688	93	861	112	783	94
2013	203286	85	187624	107	705	91	637	77
2014	257804	108	201682	115	598	78	577	70
2015	175189	73	141408	81	1099	143	950	115
2016	173156	72	104735	60	794	103	706	85
2017	277743	116	195392	111	450	58	363	44
2018	180214	75	120884	69	480	62	279	34
2019	205705	86	150103	86	458	59	451	54
2020	212309	89	157876	90	306	40	249	30

Kaynak: FAO, 2022

Üzüm, yetiştirme yöntemine ve cinsine göre hâl fiyatları da değişiklik göstermektedir. Türkiye’de 2022 yılında geleneksel (konvensiyonel) yöntemle yetiştirilen üzümün ortalama fiyatı ₺7.21 iken, iyi tarım ile yetiştirilen üzüm ise ortalama ₺9.01 olarak satışa sunulmaktadır (Anonymous, 2022a).

### 3. Tütün

Türkiye’de tütün üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, ekim alanında bir miktar azalma olsa da, üretim ve verim değerlerinde önemli oranda artış söz konusudur. FAO verilerine göre, 2011 yılında 76 658 ha olan ekim alanı, 2020 yılında 74 959 ha olarak gerçekleşerek, son 10 yılda %2 oranında azalış göstermiştir. Tütün üretim miktarı 2011-2020 yılları arasında %68 oranında artarak, 2020 yılında 76 540 tona ulaşmıştır. Tütün verimi ise 2020 yılında %36 artarak 80.5 kg/da olarak gerçekleşmiştir (Tablo 5). Tütün ekim alanlardaki azalışa rağmen verimdeki artışın, üretim miktarı üzerinde önemli rol oynadığı düşünülmektedir.

**Tablo 5.** Türkiye’de tütün üretiminin yıllar itibariyle değişimi

Yıl	Ekim alanı (ha)	İndeks (2011=100)	Üretim miktarı (ton)	İndeks (2011=100)	Verim (kg/da)	İndeks (2011=100)
2011	76658	100	45435	100	59.3	100
2012	107698	140	73285	161	68.1	115
2013	133073	174	93158	205	70.0	118
2014	99262	129	74696	164	75.3	127
2015	105868	138	75000	165	70.8	120
2016	92505	121	74238	163	80.3	135
2017	99529	130	93666	206	94.1	159
2018	93503	122	75276	166	80.5	136
2019	81035	106	70000	154	94.1	159
2020	74959	98	76540	168	80.5	136

**Kaynak:** FAO, 2022

Türkiye’de tütün dış ticaret değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, ihracat miktarı ve değeri önemli oranda azalırken, ithalat miktarı ve değerinde ciddi oranda artış olduğu görülmektedir. Tütün ihracat miktarı 2011-2020 yılı verilerine göre, 2011 yılında 68 031 tondan, 2020 yılında 48 243 tona gerileyerek %29 oranında azalmıştır. Tütün ihracat değerleri de ihracat miktarına paralel olarak %28 oranında azalmış olup, 2020 yılında 267 542 000 dolar gerçekleşmiştir. Tütünün ithalat miktarı ise ihracatın aksine neredeyse 2 katına çıkarak 2020 yılında 93 829 tona yükselmiştir. İthalat değeri ise belirtilen yıllar arasında %45 artarak, 431 668 000 dolar gerçekleşmiştir (Tablo 6). İthalat değerindeki artışın ithalat miktarı kadar artmamış olması, ürün fiyatlarında yıllar itibariyle önemli bir değişim yaşanmadığını göstermektedir.

**Tablo 6.** Türkiye tütün dış ticaretinin yıllar itibariyle değişimi

Yıl	İhracat miktarı (ton)	İndeks (2011=100)	İhracat değeri (bin \$)	İndeks (2011=100)	İthalat miktarı (ton)	İndeks (2011=100)	İthalat değeri (bin \$)	İndeks (2011=100)
2011	68031	100	369464	100	48672	100	297879	100
2012	75680	111	427092	116	60697	125	359985	121
2013	57512	85	439352	119	61099	126	378574	127
2014	67895	100	517170	140	66252	136	411040	138
2015	54153	80	386138	105	67445	139	391657	131
2016	50742	75	358206	97	73459	151	428532	144
2017	48899	72	349636	95	74577	153	392897	132
2018	60625	89	382934	104	83178	171	443686	149
2019	46665	69	262472	71	87316	179	422194	142
2020	48243	71	267542	72	93829	193	431668	145

Kaynak: FAO, 2022

Türkiye'nin tütün ihracatı 2021 yılında ise 52 042 tonun üzerinde olup, yaklaşık 258 milyon \$ değere sahiptir. En fazla tütün ihracatının yapıldığı ülkeler ABD, Belçika, Endonezya, Polonya ve Rusya gibi ülkelerdir (Anonymous, 2022c).

#### 4. Domates

Türkiye'nin domates üretiminde belirtilen yıllar arasında önemli bir artış görülse de, ekim alanının değişmediği görülmektedir. 2011 yılında 181 018 ha olan ekim alanı, 2020 yılında 181 879 ha olarak gerçekleşerek, son 10 yılda önemli bir değişime sahip değildir. Domates üretim miktarı 2011-2020 yılları arasında %20 oranında artarak, 2020 yılında 13 204 015 tona ulaşmıştır. Domates verimi ise 2020 yılında %19 artarak 7 260 kg/da olarak gerçekleşmiştir (Tablo 7). Ekim alanının değişmemiş olmasına rağmen, domates üretim miktarındaki artış üzerinde verimin etkili olduğu anlaşılmaktadır.

**Tablo 7.** Türkiye'de domates üretiminin yıllar itibariyle değişimi

Yıl	Ekim alanı (ha)	İndeks (2011=100)	Üretim miktarı (ton)	İndeks (2011=100)	Verim (kg/da)	İndeks (2011=100)
2011	181018	100	11003433	100	6.079	100
2012	189202	105	11350000	103	6.000	99
2013	189122	104	11820000	107	6.250	103
2014	183029	101	11850000	108	6.474	107
2015	193572	107	21615000	196	6.517	107
2016	190020	105	12600000	115	6.631	109
2017	186711	103	12750000	116	6.829	112
2018	174161	96	12150000	110	6.976	115
2019	180424	100	12841990	117	7.118	117
2020	181879	100	13204015	120	7.260	119

Kaynak: FAO, 2022



Türkiye domates dış ticaret değerleri yıllar itibariyle dalgalanmalar görülmekle birlikte; ihracat miktarı ve değerinde azalma, ithalat miktar ve değerinde çok ciddi bir artış söz konusudur. Domates ihracat miktarı 2011-2020 yılı verilerine göre, 2011 yılında 576 573 ton olarak gerçekleşirken, 2020 yılında %11 oranında azalarak 513 835 tona gerilemiştir. Domates ihracatında elde edilen değerler de ihracat miktarındaki azalışa bağlı %28 oranında düşüş göstererek, 2020 yılında 310 058 000 dolar gerçekleşmiştir. Domatesin ithalat miktarı ve değeri ise son yıllarda önemli ölçüde artmıştır. 2011 yılında 681 ton olan ithalat miktarı altı katının üzerine çıkarak 2020 yılında 4184 tona yükselmiş olup, domates ithalat değeri ise 4 346 000 dolar olarak gerçekleşmiştir (Tablo 8).

**Tablo 8.** Türkiye domates dış ticaretinin yıllar itibariyle değişimi

Yıl	İhracat miktarı (ton)	İndeks (2011=100)	İhracat değeri (bin \$)	İndeks (2011=100)	İthalat miktarı (ton)	İndeks (2011=100)	İthalat değeri (bin \$)	İndeks (2011=100)
2011	576573	100	432461	100	681	100	61	100
2012	560430	97	400804	93	132	19	101	166
2013	483046	84	391230	90	51	7	45	74
2014	585202	101	426490	99	107	16	61	100
2015	541355	94	365279	84	494	73	426	698
2016	485963	84	239875	55	787	116	570	934
2017	522876	91	289219	67	553	81	450	738
2018	525874	91	288349	67	1042	153	845	1385
2019	531243	92	301649	70	1210	178	1238	2030
2020	513835	89	310058	72	4184	614	4346	7125

**Kaynak:** FAO, 2022

Domates yetiştirme yöntemine ve domatesin türüne göre hâl fiyatları da değişiklik göstermektedir. Türkiye’de 2022 yılında geleneksel (konvensiyonel) yöntemle yetiştirilen tüm domates türlerinin toplamına ait ortalama fiyat ₺9.49 olarak belirlenirken, iyi tarım ile yetiştirilen domates ortalama fiyatı ₺11.86 ve organik olarak yetiştirilen domates ise ortalama ₺15.53 olarak satılmaktadır (Anonymous, 2022a).

### **5. Kayısı**

Türkiye’de kayısı üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, önemli oranda artış söz konusudur. FAO 2022 yılı verilerine göre, 2011 yılında 112 079 ha olan ekim alanı, 2020 yılında 132 748 ha olarak gerçekleşerek, son 10 yılda %18 oranında artış göstermiştir. Kayısı üretim miktarı 2011-2020 yılları arasında %28 oranında artarak, 2020 yılında 833 398 tona ulaşmıştır. Kayısı verimi ise 2020 yılında %8 oranda artarak 628 kg/da

olarak gerçekleşmiştir (Tablo 9). Kayısı üretim miktarındaki artış üzerinde ekim alanındaki artış etkili olmakla birlikte, verimde yaşanan artışın da etkili görülmüştür.

**Tablo 9.** Türkiye’de kayısı üretiminin yıllar itibariyle değişimi

Yıl	Ekim alanı (ha)	İndeks (2011=100)	Üretim miktarı (ton)	İndeks (2011=100)	Verim (kg/da)	İndeks (2011=100)
2011	112079	100	650000	100	580	100
2012	114052	102	760000	117	666	115
2013	115613	103	780000	120	675	116
2014	117907	105	278210	43	236	41
2015	123176	110	696100	107	565	97
2016	123805	110	730000	112	590	102
2017	125049	112	985000	152	788	136
2018	125756	112	750000	115	596	103
2019	131178	117	846606	130	645	111
2020	132748	118	833398	128	628	108

**Kaynak:** FAO, 2022

Türkiye’de kayısı dış ticaret değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte önemli oranda artış söz konusudur. FAO 2022 yılı verilerine göre, 2011 yılında 28 489 ton olan ihracat miktarı 2020 yılında iki katının üzerine çıkarak 64 694 tona yükselmiş olup, ihracat değeri de %92 artarak 55 627 000 dolar seviyesinde gerçekleşmiştir. Kayısı ithalat miktarı ise; belirtilen yıllar arasında 9 tondan 129 tona yükselerek önemli oranda artış göstermiştir. İthalat miktarına bağlı olarak ithalat değerinde de önemli ölçüde artış olduğu belirlenmiştir (Tablo 10).

**Tablo 10.** Türkiye kayısı dış ticaretinin yıllar itibariyle değişimi

Yıl	İhracat miktarı (ton)	İndeks (2011=100)	İhracat değeri (bin \$)	İndeks (2011=100)	İthalat miktarı (ton)	İndeks (2011=100)	İthalat değeri (bin \$)	İndeks (2011=100)
2011	28489	100	28936	100	9	100	7	100
2012	56302	198	41613	144	47	522	55	786
2013	41583	146	42444	147	1	11	1	14
2014	26692	94	27420	95	1	11	1	14
2015	55337	194	39236	136	13	144	13	186
2016	37166	130	24310	84	5	56	6	86
2017	63530	223	44188	153	45	500	23	329
2018	70698	248	41008	142	36	400	30	429
2019	67631	237	38093	132	96	1067	121	1729
2020	64694	227	55627	192	129	1433	110	1571

**Kaynak:** FAO, 2022

Kayısı fiyatı; yetiştirme yöntemine, kayısının cinsine ve yetiştirildiği ile bağlı olarak değişiklik göstermektedir. Türkiye hâl fiyatlarına göre, 2022 yılında geleneksel (konvensiyonel) yöntemle yetiştirilen kayısının ortalama fiyatı ₺11.54 olarak belirlenirken, iyi tarım ile yetiştirilen kayısı yaklaşık ₺13.00 olarak satışa sunulmaktadır (Anonymous, 2022a).

### 6. İncir

Türkiye’de incir üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, önemli oranda artış söz konusudur. FAO 2022 yılı verilerine göre, 2011 yılında 48 530 ha olan ekim alanı, 2020 yılında 53 694 ha olarak gerçekleşerek, son 10 yılda %11 oranında artış göstermiştir. İncir üretim miktarı 2011-2020 yılları arasında %23 oranında artarak, 2020 yılında 32 0000 tona ulaşmıştır. İncir verimi ise ekim alanında olduğu gibi 2020 yılında %11 oranda artarak 596 kg/da olarak gerçekleşmiştir. İncir üretim miktarındaki artış üzerinde ekim alanındaki artış etkili olmakla birlikte, verimde yaşanan artışın da etkisinin olduğu görülmektedir (Tablo 11).

**Tablo 11.** Türkiye’de incir üretiminin yıllar itibariyle değişimi

Yıl	Ekim Alanı (Ha)	İndeks (2011=100)	Üretim Miktarı (ton)	İndeks (2011=100)	Verim	İndeks (2011=100)
					(kg/da)	
2011	48530	100	260508	100	537	100
2012	49175	101	274535	105	558	104
2013	49401	102	298914	115	651	113
2014	49464	102	300282	115	671	113
2015	49718	102	300600	115	646	113
2016	49987	103	305450	117	611	114
2017	50330	104	305689	117	607	113
2018	51389	106	306499	118	596	111
2019	52116	107	310000	119	595	111
2020	53694	111	320000	123	596	111

**Kaynak:** FAO, 2022

Türkiye kuru incir dış ticaret değerlerinde de yıllar itibariyle dalgalanmalar görülmekle birlikte önemli oranda artış görülmektedir. FAO 2022 yılı verilerine göre, 2011 yılında 44 821 ton olan ihracat miktarı, 2020 yılında neredeyse iki katının üzerine çıkarak 88 509 tona yükselmiştir. İncirin ihracat değeri, 2020 yılında %94 oranında artarak 293 372 000 dolar olarak gerçekleşmiştir. Kuru incir ithalat miktarı ise; belirtilen yıllar arasında 1130 tondan 1700 tona yükselerek önemli oranda artış göstermiştir (Tablo 12). İthalat miktarına bağlı olarak ithalat değerinde de önemli ölçüde artış olduğu belirlenmiştir.

**Tablo 12.** Türkiye kuru incir dış ticaretinin yıllar itibariyle değişimi

Yıl	İhracat miktarı (ton)	İndeks (2011=100)	İhracat değeri (bin \$)	İndeks (2011=100)	İthalat miktarı (ton)	İndeks (2011=100)	İthalat değeri (bin \$)	İndeks (2011=100)
2011	44821	100	151546	100	1130	100	4619	100
2012	63970	143	196754	130	1168	103	4659	101
2013	76268	170	241539	159	658	58	2784	60
2014	73457	164	280539	185	660	58	3072	67
2015	67186	150	252180	166	876	78	4248	92
2016	69683	155	249501	165	503	45	2305	50
2017	79236	177	298505	197	824	73	3473	75
2018	78370	175	288950	191	951	84	4832	105
2019	84923	189	286348	189	1205	107	10577	229
2020	88509	197	293372	194	1700	150	7463	162

**Kaynak:** FAO, 2022

İncir fiyatı; yetiştirme yöntemine, incirin cinsine ve yetiştirildiği ile bağlı olarak değişiklik göstermektedir. Türkiye hâl fiyatlarına göre, 2022 yılında geleneksel (konvansiyonel) yöntemle yetiştirilen incirin ortalama fiyatı ₺16.58 olarak belirlenirken, iyi tarım ile yetiştirilen incir yaklaşık ₺27.45 olarak satışa sunulmaktadır (Anonymous, 2022a).

## SONUÇ VE ÖNERİLER

Ülkelerin dünya piyasalarında rekabet gücünün yüksek olması ihracat potansiyeli üzerinde etkili olmaktadır. Dolayısıyla Türkiye ihracatında; fındık, üzüm, domates, tütün, kayısı ve incir gibi ürünler ön plana çıkmaktadır. Türkiye'nin toplam ihracatının yaklaşık %13'ü tarımdan elde edilmektedir. Tarımsal faaliyetler mikro düzeyde katkısının yanı sıra, makro düzeyde de ülke ekonomisini desteklemektedir.

✓ Türkiye'de fındık üretim değerlerine bakıldığında; ekim alanında %71 oranında, üretim miktarında %55 oranında önemli ölçüde artış olduğu; fındık veriminde ise %9 oranında bir azalma olduğu saptanmıştır. Fındık dış ticaretinde ise 2011-2020 yılları arasında pek değişmediği ve hatta son 10 yılda gerilediği anlaşılmaktadır.

✓ Üzüm üretim değerlerine göre; ekim alanında %15, üretim miktarında %2 oranında bir azalma; verimde ise bunların aksine %15 oranında artış bir artış söz konudur. Üzüm dış ticaretinde ise, belirtilen yıllar arasında ihracat miktarında ve ihracat değerlerinde yaklaşık %10 oranda azalış olduğu görülürken, ithalat miktarında da ciddi oranda bir azalma olduğu belirlenmiştir.

✓ Tütün üretim değerlerine göre; ekim alanı %2 azalırken; üretim miktarı %68, verimde ise %36 oranında bir artış söz konusudur. Türkiye’de tütün dış ticaret değerlerinde ise ihracat miktarı ve değeri önemli oranda azalırken, ithalat miktarı ve değerinde ciddi oranda artış olduğu görülmektedir.

✓ Domates değerlerine göre; Türkiye’nin ekim alanında bir değişim görülmezken; üretim miktarında %20, verimde ise %9 oranında bir artış söz konusudur. Domates dış ticaret verilerinde de tütünde olduğu gibi ihracat miktar ve değerlerindeki azalma, ithalat değerlerinde artış olduğu belirlenmiştir.

✓ Kayısı değerlerine göre; ekim alanı %18, üretim miktarı %28, verim ise %8 oranında artış göstermiştir. Kayısı dış ticaretinde ise hem ihracat hem de ithalat değerlerinde önemli artışlar olduğu saptanmıştır.

✓ İncir değerlerine göre; ekim alanı %11, üretim miktarı %23, verim ise %11 oranında artış göstermiştir. İncir dış ticaretinde ise ihracat miktar ve ihracat değerleri neredeyse iki katına çıkmış olup, ithalat miktar ve ithalat değerlerinde de yaklaşık %50’nin üzerinde bir artış olduğu görülmüştür.

Sonuç olarak; Türkiye ihracatında önde gelen tarımsal ürünlerin son 10 yılda önemli ölçüde değişim gösterdiği belirlenmiştir. İhracatın sürdürülebilir olması, farklı ürünlere yönelik ihracatın yapılması için ihracat çeşitliliği ve ihracata teşvik dünya dış ticaretinde önemlidir. Ayrıca elde edilen bulgulara göre, organik olarak ve iyi tarım yöntemi kullanarak yetiştirilen ürünlerin, konvensiyonel tarım yöntemi ile yetiştirilen ürünlere göre daha yüksek fiyata alıcı bulunduğu anlaşılmaktadır.

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## **KİVİNİN DÜNYA VE TÜRKİYE EKONOMİSİNDEKİ YERİ**

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### **ÖZET**

Kivi insan sağlığı bakımından oldukça faydalıdır. Besin değeri yüksek lezzetli ve egzotik bir meyvedir. Son yıllarda kivi, dünyada üretim ve pazarlama bakımından dikkat çeken ürünler arasındadır. İklim ve toprak koşullarının elverişli olduğu bölgelerde, verim ve ürün fiyatlarının yüksek olmasından dolayı üreticiler tarafından tercih edilen bir üründür. Bu çalışmanın amacı küresel ekonomide kivinın mevcut potansiyelini ve geleceğini değerlendirmektir. Kivi, dünyada yaklaşık 250 000 hektar alanda, 4 milyon tonun üzerinde bir üretim miktarına sahiptir. Verim değeri ise 1600 kilogramın üzerindedir. Dünyada en fazla sırasıyla Asya, Avrupa ve Okyanusya kıtasında üretilmektedir. Ancak Okyanusya'nın kivi verimi diğerlerine göre oldukça yüksektir. Dünyada kivi üretiminde Çin, İtalya, Yeni Zelanda önde gelen ülkelerdir. Üretimde 1. sırada olan Çin, kivi üretiminin yaklaşık %50'sini tek başına gerçekleştirmektedir. Türkiye ise 2019 yılı verilerine göre yaklaşık 64 bin ton kivi üretimi ile dünyada 7. sırada yer almaktadır. Türkiye'nin toplam ağaç sayısı 2 milyonun üzerinde olup, verimi ise ağaç başına yaklaşık 40 kg'dır. Kivi dış ticaret bakımından da önemlidir. Dünyada 2018 yılında yaklaşık 6.5 milyar dolarlık bir işlem hacmine sahiptir. Yaklaşık 3.1 milyar dolar ihracat değeri bulunmaktadır. Yeni Zelanda, İtalya, Belçika ve Şili en fazla kivi ihracatı yapan ülkelerdir. Son yıllarda dünyada artış gösteren kivi alanları, Türkiye'de de artış göstermiştir. Yetiştirme koşulları itibarıyla kivinın yaklaşık %55'i Karadeniz Bölgesi'ndedir. Ancak Türkiye'de en fazla kivi üretimi Yalova'da gerçekleştirilmektedir. 2019 yılı verilerine göre yaklaşık 490 bin ağaç sayısına sahip olan bu ilin, 25 bin tona yakın üretimi vardır. Kivi üretiminin yaygınlaştırılması, üretici gelirin katkı sağlar. Ayrıca kivinın dünya genelinde üretim, pazarlama gibi farklı alanlarda ekonomik katkılar sunmaya devam edeceği düşünülmektedir.

**Anahtar kelimeler:** Kivi, Üretim, Pazarlama, Ticaret, Dünya.



## **THE PLACE OF KIWI IN THE WORLD AND TURKISH ECONOMY**

### **ABSTRACT**

Kiwi is very beneficial for human health. It is a delicious and exotic fruit with high nutritional value. In recent years, it is among the products that attract attention in terms of production and marketing in the world. It is a product preferred by farmers in regions where climate and soil conditions are favorable. High price and high product yield are effective in the preference of farmers. The aim of this study is to evaluate the current potential and future of kiwi in the global economy. It has a production amount of over 4 million tons in approximately 250,000 hectares of land in the world. Its yield value is over 1600 kilograms. It is produced mostly in Asia, Europe and Oceania continents in the world, respectively. However, the kiwi yield of Oceania is quite high compared to the others. China, Italy and New Zealand are the leading countries in kiwi production in the world. China, which is in the 1st place in production, realizes approximately 50% of kiwi production alone. Turkey, on the other hand, ranks 7th in kiwi production according to 2019 data. In 2019, approximately 64 thousand tons of kiwi has been produced in Turkey. The total number of trees in Turkey is over 2 million, and the yield is approximately 40 kg per tree. Kiwi is also important in terms of foreign trade. In 2018, it has a transaction volume of approximately 6.5 billion dollars in the World. It has an export value of approximately 3.1 billion dollars. New Zealand, Italy, Belgium and Chile are the countries that export the most kiwi. Kiwi areas, which have increased in the world in recent years, have also increased in Turkey. In terms of growing conditions, approximately 55% of the kiwi is in the Black Sea Region. However, the most kiwi production in Turkey is carried out in Yalova. According to 2019 data, Yalova has approximately 490 thousand trees, and 25 thousand tons of production. Expanding kiwi production in Turkey contributes to the income of farmers. In addition, it is thought that it will continue to make economic contributions in different fields such as production and marketing throughout the world.

**Keywords:** Kiwi, Production, Marketing, Trade, World.

## GİRİŞ

Kivi (*Actinidia deliciosa*) Doğu ve Güney Çin’de doğal olarak yetişen ve son yıllarda üretiminde ve tüketiminde önemli artışlar olan asma benzeri odunsu bir bitkidir (Samancı, 1990). Kivi meyvelerinin yeşilimsi kahverengi, kendine has hoş bir tadı ve lezzeti vardır. Vitamin ve mineraller bakımından oldukça zengin ve düşük kalorili bir meyvedir (Anonymous, 2003). Kuru madde içeriği yüksek olan kivi (Minchin ve ark., 2010), temel olarak glukoz ve fruktozdan meydana gelmekte olup, yüksek potasyum içeriğine sahiptir. Elma ve armuttan 10 kat daha fazla C vitamini içeren, antioksidan ve lif içeriği yüksek bir üründür (Ekşi ve Özen Türkmen, 2012). Kivi meyve ve bileşiminde en önemli ve dikkat çekici unsur C vitamini içeriğidir. Bu unsur, kivi meyvesine değer katan ve aranan bir meyve olmasını sağlamaktadır. Kivi meyvesinin 100 gramında, ortalama 100-400mg C vitamini bulunur (Akbaş ve ark., 2012). Sağlık meyvesi olarak bilenen kivi, besin değerinin yanı sıra, tıpta kullanımı da söz konusudur. Çin’de yapılan analizlerde, meyve suyunda bulunan bazı maddelerin kansere neden olan faktörleri önlediği ortaya çıkmıştır. Yine bazı tıbbi içeceklerle birlikte kullanıldığında astım, öksürük, ve nefes açıcı özelliklere sahip olduğu bildirilmiştir (Mortan, 1987). Kivi çok besleyici ve biyoaktif bileşenler bakımından zengin bir meyve olduğundan dolayı kivi; kolestrol, romatizma, sindirim sistemi gibi sağlık sorunlarının tedavisinde de kullanılmaktadır (Petilica ve ark., 2015). Ancak; bazı kimyasal ve fiziksel özelliklerinin olgunluk periyoduna göre değişim gösterdiği (Cangi ve ark., 2011), kivinın içerdiği vitamin ve mineral maddelerin yüksek olması, antioksidan, antikanserijen, antimutajenik ve antimikrobiyal etkilerinin anlaşılmasıyla son yıllarda üretiminde hızlı bir artış söz konusudur (Yazıcı ve ark., 2016).

Kivi, taze tüketiminin yanında salata, pasta, marmelat yapımında kullanıldığı gibi (Eriş,1989), meyvesinden çok farklı şekillerde fayda sağlanmaktadır. Ayrıca gıda sanayiinde, pasta, tatlı, ve içki yapımında da kullanılmaktadır. Bu şekilde tüketimi yaygınlaşan kivide, üretim ve kalite sıkıntısı yaşanması pazarlamada ciddi sorundur (Yazıcı ve ark., 2016).

Dünya’da Yeni Zelanda ile başlayan kivi üretimi, 1970’li yıllardan sonra İtalya, Şili, Fransa, Yunanistan ve Japonya gibi ülkelerde yaygınlaşırken, Türkiye’de 1988 yılında yapılan adaptasyon çalışmalarıyla başlamış olup; Karadeniz, Marmara ve Ege Bölgeleri’nde rahatlıkla kivi yetiştirilebileceği belirlenmiştir. Kivi kışları ılık, yazları ise sıcak ve nemli bir iklime gereksinim duymaktadır. Büyüme ve gelişme döneminde 20-25 °C sıcaklığa ve 16 saat ışıklandırma ihtiyacı olup, vejetasyon döneminde düzenli olarak ortalama 800-1.400 mm yağış alan bölgelerde rahatlıkla yetiştirilebilmektedir (Anonymous, 2016). Ayrıca yüksek rakımlarda,

meyvelerin fiziksel özelliklerine ait değerlerinde genel olarak bir azalmanın meydana gelmesinden dolayı düşük rakımlı yerlerin yüksek rakımlı yerlere göre daha fazla tercih edilmesi tavsiye edilebilir (Bostan ve Günay, 2014). Detaylı yapılan araştırmalarla birlikte, Doğu Karadeniz Bölgesi'nin bitkinin ekolojik isteklerini karşılması bakımından diğer bölgelere göre daha uygun olduğu belirlenmiştir (Samancı, 1990). Türkiye'de, özellikle Doğu Karadeniz Bölgesi'nde yetiştirilerek, yörede çay ve fındıktan sonra ikinci ürün haline gelmektedir. Bölgedeki çiftçilere ek gelir sağlarken ülke ekonomisine de katkısını sürdürmektedir (Kubal ve ark., 2017). Kivi çeşitlerinde, ürünün yüksek fiyatla ve daha geniş yelpazede pazara sunumu açısından meyve kalitesi önemlidir. Kivinin pazarlanma aşamasında meyve iriliği, sertliği, meyve eti ve kabuk rengi, depolama gibi sorunlar ön plana çıkmaktadır. Bu kapsamda meyve kalitesinin artırılarak ürün kayıplarının azaltılması ve kivi ihracatının artırılması hedeflenmektedir (Balıkçı ve ark., 2021). Dünya'da ve Türkiye'de kivi üretimi yeni üretici ülkelerin katılımı ve tüketici taleplerinin artışına bağlı olarak giderek artmaktadır (Uzundumlu ve ark., 2018).

Günümüzde kivi adaptasyon yeteneği iyi olduğundan, ekim alanı ve üretim miktarı bakımından hem dünya hem de Türkiye için önemli bir üründür (Bostan ve Günay, 2014). Kivi yetiştiriciliğine uygun ekolojilere sahip ülkelere biri olan Türkiye'de de kivi üretimi gün geçtikçe artmaktadır. Üreticiler ve tüketiciler tarafından rağbet gören kivi, Türk damak zevkine uygun ve genellikle taze olarak tüketilmektedir. Özellikle yüksek besin içeriği sebebiyle yetiştiriciliğine olan ilgi artarken yeni kivi bahçeleri tesis edilmektedir (Zenginbal ve Özcan, 2005). Kivi, son 30-50 yılda üretimi ve tüketimi hızla artan meyve türlerindedir. Geniş adaptasyon yeteneği, bitki ve meyve özellikleri, kolay depolanması, yüksek fiyatla alıcı bulması, üretimindeki artış sağlamıştır (Akbaş ve ark., 2012). Dünya'da en fazla ve en yaygın yetiştirilen çeşit Hayward olup; meyve eti parlak yeşil, orta şekerli, bol sulu, uzun süre depolanabilen bir kivi çeşididir (Uzundumlu ve ark., 2018). Türkiye'de kivi üretiminin neredeyse tamamı Hayward çeşidi ile gerçekleştirilmektedir (Petilica ve ark., 2015).

Bu çalışmanın amacı küresel ekonomide kivinin mevcut potansiyelini ve geleceğini değerlendirmektir. Bu kapsamda dünya ve Türkiye'deki kivi üretim ve dış ticaret değerleri (ekim alanı, üretim miktarları, verim, ihracat miktarı, ihracat değeri, ithalat miktarı, ithalat değeri) incelenmiştir.

## MATERYAL VE YÖNTEM

Araştırmanın ana materyalini TÜİK, FAO gibi veri tabanlarından elde edilen ikincil veriler oluşturmaktadır. Araştırma kapsamında dünya kivi üretimi kıtalara ve ülkelere göre incelenmiş olup, kivinin yıllar itibariyle gelişimi değerlendirilmiştir. Ayrıca Türkiye'nin kivi üretim değerleri (ekim alanı, üretim miktarı ve verim) ve dış ticaret değerlerindeki (ihracat miktarı, ihracat değeri, ithalat miktarı, ithalat değeri) değişim, tablolar aracılığıyla yorumlanmıştır. Verilerin yıllar itibariyle değişimini ortaya koymak amacıyla basit indeks yöntemi kullanılmış olup, ürünlerin son yıllardaki durumu incelenerek Türkiye açısından önemi değerlendirilmiştir.

## BULGULAR

### 1. Dünyada Kivinin Durumu

Türkiye'nin kivi üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, ekim alanı, üretim ve verimde önemli oranda artış söz konusudur. FAO verilerine göre 2000 yılında 127 033 ha olan ekim alanı, 2019 yılında 268 788 ha olarak gerçekleşerek 2 katının üzerine çıkmıştır. Kivi üretim miktarı 2000-2019 yılları arasında 2,5 katının üzerine çıkarak 4.348.011 tona ulaşmıştır. Kivi verimi ise belirtilen yıllarda %9 artarak 2019 yılında 1.618kg/da olarak gerçekleşmiştir (Tablo 1). Kivi üretim miktarındaki artış üzerinde verim bir miktar etkili olsa da, daha çok ekim alanındaki artışın etkili olduğu görülmektedir.

**Tablo 1.** Dünya kivi verilerinin değişimi (hasat edilen alan, üretim miktarı ve verim)

Yıl	Alan (ha)	İndeks (2000=100)	Üretim miktarı (ton)	İndeks (2000=100)	Verim (kg/da)	İndeks (2000=100)
2000	127.033	100	1.888.255	100	1.486	100
2005	146.424	115	2.339.791	124	1.598	108
2010	172.280	136	2.837.310	150	1.647	111
2015	263.032	207	4.061.076	215	1.544	104
2016	274.717	216	4.244.808	225	1.545	104
2017	246.406	194	3.938.640	209	1.598	108
2018	260.283	205	4.190.771	222	1.610	108
2019	268.788	212	4.348.011	230	1.618	109

**Kaynak:** FAO, 2021

Dünya'da en fazla kivi üreten kıtalar sırasıyla Asya, Avrupa ve Okyanusya'dır. Asya kıtası 2.639.064 ton üretim miktarına sahip olmakla birlikte, 200.000 hektarın üzerinde ekim alanı bulunmaktadır. Ancak, Avrupa ve Okyanusya kıtalarında ise ekim alanı fazla olmamasına rağmen verim değeri oldukça yüksektir. Özellikle Okyanusya kıtasında, 3.714 kg/da verim ile

birlikte 15.099 ha alandan 560.720 ton ürün elde edilmektedir. 2000-2019 yılları arasında belirtilen kıtalarda ekim alanında önemli artış olduğu görülmektedir. Ancak Okyanusya kıtası veriminde de önemli artışlar söz konusudur. Okyanusya üretim miktarındaki artışın ekim alanındaki artış ve verim birlikte etkili olmaktadır. Asya ve Avrupa kıtalarında ise verimde pek bir değişim görülmemiştir. Bu kıtaların üretim miktarı üzerinde daha çok ekim alanlarındaki artışın etkili olduğu düşünülmektedir. Kıtalara göre, dünya fazla kivi üretiminin yıllar itibariyle değişimi Tablo 2’de verilmiştir.

**Tablo 2.** Dünyada en fazla kivi üreten kıtalar

Yıl	Asya			Avrupa			Okyanusya		
	Alan (ha)	Üretim miktarı (ton)	Verim (kg/da)	Alan (ha)	Üretim miktarı (ton)	Verim (kg/da)	Alan (ha)	Üretim miktarı (ton)	Verim (kg/da)
2000	76.903	958.475	1.246	27.614	516.543	1.871	12.584	266.638	2.119
2005	93.148	1.244.915	1.337	32.538	588.736	1.809	12.301	322.222	2.620
2010	109.877	1.497.321	1.363	36.488	628.542	1.723	13.284	437.116	3.291
2015	196.759	2.563.907	1.303	42.538	866.041	2.036	12.428	440.517	3.545
2016	211.332	2.772.309	1.312	40.460	796.335	1.968	12.551	445.505	3.550
2017	183.330	2.431.042	1.326	41.034	856.090	2.086	11.854	422.167	3.561
2018	192.718	2.539.621	1.318	44.244	940.304	2.125	13.053	476.319	3.649
2019	200.751	2.639.064	1.315	43.554	924.256	2.122	15.099	560.720	3.714

**Kaynak:** FAO, 2021

Dünyada kivi üretiminde önde gelen ülkeler (ilk 10) başta Çin olmak üzere, Yeni Zelanda, İtalya, İran ve Yunanistan olarak sıralanmaktadır. Çin 182 566 ha ekim alanı ve 2 196 727 ton üretim miktarı ile dünya kivi üretiminde birinci sırada yer alırken, Türkiye 2019 yılı verilerine göre dünya kivi üretiminde 7. sıradadır. Verim bakımından ise 3.741 kg/da ile Yeni Zelanda’nın ilk sırada olduğu görülmektedir (Tablo 3).

**Tablo 3.** Kivi üretiminde önde gelen ülkeler (ilk 10)

Sıra	Ülkeler	Alan (ha)	Üretim miktarı* (ton)	Verim (kg/da)
1.	Çin	182.566	2.196.727	1.203
2.	Yeni Zelanda	14.922	558.191	3.741
3.	İtalya	25.080	524.490	2.091
4.	İran	12.773	344.189	2.695
5.	Yunanistan	10.290	285.860	2.778
6.	Şili	7.595	177.206	2.333
<b>7.</b>	<b>Türkiye</b>	<b>3.067</b>	<b>63.798</b>	<b>2.080</b>
8.	Fransa	3.810	55.830	1.465
9.	ABD	1.780	46.720	2.625
10.	Portekiz	2.740	32.360	1.181

**Kaynak:** FAO, 2021  
\* 2019 yılı üretim miktarına göre sıralanmıştır.

## 2. Türkiye’de Kivinin Durumu

Türkiye’nin kivi üretim değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, ekim alanı, üretim ve verim değerlerinde önemli oranda artış söz konusudur. FAO 2022 yılı verilerine göre, 2010 yılında 1719 ha olan ekim alanı, 2020 yılında 3261 ha olarak gerçekleşerek son 10 yılda %90 oranında artış göstermiştir. Kivi üretim miktarı 2010-2020 yılları arasında 2,5 katının üzerine çıkarak 73 745 tona ulaşmıştır. Kivi verimi ise belirtilen yıllarda %46 artarak 2020 yılında 2.261 kg/da olarak gerçekleşmiştir (Tablo 4). Verim ve ekim alanındaki artış kivi üretim miktarı üzerinde etkili olmuştur.

**Tablo 4.** Türkiye kivi verilerinin değişimi (hasat edilen alan, üretim miktarı ve verim)

Yıl	Alan (ha)	İndeks (2010=100)	Üretim miktarı (ton)	İndeks (2010=100)	Verim (kg/da)	İndeks (2010=100)
2010	1719	100	26554	100	1.545	100
2015	2411	140	41640	157	1.727	112
2016	2487	145	43950	166	1.767	114
2017	2744	160	56164	212	2.047	132
2018	2990	174	61920	233	2.071	134
2019	3067	178	63798	240	2.080	135
2020	3261	190	73745	278	2.261	146

**Kaynak:** FAO, 2022

Türkiye kivi dış ticaret değerlerinde yıllar itibariyle dalgalanmalar görülmekle birlikte, kivi ihracat miktarı ve ihracat değerinde önemli bir artış, ithalat miktarı ve ithalat değerinde ise azalma olduğu görülmektedir. Kivi dış ticaretinin 2010-2020 yılı arasındaki değişimine bakıldığında, 2010 yılında 61 ton olan ihracat miktarı 2020 yılında 4872 tona yükselerek, 2020 yılında 4 163 000 dolar ihracat değeri gerçekleşmiştir. Belirtilen yıllar arasında gerçekleşen ithalat miktarı ise 2020 yılında %69 oranda azalarak 2299 tona gerilemiştir (Tablo 5). Tarım ve Orman Bakanlığı verilerine göre Türkiye, 2020 yılında en fazla kivi ihracatını Lübnan, Rusya, Libya, Gürcistan ve Romanya gibi ülkelere yaparken; ithalatının ise neredeyse %80'i İran'dır (Anonymous, 2021).

**Tablo 5.** Türkiye kivi dış ticaret verilerinin değişimi

Yıl	İhracat miktarı (ton)	İndeks (2010=100)	İhracat değeri (bin \$)	İndeks (2010=100)	İthalat miktarı (ton)	İndeks (2010=100)	İthalat değeri (bin \$)	İndeks (2010=100)
2010	61	100	63	100	7308	100	2353	100
2015	301	493	200	317	3754	51	2896	123
2016	345	566	203	322	4721	65	3981	169
2017	1051	1723	906	1438	6411	88	4991	212
2018	4432	7266	3832	6083	4437	61	1868	79
2019	4564	7482	3357	5329	3174	43	1022	43
2020	4872	7987	4163	6608	2299	31	689	29

**Kaynak:** FAO, 2022

Türkiye'de 2022 yılı kivi'nin hâl fiyatları, yetiştiricilik şekline göre farklılık göstermektedir. Geleneksel (konvensiyonel) yöntemle yetiştirilen kivi'nin ortalama fiyatının ₺9.38 olduğu, iyi tarım yöntemi ile yetiştirilen kivi'nin ise ortalama fiyatı ₺15.72 olarak belirlenmiştir (Anonymous, 2022). Üretimi artırmak amacıyla Türkiye'de kivide verilen destekleme miktarı 2020 yılında mazot desteği 15 ₺/da, gübre desteği 8 ₺/da olarak ödenmiştir. Organik tarım ve iyi tarım uygulamaları desteği ise 2. kategori ürünler arasında yer alan kivi için ürün sertifikası bireysel 40 ₺/da, ürün sertifikası üretici grubuna ait grup sertifikasyonu için 20 ₺/da olarak belirlenmiştir (Anonymous, 2021).

## SONUÇ VE ÖNERİLER

Ülkelerin dünya piyasalarında rekabet gücünün yüksek olması ihracat potansiyeli üzerinde etkili olmakla birlikte, Türkiye ihracatında kivi ürünü ön plandadır. Tarımsal faaliyetler mikro düzeyde katkısının yanı sıra, makro düzeyde de ülke ekonomisini desteklemektedir. Dünyada kivi üretiminde önde gelen ülkeler başta Çin olmak üzere, Yeni Zelanda, İtalya, İran ve

Yunanistan'dır. Türkiye 2019 yılı verilerine göre dünya kivi üretiminde 7. sıradadır. Verim bakımından ise 3.747 kg/da ile dünyada Yeni Zelanda'nın ilk sıradadır. Türkiye'nin kivi verilerinde 2000-2020 yılları arasında önemli artış olduğu ve ülke ekonomisine katkı sağladığı anlaşılmaktadır. Kivi üretiminin artırılmasına yönelik yetiştiricilerin bilgilendirilmesiyle, üretim desteklemesinin artırılması ve üreticilerin bilinçlendirilmesi sağlanmalıdır.



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**TÜRKİYE’DE TÜKETİCİ FİYAT ENDEKSİ (TÜFE) İLE ÜRETİCİ FİYAT ENDEKSİ (ÜFE) ARASINDAKİ İLİŞKİNİN AMPİRİK ANALİZİ**

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**ÖZET**

En önemli makro ekonomik göstergelerden biri olan enflasyon alınan birçok ekonomik kararda ve uygulanan ekonomi politikalarında doğrudan etkilidir. Bu doğrultuda TÜFE ve ÜFE arasındaki ilişkinin analizi amaçlanmaktadır. Çalışmada, 2006:01-2021:5 dönemi arasında, TÜFE ile ÜFE ilişkisi ARDL sınır testi yaklaşımıyla araştırılmıştır. Elde edilen sonuçlara göre sadece ÜFE’den TÜFE’ye doğru hem kısa hem de uzun dönem ilişkisi belirlenmiştir. Elde edilen sonuçlara göre Türkiye’de enflasyonun maliyet kaynaklı olduğu söylenebilir.

**Anahtar Kelimeler:** ÜFE, TÜFE, ARDL

**EMPIRICAL ANALYSIS OF THE RELATIONSHIP BETWEEN CONSUMER  
PRICE INDEX (CPI) IN TURKEY AND PRODUCER PRICE INDEX (PPI)****ABSTRACT**

Inflation, which is one of the most important macroeconomic indicators, is directly effective in many economic decisions and economic policies. In this direction, it is aimed to analyze the relationship between the CPI and the PPI in Turkey. In the study, between the period of 2006:01-2021:5, the relationship between CPI and PPI was investigated with the ARDL limit test approach. Accordingly, both short-term and long-term relationships from PPI to CPI were determined. According to the results obtained, it can be said that inflation in Turkey is caused by costs.

**Keywords:** PPI, CPI, ARDL

## GİRİŞ

Fiyatlar genel seviyesinin ve maliyetlerin artması sonucunda ortaya çıkan enflasyonist ortamda tüm fiyat ve maliyetler aynı aynı oranda değişmemektedir. Çoğu zaman fiyatlar maliyetlerden gecikmeli olarak değişmektedir. Bu durumun ölçülmesinde kullanılan indekslerin başlıcaları ÜFE ve TÜFE 'dir. ÜFE, üretici fiyatlarındaki değişimlerin takibi bakımından son derece önemli bir indeksken TÜFE üretilen mal ve hizmetler piyasasında oluşan değişimlerin anlaşılmasında yardımcı olmaktadır. Artan enflasyon toplumsal yaşam üzerinde de farklı maliyetlere sebebiyet vermektedir.

Türkiye ekonomisinde uzun yıllardır görülen enflasyon olgusu birçok makroekonomik göstergelerdeki bozulmaların kaynağı olarak kabul edilmektedir. Enflasyona sebebiyet veren etmenlerin temelini talep ve maliyet artışı ile sosyo-ekonomik yapıdan kaynaklanan yapısal nedenlerden oluşturmaktadır. ÜFE ile TÜFE arasındaki ilişkinin bilinmesi enflasyonun kaynağı olarak alınacak önlemlerin daha etkili olmasını sağlayacaktır

### ÜFE-TÜFE İlişkisinin Teorik Altyapısı

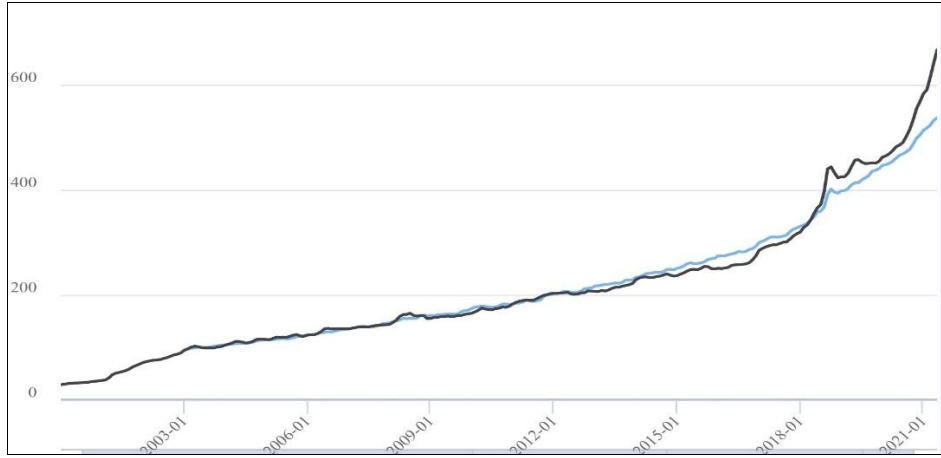
ÜFE ve TÜFE arasındaki temel ilişki ve nedensellik ilişkisi iktisat alanında farklı görüşlerde karşımıza çıkmaktadır. Makro ekonomik performansın genelde üretimdeki artış oranı, enflasyon ve işsizlik oranıyla ölçüldüğü göz önünde tutulduğunda enflasyon oranını genel olarak eşitlik (1) ile gösterilmektedir (Dornbusch and Fischer, 1998: 477).

$$\pi = P - P_{-1}/P_{-1} \quad (1)$$

Eşitlik (1) e göre sabit ve cari yıl fiyat endeksleri arasındaki ilişki analiz edilmektedir. Teorik anlamda enflasyon esas olarak talepteki artışın olması gerekenden fazla olmasından veya maliyet artışlarından kaynaklanmaktadır (Tarı vd.,2012: 2). Teorik ve ampirik literatürde, ÜFE ile TÜFE ilişkisi arasında nedensellik ilişkisi bakımından dört temel görüşe rastlanmaktadır. İlk görüşe göre ÜFE'de cari dönemde ortaya çıkan bir farklılığın gelecekte TÜFE'yi de etkileyeceği şeklindedir (Saraç ve Karagöz, 2010: 222). Bu duruma neden olan etmen, toptan satışların perakende satışlardan, dolayısıyla da üretimin tüketimden önce gerçekleşmesi ve TÜFE'deki değişimin üretimi tüketime bağlayan kanalla tüketici fiyatlarına aktarılmasıdır (Guthrie, 1982). Bu bağlamda ekonomik yapıda hammadde, nakliye, enerji işgücü için ödenen ücret gibi girdilerin fiyatlarında oluşan artışlar üretim zincirinden dolayı bir şekilde fiyatlara, dolayısıyla da TÜFE'ye yansımaktadır. Bu ilk görüşe karşı geliştirilen ikinci görüş ilk görüşün tam tersini savunmakta olup tüketici fiyatlarının üretici fiyatları üzerinde etkili olduğu konusunda teorik sebepler sunmaktadır. Bu iki görüşün yanında her iki yaklaşımı da doğrulayan

üçüncü görüşte üretici-tüketici fiyatları arasında bir geri besleme ilişkisinin mevcut olduğu iddia edilmektedir (Cushing ve McGarvey:1990 ; Kwon ve Koo: 2009). Öte yandan ÜFE ile TÜFE arasında istatistiksel bir ilişkinin bulunmasının gerekli olmadığını öne süren dördüncü bir görüşe rastlanmaktadır. Söz konusu görüşte iki endeksin hesaplanması farklı temel kitlelere ait farklı örneklemelerden ulaşılan fiyatlara dayalı olacak şekilde gerçekleştirilmektedir (Saraç ve Karagöz,2010: 230). Hammadde, ara malı ve nihai mal fiyatlarındaki değişim ÜFE'yi etkilerken TÜFE yalnızca nihai fiyatlardan etkilenmektedir. Tüm bu tartışmalar altında TÜFE ve ÜFE geçişkenliği enflasyon sürecinin yorumlanmasında, enflasyonun maliyet yada talep kaynaklı olduğunun belirlenmesinde önem arz etmektedir. Bu bağlamda endeksler arasındaki nedensellik ilişkisinin yanında endeks hareketlerindeki değişimleri ve endeksler arası geçişkenlik mekanizmasının önemlidir. Uygulanacak enflasyonla mücadele politikaları ise, TÜFE ile ÜFE arasındaki geçişkenlik mekanizmasının doğru belirlenmesini gerekli kılmaktadır.

Literatürde endeksler arası girişkenlik de nedensellik ilişkisinde olduğu gibi farklı görüşler mevcuttur. Genel kabul görüşlerden biri üretimde kullanılan her bir işgücü maliyeti ve maddelerin maliyetindeki artış öncelikle üretici fiyatlarını etkileyecek ve bu etki, bir süre sonra doğrudan tüketici fiyatlarına yansıtacaktır. Diğer bir görüşe göre beklentilerden veya gelir artışından kaynaklanan talep enflasyonu ilk olarak tüketici fiyatlarını, sonrasında üretici fiyatlarını etkileyecektir (Erdem ve Yamak, 2014:10). Bu iki görüşü göz önüne alarak kabul edilen üçüncü bir görüşe göre maliyet ve fiyatların belirlenmesinde faydalanılan yararlanılan enflasyon oranı olan TÜFE ve ÜFE pozitif ilişki içinde olmakta ve birbiri yerine kullanılmaktadır. Bu nedenle TÜFE ve ÜFE'nin benzer bir hareketlilik içerisinde bulunması beklenmektedir.



**Grafik 1: TÜFE-ÜFE Etkileşimi (2003-2021)**  
**Kaynak:TÜİK**

Grafik 1’de Türkiye’de 2003-2021 yılları arasındaki TÜFE-ÜFE etkileşimi izlenebilmektedir. Grafikte dikkat çeken nokta 2004 yılı sonuna kadar her iki endeksin aynı şekilde hareket etmesi ve 2004 yılından sonra endekslerin seyrinde farklılaşmanın meydana gelmesidir. Bunun temel nedeni iki endeks arasındaki girişkenlikte meydana gelen değişimlerdir.

## LİTERATÜR

Kwon ve Koo (2009) ABD ekonomisi için ÜFE ile TÜFE arasındaki geçişkenlik ilişkisini 1985-2001 yılları için analiz ettikleri çalışmalarında Toda ve Yamamoto yöntemini tercih etmişlerdir. Elde edilen sonuçlar ÜFE ve TÜFE arasında karşılıklı nedenselliğin varlığına ulaşmışlardır. Ayrıca 2002-2008 yılları için üretici fiyatlarından tüketici fiyatlarına doğru fiyat geçişkenlik tespit edilmiştir. Abdioğlu ve Korkmaz (2012) ÜFE ile TÜFE arasındaki nedensellik ilişkisini 2003-2012 dönemi için analiz ettikleri çalışmalarında hem toplam endeksleri hem de alt endeksleri kullanmışlardır. Analiz sonucunda ÜFE ile TÜFE arasında çift taraflı nedensellik ilişkisine ulaşmışlardır. Alt sektörlerde ise konut ve giyim için TÜFE’den ÜFE’ye doğru nedensellik ilişkisi olduğu belirlenmiştir. Bu sonuç Türkiye’de fiyat artışlarının daha çok talep yönlü nedenlerden dolayı olduğunu ifade etmektedir.

Saatçioğlu ve Karaca (2016) Türkiye’de TÜFE ile ÜFE endeksleri arasındaki nedensellik ilişkisini 2005-2016 yılları için analiz ettikleri çalışmalarında ÜFE’den TÜFE’ye nedensellik ilişkisinin varlığına ulaşmışlardır. Yamaçlı ve Saatçi (2016), Türkiye’de ÜFE ile TÜFE ilişkisini 2004-2015 yılları için analiz ettiği çalışmalarında ARDL yöntemini kullanmış ve ÜFE

oranlarının TÜFE oranlarını açıklayan temel değişken olduğu sonucuna ulaşmışlardır. Elde edilen bulgulara göre TÜFE’de kalıcı düşüş sağlanabilmesi için ÜFE’deki artışı önlemeye yönelik politikaların geliştirilmesi gerekliliği dile getirilmiştir. Terzi ve Tütüncü (2017) Türkiye ekonomisi için ÜFE ve TÜFE endeksi ilişkisini inceledikleri çalışmalarında kısa ve uzun dönemlerde çift yönlü nedensellik ilişkisinin varlığına ulaşmışlardır. Saatçioğlu ve Karaca (2017) Türkiye ekonomisi için ÜFE\_TÜFE ilişkisini 2005-2016 yılları için analiz ettikleri çalışmalarında Granger nedensellik testinden yararlanmışlardır. Ulaşılan sonuca göre ÜFE’den TÜFE’ye doğru tek yönlü nedensellik ilişkisi olduğu anlaşılmıştır. Öner (2018) Türkiye’de ÜFE ile TÜFE ilişkisini 2004-2016 yılları için Granger nedensellik testi ile incelediği çalışmasında TÜFE’den ÜFE’ye tek yönlü nedensellik ilişkisine ulaşmıştır. Koçak (2021), TÜFE, ÜFE ve tarım ÜFE’si arasındaki ilişkileri Türkiye ekonomisi için 2011-2020 yıllarını kapsayacak şekilde analiz ettiği çalışmasında nedensellik ve eş bütünleşme analizlerini kullanmıştır. Ulaşılan sonuçlara göre değişkenler arasında eş bütünleşme ve çift taraflı kısa vadeli nedensellik ilişkisinin varlığına ulaşmıştır. Çelik (2021), Türkiye’de ÜFE, kur, petrol, dış borç, ve doğalgaz fiyatları ile politika faizinin TÜFE’ye etkisini eş bütünleşme ve nedensellik analizleri ile incelediği çalışmasında 2008-2019 dönemleri için değişkenler arasında uzun dönemli pozitif bir eş bütünleşme ilişkisine ulaşmıştır. Ayrıca ÜFE’den TÜFE’ye tek yönlü nedensellik ilişkisi mevcuttur. Oral ve Eştürk (2022), Türkiye’de ÜFE ile gıda TÜFE etkisini 2006-2021 dönemleri için analiz ettikleri çalışmalarında NARDL yöntemini kullanmışlar ve uzun dönemli eşbütünleşme ilişkisinin varlığına ulaşmışlardır. Ayrıca sonuçlara göre ÜFE’nin pozitif şokları TÜFE’de %0.33, negatif şokları ise %0.92 artışa neden olmaktadır. Şanlı (2022)Türkiye’de ÜFE ve TÜFE endeks etkileşimini 2005-2021 yılları için ARDL eş bütünleşme ve Granger nedensellik analizleri ile test ettiği çalışmasında endeksler arasında güçlü bir eş bütünleşme ilişkisinin varlığına ulaşılmıştır. Nedensellik analizi sonuçlarına göre ise ÜFE’den TÜFE’ye doğru tek yönlü bir nedensellik ilişkisine ulaşılmıştır.

### **Ampirik Analiz**

Türkiye’de ÜFE-TÜFE ilişkisi Çalışmada hem TÜFE ile ÜFE arasındaki uzun dönem ilişkisi hem de nedensellik ilişkisi analiz edilecektir. Analiz 2006:01-2021:5 dönemini kapsamaktadır. Kullanılacak değişkenler, semboller ve elde edilen kaynaklar Tablo 1’de izlenebilmektedir.



**Tablo 1:** Değişkenleri Kaynakları ve Kısaltmaları

Değişken	Kısaltması	Kaynak
Tüketici Fiyat Endeksi	TÜFE	TÜİK
Üretici Fiyat Endeksi	ÜFE	TÜİK

Analizde değişen varyans ve kısmen de otokorelasyon olasılıklarına karşı değişkenler doğal logaritmaları alınarak analize dahil edilmişlerdir. Ayrıca değişkenlerin aylık olmasından dolayı mevsim etkisinden arındırılmak amacıyla Tramo-Seats yöntemi kullanılmıştır. Ekonometrik analize geçilmeden önce sahte regresyon sorununun araştırılması amacı ile değişkenlere geleneksel Augmented Dickey Fuller (ADF) birim kök testi ve kırılmalara izin veren Lee ve Strazicich (2003) testi uygulanacaktır. ADF testi eşitlik (2) ve (3)'deki şekilde ifade edilmektedir (Dickey ve Fuller,1981:1960);

$$\Delta X_t = \mu + BX_{t-1} + \sum_{i=1}^k \varphi \Delta X_{t-i} + u_t \quad (1)$$

$$\Delta X_t = \mu + \alpha + BX_{t-1} + \sum_{i=1}^k \varphi \Delta X_{t-i} + trend + u_t \quad (2)$$

Eşitlik (1) ve (2)'de test edilen ADF birim kök analizinde sıfır hipotez “seri birim kök içermektedir” ve alternatif hipotez “seri birim kök içermemektedir” şeklindedir. ADF birim kök testi sonuçları Tablo 2’de izlenebilmektedir.

**Tablo 2:** ADF Birim Kök Test Sonuçları

Değişkenler	Düzyey	1. fark	Kritik Değer (1%)
ÜFE	-2,12(7)	-3,28 (6)*	-5.31
TÜFE	-6,97(1)*	-	-4,90

Not:\* %1 seviyesinde istatistiksel olarak anlamlılığı ifade etmektedir. Akaike Bilgi Kriteri (AIC) ile ulaşılan optimal gecikme uzunlukları parantez içinde sunulmuştur.

Tablo 2’ye göre değişkenlerden sadece TÜFE değişkeni seviyede durağan çıkarken ÜFE değişkeni birinci farkta durağandır. İki farklı model kullanılarak gerçekleştirilen Lee ve Strazicich birim kök testinin ilk modeli eşitlik (4) de izlenebilmektedir (Lee ve Strazicich ,2003:144).

$$Y_t = \vartheta' Z_t + \varepsilon_t \text{ ve } \varepsilon_t = \beta \varepsilon_{t-1} + e_t \quad (4)$$

(4) numaralı eşitlikte  $Z_t$  içsel değişken vektörünü,  $\varepsilon_t$  hata terimini ifade etmektedir. Bir kırılmalı A modelinde  $D_t, t \geq T_B + 1$  şartında 1, farklı bir durumda ise 0 değerini alan kukla (dummy) değişkeni simgelemek şartıyla (2) no’lu denklem için;

$Z_t = (1, t, D_{1t})$  şeklindedir. Kırılma tarihi  $T_B$  ile gösterilmektedir. Ortalamada iki kırılmaya imkân veren birim kök testi için Model A,  $D_{jt} = 1; j = 1, 2$  olduğu durumda

$D_t, t \geq T_{Bj} + 1$  iken 1, söz konusu durum haricinde 0 değerini alan kukla (dummy) değişkeni gösteren (4) no'lu denklemde

$Z_t = (1, t, D_{1t}, DT_t)$  olmaktadır.

Sabit ve trendde iki kırılmaya izin veren CC modelini elde etmek için  $j=1, 2$  olacak şekilde  $DT_{tj}, t \geq T_{Bj} + 1$  iken  $t-T_{Bj}$  farklı şartlarda 0 değerini alan kukla değişkeni ifade etmek suretiyle  $Z_t$  yerine  $Z_t = (1, t, D_{1t}, D_{2t}, DT_{1t}, DT_{2t})$  konulmaktadır (Altunöz ve Büklü, 2019:51). Ulaşılan brim kök testi sonuçları Tablo 7'de sunulmuştur.

**Tablo 7:** Lee-Strazicich Birim Kök Testi Sonuçları (Düzeyde)

Değişkenler	A Modeli		C Modeli	
	t – istatistiği	Kırılma Tarihleri	t – istatistiği	Kırılma Tarihleri
TÜFE	-2.11 (k=10)	2009, 2018	-3,77 (k=5)	2009 2019
ÜFE	-2.35 (k=10)	2018, 2018	-3,25 (k=14)	2009, 2019

**Not:** Model A: -4.011 (1%), -3.410 (5%), -3.409 (10%), ii) Model C: -6.981(1%), -5.881 (5%), -5.331 (10%).

Tablo 7'deki sonuçlarda değişkenin ortalamasında meydana gelen kırılma A modeli ile ifade edilirken hem ortalamasında hem de eğiliminde kırılma olduğu C modeli ile ifade etmektedir.  $k_{max}$ , 14 olarak belirlenmiştir. Gerek A gerekse C modeline ait sonuçlara göre TÜFE ve ÜFE değişkenlerinde reddedilememektedir. Kırılma tarihleri küresel kriz ve ABD ile yaşanan Rahip krizi neticesindeki kur şokunu gösteren tarihler olarak anlamlıdır.

Değişkenlerin eş bütünleşik olup olmadığının küçük örneklemler için daha uygun olduğu ve uygun gecikmenin belirlenmesinde esneklik sağladığı ileri sürülen Pesaran, Shin ve Smith (2001)'in ARDL sınır testi yaklaşımının kullanılması önerilmektedir (Fosu vd., 2006:2079 ) Sınır testi yaklaşımında değişkenler arasında eşbütünleşme ilişkisinin belirlenebilmesi için öncelikle (5) ve (6) no'lu modeller oluşturulmuştur.

#### Model 1

$$\Delta T\ddot{U}FE = \beta_0 + \sum_{i=1}^{p-1} \alpha_{1i} \Delta(T\ddot{U}FE)_{t-1} + \sum_{i=0}^{q-1} \sigma \Delta(\ddot{U}FE)_{t-1} + \theta T\ddot{U}FE_{t-1} + \theta \ddot{U}FE_{t-1} + \varepsilon_t \quad (5)$$

#### Model 2

$$\Delta \ddot{U}FE = \beta_0 + \sum_{i=1}^{p-1} \alpha_{1i} \Delta(\ddot{U}FE)_{t-1} + \sum_{i=0}^{q-1} \sigma \Delta(T\ddot{U}FE)_{t-1} + \theta \ddot{U}FE_{t-1} + \theta T\ddot{U}FE_{t-1} + \varepsilon_t \quad (6)$$

Eşitlik (5) ve (6)'ya ait modellerle alakalı eş bütünleşme analizlerinde AIC bilgi kriterlerine göre her iki model için 2 gecikme göz önünde bulundurulmuştur. Ulaşılan sonuçlar Tablo 8'de izlenebilmektedir.

**Tablo 8: Eş Bütünleşme Testi Sonuçları**

<b>Model 1</b>			
<b>Bağımsız Değişken Sayısı</b>	<b>F St.</b>	<b>Kritik Değer (%1)</b>	
		<b>Alt Sınır</b>	<b>Üst Sınır</b>
1	7,191	4,04	4,78
<b>Model 2</b>			
<b>Bağımsız Değişken Sayısı</b>	<b>F St.</b>	<b>Kritik Değer (%1)</b>	
		<b>Alt Sınır</b>	<b>Üst Sınır</b>
1	3,971	4,04	4,78

Peseran vd.(20019 tarafından oluşturulan değerlerden elde edilen kritik değerlerle f istatistik değerleri karşılaştırıldığında model 1 için f değeri üst sınırın üzerinde olması nedeni ile eş bütünleşme ilişkisinin varlığına ulaşılmış olup aynı durum model 2 için söz konusu değildir. Genel olarak her iki test düşünüldüğünde değişkenler arasında eş bütünleşmenin var olduğu anlaşılmıştır. Bu bilgiler doğrultusunda değişkenler arasındaki uzun dönemli ilişkiler eşitlik (7) ile analiz edilecektir.

$$TÜFE_t = \beta_0 + \sum_{i=1}^{p-1} \alpha_{1i}(TÜFE_{t-1}) + \sum_{i=0}^{q-1} \delta_{1i}(ÜFE_{t-1}) + u_t \quad (7)$$

Eşitlik (4)'e ait uzun dönem tahmin sonuçları Tablo 9'da izlenebilmektedir.

**Tablo 9: ARDL (3,1) Uzun Dönem Tahmin Sonuçları**

<b>Değişkenler</b>	<b>Katsayılar</b>	<b>Standar Hatalar</b>	<b>t istatistikleri</b>	<b>Olasılık Değerleri</b>
$TÜFE_{t-1}$	1,440	0,333	22,189	0,00*
$TÜFE_{t-2}$	-0,188	0,022	-9,19	0,00*
$TÜFE_{t-3}$	-0,244	0,018	-7,10	0,00*
$ÜFE$	0,511	0,024	11,019	0,00*
$ÜFE_{t-1}$	0,311	0,038	11,617	0,00*
C	2213	4198	4,019	0,00*
<b>Teşhis Testleri</b>				
Breusch-Godfrey Otokorelasyon Testi F -İstatistik Değeri=1511 (0.046)				
White Değişen Varyans Testi F -İstatistik Değeri=6.104 (0.009)				
$R^2= 0.94$ , F İstatistiği = 286 (0.000)				
<b>Uzun Dönem Katsayıları</b>				
<b>Değişkenler</b>	<b>Katsayılar</b>	<b>Standart Hatalar</b>	<b>t istatistikleri</b>	<b>Olasılık Değerleri</b>
$ÜFE$	1,41	0,011	8,99	0,00*
C	22312	2110	9,15	0,12

**Not:** C, sabit terimi ifade etmektedir. Teşhis testlerinde olasılık değerleri parantez içinde ifade edilmiştir. \*, %1 seviyesinde anlamlılığı ifade etmektedir.

Tablo 9’da ulaşılan uzun dönemli tahmin sonuçlarına göre üretici fiyat endeksinde meydana gelen %1’lik bir artış tüketici fiyat endeksini uzun dönemde %1,41 arttırmaktadır. Tabloda dikkat çekici nokta  $UFE$  değişkeninin  $UFE_{T-1}$  de gücünü düşürüyor olmasıdır. Uzun dönem sonuçlarının ardından kısa dönem için kullanılacak model eşitlik (8)’de izlenebilmektedir.

$$\Delta T\dot{U}FE = \beta_0 + \beta_1 ECT_{t-1} + \sum_{i=1}^{p-1} a_{1i}(T\dot{U}FE)_{t-1} + \sum_{i=0}^{q-1} \theta_{2i}(T\dot{U}FE)_{t-1} + \varepsilon_t \quad (8)$$

Eşitlik (8)’e ait kısa dönem tahmin sonuçları Tablo 10’da izlenebilmektedir.

**Tablo 10:** ARDL (3,1) Kısa Dönem Tahmin Sonuçları

Değişkenler	Katsayılar	Standart Hata	t istatistiği	Olasılık
$\Delta T\dot{U}FE_{t-1}$	0,20	0,021	6,191	0,01**
$\Delta UFE_{t-1}$	0,33	0,030	10,01	0,00*
$\Delta \beta_0$	415	671,8	7,811	0,00*
$ECT_{t-1}$	0,20	0,017	1,011	0,03**
<b>Teşhis Testleri</b>				
Breusch-Godfrey Otokorelasyon Testi F -İstatistik Değeri=1511 (0.046)				
White Değişen Varyans Testi F -İstatistik Değeri=6.104 (0.009)				
$R^2 = 0.94$ , F İstatistiği = 286 (0.000)				

Tablo 10’da izlenen kısa dönem sonuçlarına göre cari dönemde ÜFE, TÜFE’yi pozitif yönde etkilemektedir. Hata düzetme katsayısının 0 ile 1 arasında ve negatif bir değer alması beklenir. Elde edilen 0,20 beklentiler dahilinde ve istatistiksel olarak anlamlıdır. Bu sonuç kısa dönemli dengesizliklerin 5 dönem içinde uzun dönem dengesine ulaşacağını ifade etmektedir.

Analizin son bölümünde aynı dereceden bütünleşik olmayan değişkenler için Toda-Yamamoto (1995) nedensellik analizi kullanılmıştır. Bu bağlamda VAR modeline ait optimal gecikme uzunluğunun belirlenmesi amacıyla Schwarz (SC) , Akaike (AIC), ve Hannan-Quinn (HQ) bilgi kriterleri kullanılmış ve 2 olarak belirlenmiş olup tablo 12’de izlenebilmektedir.

**Tablo 12:** VAR Modelinde Optimum Gecikme Uzunluğunun Belirlenmesi

Lag	AIC	SC	HQ
1	-7,312	-7,008	-8,007
2	<b>-8,781*</b>	<b>-7,101*</b>	<b>-9,177*</b>
3	-8,100	-6,370	-7,012
4	-8,346	-6,332	-8,388

Bir sonraki aşamada genişletilmiş VAR(3) modeli (dmax=1) ‘in (maksimum bütünleşme derecesi) en uygun gecikme uzunluğuna ilave edilerek oluşturulmuştur. Genişletilmiş VAR(3) modeli ile ulaşılan sonuçlar tablo 13’de izlenebilmektedir.

**Tablo 13:** Toda-Yamamoto Nedensellik Analizi Sonuçları

	$m = 2, d_{\max} = 1$	Ki Kare İstatistiği	Olasılık
ÜFE, TÜFE'nin nedenidir.	3	4,122	0.00***
TÜFE, ÜFE'nin nedenidir.	3	4,514	0.91

Not: \*\*\*,\*\* ve \* sırasıyla %1, %5 ve %10 seviyesinde anlamlılığı ifade etmektedir.

Tablo 13'te sunulan nedensellik analizi sonuçlarına göre ÜFE, TÜFE'nin nedenidir. ( %1 düzeyinde istatistiksel olarak anlamlıdır). Fakat TÜFE, ÜFE'nin nedenidir hipotezi istatistiksel olarak anlamsız çıkmış olup söz konusu yönde bir nedensellik tespit edilememiştir. Sonuçlar; teorik beklentilerle uyumlu olarak ÜFE'deki değişimin bir gecikmeyle tTÜFE'yi etkilemektedir. Nedensellik analizine için yapılan değişen varyans ve oto korelasyon sonuçları Tablo 14'de izlenebilmektedir.

**Tablo 18:** Otokorelasyon ve Değişen Varyans Testi Sonuçları

<i>Larange Çarpanı (LM) Otokorelasyon Testi</i>		
<i>Gecikme Uzunluğu</i>	<i>LM Test İstatistiği</i>	<i>Olasılık Değeri</i>
2	3,224	0,311
<i>White Değişen Varyans Testi</i>		
<i>Gecikme Uzunluğu</i>	<i>Test İstatistiği</i>	<i>Olasılık Değeri</i>
2	11,108	0,231

Tablo 18 sonuçlarına göre göre 2 gecikme ile gerçekleştirilen VAR analizinde değişen varyans ve otokorelasyon olmadığı anlaşılmaktadır.

## SONUÇ

Ülke ekonomilerinde TÜFE ve ÜFE arasındaki eş bütünleşme ve nedensellik ilişkisinin varlığının mevcudiyeti üretici ve tüketici fiyatlarının birbirine geçişken olduğunu ve bu geçişkenlikte hangi değişkenin diğerinin nedeni olduğunun ifade eder. Özellikle Covid salgını ile ülkelerin en öncelikli çözülmesi gereken sorunu haline gelen enflasyonla mücadelede TÜFE-ÜFE ilişkisinin anlaşılması sorunun çözülmesi ve politika geliştirilmesi açısından önem arz etmektedir. Ulaşılan sonuçlara göre uzun dönemli tahmin sonuçlarına göre üretici fiyat endeksinde meydana gelen %1'lik bir artış tüketici fiyat endeksinin uzun dönemde %1,41 arttırmaktadır. kısa dönem sonuçlarına göre cari dönemde ÜFE, TÜFE'yi pozitif yönde etkilemektedir. Hata düzetme katsayısının 0 ile 1 arasında ve negatif bir değer alması beklenir.

Elde edilen 0,20 beklentiler dahilinde ve istatistiksel olarak anlamlıdır. Bu sonuç kısa dönemli dengesizliklerin 5 dönem içinde uzun dönem dengesine ulaşacağını ifade etmektedir. Nedensellik analizi sonuçlarına göre ÜFE, TÜFE'nin nedenidir. Teorik altyapıyla uyumlu olarak incelenen dönem için toptan eşya fiyat indekslerindeki bir değişim bir gecikmeyle tüketici fiyatlarını etkilemektedir.

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## **YONCA HORTUMLU BÖCEĞİ ZARARLISI BİYOLOJİK YAŞAM DÖNGÜSÜ VE MÜCADELESİ**

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### **ÖZET**

Yem bitkileri ekolojik istekler açısından çok seçici olmayan, protein ve karbonhidrat içerikleri dengeli kaliteli ve ucuz kaba yem kaynaklarıdır. Yem bitkileri içerisinde dünyanın hemen hemen her yerinde yetişme alanı bulabilen, Dünya’da ve Türkiye’de yem bitkileri içerisinde en fazla yetiştiriciliği yapılan yonca uzun ömürlü çok yıllık bir bitkidir. Geniş uyum yeteneği, yüksek ot verimi ve besleme değeri, uzun ömürlülüğü, biçim sayısının yüksekliği gibi özellikleri ile yem bitkileri arasında çok önemli bir yer almaktadır. Yonca tarımında biyotik ve abiyotik birçok etmen büyük ölçülerde ekonomik kayıplar meydana getirmektedir. Bu biyotik etmenlerden birisi olan Yonca hortumlu böceği, *Hypera postica* (Gyllenhal, 1813) yonca üretim alanlarının başlıca zararlıları arasındadır. Yonca tarımınca önemli ekonomik kayıplara neden olan zararlının biyolojisi, tanımlanması uygun mücadelenin başlatılmasında büyük önem arz etmektedir. Bu çalışmada, zararlının biyolojik yaşam döngüsü, şeker pancarındaki zarar semptomları ve ekonomik zarar eşiği altında tutmak için uygun mücadele yöntemleri incelenmiştir.

**Anahtar Kelimeler:** Yonca hortumlu böceği, *Hypera postica*, yonca zararlıları

**BIOLOGICAL LIFE CYCLE AND CONTROL OF THE CLOVER PEST****ABSTRACT**

Forage crops are low-quality and inexpensive roughage sources that are not very selective in terms of ecological demands and whose protein and carbohydrate contents are balanced. Alfalfa is a long-lived perennial plant that can be grown in almost every part of the world among forage crops and is the most cultivated among forage crops in the world and in Turkey. It has a very important place among forage crops with its wide adaptability, high forage yield and nutritional value, longevity, high number of forms. Many biotic and abiotic factors in alfalfa cultivation cause economic losses to a large extent. Alfalfa proboscis beetle, *Hypera postica* (Gyllenhal, 1813), which is one of these biotic factors, is among the main pests of alfalfa growing areas. The biology and identification of the pest, which causes significant economic losses in alfalfa cultivation, is of great importance in initiating appropriate control. In this study, the biological life cycle of the pest, the damage symptoms in sugar beet and the appropriate control methods to keep it under the economic damage threshold were examined.

**Keywords:** Alfalfa proboscis beetle, *Hypera postica*, clover pests

## **1. GİRİŞ**

Bitkisel ve hayvansal üretimin insanoğlunun yaşamını sürdürmesindeki önemi tartışılmaz bir gerçektir. Her ikisinde bir bütünün ayrılmaz unsurlarıdır. Hayvan beslenmesinde en çok üretimi yapılan bitkilerin başında yonca (*Medicago sativa* L.) gelmektedir. Anavatanı Asya; İran, Türkmenistan ve çevresi (Bolton, 1962) olan yonca, baklagiller (Fabaceae) ailesinde yer alan, derin ve güçlü kök sistemine sahip, çok yıllık önemli bir yem bitkisidir (Davis, 1978). Ülkemizde de geniş alanlarda yetiştirilmektedir (Erişen, 2005). Yonca sahip olduğu derin kök sistemi sayesinde toprağın havalanmasını ve gevşemesini sağlamakta, erozyonun kontrol edilmesine önemli katkıda bulunarak doğayı korumaktadır. Yem bitkileri içerisinde en yüksek besin değerine sahip olan yonca, besicilikte et ve süt verimini %30'lara kadar arttırabilmekte ve ayrıca silo ve pelet yemi olarak da kullanılabilir (Manga, 1978). Yonca meraların kuruduğu yaz aylarında yeşilliğini devam ettirdiği için böceklerin beslenmesinde cazip bir bitki olmaktadır (Tan, 2018). Yem bitkilerinin kraliçesi olarak da adlandırılan yonca, tarımı yapılan tüm yem bitkilerinden daha yüksek bir yem değerine sahiptir. Protein miktarı yüksek olan yoncanın, kuru ve yeşil otu hayvanlar için besleyici olup, vitaminlerce zengindir. Yonca, toprak yüzeyini örtücü bir bitki, yeşil gübre ve toprak ıslah edici olarak da ekilebilir. Yonca aynı zamanda köklerini fazla derinlere indirerek buradaki su ve besin maddelerinden kolayca faydalanabilen bir bitkidir. Köklerindeki yumrucuklar ile toprağa fazla miktarda azot bağlayıp, kendisinden sonra ekilecek olan yüzeysel köklü bitkiler için organik maddece ve azotça zengin, su tutma kapasitesi iyi bir tarla toprağı bırakır (Anonim, 1999). Ayrıca, çevredeki biçilmiş yonca anız saplarının içerisinde de yumurtalara rastlanılmıştır. Talwar (2015) bu dönemin ekim ve kasım aylarında havaların yumuşamasıyla gerçekleştiğini bildirmiştir. Dowdy (1984), Stark ve ark. (1993) ve DeGooyer ve ark. (1996) ise, *H. postica* erginlerinin yazlamalarından sonra ekim ve kasım aylarında yonca tarlasında görüldüğü ve çok sayıda yumurta bıraktıklarını bildirmiştir.

## **2. YONCA HORTUMLU BÖCEĞİ BİYOLOJİSİ**

Yonca hortumlu böceğı kışı, ergin halde, yonca tarlalarında veya kenarlarında bitki artıkları bitki kökleri civarında, toprak yarı ve çatlaklarında geçirir. İklimle bağı olarak mart ayının ikinci yarısından itibaren erginler tarlada görülmeye başlar. Yumurtalarını bitki fonolojisi ile ilgili olarak başlangıçta kuru saplar içinde, yeşil gövdelere, yaprak sapının bitki gövdesi ile birleştiği yerlere, yaprak saplarına ve sürgün uçlarına açtıkları delikten içeriye 1-29 adet olarak

bırakırlar. Bir dişi ortalama 1100 yumurta bırakır. Yumurtalar 2-3 haftada açılır. Larvalar 2-3 gün sap içinde beslendikten sonra yaprak ve tepe tomurcuklarına dağılırlar. İlk 2 larva dönemini tomurcuk içlerinde beslenerek geçirirler, üçüncü ve dördüncü larva dönemlerinde bitki üzerinde açıkta beslenirler. Tarlada kokon içindeki ilk pupaların görülmesi Mayıs ayı ortalarına rastlar. Yeni erginler yaz sıcaklıkları başına kadar beslenir. Daha sonra yazlamaya çekilirler. Sonbaharda tekrar hareketlenerek tarlalarda görülürler. Havalarda soğumaya başlaması ile kışlamak üzere toprağa girerler. Yılda bir döl verirler.



**Şekil 1.** Yonca hortumlu böceği ergin ve larvasının genel görünümü.

### **3. YONCA HORTUMLU BÖCEĞİ ZARARI**

Ergin zararı, larva zararına göre daha az olup, erginler genellikle yaprağın orta damarı hariç yan damarları, yaprak ayasını ve sürgün uçlarını yerler. Larva zararı önemlidir. İlk iki dönem larvalar sürgün uçları ve yaprak koltukları arasında beslenirler. Tomurcuk ve sürgün ucu yediklerinden bitki gelişmesi yavaşlar. Son iki dönem larva yaprakları dıştan kemirerek yer, sadece orta damar veya yan damarlar kalır. Larva zararı daima bitkilerin üst kısımlarından başlar, aşağıya doğru devam eder. Asıl zarar birinci biçime kadar olan zamandır. Larva yoğunluğu fazla ise zarar gören yaprakların kuruması sonucu tarla boz, gümüşü bir görünüm kazanır. Sulama imkanı kısıtlı ve az biçimde yapılan yerlerde ekonomik önemi büyüktür. Türkiye'de bütün bölgelerde zararlı olmaktadır.



Şekil 2. Yonca hortumlu böceği larva zararı.

### SONUÇ VE ÖNERİLER

Yonca kuvvetli ve sık yetiştirilmelidir. Böyle tarlalarda güneş ışıkları toprağa ulaşmadığından yumurta ve larva gelişimi yavaşlamaktadır. Sulama, tarla sıcaklığını birkaç gün süre ile azaltmaktadır. Bu nedenle, biçimden bir hafta önce yapılan sulama, larva gelişmesini yavaşlatacak ve pupa olmasını geciktirecektir. Biçimden 7-10 gün sonrasına kadar su vermemek ile de toprak yüzeyine dökülen larvaların doğrudan güneş ışığı etkisinde kalmaları ve büyük oranda ölmeleri sağlanmış olur. Yonca hortumlu böceği birinci biçime kadar olan ürüne zarar verir. Bu nedenle biçimi 10-15 gün evvel yapmak etkili bir yöntemdir. Biçimi yapılan yoncaların, tarladan hemen kaldırılarak, bir başka yerde kurutulmaya bırakılmasının faydası büyüktür. Böylece, kuruyan yoncaları terk eden larvalar, beslenecek konukçu bulamaz. *H. postica*, yumurtalarını sonbahar ve ilkbahar aylarında iki seferde bıraktığı, ilkbaharda ilk görülen larvaların sonbaharda bırakılan yumurtalara ait olduğu belirlenmiştir. Bu yumurtalardan ilkbaharda çıkış yapan larvaların bitkinin genç döneminde daha fazla zarar yaptığı bu yüzden, sonbaharda biçim ya da otlatma yapılmasının ilkbahar larva popülasyonunu azaltacağı düşünülmektedir. Aynı şekilde, ilkbaharda bırakılan yumurtaların bir kısmı ve henüz ergin döneme girmemiş olan larvaların mayıs sonu-haziran ayı başlarında yapılan biçimle zarar gördüğü bildirilmiştir (Gözüaçık ve ark., 2019).

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## **BLOCKCHAIN TEKNOLOJİSİ'NİN SU ÜRÜNLERİ ÜRETİM SEKTÖRÜNDE UYGULAMASI**

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### **ÖZET**

Blokchain (Blok zinciri), bir bilgisayar ağının düğümleri arasında paylaşılan dağıtılmış bir veri tabanıdır. Bir veri tabanı olarak, bir blok zinciri, bilgileri elektronik olarak dijital biçimde saklar. Blok zincirleri en iyi, güvenli ve merkezi olmayan bir işlem kaydını tutmak için Bitcoin gibi kripto para sistemlerindeki önemli rolleriyle bilinir. Blok zincirindeki yenilik, bir veri kaydının aslına uygunluğunu ve güvenliğini garanti etmesi ve güvenilir bir üçüncü tarafa ihtiyaç duymadan güven oluşturmalarıdır. Bugün blockchain, deniz ürünleri için uzun ve karmaşık üretim döngülerini belgelemek ve kritik gözetim zincirini izlemek, kıyı, liman, işleme ve son Pazar gibi konuları dikkate alarak analiz yapmak suretiyle ticari olarak sahtekârlıkla mücadele etmektedir. Bunlar, balıkçılık ürünleri hasat, aktarma, karaya çıkarma ve işlemeden nihai tüketici pazarına kadar ulusal ve uluslararası tedarik zincirlerinden geçtiği için çok önemlidir. Ülkenin her bölümü, yerinde olması gereken genel kontrol öğelerini gerektirir, bunlar genellikle izlenebilirlik, izleme ve veri toplama için temel oluşturur ve tüketicilerin deniz ürünlerine tam olarak güvenmesini sağlar. Su ürünleri yetiştiriciliği, dünya çapında en çok ticareti yapılan gıda gruplarından biri haline gelirken dünya çapında milyonlarca insanın geçimini sağlamaktadır. Gelişmekte olan ülkelerde ihracatın büyüme hızı, küreselleşme ve dünya ekonomisinin teknolojik gelişmelerle birlikte dönüşmesi nedeniyle son on yılda çok hızlı bir artış göstermiştir. Küresel balık stoklarının neredeyse üçte birinin aşırı kullanımıyla, su ürünleri yetiştiriciliği ve balıkçılığın ekolojik ayak izi, sürdürülebilir tedarik zincirinin dengesine dikkat çekmektedir.

**Anahtar Kelimeler:** Blokchain, Su Ürünleri Sektörü, Kalite Yönetimi, Gıda Güvenliği

**APPLICATION OF BLOCKCHAIN TECHNOLOGY IN FISHERIES AND  
AQUACULTURE PRODUCTION SECTOR****ABSTRACT**

Blockchain is a distributed database shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital form. Blockchains are best known for their important role in cryptocurrencies like Bitcoin to keep a secure and decentralized record of transactions. Blockchain innovation is that it guarantees the fidelity and security of a data record and establishes trust without the need for a trusted third party. Today, blockchain combats commercial fraud by documenting long and complex production cycles for seafood and monitoring critical chain of custody, analyzing by considering coastal, port, processing, and end-market. These are crucial as fishery products pass through national and international supply chains, from harvesting, transshipment, landing, and processing to the final consumer market. Every part of the country requires general control elements that must be in place, often forming the basis for traceability, tracking and data collection, and ensuring consumers have complete confidence in seafood. Aquaculture has become one of the most traded food groups worldwide and provides a livelihood for millions of people around the world. The growth rate of exports in developing countries has increased rapidly in the last ten years due to globalization and the transformation of the world economy with technological developments. With almost one-third of global fish stocks being overused, the ecological footprint of aquaculture and fisheries highlights the balance of the sustainable supply chain.

**Keywords:** Blockchain, Aquaculture Industry, Quality Management, Food Safety



## **GİRİŞ**

Blockchain, "internetin kazandırdığı değer" (FAO ve ITU, 2019) olarak adlandırılmıştır ve en basit ifadeyle, "değeri" olduğu düşünülen herhangi bir şeyle bağlantılı "işlemleri işleme, doğrulama ve yetkilendirme mekanizmaları" ile dijital, dağıtılmış bir "varlık ve işlem defteridir" (Hammerich, 2018; FAO ve ITU, 2019 ; Kochupillai, 2019). Blockchain Tipik bir veritabanı ile bir blok zinciri arasındaki temel farklardan biri, verilerin nasıl yapılandırıldığıdır. Bir blok zinciri, bilgi kümelerini tutan bloklar olarak bilinen gruplar halinde bilgileri bir araya toplar. Blokların belirli depolama kapasiteleri vardır ve doldurulduklarında kapatılır ve önceden doldurulmuş bloğa bağlanarak blok zinciri olarak bilinen bir veri zinciri oluşturur. Yeni eklenen bloğu takip eden tüm yeni bilgiler, doldurulduktan sonra zincire eklenecek olan yeni oluşturulmuş bir bloğa derlenir. Bir veritabanı genellikle verilerini tablolar halinde yapılandırırken, bir blok zinciri, adından da anlaşılacağı gibi, verilerini birbirine dizilmiş parçalar (bloklar) halinde yapılandırır. Bu veri yapısı, merkezi olmayan bir yapıda uygulandığında, doğası gereği geri döndürülemez bir veri zaman çizelgesi oluşturur. Bir blok doldurulduğunda taşınabilir ve bu zaman çizelgesinin bir parçası olur. Zincirdeki her bloğa, zincire eklendiğinde kesin bir zaman damgası verilir (Anonim 2022a ).

Blockchain ayrıca, fikri mülkiyet rejimleri gibi mevcut düzenlemeler tarafından en uygun şekilde teşvik edilmeyen faaliyetleri ve iş modellerini teşvik etmenin bir yolu olarak giderek daha fazla tanınmaktadır ( Kochupillai ve ark, 2019 ). Bu faaliyetler ve iş modelleri, örneğin, sosyal, ekonomik ve çevresel sürdürülebilirliği destekleyen, demokratik ve şeffaf karar almayı artıran ve toplumun daha yoksul ve marjinal kesimlerinin de adil kalkınmasına ve zenginleşmesine izin verenleri içerir. Dezavantajlı piyasa katılımcılarının bu teknoloji sayesinde bir nevi 'masaya oturabilecekleri' söylenmiştir ( Hammerich, 2018 ). Bu, "güven, kanun ve yaptırım" "bilgisayar koduna" dış kaynak sağlayan akıllı sözleşmeler ve "kripto yönetim" ile gerçekleştirilir (Chapron 2017 ). Karmaşık bir teknoloji olmakla birlikte, büyük ölçüde mevcut ve iyi bilinen birkaç mekanizmanın birleşimidir. Özellikle, yazılım sistemlerini (özellikle merkezi olmayan, dağıtılmış ve eşler arası sistemler) bütünlüklerini, şeffaflıklarını ve değişmezliklerini koruyacak şekilde uygulama yöntemlerinin bir kombinasyonudur; bir veri depolama ve iletim yöntemi ve bunun üzerine yeni uygulamaların (dağıtılmış uygulamalar veya dApp'ler (merkeziyetsiz uygulamalar) ve akıllı sözleşmeler) oluşturulmasına izin veren programlanabilir bir platformdur ( Drescher 2017 ; Finck 2019, ).

### **Su Ürünleri Yetiştiriciliğinde Blok Zinciri ve İzlenebilirlik Gereksinimi**

Günümüzde Su ürünleri yetiştiriciliği ve balık ürünleri, dünya çapında en çok ticareti yapılan gıda maddeleri haline gelirken dünya çapında milyonlarca insanın geçim kaynağı olmuştur. Gelişmekte olan ülkelerde ihracatın büyüme hızı, küreselleşme ve dünya ekonomisinin teknolojik gelişmelerle birlikte dönüşmesi nedeniyle son on yılda hızlı bir artış göstermiştir. Küresel stokların neredeyse üçte birinin aşırı kullanımıyla, su ürünleri yetiştiriciliği ve balıkçılığın ekolojik ayak izi, sürdürülebilir tedarik zincirinin dengesine dikkat çekmektedir.

Son yapılan tahminler gerçekleşirken, küresel su ürünleri yetiştiriciliği yörüngesi sabit kalmış ve 2019'da öngörülen somon, tilapia, levrek ve çipura üretimi ile ilgili beklentiler tamamen karşılanmıştır. 2016'da küresel balık Üretim 171 milyon tona yakinken, Gıda ve Tarım Örgütü (FAO) 2030 yılına kadar küresel tüketimin yüzde 20 daha yüksek olacağını tahmin etmektedir. Hem gelişmiş hem de gelişmekte olan ülkelerde donmuş balık talebindeki hızlı artış, okyanus endüstrisinin sürdürülebilirliğini sağlamak için kalite ve izlenebilir veri konularının ele alınmasını kritik hale getirmektedir.

2019 yılında, Norveç deniz ürünleri işletmeleri derneği (Sjømatbedriftene) ve IBM tarafından ortaklaşa düzenlenen Aqua Nor'da özel bir seminerde Blockchain, okyanus endüstrilerinin değer zincirini güvence altına alma olasılıklarını tartışmıştır. Balıkçılıkta blockchain teknolojisini uygulamak için şu üç özel nedenden bahsedilmektedir (Anonim 2022b)

1. Güvenlik – endüstri ve tüketiciler, satın aldıkları balığın doğru tür olduğundan kesinlikle emin olmalıdır. Çoğu su ürünleri şirketi sürdürülebilir çiftçiliğe büyük yatırım yapar ve kalitesiz ürünlerin satılması riskini alamaz.
2. Pazar talepleri – Büyük perakendeciler ve süpermarket zincirleri menşe kanıtı talep eder.
3. İzlenebilirlik – hem gıda perakendecileri hem de tüketiciler izlenebilirlik ve yeterli bilgi talep etmektedir.

Bu konuda ilk adımlar 2018 yılında ABD Ticaret Bakanlığı tarafından atılmıştır. Bu plana göre karideslerin yetiştirildiği yerden ABD'ye girişine kadar yerel bir izlenebilirlik programı oluşturulmuştur. Bu program (SIMP) ve izlenebilirlik sistemi, ithal edilen deniz ürünleri için ilgili düzenleyiciler ve icra makamları arasında uygun veri toplama, paylaşma ve analizini kolaylaştırmıştır; bu, yasadışı, düzenlemeye tabi olmayan ve bildirilmeyen (IUU) balıkçılık ve deniz ürünleri sahtekarlığını ele almak için önemli bir adım olmuştur (Anonim 2022 b).

Bugün, blockchain, sahtekarlıkla mücadele etmek, deniz ürünleri için uzun ve karmaşık üretim döngülerini belgelemek ve kritik gözetim zincirini izlemek, 'durumları' (bayrak, kıyı, liman, işleme ve son pazar) dikkate alarak analiz yapmak için ticari olarak mevcuttur. Bunlar, balıkçılık ürünleri hasat, aktarma, karaya çıkarma ve işlemeden nihai tüketici pazarına kadar ulusal ve uluslararası tedarik zincirlerinden geçtiği için çok önemlidir. Eyaletin her bölümü, yerinde olması gereken genel kontrol öğelerini gerektirir, bunlar genellikle izlenebilirlik izleme ve veri toplama için temel oluşturur ve tüketicilerin deniz ürünlerine tam olarak güvenmesini sağlar (Şekil 1).

### **Blockchain deniz ürünleri sahtekârlığıyla nasıl mücadele ediyor?**

Gıda dolandırıcılığı son yıllarda %60 arttı ve deniz ürünleri endüstrisi özellikle sert darbe aldı. Somon, ton balığı ve pisi balığı, restoran ve market hikayelerinde yaygın olarak yanlış etiketlenen çeşitlerden sadece birkaçıdır. Yeni bir blockchain ağı, deniz ürünlerini yakalama noktasından mutfağa kadar takip ederek dolandırıcılığı ortadan kaldırmayı amaçlıyor.

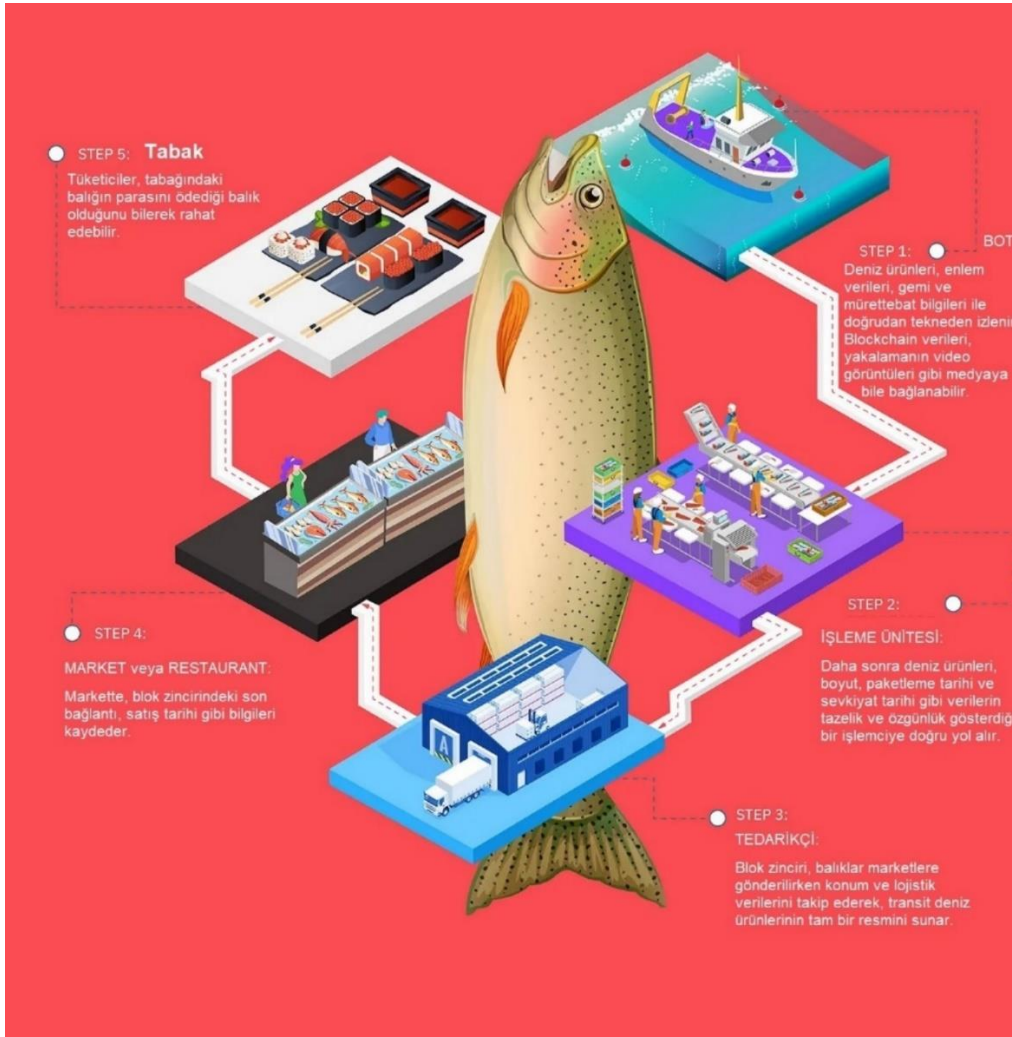
Step 1 Bot. deniz ürünleri, enlem verileri, gemi ve mürettebat bilgileri ile doğrudan tekneden izlenir. Blockchain verileri, yakalamanın video görüntüleri gibi medyaya bile bağlanabilir.

Step 2. İşlemci: Daha sonra deniz ürünleri, boyut, paketlenme tarihi ve sevkiyat tarihi gibi verilerin tazelik ve özgünlük gösterdiği bir işlemciye doğru yol alır.

Step 3. Tedarikçi: Blok zinciri, balıklar marketlere gönderilirken konum ve lojistik verilerini takip ederek, transit deniz ürünlerinin tam bir resmini sunar.

Step 4. Market veya restoran: Markette, blok zincirindeki son bağlantı, satış tarihi gibi bilgileri kaydeder.

Step 5. Tabak: Tüketiciler, tabağındaki balığın parasını ödediği balık olduğunu bilerek rahat edebilir.



Şekil 1 Blockchain deniz ürünleri sahtekarlığıyla nasıl mücadele ediyor? (Anonim 2022c)

## Su Ürünleri Yetiştiriciliğinde Blockchain için İlk Ulaşılabilir Kilometre Taşları Şunlardır (Şekil 2):



Şekil 2. Su Ürünleri sektöründe Blockchain uygulamasının adımları (Anonim 2022b).

FAO, projeler arasında blok zincirinin başarılı bir şekilde uygulanması için birkaç yaygın faktörden bahseder. Bu faktörler şunları içerir:

- Bunların çoğu yalnızca yüksek değerli balık türleri olarak kabul edilir (ton balığı ve deniz levreği gibi türler yüksek değerli ürünlerdir).
- Bu akuakültür şirketlerinin bir arada var olan dijital ve fiziksel yöntemler arasında doğrudan bir bağlantısı vardır, bu bağlantı ya tek tek balıkların etiketlenmesi ya da yakalama verilerinin birimlerinin kaydedilmesi için başka yollarla tanımlanmıştır.
- Projelerin çoğu, aktörlerin bilindiği ve izlenebilir olduğu nispeten kısa ve açıkça tanımlanmış veya dikey olarak entegre değer zincirlerine sahiptir.
- Verilerin değişmezliği ve güvenli veri paylaşımı, bu deniz ürünleri şirketleri tarafından blok zincirinin benimsenmesinin ana faktörleridir.
- Ürün ambalajında QR kodların kullanıldığı uygulama, kullanılabilirliği nedeniyle tercih edilmektedir.

#### **Su Ürünleri projelerinde Blockchain Uygulaması için gerçeklik kontrolü:**

Her proje blok zinciri çözümleri için farklı teknoloji kullanırken, ortaya çıkan birkaç aşılabilir zorluktan söz edilir, FAO analizi aşağıdakileri temsil etmektedir (Anonim 2022b).

- İnsan girdisine dayalıdır – projelerin çoğu, muhtemelen kurcalanmaya açık olan balık verilerinin insan girdisine dayanmaktadır.
- Balıkların manuel olarak markalanması ve etiketlenmesi – fiziksel balık markaları/etiketleri nakliye sırasında kaybolabilir veya hasar görebilir ve hatta kurcalanabilir.
- Özel ve konsorsiyum blok zinciri platformlarının doğrulanabilirliği - mimarileri ve tasarımlarıyla bu blok zincirleri halka açık değildir, işlemleri bağımsız olarak doğrulamak zor görünmektedir.
- Karmaşık deniz ürünleri değer zinciri senaryoları denenmemiştir – birkaç aktörün bilinmediği gerçek dünyadaki karmaşık deniz ürünleri değer zincirlerinden kaynaklanan belirsizlik henüz dikkate alınmamıştır.

#### **Su Ürünleri Endüstrisini Zorlayıcı Faktörler**

- Çevre düzenlemelerinin sıkılaştırılması
- Sosyal, çevresel ve ekolojik sürdürülebilirlik konusunda ihmal edilebilir şeffaflık
- Gıda güvenliği ve güvenlik de dahil olmak üzere çok-sınırlı Tedarik zinciri yönetimi, su ürünleri talebini etkileyen başlıca endişelerden bazılarıdır.
- Müşteriler dahil tüm paydaşlar için bilgiye erişim eksikliği,

- Büyük veri ve veri analitiği kullanılarak eyleme dönüştürülebilir içgörüler oluşturmak için gerçek zamanlı verilerin bulunmaması,
- Doğrulanmış bilgiler ve tanımlanmış veri noktaları ile deniz ürünlerinin çapadan çatala izlenebilirliği.

#### Gerçek Zamanlı Blockchain Projeleri Örnekleri

Denizlerin korunması için şeffaf kaynak kullanımı, plastikten kaynaklanan kirliliğin azaltılması, denizde köleliğin azaltılması ve sürdürülebilir balıkçılık yönetimi de dahil olmak üzere bir dizi hizmet ve endüstri için blok zinciri giderek daha fazla kullanılmaktadır. Balık ve çiftçi koruma operasyonlarına yönelik artan kamu güvensizliği ve deniz ürünlerinin menşei artıyor. Balık çiftçilerini blok zinciri çözümleriyle bütünleştirmeye ve çevresel etki, yem, büyüme ve balık sağlığı hakkında özel veriler toplamaya odaklanıyor, çünkü bunlar balıkları sürdürülebilir bir şekilde yetiştirirken kilit faktörler olarak katkıda bulunuyor.

Yabani deniz ürünleri değer zinciri göz önüne alındığında, Tuna, diğer emtiaların yanı sıra Şili deniz levrekleri ve çiftlik karidesleri de dahil olmak üzere, blok zincirinde izlenen en yaygın deniz ürünleridir. FAO tarafından yakın zamanda yapılan bir araştırma, dünya çapında uygulanan blok zinciri projeleri için türlerin, kullanılan teknolojinin ve etkinin temel bulgularıyla birlikte verileri toplamıştır.

Deniz ürünleri değer zincirlerindeki en eski pilot projelerden biri, 2016 yılında Endonezya'daki Project Provenance Ltd (Provenance) tarafından sarı yüzgeçli ton balığı filetosu ve konserve için ton balığına odaklanmıştı. Bunu 2017 yılında WWF-Yeni Zelanda, ConsenSys, Sea Quest, TraSeable Solutions Fiji için başka bir proje izlemiştir. 2018 yılında, Nauru Anlaşma Ofisi Taraflarının (PNAO) ton balığı pazarı geliştirme şirketi ve Tayland'da bir hizmet olarak blok zinciri (BaaS) platformu olan Atato, gırgırda konserve amaçlı yakalanan ton balıklarını izlemek için ilk büyük ölçekli blok zinciri girişimini hayata geçirmişlerdir. Bu girişim, Marine Stewardship Council (MSC) özel sertifikasyonunun gözetim zinciri (CoC) gereksinimlerini kamu malı haline getirmiştir. Son zamanlarda Fishcoin gibi şirketler, sürdürülebilir deniz ürünleri üretimine doğru ilerlemelerini hızlandırmak için BM Gıda Programı'nın SKH 2 Savunuculuk Merkezi ile ortaklık kurmuştur. Şirket, her tür deniz ürünü için avlama verilerinin yakalanmasını ve iletilmesini teşvik ederek, merkezi olmayan defter teknolojisini kullanarak veri toplamayı iyileştirmeyi teklif etmektedir. Ayrıca Endonezya'daki Bumble Bee Foods, ürün ambalajına QR kodları uygulayarak Yellowfin orkinos ("Adil Ticaret" sertifikalı) için SAP blockchain kullanımına geçmiştir. Ayrıca, Sustainable Shrimp Partnership Ecuador şirketi,

IBM Food Trust'ı kullanmaktadır böylelikle, Ekvador'daki karides çiftlikleri ve ürünleriyle ilgili tüm verilere dünya çapındaki perakendeciler erişebilmektedirler (Anonim 2022b).

### **Ülkemizde Gıda Güvenliği İçin Blockchain Teknolojisi Kullanılıyor**

İzlenebilir Güvenli Gıda Platformu ile birlikte tarım sektöründe blockchain teknolojisini kullanan ilk Türk firmasının HEKTAŞ olduğu belirtilmektedir, “Blockchain teknolojisiyle tarım sektöründeki paydaşlar tedarik zincirindeki her bir ürünün topraktan sofraya kadarki yolculuğunun tüm aşamalarını, kullanılan tüm girdiyi ve üretici tarafından yapılan uygulamaları izleyebilmektedir. Blockchain teknolojisindeki bilgilerin değiştirilemez olması da tüketicilerin doğru bilgiye ulaşımını garanti etmektedir (Anonim 2022d). Ülkemizde İzlenebilir Güvenli Gıda Platformu ve yeni iş birlikleriyle ilgili olarak özel bazı kuruluşların yöneticileri; “kendi kurumlarının güvencesi altında yüksek teknoloji kullanarak akıllı seralarda üretilen, izlenebilir ürünlerini ilk olarak CarrefourSA’da tüketiciyle buluşturduklarını ifade etmişlerdir. Bu proje ile üreticilerin daha verimli üretim yapmalarına yönelik yapay zekâ destekli akıllı tarım teknolojileri üzerine sistemler geliştirirken, gıda güvenliğine dikkat çekerek, tüketicilerin tarımsal okuryazarlığını arttırmak amacıyla, blockchain teknolojisini de kullanmaktadırlar. Platform ayrıca, üretim yapılan seralardaki mahsullerin gelişimleri ve olası olumsuz durumları sensörler aracılığıyla uzaktan takip etmeyi, hızlı ve doğru müdahale ile verim kaybının önüne geçmeyi de sağlamaktadır. Böylece üreticilerin olumsuz koşullardan minimum düzeyde etkilenmeleri sağlanarak, menfaatleri korunurken, sürdürülebilir tarımsal üretim konusunda da önemli adımlar atılmasına imkân sunmaktadır. Özellikle tarımda ayrı bir önemi olan bu yeni teknolojinin ülkemizde yaygınlaştırılması için çalışmaların sürdürülmesi gereklidir.

### **Dünya çapında Gıda Tedarik Zincirinde Blockchain Kaynaklı Teknolojik Uygulamalar**

Gıda tedarik zinciri; girdi tedariki, üretim, hasat, işleme, nakliye, pazarlama, dağıtım ve perakende birimlerini bir bütün olarak kapsamaktadır. Bu zamana kadar, tarımsal gıda ürünlerinin üretiminden tüketici pazarlarına kadar bütün tedarik zinciriyle ilişkili menşei, izlenebilirlik ve riskler hakkındaki bilgiler kısıtlıydı ve kontrol edilebilmesi sınırlıydı ancak Blockchain teknolojisinin gıda sektöründeki uygulamaları ile bu konuların üstesinden gelinmektedir. Bu noktada en önemli gelişmelerden bir tanesi de tüketicilerin akıllı telefonlarında yer alan uygulamalar aracılığıyla, mağazadan tedariki gerçekleştirilecek olan organik tavuklar, Sicilya portakalları ve limonları etiket kısımlarında yer alan QR kodu ile gerekli olan bütün bilgilere kısa süre içerisinde ulaşabilmeyi mümkün kılmaktadır (Anonim 2018a). Avustralya, Fiji ve Yeni Zelanda'daki Dünya Vahşi Yaşam Fonu ( WWF) teknolojik

şirketler ile beraber gerçekleştirdiği bir çalışmada ton balıklarının avlama ve işleme endüstrisinde, pasifik adalarda karşılaşılan yasa dışı olarak yürütülen orkinos avcılığına karşı çıkmak amacıyla Blockchain teknolojisi kullanarak örnek bir projeye imza atmıştır. Bu sayede balık ve türevlerinde QR kodu kullanılarak balığın kökeni belirlenebilmektedir (Anonim 2018b). Teknolojik şirketler IBM Blockchain teknolojisini kullanarak, tedarikçilerden temin edilen birçok ürünü ( meyve, sebze, et ve süt ürünleri ) hızlı bir şekilde izleme olanağına sahiptirler. Ayrıca gıda kaynaklı hastalıkları ve insan güvenliğini tehdit eden unsurların kaynağı kısa sürede belirlenebilmektedir. Sürdürülebilir ekonomik model sayesinde ürünlerin geri dönüşümü mümkün olmakta ve tedarik zincirinde oluşabilecek aksaklıklar önlenmektedir (Anonim 2018c, Chang ve ark., 2019).

#### **Gıda Sektöründeki Blockchain Teknolojisinin Faydaları**

Blockchain teknolojisi performans ölçümlerinde önemli tedarik zinciri iyileştirme potansiyeline sahiptir. Geleneksel gıda tedarik zincirinde ürünlerin üretimi ve satışına ilişkin veriler dizilere ayrılmıştır. Tedarik zinciri katılımcılarının, merkezi veri tabanlarında orjinal olarak saklanan bilgilerin erişilebilirliği, diğer katılımcılarla daha fazla iletişim kurulmasını sağlamaktadır (Montecchi,ve ark., 2019) Blockchain teknolojisi, tedarik zincirinin üyeleri sistemde yer alan kayıtlı bilgileri tahrif edemediği için manüplasyon riskini azaltmaktadır. Blockchain teknolojisi mikro sensörlerin kullanımı sayesinde ürünlerin sıcaklığını, nemini ve diğer kritik kalite faktörlerinin ölçülmesinde muazzam fayda sağlamaktadır. Bu faktör neticesinde taze gıdaların, kalite standartlarının eş zamanlı olarak kontrol edilebilmesini sağlamakta ve ürünlerin güvenliğini, kalitesini ve raf ömrünün arttırılabilmesini sağlamaktadır (Sander,ve ark.(2018).

Sayısal verilerin kayıt altına alınması, tasarruf ve israf edilen gıda miktarının belirlenebilmesi neticesinde döngüsel ekonomik modeli oluşturulabilmektedir. Hileli ve kontamine olabilecek gıda ürünlerinin varlığı kısa sürede belirlenebilmekte ve oluşabilecek tehlikeler önlenmektedir. Tüketiciler, satın aldıkları ürünlerle ilgili menşelerin dışında güvence talep etmektedirler. Bu noktada ürünün dijital ortamda sahip olduğu bilgiler tüketiciler ile hızlı bir şekilde paylaşmakta ve tüketicilerin arzu ettikleri güvence bu noktada karşılanmaktadır (Tse, ve ark.,2018) (Şekil 3).





Şekil 3. Blockchain teknolojisi ile oluşturulmuş bir tarımsal tedarik zinciri (Tripoli ve Schmidhuber, 2018 ve Güçlü 2020).

### Akıllı Sözleşme Nedir?

Akıllı sözleşmeler blockchain teknolojisinin ayrılmaz bir parçasıdır. İşlemleri otomatik olarak yürütür ve bilgileri insan müdahalesi olmadan büyük deftere kaydederler.

Akıllı sözleşmelerin koşulları, ađın üyeleri tarafından üzerinde anlaşmaya varılmış koşullardır. Bunlar, taraflar arasında güven ve verimlilik oluşturmanın önemli bir unsurudur. Akıllı sözleşmeler evrak işlerini ortadan kaldırır, süreci basitleştirir, zaman ve para tasarrufu sađlar (Anonim 2022 c)

## SONUÇ

Blockchain, tüm tarımsal üretim sektörlerinde sürdürülebilirliğe doğru ilerleyen dünyada, birincil protein kaynaklarından biri olan deniz ürünleri, sadece pazar payını artırmakla kalmayıp, yeni pazarlar açabilir, işbirliklerini artırabilir ve çevresel, sosyal ve ekolojik sürdürülebilirlik için izlenebilirlik ve şeffaflık sağlayabilir. Ayrıca, merkezi olmayan bir veri tabanı kanıt işlevi görebilir ve kaynak yönetimini iyileştirebilir. Su ürünleri yetiştiriciliği ve balıkçılıkta blockchain, hareket işleme süresini azaltarak gıda üreticileri, hükümetler, perakendeciler, sertifikasyon kuruluşları ve tüketiciler arasında bir güvenilirlik ve güven ilişkisi geliştirmiştir.

Ancak halen söz verilmesine rağmen, balık ve su tedarik zincirinin küresel varlığını kabul eden, ölçekte test edilen, verimli bir şekilde kabul edilebilir ve işleyen pazar tabanlı çözümlerin eksikliği vardır. Dijital İzlenebilirlik kaçınılmazdır ve doğal olarak sektörü alt üst etmektedir. Diğer tarımsal endüstrilerle karşılaştırıldığında, su ürünleri yetiştiriciliği ve balıkçılık bu konuyu geç benimseyen bir sektör olmuştur. Bugün bile kapsamlı kayıtmakta, ancak izlenebilirliğe öncelik verilmemiş ve şirketler bilgi paylaşımı konusunda isteksiz kalmışlardır. Teknolojiden tam potansiyeliyle yararlanılmazsa, veri kalitesi endüstri genelinde zarar görecektir ve daha ciddi sonuçlara yol açacaktır. Bu nedenle üretici kurumların bu konuda gereken yatırımları yaparak tam anlamıyla uygulamaya geçmeleri tüm sektör bileşenlerinin yararına olacaktır.

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## **SU ÜRÜNLERİ YETİŞTİRİCİLİĞİ YÖNETİMİNDE DİJİTALLEŞME**

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### **ÖZET**

Su ürünleri yetiştiriciliği, balık, kabuklu deniz ürünleri ve su bitkilerinin belli bir zaman dilimi içinde belli bir yatırımla birçok teknik faktör gözetilerek yapılan ekonomik bir üretim faaliyetidir. Temel olarak bahsedilen bu sucul canlıların refahları gözetilerek Pazar boyuna kadar yetiştirilir ve sonunda hasat edilir. Günümüzde dünyanın en hızlı büyüyen sektörleri arasındadır. Üretim performansı ve kalitesi, gıda miktarı ve periyodikliği, sıcaklık, yaşam döngüsü ve kullanılan suyun özellikleri gibi farklı faktörlerin kombinasyonuna bağlıdır. Son dönemlerde talebin artmasıyla birlikte üretim miktarlarının artması ve endüstrinin gelişmesi, birçok teknolojik sistemin kullanımı ile gerçekleşmektedir. Bu teknolojik sistemler sahip oldukları sensörler ve iletişim ağı ile gelişmiş veri analizlerini içeren programlar yardımıyla üretimi ve kaliteyi istenilen seviyelere çıkartmıştır. Yapılan ölçümler ve toplanan veriler aracılığıyla neredeyse tüm kontrol sağlanarak gerçeğe çok yakın seviyelerde tahminler üretilerek, hem kaynakların daha verimli kullanılması sağlanmakta hem de olası hastalık ve risklerden çok daha az etkilenilmektedir. Dijital veri toplama ve işleme sayesinde işletmeler hem daha kolay kontrol edilmekte hem de daha şeffaf bir üretim prosesi takip etmektedirler. Üretici dijitalleştikçe piyasadaki rekabete katılma gücü elde etmekte bunla birlikte Blockchain teknolojisi dâhil birçok uygulamaya uyumlu hale gelmektedir.

**Anahtar Kelimeler:** Dijitalleşme, Su Ürünleri yetiştiriciliği, Teknoloji, Üretim Kontrolü, Üretim Yönetimi

## **DIGITALISATION IN AQUACULTURE MANAGEMENT**

### **ABSTRACT**

Aquaculture is an economic production activity of fish, shellfish, and aquatic plants with a certain investment in a certain period, taking into account many technical factors. These aquatic species are grown until the market and finally harvested, taking into account the welfare of these aquatic species. It is among the fastest-growing industries in the world today. Production performance and quality depend on a combination of different factors, such as the quantity and periodicity of food, temperature, life cycle, and characteristics of the water used. With the increase in demand in recent times, the increase in production amounts and the development of the industry are realized with the use of many technological systems. These technological systems have increased the production and quality to the desired levels with the help of their sensors and communication network and programs containing advanced data analysis. To make the production and post-production quality management safer, the consumer and the seller have the opportunity to work with a safer product, thanks to the monitoring studies carried out to monitor the production and supply. Thus, while the producer can prove how high quality his production is, it is ensured that the consumer gets away from their concerns and possible misinformation. In addition, although digital technology requires an investment at first, it also has the effect of reducing the production cost over a long period. Because it is getting harder to find a high-quality workforce day by day and the need for personnel decreases as the digitalization infrastructure increases due to the possibility of success in production parallel to the success of the personnel. By providing almost all control through the measurements and data collected, estimates are produced at very close levels to reality, thus ensuring more efficient use of resources and much less exposure to possible diseases and risks. Thanks to digital data collection and processing, businesses are both easier to control and follow a more transparent production process. As the manufacturer digitizes, it gains the power to participate in the competition in the market, and it also becomes compatible with many applications, including Blockchain technology.

**Keywords:** Digitalisation, Aquaculture, Technology, Production Control, Production management

## **GİRİŞ**

Dijitalleşme veya sayısallaşma, ulaşılabilir bilgilerin herhangi bir bilgisayar tarafından okunabilecek şekilde dijital ortama aktarılması sürecine verilen addır. Özellikle mühendisler çeşitli fiziki görüntüleri bilgisayara aktarıp çalışmalar yapmak için kullanırlar. Dijitalleşmenin üzerinde mutabık kalınan tek bir tanımı olmamasına rağmen, genellikle dijitalleşme ve dijital dönüşüm ile yer değiştirirken, her terim farklı bir bakış açısını kapsar (Alsufyani,ve Gill., 2022).. Dijitalleştirme teknik yönü kapsarken, dijitalleşme hem sosyal hem de teknik yönleri kapsar (Bockschecker ve ark., 2018)

İlk dönemlerde elde edilen veriler analog olarak kaydedilirken günümüzde artık dijital olarak elde edilerek depolanmaktadır. Bilgi saklayabilmenin en önemli kazancı, geçmiş bilgilerin fiziksel bir formatta olması gerektiğidir. Bundan dolayı bilginin yerel olduğu ve aynı zamanda imha edilebileceği anlamına da gelir. Dijitalleşme, bu sorunu büyük bir ölçüde çözmektedir, çünkü neredeyse tüm bilgilerin kopyalanmasına izin verir ve aynı bilgiyi birden fazla yerde saklama olanağı sağlar. Bu arada, dijitalleştirme çok sık, bilgi kaybını önler. Aynı zamanda, kâğıt gibi büyük hacimli depolama zorunluluğunu büyük oranda gereksiz kılar (Anonim 2022a <https://scientu.net/dijitallesme1/>). Dijitalleşme sadece bilginin depolanabileceği ve kullanılabilmesi şeklini değiştirmekle kalmaz, aynı zamanda gözlem olanaklarını da genişletir ki bu konu en çok bilim alanında kullanım olanağı bulmaktadır. Dijitalleşmenin ortaya çıkması için iki ön koşul gereklidir:

- dijital altyapı
- insanların dijital yeterliliği

Dijital altyapı, dijital programların ve ekipmanların kullanılmasını olanaklı kılar. Sayısallaştırma, bilgi sunmak ve bilgi ile ilgilenmek için günümüzde en modern bir yoldur.

Su ürünleri üretim sektöründe tahmin programlarının kullanımı yetiştiriciliğin modernleştirilmesine de yardımcı olmaktadır. Bu programlar “Sürdürülebilirlik ve balık yetiştiriciliğinde verimliliği” bir sonraki seviyeye taşımaktadır (Anonim 2022b).

Su ürünleri yetiştiriciliğinde verilerin artan değerini ve tahmine dayalı tahmin yazılımının deniz çiftçiliğinin çehresini nasıl değiştirdiğini bu yazıda görmek mümkün. Birçok kişi hava durumu ile ilgili tahminleri duymuştur, ancak muhtemelen balık yetiştiriciliği bağlamında değil. Su ürünleri yetiştiriciliğinde tahmine dayalı analitik nasıl çalışmaktadır? Prensipler aslında aynı: Gelecekte meydana gelme olasılığını tahmin etmek için geçmişte bir hastalık oluşumu veya zehirli bir alg oluşumu gibi faktörlere bakılması gerekmektedir. Uygulamada, balık çiftlikleri

için tahminler oluşturulabilmektedir. Örneğin, yakın zamanda Kuzey Avrupa'da somonda bulunan ve üretim sırasında çiftlikler arasında bulaşabilen ve somon büyümesini sınırlayan bir hastalık olan Pankreas Hastalığı (PD) için özel bir kurum tarafından bir tahmin geliştirmiştir (Anonim 2022b) . Bu hastalığın gelişimini tahmin etmek için, PD'nin geçmişteki gelişimini hangi faktörlerin (deniz sıcaklığı, bir çiftliğe giden tekne sayısı vb.) etkilediğini belirlemek için veri toplanmakta ve daha sonra, aralarındaki ilişkileri değerlendirmek için bu faktörler üzerinde algoritmalar çalıştırılmaktadır. Bu ilişkilere dayanarak, bilgisayar yakın gelecekte PD geliştirme olasılığının düşük, orta veya yüksek olduğunu tahmin edebilir ve bu da balık çiftliği operatörlerinin PD'yi önlemek için hasat, besleme veya temizlik gibi çiftlik faaliyetlerini yönetmelerine olanak tanımaktadır. Esasen, bu teknoloji çiftçilere, balıklarının refahını nasıl en üst düzeye çıkaracakları ve koruyacakları konusunda gelecekte en etkili kararları vermeleri için geçmiş olayları bir araç olarak kullanma olanağı sağlar (Anonymous 2022 b).

Su ürünleri üretim alanında hangi konularda dijitalleşmenin gündemde olduğuna bakmak konun daha iyi anlaşılmasına yardımcı olabilir.

Hava tahminleri konusunda

Su kalite unsurlarının ölçüm, kayıt ve dengelemede

Yemleme-besleme konularında

Genel görüntüleme, Koruma ve kontrol konularında

Balık sayma- boylama ve ölçümleri konularında

Hastalıklarla mücadele konusunda

Rutin günlük kayıt ve düzen konularında

Kalite yönetimi, Blockchain teknolojisi uygulamasında,

yoğun olarak dijital veriler kullanılmaktadır. Dijital verilerin toplanmasının yanı sıra depolanmasıyla uzun zamana dayalı yapılan operasyonlar ile ilgili geçmişe dönük bilgiler incelenebilirken olası bir olağan dışı olayla karşılaşıldığında sebep sonuç ilişkisinin incelenmesi adına da bu verilerden ciddi bir biçimde yararlanılmaktadır.

Doğru veri üretmek yetiştiricilik uygulamasının artık çok önemli bir parçası haline gelmiştir. Kesintisiz seviyede sürekli veri toplanması, verilerin transferi ve depolanması, yorumlanması ve aksiyon alınması konusu günümüz üretimini daha da yükseklerle çıkartmaktadır.





Şekil 1. Üretimde sahada pek çok noktada dijital teknolojiden destek alınmaktadır.

Yetiştiricilikte dijitalleşme konusunu ele alırken birkaç farklı süreçte bu konuyu incelemek ayrıntıların daha belirginleşmesi için daha yararlı olacaktır.

### **Üretim Sürecinde Dijitalleşme**

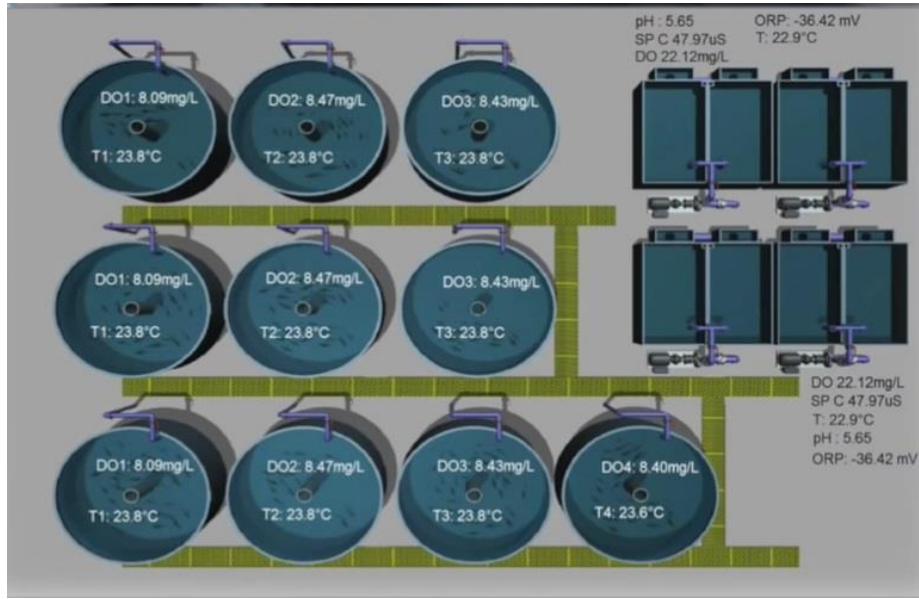
Üretimde nerede yapıldığına göre kullanılan ve yardım alınan ekipmanlar farklılık gösterebilir. Karasal ünitelerde denizel ünitelerde hareketli ortamlarda, su içinde ve su dışında olmak üzere farklı alanlarda farklı sistemlerden yararlanmak olasıdır.

### **Karasal ve Denizel Ünitelerde Kullanılan Dijital Ekipmanlar**

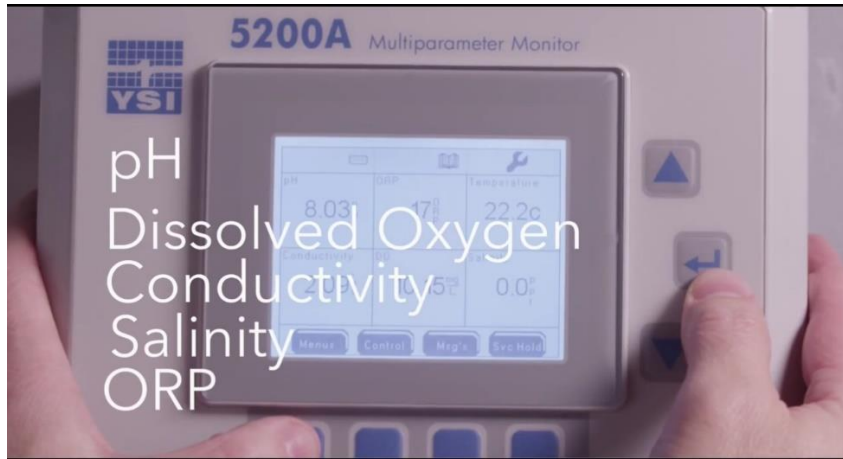
Tanklarda, beton havuzlarda, iç ünitelerde, depolarda kullanılan ölçüm ve kontrol ekipmanları bunlara örnek verilebilir (Şekil 2). Bir merkezi beyin tarafından kablolu ya da kablosuz olarak bir ölçüm sensörü yardımıyla verileri alır ve sisteme iletir. Sistem merkezde bu verileri işler ve normal programla karşılaştırarak aksiyonu belirler. Verileri hem kendi değerlendirebilir hem de ilgili verilmiş adreslere yollayabilir (mail ya da sms yardımıyla). Zaman zaman sistem hemen uyarı yapmak için siren yardımıyla uyarıcı olabilir. Günlük ve anlık olguları veri haline getirerek depolar. Operasyon çok uzaklardan dahi takip edilerek bilgi sahibi olunabilir.



Şekil 2. Havuzlarda Dijital olarak kontrol edilen yem üniteleri



**Şekil 3.** Program destekli bir üretim ünitesinde Oksijen ve sıcaklık seviyesi kontrolleri

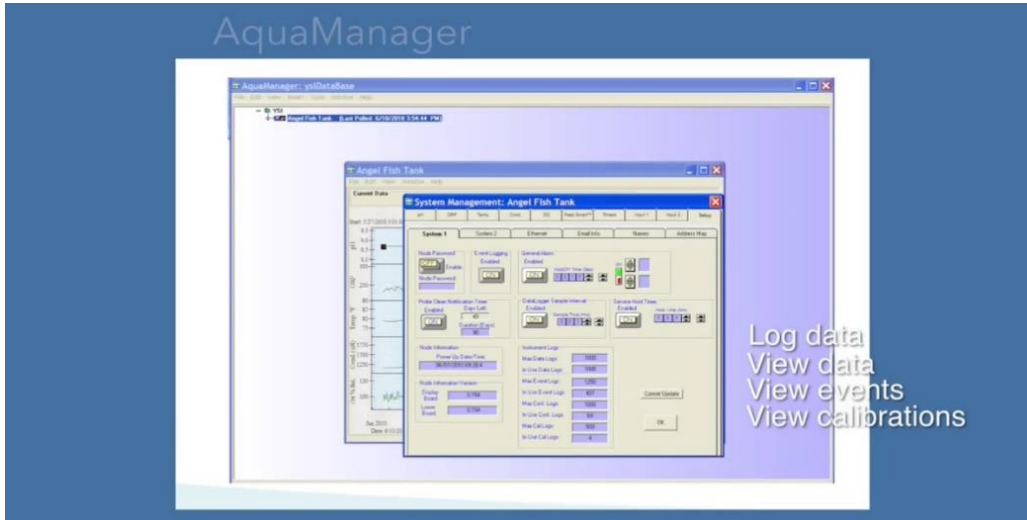


**Şekil 4** Bir Üretim sisteminde Su kalite kontrol ölçümlerinin dijital olarak sağlanması



Şekil 5. Bir Üretim ünitesinde kontrol panelleri

Şekil 6. Üretim sisteminde kullanılan Program ara yüzlerinden birisi

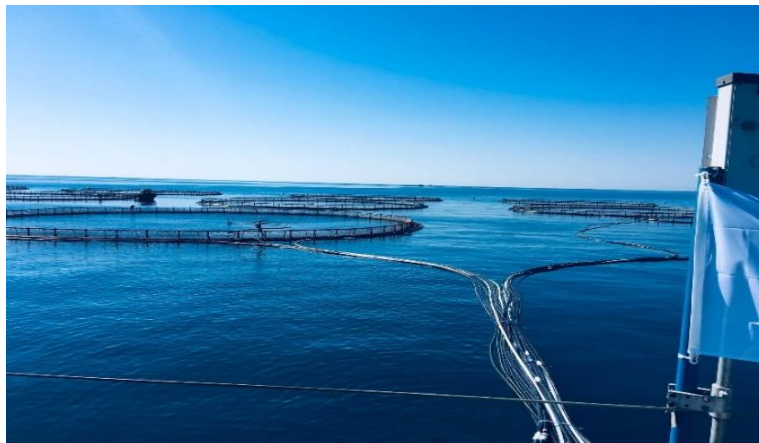




Şekil 7. Üretim sisteminde otomatik ve dijital olarak yapılan kontrol işlemleri



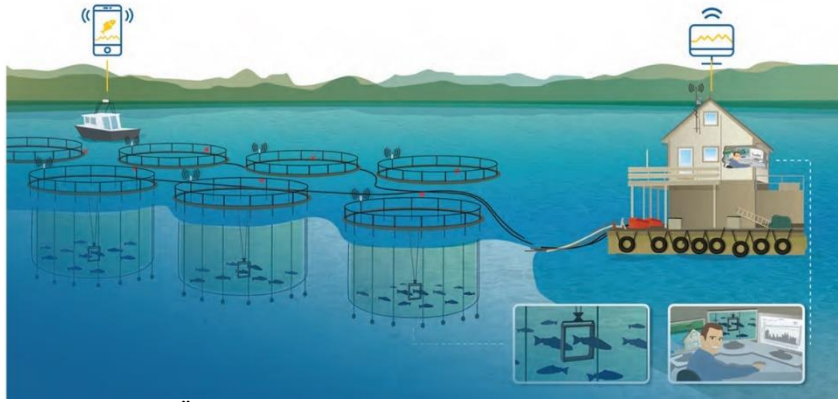
Şekil 8. Kafes Üretim sistemlerinde kullanılan yemleme ünitesinin izleme program bölümü



Şekil 9. Açık deniz kafes sistemlerinde dijital olarak kontrol edilen yemleme sistemleri

Yetiştiricilik çiftliklerinde günlük ve hatta anlık olarak yapılması gerekli tüm ölçümler ve değerlendirmeler dijital ölçüm araçları ile otomatik olarak yapılmakta ve veriler bir derleyici ile toplanarak değerlendirilmektedir. Yapılan ölçümlerin ışığı altında su sıcaklığı, sudaki çözülmüş oksijen seviyesi, tuzluluk değeri, dalga ve rüzgar derecesi, suyun ph seviyesi gibi birçok değişken değerlendirilerek otomatik yemliklerin kullanımında alt yapı bilgileri sağlamaktadır. Yemleme bu verilerin durumuna göre yapılmaktadır. Ayrıca yapılan gözlemlerle balıkların sağlık durumları ve iştahları değerlendirilerek verilecek yem miktarına karar verilmektedir. Bu uygulamalar yardımıyla yem uygun zamanda ve uygun miktarlarda balıklara verilmiş oluyor ki bu da yemin çok rasyonel kullanılmasına olanak sağlamaktadır (Şekil 8 ve 9).

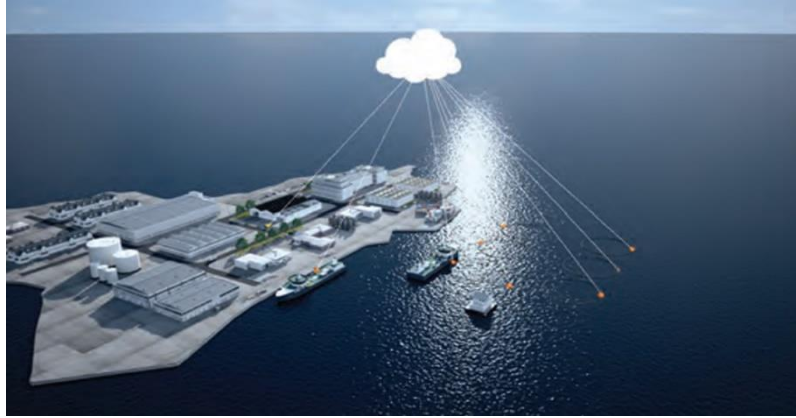
Gün içinde operasyon sırasında balıkların boy ve ağırlıkla ilgili verileri dijital olarak ölçümlenebilmekte ve böylece verilen yemden ne kadar yararlanabildikleri hakkında ciddi bir bilgi edinilmektedir (Şekil 10 a, b ve c). Tüm üretilen veriler sistemlerde saklanabildiği gibi uydu (bulut) aracılıkları ile merkezi bir sisteme de depo edilebilmektedir (Şekil 11).



**Şekil 10 a.** Üretim sistemlerinde kullanılan dijital boylama ekipmanları



Şekil 10 b ve c. Üretim sistemlerinde kullanılan dijital boylama ekipmanları



Şekil 11. Tüm Ekipman kolayca bir buluta bağlanarak verileri aktarabilmekte ve depolayabilmektedir.

### **Sonuç olarak dijitalleşme balık refahına tam olarak nasıl yardımcı olabilir?**

Balık sağlığını nasıl etkileyebileceğini anlamak için öncelikle balık sağlığının genel olarak nasıl korunduğunu anlamak önemlidir. Esasen, bir balığın sağlığı 3 ana alana bağlıdır:

1. Hastalık/patojen varlığı
2. Çevre (örneğin okyanus akıntıları, sıcaklıklar ve tuzluluk)
3. Balığın kendisi (örneğin genetik, aldığı yem ve genel sağlık durumu)

Bu bölgelerdeki koşullar ideal seviyelerinin çok dışına çıktığında bir balık hastalanabilir veya ölebilir. Bir örnek vermek gerekirse, su sıcaklığı biraz fazla sıcaksa ve sudaki zararlı bakterilerde bir artış varsa, o zaman balığı bir kafesten diğerine hastalanmadan veya ölmeden önce balığın dayanabileceği kritik eşiğin üzerindeyken (genellikle balık zarar görmeden) taşımak gibi bir hareket yeterli olabilir. Tahmin modelleri, bu faktörler arasındaki ilişkileri ve balıkları nasıl etkilediğini anlayarak, balık çiftçilerinin balık sağlığına yönelik zorlukları veya tehditleri daha erken görmelerine yardımcı olur. Balıklar zaten savunmasız bir durumda olduğunda sonuçlarla uğraşmak yerine, balıkları sağlıklı tutmak için önleyici tedbirler alma fırsatı verir.

Balık çiftçileri bu analizlerin bir kısmını zaten kafalarında yapıyorlar ve yılların tecrübesiyle çok iyi başarabiliyorlar. Ancak insan zihninin bu kadar çok faktörü ve bunlar arasındaki ilişkileri yönetebilme konusunda sınırlar vardır. İşte burada bilgisayarlar ve veri bilimi teknikleri devreye girmektedir. Bir çiftçinin bilgisi ile birleştiğinde, balıklara mümkün olan en iyi yaşam koşullarını sağlamak için çok daha güçlü bir analitik araç sağlamaktadır.

Dijitalleşme üretimin ötesinde tüketim sürecinde de yine sektöre destek sağlamaktadır. Üretimin ilk aşamasından satış aşamasının sonuna dek üretilen ürünün izlenebilmesi hem üreticiye hem tüketiciye hem de yöneticiye büyük olanak ve kolaylıklar sağlayabilmekte ve kalite yönetiminde eşsiz değerler sağlayabilmektedir. Örneğin ülkemizde de kullanılmaya başlanan programlar yardımıyla kurumlar satılan tüm su ürünlerinin üretim öykülerini tüketicileriyle anlık olarak paylaşabilmektedir (Şekil 12, 13 ve 14).

Lojistik ve tedarik zinciri verileri, ortalama ve taşıma şekli ve teslimat süresi hakkında da bilgiler içerir. Farklı sensör taramaları, kimyasal ve biyokimyasal bileşenler, lojistik ve dağıtım sırasında gıda ürünlerinin gerçek raf ömrünü, mikrobiyolojik stabilitesini veya meyve ve sebzelerin olgunluğunu tahmin etmek için kullanılır. Lojistik ve tedarik zinciri verileri, ortalama ve taşıma şekli ve teslimat süresi hakkında da bilgiler içerir. Farklı sensör taramaları, radyo frekansı tanımlama (RFID), akıllı etiketler (yakın alan iletişimi (NFC), QR kodları) ve barkod teknolojileri, ürünleri tüketici deneyimini geliştiren hizmetlere bağlamak ve gıda tüketimi israfını en aza indirecek çözümler sunmak için kullanılır. Ayrıca tüketiciler, besin bileşimi, alerjenler, menşee ve özgünlük ile ilgili ürün bilgilerini talep ederken, tüketim kalıpları aracılığıyla perakendeciler ve gıda şirketleri için de değerli bilgiler üretirler (Zeb ve ark., 2021).



Şekil 12 ve 13. Ürün bilgisinin veri sistemine kaydı ve QR kod uygulaması ile takibi



Şekil 14. Markette alışveriş sırasında mobil telefonlar yardımıyla okutulan QR kod uygulaması



### **Dijitalleşmede karşılaşılan zorluklar ve sorunlar**

Gıda bileşimi verileri, ulusal gıda alışkanlıkları ve tüketim kalıpları hakkında bilgi sağlamalıdır. Bu tür veriler, karşılaştırılabilir ve güvenilir verilerle sonuçlanan uluslararası yönergelerle oluşturulmalıdır. Bu veriler aynı zamanda çok sayıda yüksek oranda tüketilen gıdaların ve bunların ana bileşenlerinin temsilcisi olmalıdır. Bununla birlikte, gıda bileşimi verilerinin çoğu taze gıdalara dayanırken, işlenmiş ve zenginleştirilmiş gıdalara ilişkin bilgiler eksiktir. Ayrıca, ulusal gıda bileşimi veri tabanlarının çoğu eksik, modası geçmiş ve doğru veri sağlamaz (Zeb ve ark.,2021). Diğer taraftan, birçok gelişmekte olan ve bazı gelişmiş ülkeler hala kendi ulusal veri setlerinden yoksundur ve komşu ülkelere veri ödünç almaktadır. Bununla birlikte, bazı ülkeler gıda bileşimi verilerinin önemini dikkate almamakta ve gıda verilerinin toplanması konusunda gönüllü olarak çalışan kurumları desteklemeye yönelik politikaları bulunmamaktadır (FAO, 2017a). Tüm bu faktörler üretilen verinin kalitesini olumsuz etkilemekte ve veri uyum sürecini zorlaştırmaktadır.

### **SONUÇ**

Bu çalışma son yıllarda ciddi bir büyüme sağlayarak önümüzdeki dönemlerde dijitalleşme sağlayarak daha da büyüyeceği kanısını uyandıran su ürünleri yetiştiricilik sektörünün gelmiş olduğu noktayı işaret ederken, bu alanda sahip olduğu avantajları ve karşılaştığı zorlukları incelerken bunlar için ileride neler yapılabileceği konusunda fikirler vermeye çalışmaktadır. Bu alanda yapılacak çok çalışma ve uygulanacak çok sonuç vardır.

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**ÜNİVERSİTE ÖĞRENCİLERİNİN BESLENME ALIŞKANLIKLARININ  
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**ÖZET**

Dünyada olduğu gibi ülkemizde de genç nüfusumuzun önemli sorunlarından biri yetersiz ve dengesiz beslenmedir. Sağlık Bilimleri Fakültesi öğrencileri arasından randomize olarak 173 Kadın, 47 Erkek olmak üzere toplam 220 öğrenci (n=220) ile gerçekleştirilen bu araştırmada öğrencilerin beslenme alışkanlıkları ve Akdeniz diyetine uyumluluk skorlarının (KIDMED) belirlenmesi amaçlanmıştır. Araştırma sonucunda Akdeniz Diyeti Kalite İndeksi dağılımlarının erkek ve kadın öğrenciler arasında cinsiyet, yaşanan yer, BKİ ve ara öğün dağılımına göre istatistiksel olarak anlamlı bir farklılık göstermediği tespit edildi. Ana öğün dağılımına göre 3 ve üzeri ana öğün yapan grupta Akdeniz diyet kalitesi düşük olanların oranı (%27,37) iken 1-2 ana öğün yapanların Akdeniz diyet kalitesi düşük olanların oranı (% 45,6) olarak tespit edildi. Ana öğün sayısının artması Akdeniz diyeti kalite düzeyini de yükselttiği tespit edildi (p=0,011). Katılımcıların (% 50,9)' u günde iki ana öğünle beslendiği belirlenmiştir. Sonuçlarımız beslenme alışkanlığının, gelişme evresinde olan bireyler için oldukça yetersiz olduğunu göstermektedir.

**Anahtar kelimeler:** : Akdeniz Diyeti, Akdeniz Diyetine Uyum, Beslenme, Üniversite Öğrencileri

*\*Bu çalışma; 2019 Yılı, Biruni Üniversitesi Sağlık Bilimleri Fakültesi Beslenme Ve Diyetetik Lisans Programı Lisans Bitirme Tezi olarak sunulmuştur.*

**ADHERENCE OF NUTRITIONAL HABITS OF UNIVERSITY STUDENTS TO THE MEDITERRANEAN DIET****ABSTRACT**

The main problem of the young population in the world as in our country is poor and unbalanced nutrition. In this study, which was conducted with a total of 220 students (n=220), 173 female and 47 male, randomly among the students of the Faculty of Health Sciences, it was aimed to determine the nutritional habits of the students and the compatibility scores of the Mediterranean diet (KIDMED). As a result of the research, it was determined that the distribution of the Mediterranean Diet Quality Index did not show a statistically significant difference between male and female students according to gender, place of residence, BMI and snack distribution. According to the main meal distribution, the percentage of those who have 3 or more main meals in the Mediterranean diet is (27,37%), while the ratio of those who have 1-2 main meals to those with low Mediterranean diet quality is (45,6%). It was determined that the increase in the number of main meals increased the quality level of the Mediterranean diet (p=0.011). It was observed that 50.9% of the participants were fed with two main meal a day. It can be said that the eating habits are quite inadequate for individuals who are in the developmental stage.

**Keywords :** Mediterranean Diet , Adherence to Mediterranean Diet, Nutrition, University Student.

## GİRİŞ

Doğumdan itibaren hızlı bir gelişme ve büyüme sürecine giren vücudumuzun artmış olan metabolizma hızına bağlı olarak besin ve enerji ihtiyacı da artar. Yaş, cinsiyet, fiziksel aktivite, mevcut hastalıklar ve genetik yapı gibi faktörler besin ihtiyacını belirleyen en önemli faktörlerdir. Gelişim evresinde olan gençler için gerekli enerji ve besin ihtiyacı erişkine kıyasla doğal olarak daha fazladır.<sup>1</sup> Dünyada olduğu gibi ülkemizde de yetersiz ve dengesiz beslenme önemli bir sorun haline gelmiştir. Beslenme sorunlarının en fazla görüldüğü önemli gruplardan biri de üniversite öğrencileridir. Bu gruptaki bireyler yaşam tarzları üzerinde her zamankinden daha fazla özgürlük ve kontrole sahiptir. Bu geçiş dönemi, hem sağlıklı yaşam tarzı davranışları oluşturmak için uygun bir zaman hem de sağlıklı yaşam davranışlarını etkileyen faktörlerin belirlenmesi için daha fazla dikkat gerektiren bir dönemdir.<sup>2</sup> Üniversite öğrencilerinin sosyalleşmesiyle birlikte zamanlarının çoğu dışarıda geçmektedir. Dışarıda yaşam, öğrencilerin öğün atlamasına ya da tek tip besin tüketmesine neden olmaktadır. Ailesinden uzak yaşayanlarda bu problem daha da belirginleşmekte; besin seçimleri, besin ögesi alımları ve fiziksel aktivite düzeyleri etkilenmektedir.<sup>3</sup> Değişen beslenme davranışları bireylerin zihinsel ve fiziksel durumunu dolayısıyla okul performansını da etkileyebilmektedir. Çalışmalar, üniversite öğrencilerinin beslenme alışkanlıkları ile demografik ve antropometrik özellikler arasında bir bağlantı olduğunu göstermiştir. Araştırmalar, üniversite öğrencilerinin genellikle sağlıksız beslenme alışkanlıklarına sahip olduğunu göstermektedir. Öğrenciler günlük olarak daha az meyve ve sebze yeme, daha yüksek yağlı, kalorili yiyecek alımı eğilimindedir.<sup>4</sup> Bu tür sağlıksız beslenme alışkanlıkları ileriki yaşlarda kronik hastalıklara zemin hazırlamaktadır. Epidemiyolojik çalışmalarda Akdeniz’de kıyısı bulunan ülkelerin kronik hastalık oranı ile morbiditenin diğer ülkelere göre düşük, ortalama yaşam süresinin yüksek olduğu bildirilmiştir. Akdeniz diyetinin karakteristik özelliklerini kırmızı et ve ürünlerinin tüketiminin düşük, kümes hayvanlarının tüketiminin küçük porsiyonlarda, kuru baklagiller, tahıl, kabuklu yemişlerin, sebze ve meyve tüketiminin yüksek, balık ve şarap tüketiminin ılımlı yüksek ayrıca yüksek zeytinyağı tüketimi oluşturur. Kardiyovasküler hastalık riskinin balık, sebze ve meyve, tam tahıl kaynakları ve kuru baklagiller tüketimi ile azaldığı yapılan çalışmalarla ortaya konulmuştur.<sup>5</sup> Akdeniz diyeti, kanserin başlamasını ve ilerlemesini potansiyel olarak önleyen lifleri ve düşük omega-6-omega-3 yağ asidi gibi diyet bileşenlerini içerir.<sup>6</sup> Sağlıklı beslenme tek besine dayalı beslenmeye uygun değildir, besin gruplarındaki çeşitlilik sağlıklı beslenmenin temelini oluşturmaktadır. Akdeniz diyeti, sürdürülebilir diyetlere çok kültürlü bir

yaklaşım kullanarak yerli veya yerel gıda sistemlerini kullanma fırsatı sunar. Aynı zamanda geleneksel gıda ve kültür bilgisinin korunması sorununu da gündeme getirir. Akdeniz diyeti Amerikan Diyabet Birliği (ADA) raporunda fazla ve çeşitli besin ögesi içeriğine sahip, sağlıklı yaşam kurallarına uygun olduğu belirtilmektedir.<sup>7</sup>

Beslenme alışkanlıklarının oluştuğu üniversite dönemi önemli bir aşamadır. Bu aşamada kişiyi kaliteli, sürdürülebilir ve sağlıklı olan Akdeniz diyetiyle tanıştırmak, yaşam niteliklerini arttırmak gerekmektedir. Bu çalışmada, sağlık bilimleri fakültesi öğrencilerinin, beslenme alışkanlıkları incelenerek, Akdeniz diyetine uyumlarının belirlenmesi amaçlanmıştır.

### **MATERYAL VE METOT**

Çalışmanın örneklemini Biruni Üniversitesinde öğrenim görmekte olan 173 kadın, 47 erkek olmak üzere toplam 220 gönüllü öğrenci oluşturmuştur. Öğrencilerin yaş ortalaması  $21,7 \pm 1,4$  yıldır (19-29 yaş). Randomize olarak katılımcılarla yüz yüze görüşmelerde, genel beslenme özelliklerini belirlemeye yönelik bir soru kağıdı ve Akdeniz diyetine uyumlarının belirlenmesinde “Akdeniz Diyeti Uyumluluk İndeksi (KIDMED)” anketi uygulanmıştır.<sup>8</sup> Toplam 16 sorudan oluşan anketin 12’si olumlu, 4’ü olumsuz sorulardır. Olumlu sorulara evet cevabı verenler +1, olumsuz sorulara evet cevabı verenler ise -1 puan almakta ve bu puanların toplanması ile değerlendirme sonunda 0-12 arasında değişen puanlar elde edilmektedir. Sonrasında ise bu puanlar;

- (1)  $\geq 8$  puan optimal Akdeniz diyeti (iyi),
- (2) 4-7 arası puan Akdeniz diyetine uygunluğunun geliştirilmesi gerektiği (orta),
- (3)  $\leq 3$  puan ise çok düşük beslenme kalitesi (düşük) olarak puanlanmaktadır.<sup>8</sup>

Öğrencilerin antropometrik ölçümleri; bel/kalça ölçümleri esnemeyen mezura kullanılarak yöntemine uygun şekilde araştırmacılar tarafından yapılmıştır. Vücut ağırlığı ölçümleri 100 gram hassasiyet kapasitesi olan, taşınabilir CVS DN-126 elektronik baskül ile alınmıştır. Boy uzunluğu için standart stadiometre kullanılmıştır. Vücut ağırlığının (kg) boy uzunluğunun karesine ( $m^2$ ) bölünmesi ile beden kütle indeksi (BKİ) hesaplanmıştır.

### **Verilerin İstatiksel Olarak Değerlendirilmesi**

Kategorik değişkenler için frekans, yüzde (%) değerleri verilmiştir. Sürekli değişkenler için ortalama ( $\bar{x}$ ) standart sapma (S), medyan, minimum ve maksimum değerleri verilmiştir. Sürekli değişkenlerin normal dağılım sınaması Kolmogorov Smirnov testi ile yapıldı. Sürekli değişkenlerin güvenilirlik sınaması için Kr 20 güvenilirlik analizi yapıldı. Kategorik

değişkenler arası ilişkiler için Ki-kare analizi ile yapılmıştır. Uygun olan durumlarda kategorik değişkenler Fisher Freeman Halton Testi ile değerlendirildi. Normal dağılım varsayımını gerçekleştirilmeyen değişkenlerde, bağımsız iki grup karşılaştırmasında Mann Whitney U testi, İki den fazla grup karşılaştırmalarında ise Kruskal Wallis H testi kullanıldı. Normal dağılım varsayımını sağlamayan değişkenler arası korelasyonel ilişkileri tespit etmek için Spearman korelasyon analizi kullanıldı.

Analizler SPSS 5 (Statistical Package for the Social Sciences) paket programı ile yapıldı, en düşük önemlilik düzeyi  $P < 0,05$  istatistiksel olarak anlamlı kabul edildi.

### **BULGULAR VE TARTIŞMA**

Katılımcıların beslenme alışkanlıklarına ilişkin bilgilerin dağılımı değerlendirildiğinde (Tablo 1), (% 50,9)'nun günde iki ana öğünle beslendiği görülmüş olup bu beslenme alışkanlığının gelişme evresinde olan bireyler için yetersiz olduğu söylenebilir. Bireylerin (% 40,3)'nün günde bir ara öğünle beslendiği bunun da bireysel enerji ihtiyacına göre yetersiz olduğu görülmektedir. Öğrencilerin (% 89,5)'inin öğün atladığı, (% 56,8)'inin öğün atlama nedeninin zaman yetersizliğinden kaynaklandığı bu alışkanlığın da üniversite öğrencileri arasında yaygın olduğu ve (% 65,9)'unun ara öğün yapma alışkanlığının olduğu belirlendi. Çalışmaya katılan bireylerin çoğunluğunun öğle öğününü, sonrasında ise en fazla sabah öğününü atladıkları, iki öğünü atlayanların çoğunluğunun en fazla öğle öğününü ve ara öğünleri atladıkları tespit edilirken, iki öğün atlayan en az bireyin akşam öğünü ile ara öğünleri atladıkları tespit edildi. Türkiye genelinde yapılan çalışmalarda da bireylerin en az bir öğün atladıkları belirtilmektedir.<sup>9-12</sup> Dalgıç'ın çalışmasında öğrencilerin en fazla kahvaltı ve öğle öğününü atladıkları saptanmıştır.<sup>9</sup> Aynı çalışmada öğün atlama nedeni olarak zamansızlık olarak belirtilmiştir.<sup>9</sup> Türkiye Beslenme ve Sağlık Araştırması sonuçlarına göre öğün atlama nedeni 'canı istemiyor' olarak verilmektedir.<sup>10</sup> Çalışmaya katılan bireylerin (%33)'nün ikindi ve (26,8)'nin de gece ara öğün yaptığı saptanmıştır.

**Tablo 1: Beslenme Alışkanlıklarına İlişkin Bilgilerin Dağılımı**

Öğün	Toplam		Kadın		Erkek		X <sup>2</sup>	p
	Sayı	%	Sayı	%	Sayı	%		
<b>Ana Öğün</b>							10.137	0.071
1	13	5,91	11	6,4	2	4,3		
2	112	50,91	95	54,9	17	36,2		
3	89	40,45	64	37,0	25	53,2		
4	3	1,36	1	0,6	2	4,3		
5	2	0,91	1	0,6	1	2,1		
6	1	0,45	1	0,6	0	0,0		
<b>Ara Öğün</b>							1.369	0.850
Yok	31	14,90	25	15,3	6	13,3		
1	84	40,38	68	41,7	16	35,6		
2	68	32,69	51	31,3	17	37,8		
3	19	9,13	15	9,2	4	8,9		
4	6	2,88	4	2,5	2	4,4		
<b>Öğün atlama</b>							1.933	0.164
Evet/ Bazen	197	89,55	158	91,3	39	83,0		
Hayır	23	10,45	15	8,7	8	17,0		
<b>Öğün atlama nedeni</b>							3.552	0.615
Zaman yetersizliği	112	56,85	87	55,1	25	64,1		
Canı istemiyor, iştahsız	49	24,87	41	25,9	8	20,5		
Hazırlanmadığı için	12	6,09	9	5,7	3	7,7		
Zayıflamak istiyor	4	2,03	4	2,5	0	0,0		
Alışkanlığı yok	13	6,60	12	7,6	1	2,6		
Diğer	7	3,55	5	3,2	2	5,1		
<b>Ara öğün yapma/yapmama</b>							0.766	0.381
Hayır	75	34,09	62	35,8	13	27,7		
Evet	145	65,91	111	65,2	34	72,3		
<b>Yemeklere konulan tuz sınırlama miktarı</b>							0.551	0.361
Evet	157	71,36	126	72,8	31	66,0		
Hayır	63	28,64	47	27,2	16	34,0		
<b>Şeker içeren çay, kahve vb. içecek tüketimi</b>							0.035	0.852
Evet	79	36,07	61	35,5	18	38,3		
Hayır	140	63,93	111	64,5	29	61,7		



Çalışmaya katılan bireylerin yaş ortalaması  $21,7\pm 1,4$  yıl olarak bulundu. Dalgıç'ın üniversite öğrencileri ile gerçekleştirdiği çalışmasında da katılımcıların yaş ortalaması  $21,08\pm 2,05$  yıl olduğu saptanmıştır.<sup>9</sup> Antropometrik ölçümlerinin analizleri incelendiğinde (Tablo 2); Bireylerin bel çevrelerinin ortalama 72,5cm, boy uzunluklarının ortalama 167,4cm, vücut ağırlıklarının ortalama 62,1kg olduğu görüldü. Ortalama BKİ' leri  $18,4\text{kg/m}^2$  olarak düşük düzeyde bulundu. Beden kitle indeksinin  $18,4\text{kg/m}^2$  olması katılımcıların Dünya Sağlık Örgütü'nün (WHO) BKİ sınıflamasına göre zayıf sınıfta olduğunu göstermektedir.<sup>13</sup>

**Tablo 2.** Bireylerin Yaş ve Antropometrik Ölçümlerinin Ortalama ( $\pm$ S) Değerleri

	(n=20) $\bar{X} \pm$ Medyan. (Alt-Üst)	S.S.
Yaş	$21,7\pm 1,4$ 22- (19-29)	
Boy Uzunluğu (cm)	$167,4\pm 8,58$ 167- (144-193)	
Vücut Ağırlığı (kg)	$62,13\pm 13,38$ 59- (40-111)	
BKİ ( $\text{kg/m}^2$ )	$18,48\pm 3,4$ 17,79- (13,03-30)	
Bel Çevresi (cm)	$72,57\pm 13,2$ 69,5- (50-115)	

Ana öğün ve ara öğün dağılımına göre Akdeniz diyeti uyum indeksinin dağılımı incelendiğinde (Tablo 3) ana öğün dağılımına göre Akdeniz diyeti kalite indeksi dağılımının istatistiksel olarak anlamlı bir farklılık gösterdiği tespit edildi ( $p=0,011$ ). Üç ve üzeri ana öğün yapan grupta Akdeniz diyet kalitesi düşük olanların oranı %27,37 iken 1-2 ana öğün yapanların Akdeniz diyet kalitesi düşük olanların oranı %45,6 olarak tespit edilmiştir. Üç ve üzeri öğün ile beslenen grupta Akdeniz diyeti kalitesi düşük olanların oranı, 1-2 ana öğün yapanlara göre daha düşüktür. Üç ve üzeri ana öğün yapan grupta Akdeniz diyeti kalitesi iyi olan bireylerin oranı (%18,95), 1-2 öğün yapan gruba (%9,60) göre daha yüksek olduğu tespit edildi. Ana öğün sayısının artması Akdeniz diyeti kalitesi düzeyini arttırmaktadır. Ara öğün dağılımına göre Akdeniz diyeti kalite indeksi dağılımının istatistiksel olarak anlamlı bir farklılık göstermediği tespit edildi. ( $p=0,532$ ). Ara öğün dağılımına göre Akdeniz diyeti kalite indeksi dağılımının birbirine benzer olduğu tespit edildi.

**Tablo 3.** Ana öğün ve Ara Öğün Dağılımına Göre Akdeniz Diyeti Kalite İndeksinin Dağılımı

		Akdeniz Diyeti Kalite İndeksi						P
		Çok Düşük Beslenme Kalitesi (düşük)		Akdeniz Diyetine Uygunluğunun Geliştirilmesi (orta)		Optimal Akdeniz Diyeti (iyi)		
		N	%	N	%	n	%	
Ana Öğün Sayısı	1-2 ana öğün	57	45,60	56	44,80	12	9,60	0,011*
	3 ve üzeri ana öğün	26	27,37	51	53,68	18	18,95	
Ara Öğün	Ara öğün yok	14	45,16	13	41,94	4	12,90	0,532**
	1-2 Ara öğün	56	36,84	74	48,68	22	14,47	
	3-4 ara öğün	6	24,00	16	64,00	3	12,00	

*Ki-kare testi, \*p<0,05*
*\*\*Fishers Freeman Halton test*

Ana öğün sayısı ile antropometrik veriler Student t testi kullanılarak karşılaştırıldı (Tablo 4). Ara öğün sayısı ile antropometrik verileri de ANNOVA testi kullanılarak karşılaştırıldı (Tablo 5). Antropometrik ölçümler ile öğünler arasında anlamlı bir ilişki bulunmadı. Çalışmalarda öğün atlama ve düzensiz öğün yapma alışkanlıklarının sık görüldüğü ve bu durumun özellikle obeziteye neden olabildiği bildirilmektedir.<sup>10</sup>

**Tablo 4.** Ana Öğün Sayıları ile Antropometrik Özellikler Arasındaki İlişki

Ana Öğün Sayısı	1-2 öğün (n:125)	3 ve üzeri öğün (n:95)	p
Boy uzunluğu (cm)	116,47±7,82	168,62±9,38	0.066
Vücut ağırlığı (kg)	61,76±13,44	62,60±13,35	0.646
BKİ (kg/m <sup>2</sup> )	18,49±3,54	18,46±3,22	0.953
Bel çevresi (cm)	72,98±13,46	72,02±12,89	0.593

*Student t testi, p<0,05*
**Tablo 5.** Ara Öğün Sayıları İle Antropometrik Özellikler Arasındaki İlişki

Ara öğün sayısı	Ara öğün yok (n:31)	1-2 ara öğün (n:152)	3-4 ara öğün (n:25)	P
Boy uzunluğu (cm)	166,19±8,01	167,31±8,57	168,60±8,85	0.577
Vücut ağırlığı (kg)	63,0±15,20	61,72±12,79	62,15±14,05	0.886
BKİ (kg/m <sup>2</sup> )	18,86±3,87	18,37±3,22	18,30±3,26	0.740
Bel çevresi (cm)	73,10±14,43	72,05±12,59	73,0±13,75	0.886

*ANNOVA, p<0,05*

Bireylerin cinsiyet ve yaşamları yer dağılımına göre KIDMED kalite indeksi dağılımı karşılaştırılıp incelendiğinde (Tablo 6) Cinsiyet dağılımına göre Akdeniz diyeti kalite indeksi dağılımının istatistiksel olarak anlamlı bir farklılık göstermediği, cinsiyet dağılımına göre

Akdeniz diyeti kalite indeksi dağılımının birbirine benzer olduğu tespit edildi. Kabaran ve Gezer, Gümüş ve Yardımcı ve Kontogianni ile arkadaşlarının, benzer yaş grubu bireylerle yapmış oldukları çalışmalarında da benzer sonuçlar elde edilmiştir.<sup>14-16</sup>

Yaşanılan yer dağılımına göre Akdeniz diyeti kalite indeksi dağılımının istatistiksel olarak anlamlı bir farklılık göstermediği, yaşanılan yer dağılımına göre Akdeniz diyeti kalite indeksi dağılımının birbirine benzer olduğu tespit edildi.

**Tablo 6.** Cinsiyet ve Yaşanılan Yer Dağılımına Göre Akdeniz Diyeti Kalite İndeksinin Dağılımı

		Akdeniz Diyeti Kalite İndeksi						P
		Çok Düşük Beslenme Kalitesi(düşük)		Akdeniz Diyetine Uygunluğunun Geliştirilmesi (orta)		Optimal Akdeniz Diyeti(iyi)		
		n	%	n	%	n	%	
<b>Cinsiyet</b>	Kadın	67	38,73	83	47,98	23	13,29	0,837
	Erkek	16	34,04	24	51,06	7	14,89	
<b>Yaşanılan Yer</b>	Evde aile ile birlikte	52	34,90	71	47,65	26	17,45	0,192*
	Evde arkadaşları ile	10	43,48	10	43,48	3	13,04	
	Yurtta arkadaşları ile	16	53,33	13	43,33	1	3,33	

*Ki-kare testi, \* Fishers Freeman Halton test*

Akdeniz diyeti kalite indeksi, ana ve ara öğünler ile antropometrik özellikler arasında istatistiksel olarak anlamlı bir ilişki tespit edilemedi (Tablo 7). Gümüş ve Yardımcı'nın çalışmasında benzer sonuçlar elde edilirken, Kabaran ve Gezer çalışmalarında 9-18 yaş grubu çocuk ve adölesanlarda Akdeniz diyeti kalite indeksi ile BKİ arasında negatif yönde zayıf ilişki olduğunu belirtmişlerdir.<sup>14,15</sup>

**Tablo 7.** Akdeniz Diyeti Kalite İndeksi, Ana ve Ara Öğünler İle Antropometrik Özellikler Arasındaki İlişki

		<b>BKİ (kg/m<sup>2</sup>)</b>	<b>Boy (cm)</b>	<b>Vücut ağır. (kg)</b>	<b>Bel çevresi (cm)</b>
<b>Ana öğün sayısı</b>	<b>r</b>	0.025	0.130	0.059	-0.014
	<b>p</b>	0,707	0.055	0.382	0.838
	<b>N</b>	220	22	22	220
<b>Ara öğün sayısı</b>	<b>r</b>	-0.011	0.081	0.013	-0.001
	<b>p</b>	0.870	0.243	0.858	0.911
	<b>N</b>	208	208	208	208
	<b>r</b>	-0.094	-0.047	-0.095	-0.0128
<b>KİDMED</b>	<b>p</b>	0.164	0.484	0.160	0.058
	<b>N</b>	220	220	220	220

*Spearman Korelasyon Analizi, p<0,05*

## SONUÇ VE ÖNERİLER

Üniversite öğrencilerinin beslenme alışkanlıklarının Akdeniz diyeti ile uyumunu belirlemek amacıyla yapılan çalışmamızda;

Katılımcı bireylerin Akdeniz diyeti kalite indeksi ile BKİ düzeyi arasında istatistiksel olarak anlamlı bir ilişki tespit edilmemekle birlikte, BKİ'nin 18,4 olması katılımcıların Dünya Sağlık Örgütü'nün (WHO) BKİ sınıflamasına göre zayıf sınıfta olduğunu göstermektedir. Öğün atlamanın ve ev dışı beslenmenin Akdeniz diyetine uyumda risk faktörü olabileceğini düşündürmektedir. Üniversite öğrencilerinin Akdeniz diyetine uyumlu olarak beslenmesi yönünde teşvik edilmesi,

En fazla atlanan öğünün sabah kahvaltısı ve öğle yemeği olması sebebiyle kahvaltının ve öğle yemeğinin öneminin anlatılması, öğün atlamadan beslenme alışkanlığının kazandırılması.

Okul kantinlerinde sağlıklı besinlerin satılmasının desteklenmesi, fast food gibi hazır gıdaların satılmasının engellenmesi, önerilmektedir.

Üniversite öğrenciliği dönemi, özellikle yetişkin dönemde beslenme ilişkili hastalıkların ortaya çıkmasını önleyebilme açısından önemli bir dönemdir. Bu dönemde kazandırılacak sağlıklı beslenme alışkanlıkları ile birçok hastalık önlenilebilecektir. Bu amaca yönelik farkındalık yaratacak eğitim programlarının düzenlenmesi öngörülmelidir.

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## **WOUND HEALING AND EFFECTIVE FACTORS**

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### **SUMMARY**

Structural and functional disorders in tissues due to different reasons can be defined as wounds. In every tissue, there is a process of regaining the old structure and function of the wounds, which occurs at a speed that varies depending on the internal dynamics of the living things, although not completely. This process is called wound healing. Wounds can be examined under two main headings, acute and chronic, according to their healing processes. Acute wounds can be defined as wounds that occur in tissues that have a rapid healing process, usually exposed to processes such as traumatization, surgery or burns. Chronic wounds, on the other hand, are defined in the literature as wounds that have difficulties in the healing process, do not show any signs of healing in the four-week period, or in which the healing process cannot be completed at the end of the six- to eight-week period. Factors such as arterial insufficiency, venous ulcers, diabetes or secondary to pressure can be counted in the emergence of chronic wounds. Based on our literature and clinical observations and experiences, we aimed to provide information about wound healing and its effective factors.

## **YARA İYİLEŞMESİ VE ETKİLİ FAKTÖRLER**

### **ÖZET**

Dokularda farklı nedenlere bağlı ortaya çıkan yapısal ve işlevsel bozukluklar yara olarak tanımlanabilir. Her dokuda canlıların kendi iç dinamiklerine bağlı farklılıklar gösteren hızda meydana gelen, yaraların yeniden eski yapı ve işlevine tam olarak olmasa da kavuşma süreci yaşanır. Yaşanan bu sürece yara iyileşmesi adı verilir. Yaralar iyileşme süreçlerine göre akut ve kronik olmak üzere iki ana başlık altında incelenebilir. Akut yaralar, hızlı iyileşme sürecine sahip genellikle travmatizasyon, cerrahi ya da yanık gibi süreçlere maruz kalan dokularda meydana gelen yaralar olarak tanımlanabilir. Kronik yaralar ise iyileşme sürecinde zorluklar yaşanan, dört haftalık süreçte iyileşme belirtisi göstermeyen ya da altı ila sekiz haftalık sürecin sonunda iyileşme sürecinin tamamlanamadığı yaralar olarak literatürde tanımlanmaktadır. Kronik yaraların ortaya çıkmasında hastanın arteriyal yetmezlik, venöz ülser, hastanın diyabetik oluşu ya da basınca sekonder meydana gelmesi gibi faktörler sayılabilir. Literatür ve klinik gözlem ve tecrübelerimizden hareketle yara iyileşmesi ve etkili faktörleri hakkında bilgi vermeyi amaçladık.



## **GİRİŞ**

Yara, dokularda farklı nedenlere bağlı ortaya çıkan yapısal ve işlevsel bozukluklar olarak ya da patolojik sebepli dokudaki bütünlüğün kaybı olarak tanımlanabilir. Yara iyileşmesi çok sayıda farklı hücre tipiyle kompleks şekilde etkileşime giren mediyatörlerle gelişen bir süreçtir(1). Birbiri takip eden aşamalar sonucunda, nonspesifik bağ dokusu olan skar oluşumuyla çoğu zaman tamamlanır(2). Nonspesifik bir bağ dokusu olan skarın oluşumuyla, doku bütünlüğünü sağlar. Ancak skarla oluşan yeni dokunun enerji absorbe etme ve gerilme gücü önceki sağlıklı dokuya göre daha düşüktür(1,2). Sağlıklı dokularda yara iyileşmesi normal, sıralı ve zamanlamaya uygun olarak gerçekleşip tam iyileşme sağlanmasıyla tamamlanır. Yaralar iyileşme süreçlerine göre akut ve kronik olmak üzere iki ana başlık altında incelenebilir. Akut yaralar, hızlı iyileşme sürecine sahip genellikle travmatizasyon, cerrahi ya da yanık gibi süreçlere maruz kalan dokularda meydana gelen yaralar olarak tanımlanabilir. Kronik yaralar ise iyileşme sürecinde zorluklar yaşanan, dört haftalık süreçte iyileşme belirtisi göstermeyen ya da altı ila sekiz haftalık sürecin sonunda iyileşme sürecinin tamamlanamadığı yaralar olarak tanımlanır (3). Yara iyileşmesi üç farklı aşamaya ayrılmıştır: inflamasyon, proliferasyon ve yeniden şekillenme.

### **A)İnflamasyon Fazı**

Vücudun inflamatuvar hücrelerinin aktivasyonu ile başlayan bu faz, hemostazın sağlanması ve inflamasyon ile karakterizedir. Zedelenme ile ortaya çıkan kollajen, inflamatuvar fazı tetikleyerek pıhtılaşma kaskadını başlatır. Yaralanma sonrası, 4 ila 6. günler arasında gelişen bu fazda; meydana gelen zedelenmeyi müteakip öncelikle hücre zarlarından tromboksan A2 ve prostaglandin 2- $\alpha$ 'yı serbest bırakılır. Sekrete edilen maddeler güçlü vazokonstriktör etkisiyle hemostazın ilk aşamasında önemli rol oynar. Trombin trombositler, fibronektin ve kollajen' den oluşan pıhtı da hem hemostazı sağlamada hem de sitokinleri ve growth faktörlerini serbest bırakarak inflamatuvar cevabı başlatmakta etki eder(4). Fibrin pıhtısıyla birlikte, yara yerine gelen fibroblastlar, monositler ve nötrofil hücreleri onarım için adeta bir iskele görevi görmesinin yanısıra sitokin ve growth faktörlerinin dokuda konsantre edilmesini sağlarlar (4,5).

### **Proliferasyon Fazı**

Geçici matriksle beraber damarlanma ve epitelin geliştiği faz olan bu aşama genellikle zedelenme sonrası 4. ile 15. günler arasındadır. Bu fazın başlangıcında epitelin onarımı ilk başlayan aktivasyondur. Dokunun bazal membranı çatı işlevi görür. İntakt olduğu zedelenmelerde epitelizasyon fizyolojik süreçte üste doğru gelişip ilerleyerek epitel kaybını

giderir. Bu durumda epiteldeki onarım 3 gün içerisinde sağlanabilir. Bazal membran yokluğunda, endotelial hücre göçü sonrasında granülasyon doku oluşumuyla yara iyileşmesi gelişir. Bu aşamada granülasyon için gerekli hücre ve mediatörlerde eksiklik yada zedelenme bölgesine gelmemesi iyileşmeyen kronik bir yara vakası ile sonuçlanır(6).

### **Matürasyon ve Remodeling**

Klinisyen açısından; dayanıklılık ve fonksiyonların yeniden kazanılmasının göstergesi olarak kabul edilen son faz en önemli aşama olarak kabul edilir. Süresi 8. Gün - 1. Yıl dır (4). Kollajen organize şekilde birikir. Hastaların matriks birikimi her ne sebeple olsun sorunlu ise oluşan yaranın onarım gücünde eksiklik gelişir. Aksine artmış kollajen sentezi ve birikimi olursa bu sefer hipertrofik bir yara dokusu yahut keloid oluşacaktır(6).

### **Yaraların Değerlendirilmesi**

Oluşan yaranın ilk değerlendirilmesinde; yaranın vasfı ne şekilde olduğu türü, akut ya da kronik oluşu enfeksiyonun eşlik edip etmediğinin belirlenmesi büyük önem taşır. Travmaya yahut sistemik bir hastalığa bağlı etioloji belirlendikten sonra takip edilecek sürecin tayin edilmesi gerekir. Mevcut zedelenme değerlendirilmesinde öncelikle iyi bir anamnez alınması müteakibinde inspeksiyon ve muayene aşamaları sonucu etiyolojik sebebin netleştirilmesi, yaklaşım ve tedavide yol göstericidir.

Kesik vafında yaralanmalar; çoğunlukla keskin kenarlı cisimlerin deriye teması sonucu gelişirler ve en sık görülen yaralanmalardır(7). Kesici cisimlerle dokuda oluşan yaralanmalar, massif kanama ve dolayısıyla hayati tehlikeye haiz olmakla beraber keskin kenarlı olmaları sayesinde doğru yapılan cerrahi müdahaleyle kapatıldıklarında, doku bütünlüğü daha iyi sağlanır.

Penetre edici ya da ateşli silahlar vasıtasıyla gelişen yaralanmalarda ise; temas yerinde aldatıcı olarak kısıtlı görünen harabiyetin çok daha fazlasının derin dokularda olması çoğu zaman muhtemeldir. Bu yaralarda boyutlarının saptanması büyük önem arz eder. Bu amaçla kimi klinisyenler steril bir sonda vasıtasıyla penetrasyon derinliğinin ölçülmesini benimsemişlerse de uygulamada çeşitli sorunlara yol açma potansiyelinden dolayı biz steril şartlarda derin eksplorasyonla değerlendirilmesi görüşünü paylaşmaktayız.

Vahşi hayvanlar yada yüksek enerjili iş yahut trafik kazaları sonucu oluşan kopma; avulziyon türü yaralara doku kaybı ve yeniden kanlanmanın sağlanabilmesi sorunu rekonstrüksiyonu ciddi şekilde olumsuz etkiler. Bu yaralanmalarda enfeksiyon kontaminasyonu ve nekroz sıklıkla görülmektedir.

Dünya çapında bildirilen en yaygın yaralanmalar arasında olan yanık yarası, termik, kimyasal veya elektrik etkileri ile oluşabilir. Amerika Birleşik Devletleri'nde, her yıl tıbbi bakım gerektiren 500.000 yanık vakası olduğu bildirilmiştir (8). Bu tür yaralar geniş bir alanı kaplıyorsa, çoğunlukla yoğun protein kaybı nedeniyle sistemik etkiler ortaya çıkar. Bu tür yaralarda sıklıkla sekonder enfeksiyon bulunur, bu da böyle yaraların sağaltımını ilave olarak etkiler(7). Yanığın ciddiyetine bağlı olarak, yaralanma patofizyolojisi, lokal doku hasarından hızla yaşamı tehdit edebilen karmaşık bir sistemik yanıt kadar değişir(7,8).

İskemi, reperfüzyon hasarıyla oluşan reaksiyonlar; dokularda tahrip oluşturan proteinlerin salgılanmasına yol açar.

Bu durum iyileşme süreçlerinin tamamen bozulmasına yahut iyileşme sürecinin gecikmesine neden olabilir. Subklinik bakteriyel kontaminasyonu, tekrarlayıcı fizik travma ve yabancı cisim reaksiyonları da bu etkilere yol açarak yara kronikleşmesine yol açabilir(2,9). Kronikleşme ve akut olarak, iyileşme süresine göre de yaralar sınıflandırılabilir(2,9).

#### **A) Akut Yaralar**

Düzenli organize olup ciddi müdahale olmaksızın küre yönelik progres izleyen, iyileşme süresi çoğunlukla gün 5-10 günde olup 30 güne kadar iyileşen, sonuç olarak restorasyonu anatomik ve fonksiyonel olarak normal olarak neticelenen yaralardır(1,3).

#### **B) Kronik Yaralar**

Normal süreç ve aşamalar içinde iyileşmenin sağlanıp rekonstrüksiyonun zamanında sağlanmadığı yaralardır. İyileşme süreci uzun ve eksiktir. İyileşme fazlarını olumsuz etkileyen iskemi, inflamasyonu ya da metabolik bozukluklar gibi faktörler söz konusu olabilir(10).

İyileşmenin bozulmasında; yara iyileşme basamaklarında ya da içeriklerinde duraklama ya da bozulma olduğu düşünülmektedir(11). İyileşme sırasında yaranın çeşitli alanları farklı fazda olabilir. Yara alanlarında heterojen süreçler gelişebilir. Senkronizasyonun bozulması doğal iyileşmeyi bozar. Fenotipik olarak kronik yaradaki bazı hücreler değişken gelişim seyredebilir. Örneğin, kronik yaraların sınırındaki keratinositlerinin migrasyonunun bozulduğu ve böylece yara kapanmasının geciktiği bilinmektedir(11). Bunun sebebinin hücre migrasyon faktörlerine cevapsız olmaları olabilir. Diyabetik ülserlerdeki fibroblastların TGF-beta ya da diğer büyüme faktörlerine karşı dirençli olduğu gösterilmiştir(11,12).

#### **Venöz Ülser Yaraları**

İleri dereceli kronik venöz yetmezlik hastalarında oluşur. Venöz staz sonucu dokuda biriken inflamatuvar sistem elemanları aktive olup, artan permabilityle vasküler duvardan doku içinde

inflamatuvar süreç başlatır(13). İnflamatuvar yanıtın artışıyla başlayan reaksiyonlar endotel hasarı, lökosit aktivasyonu, plateletlerin agregasyonu, cilt oksijenasyonunda düşme, lipodermatosklerozis, hiperpigmentasyon, egzama, cilt de atrofi ve sonuçta yara oluşumunu gerçekleştirir (14).



Resim.1,2,3; Venöz Staz, Venöz Ülser, Yetmezlikle genişleyen venöz damar Doppler USG görüntüsü

### **Etiyoloji**

- Derin veya ileri düzeyde yüzeyel venlerde yetersizlik
- Geçirilmiş DVT ve posttromboflebitik sendrom
- Majör cerrahi girişim
- Tütün kullanımı
- Tromboanjinitis Obliterans
- Vaskülitler
- Damar yapısında kollajen yetersizliği
- Obesite
- Hiperkolesterolemi, hiperlipdemi
- Travma
- Romatoid artrit
- Tümör, ven tromboz, ,
- İleri yaş
- Osteomyelit
- Yanıklar
- Kontrolsüz diyabet mellitus
- Multiple sklerozis, pleji, parezi, parapleji
- Hematolojik koagülasyon bozukluklar sıklıkla etkilidir (15,16,17).

Alt ekstremitte venöz ülserlerin%60-80 arası venöz kaynaklı olmakla birlikte kadınlarda daha fazla görülmekte olup, %45-60'ının da neden venöz hipertansiyon bağlı gelişen venöz yetmezliktir(14,18).

### **Tanı**

Anamnez, fizik muayene ile ön tanıda venöz ülser yarası olarak mütalaa edilen hastalarda renkli Doppler ultrasonografi ile kesinleştirilir.

### **Tedavi**

- A) Konservatif tedavi
  - Venotonik medikasyon
  - Yara bakımı
  - Ayak elevasyonu
  - Yaşam tarzı değişiklikleri; günlük 1 saat tempolu yürüyüş
- B) Kompresyon tedavisi
  - Varis çorabı
  - Bandaj
  - Pnömatik sistemle kompresyon sağlayan cihazlar.
- C) Ablasyon
  - Termokoagülasyon
    - Radyofrekans
    - Lazer
  - Embolizasyon
  - Skleroterapi
- D) Cerrahi Tedavi
  - Yüksek ligasyon
  - Stripping
  - Pake eksizyonu

Kronik venöz yetmezliğin değerlendirilmesinde; hastalığın klinik, etiyolojik, anatomik ve fizyopatolojik İngilizce baş harflerinden köken alınarak dizayn edilen evrelendirme ölçeği olan CEAP sınıflaması kullanılmaktadır. Hastalığın klinik evresini göstermesi dışında yanında, hangi etiyolojik neden sonrasında oluştuğunu ifade etmektedir. Bir kalsifikasyon olarak 1994'de İlk kez bir uygulanmaya başlanmış, 2004'de yeniden düzenlenen şekliyle yaygın kabul görmüştür(18). Venöz yara pansumanları için çok sayıda yeni yara örtüsü kullanıma girmiştir.

Bununla beraber bizim venöz yara pansumanında uygulamamız, enfeksiyonların tedavisi akut dönemde steril spançlı serum fizyolojikle pansuman enfekte ve ölü dokunun debritlemesi ve etkene yönelik tedavinin gerçekleştirilmesi şeklindedir. Venöz ülserde en etkin tedavi 4 katlı bandajla kompresyondur. Ancak periferik arter hastalığı olasılığına yönelik uygulama öncesi dikkatli anamnez ve klinik muayene gereklidir. Zira kimi hastalarda venöz ve arteriyel hastalık beraber bulunmakta olup yetersiz arteriyel dolaşım kolaylıkla gözden kaçabilir.

### **Arteriyel Ülser Yaraları**

Alt ekstremitelerde daha sık olmak üzere ateroskleroz nedenli periferik vasküler hastalık (PAH)'ın sonucu olarak görülebilmektedir. Klinik olarak PAH genellikle Fontaine sınıflamasına göre değerlendirilir.

- Stage I: Asemptomatik
- Stage II: Klodikasyon ağrısı
- Stage IIA: 200 metreden daha uzun mesafede klodikasyon
- Stage IIB: 200 metreden daha kısa mesafede klodikasyon
- Stage III: İstirahat ağrısı
- Stage IV: Ayakta nekroz ve gangren

PAH'm ileri evrelerinde, ülser ve gangrenler görülür. İstirahat ağrısı veya ülser varlığı "kritik bacak iskemisi" olup sıklıkla ivedi cerrahi revaskülarizasyonu gerekli kılar (19). PAH'a bağlı ülserler genellikle bası bölgelerinde, parmaklar, kemik çıkıntıları üzerinde, tibia kenarı ve uç bölgelerde oluşur. Ülser vasfı çoğu zaman zımba ile delinmiş gibi sınırlanmış olup tabanı genellikle kuru ve nekrotiktir(19,20).

### **Arteriyel Ülser etiyojisi**

1. Atherosklerotik stenotik nedenli
  - Sigara kullanım
  - Tromboanjitis Obliterans
  - Obezite
  - Kronik böbrek yetmezliği
  - Diabetes mellitus
  - İleri yaş
  - Hiperlipdemi
2. Vaskülitler
3. Fonksiyonel hastalıklar

- Skleroderma
- Raynaud fenomeni

### **Tanı**

Vakalarda; anamnez, inspeksiyon yanı sıra fizik muayenede, nabızların değerlendirilmesi önemli yer tutar. Pedal, popliteal ve femoral arter nabızların mukayeseli olarak manuel muayenesi esastır. Kronik iskemik ekstremitelerde; deri ve tırnaklar atrofik kıllar dökülmüş soluk ve soğukluk görülür. Tanı alt ekstremitelerde renkli Doppler tetkiki ile kesinleştirilir. En sık ayak bileğinin proksimaline yerleşen saf venöz ülserlerin aksine, arteriyel ülserler kısmen ayak bileğinin distalinde bulunur, çünkü kısmen azalmış kan dolaşımı vasküler ağacın distalinde en büyük etkiye sahiptir(21). İskemik bir yaranın tabanı genellikle kanamaz. Yüzey sarımsı, kahverengimsi, gri veya siyah, genellikle nekrotik bir yüzeye sahiptir ve genellikle herhangi bir granülasyon dokusu içermez. Yara derin olabilir, "delinmiş" görünebilir (21).



Resim.4,5,6;Kritik iskemik ayak,arteriyo-venöz yetmezlikli yatak yarası,vasküler tromboz dopler görüntüsü

Arteriyel yetmezlik kökenli olmakla beraber çeşitli yaraların farklı özellikleri mevcuttur. Bası yaralarına (dekübit) lokal iskemi neden olur.(Resim5) (13) . Artmış doku basıncı, kılcıl damarları ve arteriyelleri sıkıştırıp yerel kan perfüzyonunun azalmasına neden olur. Uzun süreli yara oluşumuna yol açabilir(22,23).

Tromboanjitit obliterans, küçük ve orta büyüklükteki arter ve damarların inflamatuvar, segmental oblitere edici bir hastalıdır. Tipik anjiyografik değişiklikler, Arterlerde fokal kalınlaşmalar ve alt ekstremitelerde tirbuşon benzeri, küçük kalibreli kollateraller anjiyografik görüntüleridir. Tütün kullanan 25-40 yaş arası erkeklerde sık görülür. Vakalarda HLA-A9 ve HLA-B5 ile ilişkili genetik yapı görülmüştür (24).

Diabetes mellitus, periferik aterosklerotik hastalık gelişimi için önemli bir risk faktörüdür ve kritik iskemisi olan hastaların %30-40'ında bulunur(25). Diyabetik nöropatinin klinik belirtilerinden biri olan diyabetik ayak; diyabetik nöropati ve farklı derecelerde periferik vasküler hastalık ile ilişkili ülserasyon, enfeksiyon ve/veya kangren gibi ayaktaki yapısal veya fonksiyonel değişiklikler olarak tanımlanır(26). Nöropatik ülserler genellikle ayak tabanlarında, tabanlardaki basınç noktalarında, ayak parmaklarında ve malleollerde lokalizedir(27). Diyabetik ayakta önce ağrı ve sıcaklık duyumunda bir azalma ve daha sonra titreşim hassasiyetinde ve yüzeysel dokunuşta bir azalma ile tanımlanır(28). Sonuç olarak, DF hastaları normal durumlarda ağırlı mekanik, kimyasal veya termal uyarınları hissedemeyebilirler(28). Süreç sonunda, Charcot osteoartropatisi ve ülser komplikasyonları ve gelişir.

### **Tedavi**

Yaraya yol açan primer sebep ortaya konup tedavi edilmesi temel yaklaşımdır. Yaradan kaynaklanan septik bir durum olmadıkça nekrotik ve fibrin dokuları içeren cansız dokuların debridmanı revaskülerizasyon sonrasında yapılmalıdır. Revaskülerizasyon gerçekleştirilene kadar ülser veya gangrenöz dokular kuru vaziyette tutulmalıdır(29). İskemik alanının yeniden kanlandırılmasını müteakip canlı dokulara kadar ulaşılan debridman yapılmalı nekrotik ve cansız doku derbide edilmelidir. Yaraların enfeksiyona karşı korunması esas olup aralıklı pansuman ve gerekirse antibiyotik kullanılmalıdır.

### **Pansumanlarında kullanılan yara örtüleri aktif pasif olmak üzere ikiye ayrılır.**

➤ Aktif kapamada Vakum yardımcı kapama (VAC) ile yapılan negatif basınçlı yara tedavisi kullanılır. VAK'ın etki mekanizması ile ilgili olarak çeşitli çalışmalar yapılmıştır. Lokal kan akımını ve hücre proliferasyonunu artırdığı, yara yüzeyindeki enfeksiyonu ve zararlı enzimleri uzaklaştırdığı, kollajen dizilimini düzenleyerek yara iyileşmesini ve granülasyon dokusu oluşumunu hızlandırdığı bildirilmiş, aynı zamanda negatif basınç sağlayarak yara yerinde kontraksiyona neden olarak yarada küçülmeye neden olduğu gösterilmiştir(30,31).

➤ Pasif kapama: Geleneksel pansumanlarda genellikle minimum eksüda ile temiz, kuru yaralar için endikedir. Gazlı bez, tiftik, sıvalar, bandajlar ve pamuk yünü, yaralara mekanik koruma sağlamak için pansuman olarak kullanılmıştır. Gazlı bez ıslandığında yaraya yapışma eğilimi gösterir ve çıkarılması acı verici olabilir. Hidrokolloid, köpük, kompozit, hidrofiber, transparan, alginat, hidrojel veya antibakteriyel örtüler günümüzde kullanılan modern yara örtü çeşitleridir(32).



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**ÖZET**

Gebelik dönemi neslin devamı niteliğinde olup kadınların anne rolüne geçtiği bir dönemdir. Gebelik bir kadının hayatında fiziksel, biyolojik değişimlerin yaşandığı ve ruhsal hayatına etki eden bir süreci kapsamaktadır. Aleksitimik özellik gösteren birey, duyguları isimlendirememek ve ifade edememek, birbirinden ayırtıramamak veya farkında olmaksızın yaşamak şeklinde duygularını anlamada ve düzenlemede zorluklar yaşamaktadır. Bu durum gebeliğin ruhsal etkileri ile birleştiğinde kadınlarda sosyal izolasyona kadar giden sürece neden olabilir. Bu çalışma, gebelerde aleksitimi düzeyini belirlemek ve ilişkili faktörleri saptamak amacıyla yapılmıştır. Tanımlayıcı ve kesitsel tipte gerçekleştirilen çalışmaya 469 gebe dahil edilmiştir. Veriler gebe tanılama formu ve Toronto Aleksitimi Ölçeği ile elde edilmiştir. Gebelerin yaş ortalaması 28.03±5.51 yıl olup, gebelik haftası ortalaması 23.49±10.25'tir. Katılımcıların; %36.9'u lise ve üzeri eğitim düzeyine sahip, %13.4'ü çalışmakta, %2.1'inin kronik fiziksel bir hastalığı bulunmakta, %18.4'ünün gebelik sayısı dört ve üzerinde, %4.3'ü halen sigara kullanmakta ve %24.7'sinde gebelik planlı değildir. Gebelerin Toronto Aleksitimi Ölçeği toplam puan ortalaması 56.79±10.71 olup %29'unun aleksitimik özellik gösterdiği tespit edilmiştir. Bununla birlikte gebelerin Toronto Aleksitimi Ölçeği alt boyutu olan duyguları tanımada güçlük alt boyutu toplam puan ortalamasının 17.45±4.73; duygularını söze dökmeye güçlük alt boyut toplam puan ortalamasının 14.20±3.06 ve dışa dönük düşünme alt boyut toplam puan ortalamasının 25.12±5.10 olduğu belirlenmiştir. Çalışmada yaş, eğitim, çalışma durumu, kronik fiziksel hastalık varlığı, sigara kullanımı, evlilik yaşı ve gebelik haftası ile aleksitimi düzeyi arasında ilişki bulunmamıştır ( $p>0.05$ ). Bununla birlikte planlı gebelik durumu ile aleksitimi düzeyi arasında ilişki olduğu, gebeliği planlı olmayanların aleksitimi düzeyinin daha yüksek olduğu belirlenmiştir ( $p<0.05$ ). Gebelik döneminde ortaya çıkabilecek herhangi bir ruhsal durum bozukluğunun erken dönemde tanınmasında sağlık profesyonellerine büyük sorumluluk düşmektedir. Aleksitimik özellik gösteren ya da aleksitimi açısından riskli olan gebelerin kendilerini ifade etmeleri için rahat bir ortam sağlanmalı ve fırsat tanınmalıdır.

**Anahtar kelimeler:** Gebe, aleksitimi, duygu

**ALEXITHIMIA LEVEL AND RELATED FACTORS IN PREGNANCY****ABSTRACT**

The pregnancy period is a continuation of the generation and is a period in which women pass the role of mother. Pregnancy covers a process in which physical and biological changes are experienced in a woman's life and affects her spiritual life. Individuals with alexithymia have difficulties in understanding and regulating their emotions, such as not being able to name and express emotions, not being able to distinguish their emotions from each other, or living their emotions unconsciously. When this situation is combined with the psychological effects of pregnancy, it can lead to social isolation in women. This study was carried out to determine the level of alexithymia and related factors in pregnant women. A descriptive and cross-sectional study included 469 pregnant women. The data were obtained with the pregnant diagnosis form and the Toronto Alexithymia Scale. The mean age of the pregnant women was  $28.03 \pm 5.51$  years and the mean week of gestation was  $23.49 \pm 10.25$ . 36.9% of the pregnant women have a high school or higher education level and 13.4% are working. 2.1% of the participants have a chronic physical disease and 4.3% are still smokers. 18.4% of the pregnant women had four or more pregnancies, and 24.7% stated that the pregnancy was not planned. Total Toronto Alexithymia Scale mean score of the pregnant women was  $56.79 \pm 10.71$ , and 29% of them were found to have alexithymic features. On the other hand, when the Toronto Alexithymia Scale sub-dimension total score averages of pregnant women were examined; difficulty identifying feelings  $17.45 \pm 4.73$ ; difficulty in verbalizing their feelings  $14.20 \pm 3.06$ ; e externally oriented thinking  $25.12 \pm 5.10$ . In the study, no relationship was found between age, education status, employment status, presence of chronic physical disease, smoking, marriage age, gestational week and alexithymia level ( $p > 0.05$ ). On the other hand, it was determined that there was a relationship between planned pregnancy and alexithymia level, and those whose pregnancy was not planned had a higher alexithymia level ( $p < 0.05$ ). Health professionals have a great responsibility in the early recognition of any mental state disorder that may occur during pregnancy. A comfortable environment should be provided and an opportunity should be provided for pregnant women who have alexithymia or who are at risk for alexithymia to express themselves.

**Keywords:** Pregnant, alexithymia, emotion

## **GİRİŞ**

Gebelik, kadınlar için biyo-psikososyal dengenin, aile ve iş rollerinin değiştiği, yeni sorumlulukların edinildiği ve yeni role uyumun sağlandığı bir kriz dönemi olabilmektedir (Özşahin ve ark., 2018). Gebelik sadece anneyi değil aynı zamanda fetüsün sağlığını da etkileyen bir süreçtir. Annenin gebelik sürecinde yaşadığı ruhsal sorunlar fetüsü etkilemekte, anne-bebek arasındaki bağlanma ilişkisini bozmakta ve doğum sonrası dönemde de annenin var olan kapasitesinden ödün vererek bakım verme isteğine zarar vermektedir (Yar ve Yılmaz, 2021). Gebelikte mevcut psikiyatrik semptomlarda alevlenme görülebilenken, ilk psikiyatrik semptomlar gebelik sırasında da ortaya çıkabilmektedir (Sönmez ve ark., 2020).

Latince kökenli bir kelime olan ve “duygulara söz bulamamak” anlamına gelen aleksitimi (Motan ve Gençöz, 2007), bireyin duyguları tanımlama ve anlama yetersizliğidir (Stojanov ve Stojanov, 2020). Aleksitimik özellik gösteren birey, duyguları ifade edememek, birbirinden ayırtıramamak veya farkında olmaksızın yaşamak şeklinde duygularını anlamada ve düzenlemede zorluklar yaşamaktadır (Motan ve Gençöz, 2007; Kuluoğlu ve ark., 2013). Aleksitimik bireyler, fiziksel hastalık belirtileri olarak duygusal uyarılmalarını yanlış yorumlama eğilimi göstererek tuhaf hastalık davranışı gösterebilmektedir (Bodini et al., 2008). Ayrıca aleksitimi, bireylerin kendi kendilerini algılama, davranış kontrolü ve başka bireylerle iletişimde olumsuz etkilere neden olabilmektedir (Prochnow et al., 2011). Bu nedenle gebelik gibi yeni yaşam döngüsünün ortaya çıktığı dönemde, bireylerde aleksitimi düzeylerinin ve ilişkili faktörlerin belirlenmesi önemlidir.

## **YÖNTEM**

### **Araştırmanın Amacı ve Tipi**

Araştırma gebe kadınlarda aleksitimi düzeyini belirlemek ve ilişkili faktörleri saptamak amacıyla tanımlayıcı ve kesitsel dizaynda yapılmıştır.

### **Araştırmanın Evren ve Örneklemi**

Araştırmanın evrenini; Sivas merkezinde yer alan Sivas Numune Hastanesi Kadın Doğum Polikliniği'ne başvuran gebe olan kadınlar oluşturmuştur. Örneklemeye ise Mart-Haziran 2022 tarihleri arasında araştırma kriterlerine uyan 469 gebe dahil edilmiştir. Araştırma kriterleri; okur- yazar, gebe ve 18 yaş ve üzerinde olma, sözel iletişim kurabilmede sorunu olmama, bipolar hastalık, yeme bozuklukları veya diğer önemli psikolojik / psikiyatrik hastalık tanısı almama ve antidepresan ilaç kullanmama şeklinde belirlenmiştir.

### **Veri Toplama Araçları**

Veriler kişisel bilgi formu ve Toronto Aleksitimi Ölçeği ile toplanmıştır. Kişisel bilgi formunda, gebelerin yaşı, eğitim durumu, çalışma durumu, kronik fiziksel hastalık varlığı, evlilik süresi, evlilik yaşı, gebelik haftası ve gebelik sayısı gibi bilgileri içeren 16 soru yer almaktadır.

Toronto Aleksitimi Ölçeği (TAÖ-20), Bagby ve arkadaşları tarafından geliştirilmiş olup Türkiye’de geçerlilik ve güvenilirliği Güleç ve arkadaşları (2009) tarafından yapılmıştır. Ölçek, 5’li likert tipinde ve 20 maddeden oluşmaktadır. Ölçeğin, duygularını tanımada güçlük, duyguları söze dökmede güçlük ve dışa-dönük düşünme alt boyutları vardır. Duygularını Tanımada Güçlük alt boyutu, yedi maddeden oluşmakta olup duyguları belirleme ve onları duygusal uyarılmaya eşlik eden bedensel duyumlardan ayırt etmede güçlük şeklinde tanımlanır. Duyguların başkalarına aktarılmasında güçlük şeklinde tanımlanan Duyguları Söze Dökmede Güçlük alt boyutu beş maddeden oluşmaktadır. Dışa Dönük Düşünme alt boyutu, sekiz maddeden oluşmakta ve dışadönük bilişsel bir yapının varlığı, içedönük düşünme ve imgelem gücünün zayıflığı olarak tanımlanmaktadır. Bireyden, her madde için “Hiçbir zaman”, “Nadiren”, “Bazen”, “Sık sık” ve “Her zaman” seçeneklerinden kendisine en uygun olanını işaretlemesi istenir. Ölçeğin kesme puanı 61 olarak bulunmuştur. Toronto Aleksitimi Ölçeği toplam puanından 61’in üstünde alanlar aleksitimik olarak değerlendirilirler. Yüksek puanlar yüksek aleksitimik seviyeyi gösterir (Güleç ve ark., 2009). Bu çalışmada alt boyutların Cronbach Alpha değeri sırasıyla duygularını tanımada güçlük için 0.79, duyguları söze dökmede güçlük için 0.83 ve dışa-dönük düşünme için 0.80 olarak saptanmıştır.

### **Verilerin Toplanması**

Veriler, araştırmacılar tarafından gebelerle yüz yüze görüşülerek elde edilmiştir. Araştırmacı gebelere araştırma hakkında sözel olarak bilgi vermiş, gebelerin sözel ve yazılı onamlarını aldıktan sonra, araştırmayı kabul edenlere anket formlarını uygulamıştır. Anketlerin uygulanması ortalama 20 dakika sürmüştür.

### **Verilerin Değerlendirilmesi**

Veriler SPSS 22.0 programında analiz edilmiştir. İstatistiksel değerlendirmede yüzdellik, ortalama, student t testi, tek yönlü ANOVA, Mann Whitney U testi ve Pearson korelasyon katsayısı kullanılmıştır. İstatistiksel anlamlılık  $p < 0.05$  olarak değerlendirilmiştir.

## BULGULAR

Gebelerin yaş ortalaması 28.03±5.51 yıl olup, gebelik haftası ortalaması 23.49±10.25'tir. Katılımcıların; %36.9'u lise ve üzeri eğitim düzeyine sahip, %13.4'ü çalışmakta, %2.1'inin kronik fiziksel bir hastalığı bulunmakta, %18.4'ünün gebelik sayısı dört ve üzerinde, %4.3'ü halen sigara kullanmakta ve %24.7'sinde gebelik planlı değildir (Tablo 1).

**Tablo 1.** Gebelerin kişisel ve gebelik ile ilgili özellikleri (N=469)

Özellikler	X̄±SS	
Yaş (yıl)	28.03±5.51	
Evlilik yaşı (yıl)	21.91±4.27	
Evlilik süresi (yıl)	2.22±1.24	
Gebelik haftası	23.49±10.25	
<b>Eğitim durumu</b>	<b>n</b>	<b>%</b>
İlkokul	139	29.7
Ortaokul	157	33.5
Lise ve üzeri	173	36.8
<b>Çalışma durumu</b>		
Evet	63	13.4
Hayır	406	86.6
<b>Yaşadığı yer</b>		
İl merkezi	339	72.3
İlçe	95	20.3
Köy	35	7.5
<b>Kronik fiziksel hastalık varlığı</b>		
Evet	10	2.1
Hayır	459	97.9
<b>Sigara kullanma durumu</b>		
Evet	20	4.3
Hayır	449	95.7
<b>Evlilikte gerginlik yaşanma durumu</b>		
Evet	6	1.3
Ara sıra	345	73.6
Hayır	118	25.2
<b>Gebelik sayısı</b>		
1. gebelik	162	34.5
2. gebelik	118	25.2
3. gebelik	103	22.0
4 ve üzeri gebelik	86	18.4
<b>Gebeliğin planlı olma durumu</b>		
Evet	353	75.3
Hayır	116	24.7



Gebelerin Toronto Aleksitimi Ölçeği toplam puan ortalaması  $56.79 \pm 10.71$  olup kesme puana göre karşılaştırıldığında, %29'unun aleksitimik özellik gösterdiği tespit edilmiştir. Bununla birlikte gebelerin Toronto Aleksitimi Ölçeği alt boyutu olan duygularını tanımada güçlük alt boyutu toplam puan ortalamasının  $17.45 \pm 4.73$ ; duyguları söze dökmede güçlük alt boyut toplam puan ortalamasının  $14.20 \pm 3.06$  ve dışa dönük düşünme alt boyut toplam puan ortalamasının  $25.12 \pm 5.10$  olduğu belirlenmiştir (Tablo 2).

**Tablo 2.** Gebelerin Toronto Aleksitimi Ölçeği puan ortalamasının dağılımı

Ölçekler	$\bar{X} \pm SS$	n	%
<b>Toronto Aleksitimi Ölçeği</b>	$56.79 \pm 10.71$		
Duyguları tanıma güçlüğü	$17.45 \pm 4.73$		
Duyguları söze dökmede güçlük	$14.20 \pm 3.06$		
Dışa dönük düşünce	$25.12 \pm 5.10$		
<b>Aleksitimi grubu</b>			
Aleksitimik özellik yok		333	71.0
Aleksitimik özellik var		136	29.0

Çalışmada yaş, eğitim durumu, çalışma durumu, kronik fiziksel hastalık varlığı, sigara kullanımı, evlilik yaşı ve gebelik haftası ile aleksitimi düzeyi arasında ilişki bulunmamıştır ( $p > 0.05$ ). Bununla birlikte planlı gebelik durumu ile aleksitimi düzeyi arasında ilişki olduğu, gebeliği planlı olmayanların aleksitimi düzeyinin daha yüksek olduğu belirlenmiştir ( $p < 0.05$ ), (Tablo 3).

**Tablo 3.** Gebelerin kişisel ve gebelik ile ilgili özelliklerine göre Toronto Aleksitimi Ölçeği puan ortalaması

Özellikler	TAÖ -- $\bar{X}$ ±SS	Özellikler	TAÖ -- $\bar{X}$ ±SS
<b>Yaş</b>		<b>Kronik fiziksel hastalık varlığı</b>	
Test, p	r=0.006; 0.896	Evet	56.73±10.80
<b>Evlilik yaşı</b>		Hayır	59.60±4.19
Test, p	r=-0.014; 0.771	Test, p	t=-0.837; 0.403
<b>Gebelik haftası</b>		<b>Sigara kullanma durumu</b>	
Test, p	r=0.046; 0.325	Evet	60.65±14.57
<b>Eğitim durumu</b>		Hayır	56.62±10.49
İlkokul	58.00±9.02	Test, p	Z=0.129; 0.897
Ortaokul	56.59±11.91	<b>Gebelik sayısı</b>	
Lise ve üzeri	56.46±10.21	1. gebelik	56.38±9.87
Test, p	F=1.327; 0.231	2. gebelik	56.88±11.86
<b>Çalışma durumu</b>		3. gebelik	57.98±10.51
Evet	57.03±9.47	4 ve üzeri gebelik	53.88±11.35
Hayır	56.75±10.90	Test, p	F=1.272; 0.269
Test, p	t=0.188; 0.851	<b>Gebeliğin planlı olma durumu</b>	
		Evet	54.12±10.72
		Hayır	57.34±10.66
		Test, p	t=2.146; 0.048*

\*p<0.05

## TARTIŞMA

Aleksitimi; duyguların ayarlanmasını, konsantrasyonunu, işlenmesini ve bilişsel-duygusal bilgilerin değerlendirilmesini bozan bir bozukluktur. Bu nedenle aleksitimik özellik gösteren bireyler bilişsel-duygusal değişimlerini yönetemezler ve gerektiği gibi baş edemezler (Nekouei ve ark., 2014). Bu çalışmada, gebelerde aleksitimi düzeyi ve ilişkili faktörler incelenmiştir. Ancak literatürde sınırlı sayıda araştırma olması nedeniyle bulgular kadın popülasyonu ile yapılan başka çalışmalarla tartışılmıştır.

Çalışmada gebe kadınların Toronto Aleksitimi Ölçeği puan ortalaması 56.79±10.71 olup yaklaşık üçte birinin aleksitimik özellik gösterdiği tespit edilmiştir. Literatürde benzer çalışma bulunmamaktadır. Bununla birlikte 65 yaş üzeri kadınlarla yapılan bir çalışmada, katılımcıların aynı ölçekten alınan puan ortalaması 50.28±9.51 olarak bulunmuştur (Yiğitbaş, 2017). Bu çalışma, gebelerde aleksitiminin yaygın olabileceğini göstermesi açısından önemlidir.

Çalışmada, gebelerin yaşı, eğitim durumu, çalışma durumu, kronik fiziksel hastalık varlığı, sigara kullanımını, evlilik yaşı ve gebelik haftası ile aleksitimi düzeyi arasında ilişki bulunmazken, planlı gebelik durumunun aleksitimi düzeyi ile ilişki olduğu, gebeliği planlı

olmayanların aleksitimi düzeyinin daha yüksek olduğu belirlenmiştir. Bir çalışmada, gebeliğini isteyen kadınların Toronto Aleksitimi Ölçeği puan ortalamasının  $65.04 \pm 11.83$ , gebeliğini istemeyen kadınların puan ortalamasının ise  $65.37 \pm 11.15$  bulunduğu ve gruplar arasında istatistiksel olarak anlamlı bir farklılık olmadığı tespit edilmiştir (Sönmez ve ark., 2020). Literatür çalışması ile farklılık gösteren çalışma bulgusu, bu konuda daha fazla çalışmaya ihtiyaç olduğunu göstermektedir.

## **SONUÇ**

Çalışmada; aleksitiminin gebelerde yaygın görüldüğü ve planlı gebelik durumunun aleksitimi düzeyi ile ilişkili olduğu tespit edilmiştir. Sağlık profesyonellerine, gebelik döneminde ortaya çıkabilecek herhangi bir ruhsal durum bozukluğunun erken dönemde tanınmasında büyük sorumluluk düşmekte olup psikolojik açıdan gebelerin kendilerini ifade etmeleri için rahat bir ortam sağlanmalı ve fırsat tanınmalıdır.

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**GESTASYONEL DİYABETLİ GEBELERİN DİSTRES DURUMLARI VE  
ETKİLEYEN FAKTÖRLERİN BELİRLENMESİ**

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**ÖZET**

Gestasyonel diabetes mellitus (GDM), ilk kez gebelikte tanısı konulan ya da gebelik sürecinde ortaya çıkan, herhangi bir derecedeki glukoz intoleransıdır. GDM'nin anne ve bebek sağlığı üzerine olumsuz etkileri vardır. Anne ve bebek sağlığının korunması yanı sıra sağlıklı bir toplum geliştirmek için GDM'nin dikkatle ele alınması gerekmektedir. Gebelik, herhangi bir sağlık problemi yaşanmadığı durumda bile stresli ve kompleks bir süreçtir. GDM gibi yüksek riskli gebelikte görülme olasılığı artan distresin de değerlendirilmesi, gebelere verilen sağlık hizmetlerinin verimliliği ve etkinliği açısından önem taşımaktadır. Bu çalışma, GDM olan gebelerin distres durumlarını ve etkileyen faktörleri belirlemek amacıyla yapılmıştır. Tanımlayıcı ve kesitsel tipte gerçekleştirilen çalışmaya 112 gestasyonel diyabetli kadın dahil edilmiştir. Veriler tanılama formu ve Tilburg Gebelikte Distres Ölçeği ile elde edilmiştir. Gebelerin; yaş ortalaması 32.31±5.87 yıl olup %58'i lise mezunu, %29.5'i çalışmakta, %37.5'inin ikinci gebeliği ve %24.1'i GDM hakkında sağlık profesyonellerinden eğitim aldığını belirtmiştir. GDM'li gebelerin Tilburg Gebelikte Distres Ölçeği toplam puan ortalaması 25.05±4.83 olup, %29.5'i distres açısından risk altındadır. Ölçeğin alt boyutu olan olumsuz duygulanım için toplam puan ortalaması 18.07±3.68 ve eş katılımı için toplam puan ortalaması 6.98±2.94'tür. GDM'li gebelerin yaş, eğitim, çalışma durumu, gebelik, düşük ve ölü doğum yapma sayısı ile distres düzeyi arasında ilişki bulunmamıştır ( $p>0.05$ ). Bununla birlikte GDM hakkında eğitim alma durumu ile distres düzeyi arasında ilişki olduğu, eğitim alanların distres düzeyinin daha düşük olduğu belirlenmiştir ( $p<0.05$ ). Ebe ve hemşirelerin risk altındaki gebelerin belirlemede ve uygun girişimlerin yapılmasında önemli rolleri bulunmaktadır. Özellikle GDM olan gebelerde uygun eğitim ve danışmanlık hizmetlerinin yaygınlaştırılması, distresin etkilerinin azaltılması açısından önemlidir.

**Anahtar kelimeler:** Gebe, gestasyonel diyabet, distres

**DETERMINATION OF STRESS AND AFFECTING FACTORS OF PREGNANCY  
WITH GESTATIONAL DIABETES****ABSTRACT**

Gestational diabetes mellitus (GDM) is any degree of glucose intolerance that is first diagnosed during pregnancy or that occurs during pregnancy. GDM has adverse effects on maternal and infant health. GDM needs to be handled carefully in order to protect maternal and infant health as well as to develop a healthy society. Pregnancy is a stressful and complex process even in the absence of any health problems. Evaluation of distress, which is more likely to be seen in high-risk pregnancy, such as GDM, is important in terms of the efficiency and effectiveness of health services provided to pregnant women. This study was carried out to determine the distress and affecting factors of pregnant women with GDM. A descriptive and cross-sectional study included 112 women with gestational diabetes. Data were obtained with the diagnostic form and the Tilburg Pregnancy Distress Scale. The mean age of the pregnant women is  $32.31 \pm 5.87$  years, 58% of them are high school graduates and 29.5% are working. 37.5% of the women had their second pregnancy, and 24.1% stated that they received training from health professionals about GDM. The Tilburg Distress in Pregnancy Scale mean total score of pregnant women with GDM is  $25.05 \pm 4.83$  and 29.5% of them are at risk for distress. The total mean score for negative affect, which is the sub-dimension of the scale, is  $18.07 \pm 3.68$  and the total mean score for spousal involvement is  $6.98 \pm 2.94$ . There was no relationship between the age, age, education level, employment status, number of pregnancies, number of miscarriages, stillbirth and distress level of pregnant women with GDM ( $p > 0.05$ ). On the other hand, it was determined that there was a relationship between the level of education about GDM and the level of distress, and those who received training about GDM had a lower level of distress ( $p < 0.05$ ). Midwives and nurses have important roles in identifying pregnant women at risk and in making appropriate interventions. Dissemination of appropriate education and counseling services, especially in pregnant women with GDM, is important in terms of reducing the effects of distress.

**Keywords:** Pregnant, gestational diabetes, distress

## **GİRİŞ**

Gestasyonel diyabet (GDM), ilk kez gebelik sırasında saptanan değişik derecelerde glikoz tolerans bozukluğu olarak tanımlanmaktadır (Oğuz, 2016). Gebeliğin en sık metabolik hastalığı olan GDM, farklı toplumlarda farklı sıklıklarda görülmekle beraber ortalama %3-5 sıklıkla seyretmektedir (Aksu ve Yurtsev, 2009; Sterne, Logan and Palmer, 2011). GDM'nin anne ve bebek sağlığı üzerine olumsuz etkileri vardır. Maternal olarak; preeklamsi, sezaryen-müdehaleli doğum, tip II diabet, böbrek-idrar yolu- vajinal enfeksiyonlar, metabolik sorunlar, diabetik vaskülopatilerin ilerlemesi, gebeliğin ilk 7 haftası spontan abortus, preterm eylem, polihidroamnios, doğum travmaları, postpartum endometrit, yara yeri enfeksiyonu gelişmesi ve maternal mortalite riskine neden olur (Abebe ve ark., 2017; Şen ve ark, 2008). Anne ve bebek sağlığının korunması yanı sıra sağlıklı bir toplum geliştirmek için GDM'nin dikkatle ele alınması, bu alanda kanıta dayalı uygulamaların benimsenmesi ve bu alanda daha fazla bilimsel çalışmanın yapılması gereklidir (İlgen ve Koçak, 2019).

Gebelik, kadının görünüşünden sosyal statüsüne kadar yaşamında birçok değişime neden olan bir deneyimdir. Birçok kadın gebelikte meydana gelen bu değişikliklere kolaylıkla adaptasyon sağlar. Ancak bazı kadınlar gebelikte meydana gelen fizyolojik, psikolojik ve sosyal değişikliklere uyumda zorlanır, sonuçta fizyolojik ya da psikolojik sorunlar ortaya çıkar (Dündar ve ark, 2019). Bu sorunların çoğu psikolojik distres le ilgilidir (Çapık ve ark, 2015). Gebeliğe özgü psikolojik distres, fetüsün sağlığına, gebeliğe bağlı fiziksel semptomlara, doğum eylemine, postpartum döneme ve bebeğin sağlığına yönelik maternal korku ve endişeleri ifade etmektedir (Simsek Kucukkelepce et al, 2022). Anneye veya bebeğe ait sorunlar nedeniyle yüksek riskli gebeliklerde kadınların stres düzeyi daha da artmaktadır (Gözüyeşil ve Düzgün, 2021). GDM gibi yüksek riskli gebelikte görülme olasılığı artan distresin de değerlendirilmesi, gebelere verilen sağlık hizmetlerinin verimliliği ve etkinliği açısından önem taşımaktadır. Bu nedenle kadın sağlığı hemşireleri ve ebeler tarafından GDM olan gebelerde psikolojik distres gelişmesini etkileyen faktörlerin belirlenmesi, erkenden tanınması ve baş etme yöntemlerinin geliştirilmesi, prenatal ve postpartum komplikasyonların önlenmesi için üzerinde önemle durulması gereken bir durumdur (Simsek Kucukkelepce et al, 2022).

## **YÖNTEM**

### **Araştırmanın Amacı ve Tipi**

Araştırma, GDM olan gebelerin distres durumlarını ve etkileyen faktörleri belirlemek amacıyla tanımlayıcı ve kesitsel dizaynda yapılmıştır.

### **Araştırmanın Evren ve Örneklemi**

Araştırmanın evrenini; Sivas Cumhuriyet Üniversitesi Tıp Fakültesi Hastanesi Kadın Doğum polikliniğine başvuran ve GDM olan kadınlar oluşturmuştur. Örneklem ise Nisan-Ağustos 2022 tarihleri arasında araştırma kriterlerine uyan 112 GDM’li gebe dahil edilmiştir. Araştırma kriterleri, 18 yaş ve üzeri olmak, GDM tanısı alma, sözel iletişim kurabilmede sorunu olmamaktır.

### **Veri Toplama Araçları**

Veriler tanılama formu ve Tilburg Gebelikte Distres Ölçeği ile toplanmıştır. Tanılama formunda, gebelerin yaşı, eğitim durumu, çalışma durumu, gebelik sayısı, önceki gebeliklerinde GDM gelişme durumu, birinci derece yakınlarında diyabet varlığı gibi kişisel, gebelik ve hastalığa özgü bilgileri içeren 20 soru yer almaktadır.

Tilburg Gebelikte Distres Ölçeği, Pop ve ark.’nın (2011) tarafından, gebelikteki distresin belirlenmesi amacıyla geliştirilmiştir. Ölçeğin Türkçe geçerlilik- güvenirlilik çalışması Çapık ve Pasinlioğlu (2015) tarafından yapılmıştır. Ölçek toplam 16 maddeden oluşmaktadır. Ölçeğin her bir maddesi “çok sık” (0 puan), “oldukça sık” (1 puan), “ara sıra” (2 puan), “nadiren veya hiç” (3 puan) arasında değişen 4’lü likert tipi şeklinde derecelendirilmiştir. “Olumsuz Duygulanım” ve “Eş Katılımı” olmak üzere iki alt boyutu bulunmaktadır. “Olumsuz Duygulanım” alt boyutu, 11 maddeden oluşmaktadır. Bu maddeler 3,5,6,7,9,10,11,12,13,14 ve 16. maddelerdir. Bu alt boyuttan alınabilecek en düşük puan 0, en yüksek puan 33’tür. “Eş Katılımı” alt boyutu, 5 maddeden oluşmaktadır. Bu maddeler 1,2,4,8 ve 15. maddelerdir. Bu alt boyuttan alınabilecek en düşük puan 0, en yüksek puan 15’tir. Ölçekteki 3,5,6,7,9,10,11,12,13,14 ve 16. maddeler ters kodlanmaktadır. Ölçeğin toplamından alınabilecek en düşük puan 0, en yüksek puan 48’tir. Ölçek, 12 hafta ve üzeri gebeliği olanlara uygulanmaktadır. Ölçeğin kesme noktası bulunmakta ve toplam puanın 28 ve üzerinde olması distres (depresyon, anksiyete, stres) açısından risk altında olan gebelerin tanılanmasını sağlamaktadır. Ölçeğin geçerlilik-güvenirlilik çalışmasında Cronbach Alfa değeri 0.83 olarak bulunmuştur (Çapık ve Pasinlioğlu, 2015). Bu çalışmada ölçeğin Cronbach Alpha değeri 0.80 olarak saptanmıştır.



### **Verilerin Toplanması**

Veriler, arařtırmacılar tarafından gebelerle yüz yüze görüşülerek elde edilmiştir. Arařtırmacı gebelere arařtırma hakkında sözel olarak bilgi vermiş, gebelerin sözel ve yazılı onamlarını aldıktan sonra, arařtırmayı kabul edenlere anket formlarını uygulamıştır. Anketlerin uygulanması ortalama 20 dakika sürmüştür.

### **Verilerin Deęerlendirilmesi**

Veriler SPSS 22.0 programında analiz edilmiştir. Verilerin normallięi Kolmogorov- Smirnov testi ile deęerlendirilmiştir. İstatistiksel deęerlendirmede yüzdellik, ortalama ile birlikte, veriler parametrik şartları sağlamadığı için (verilerin dağılımı homejen olmadığı için) bağımsız iki grup için Mann Whitney U testi ve Kruskal-Wallis test, ilişkinin belirlenmesinde Spearman korelasyon katsayısı kullanılmıştır. İstatistiksel anlamlılık  $p<0.05$  olarak deęerlendirilmiştir.

### **BULGULAR**

Gebelerin yaş ortalaması  $32.31\pm 5.87$  yıl olup %58'i lise mezunu, %29.5'i çalışmakta, %37.5'inin ikinci gebelięi ve %24.1'i GDM hakkında saęlık profesyonellerinden eğitim aldığını belirtmiştir (Tablo 1)

**Tablo 1.** GDM'lu gebelerin kişisel ve gebelik ile ilgili özellikleri (N=112)

Özellikler	n	%
<b>Yaş (yıl) (Ort±SS)</b>	28.03±5.51	
<b>Eğitim durumu</b>		
İlkokul	27	23.1
Ortaokul	65	58.0
Lise ve üzeri	20	17.9
<b>Çalışma durumu</b>		
Evet	33	29.5
Hayır	79	70.5
<b>Aile tipi</b>		
Çekirdek aile	103	92.0
Geniş aile	9	8.0
<b>Yaşadığı yer</b>		
İl merkezi	86	76.8
İlçe	21	18.8
Kasaba/Köy	5	4.5
<b>Maddi durumu</b>		
İyi	35	31.3
Orta	73	65.2
Kötü	4	3.6
<b>Gebelik sayısı</b>		
1. gebelik	13	11.6
2. gebelik	42	37.5
3. gebelik	41	36.6
4 ve üzeri gebelik	16	14.3
<b>Düşük sayısı</b>		
Yok	37	33.0
1	68	60.7
2 ve üzeri	7	6.3
<b>Önceki gebeliklerinizde gestasyonel diyabet gelişme durumu</b>		
Evet	15	13.4
Hayır	97	86.6
<b>Gebelikte gestasyonel diyabet dışında başka bir sorun gelişme durumu</b>		
Evet	1	0.9
Hayır	111	99.1
<b>Birinci derece aile yakınlarında diyabetli birey varlığı</b>		
Evet	75	67.0
Hayır	37	33.0
<b>Gestasyonel diyabetle ilgili herhangi bir eğitim alma durumu</b>		
Evet	27	24.1
Hayır	85	75.9
<b>Gestasyonel diyabet dışında başka kronik hastalık varlığı</b>		
Evet	0	0.0
Hayır	112	100.0

GDM'li gebelerin Tilburg Gebelikte Distres Ölçeği toplam puan ortalaması  $25.05 \pm 4.83$  olup, %29.5'i distres açısından risk altındadır. Ölçeğin alt boyutu olan olumsuz duygulanım için toplam puan ortalaması  $18.07 \pm 3.68$  ve eş katılımı için toplam puan ortalaması  $6.98 \pm 2.94$ 'tür (Tablo 2).

**Tablo 2.** GDM'lu gebelerin Tilburg Gebelikte Distres Ölçeği puan ortalamasının dağılımı

Ölçekler	Mean±SD	n	%
<b>Tilburg Gebelikte Distres Ölçeği</b>			
Olumsuz duygulanım	$18.07 \pm 3.68$		
Eş katılımı	$6.98 \pm 2.94$		
Genel	$25.05 \pm 4.83$		
<b>Distres varlığı</b>			
Distres açısından risk yok		79	70.5
Distres açısından riskli		33	29.5

GDM'li gebelerin yaş, eğitim, çalışma durumu, gebelik, düşük ve ölü doğum yapma sayısı ile distres düzeyi arasında ilişki bulunmamıştır ( $p > 0.05$ ). Bununla birlikte GDM hakkında eğitim alma durumu ile distres düzeyi arasında ilişki olduğu, eğitim alanların distres düzeyinin daha düşük olduğu belirlenmiştir ( $p < 0.05$ ) (Tablo 3).

**Tablo 3.** GDM'lu gebelerin kişisel ve gebelik ile ilgili özelliklerinin Tilburg Gebelikte Distres Ölçeği puan ortalaması ile karşılaştırılması

Özellikler	Tilburg Gebelikte Distres Ölçeği	
	Ort±SS	
<b>Yaş</b>		
Test, p	r=-0.106; 0.266	
<b>Eğitim durumu</b>		
İlkokul	26.20±5.18	
Ortaokul	24.81±4.55	
Lise ve üzeri	24.05±5.02	
Test, p	KW=1.099; 0.295	
<b>Çalışma durumu</b>		
Evet	24.33±4.65	
Hayır	25.35±4.90	
Test, p	Z=-1.049; 0.294	
<b>Gebelik sayısı</b>		
1. gebelik	24.46±4.07	
2. gebelik	25.21±4.90	
3. gebelik	25.17±5.40	
4 ve üzeri gebelik	24.81±3.93	
Test, p	KW=0.429; 0.934	
<b>Önceki gebeliklerinizde gestasyonel diyabet gelişme durumu</b>		
Evet	24.06±4.06	
Hayır	25.20±4.94	
Test, p	Z=-0.848; 0.398	
<b>Gebelikte gestasyonel diyabet dışında başka bir sorun gelişme durumu</b>		
Evet	21.00±0.00	
Hayır	25.09±4.84	
Test, p	Z=-0.841; 0.402	
<b>Gestasyonel diyabetle ilgili herhangi bir eğitim alma durumu</b>		
Evet	23.01±4.51	
Hayır	25.54±4.85	
Test, p	Z=-2.317; 0.047*	

\*p<0.05

## TARTIŞMA VE SONUÇ

Gebelik döneminde kadının bedeninde meydana gelen değişimler çoğunlukla pozitif olarak karşılanır, hatta kendisi ve eşinde bir gurur yaratır. Fakat bunun aksine bazı kadınlarda bu değişiklikler olumsuz bir beden imajı yaratabilir. Gebelerin ruhsal durumu ve yaşantısı distrese neden olabileceği gibi, gebelikteki yaşananlar da distrese neden olabilir (Yıldız Çiltaş ve Köse Tuncer, 2019). Gebelik döneminde yaşanan psikolojik distresin, fetüsün ve gebenin iyilik halini

olumsuz yönde etkilemesine doğum komplikasyonlarına ve postpartum dönemde depresyon gelişmesine neden olduğu belirtilmektedir (Simsek Kucukkelepce et al, 2022).

Çalışmada, GDM'lu gebelerin Tilburg Gebelikte Distres Ölçeği'nden alınabilecek minimum ve maksimum puan aralıkları göz önüne alındığında, puan ortalamasına (25.05±4.83) göre distres düzeyinin orta düzeyde olduğu ve yaklaşık üçte birinin (%29.5) distres açısından risk altında olduğu belirlenmiştir. Çalışma bulgusu literatür ile benzerlik göstermektedir (Çapık ve ark, 2015). Yüksek riskli gebelerle yapılan başka bir çalışmada da, gebelerin yarısından fazlasının distres yaşadığı belirlenmiştir (Gözüyeşil ve Düzgün, 2021). Bu çalışmaların aksine, başka bir çalışmada, gebelerin Tilburg Gebelikte Distres Ölçeği'nden puan ortalaması 13.48±8.6 olup, %9.6'sının distres yaşadığı saptanmıştır (Dündar ve ark, 2019). Çalışma bulgusu, GDM olan gebelerin distres açısından ele alınması gerekliliğini ortaya koymaktadır.

Çalışmada, GDM'lu gebelerin yaş, eğitim, çalışma durumu, gebelik, düşük ve ölü doğum yapma sayısı ile distres düzeyi arasında ilişki bulunmazken GDM eğitimi alanların distres düzeyinin daha düşük olduğu belirlenmiştir. Literatürde GDM gebelerde distres düzeyini inceleyen çalışma bulunmamaktadır. Bununla birlikte gebelerle yapılan başka çalışmalarda farklı bulgular elde edilmiştir. Örneğin Çapık ve ark. (2015) çalışmasında, yaş ile distres düzeyi arasında negatif yönlü ilişki olduğu, eğitim düzeyi üniversite ve üzeri olan gebelerin distres düzeyinin daha düşük olduğu, ilk gebeliği olanların distres düzeyinin daha yüksek olduğu tespit edilmiştir. Başka bir çalışmada, 26 yaş ve üzeri gebelerin 20-25 yaş arası gebelere göre, ilköğretim mezunu gebelerin, üniversite mezunu olan gebelere göre daha fazla distres yaşadığı saptanmıştır (Simsek Kucukkelepce et al, 2022). Buna rağmen, riskli gebelik tanısı almış gebelerle yapılan bir çalışmada da, gebelerin yaşı ve gebelik sayıları gibi değişkenlerinin distres düzeyi ile ilişkili olmadığı belirlenmiştir (Gözüyeşil ve Düzgün, 2021). Başka bir çalışmada, gebeliğin plansız ve/veya istenmeyen gebelik olması, yaşayan çocuk sayısı ve gebelik sayısı ile distres düzeyi arasında ilişki olmadığı, buna rağmen, gebeliğin farklı trimesterinde olması, düşük yapma, gravida, gebelikte sorun yaşama durumu ile distres düzeyi arasında ilişki olduğu saptanmıştır (Dündar ve ark, 2019). Çalışma bulgusu, literatür ile farklılık göstermekle birlikte, elde edilen bulgular, çalışma popülasyonunun farklılığından kaynaklanmış olabilir

Bu çalışmada, GDM'lu gebelerin distres düzeylerinin orta düzeyde olduğu buna rağmen yaklaşık üçte birinin distres yaşadığı belirlenmiştir. Ayrıca hastalığı hakkında eğitim alanların distres düzeyinin düşük olduğu tespit edilmiştir. Ebe ve hemşirelerin risk altındaki gebelerin belirlemede ve uygun girişimlerin yapılmasında önemli rolleri bulunmaktadır. Özellikle GDM olan gebelerde uygun eğitim ve danışmanlık hizmetlerinin yaygınlaştırılması, distresin etkilerinin azaltılması açısından önemlidir.

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**ANNELERİN ÇALIŞMASINA YÖNELİK TUTUMLARIN BAZI SOSYO-  
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**ÖZET**

Günümüzde kadınlar, ekonomik zorunluluklar, kendisi ve ailesi için daha iyi bir gelecek sağlamak, daha üretken olmak, kariyerinde ilerlemek, yaşam standartlarını yükseltmek, toplumda itibar kazanmak gibi bir dizi nedenden çalışma hayatına yönelmektedir. Öte yandan, bu nedenlerle çalışmaya ihtiyaç hisseden veya çalışmayı arzu eden bir çok kadın, toplumda çalışan kadına yönelik olumsuz tutumların etkisiyle çalışmaktan vazgeçmekte veya çalışmayı tercih etseler bile bu tutumların etkisiyle pek çok alanda zorluklar yaşayabilmektedirler. Ülkemizde ve uluslararası alanda yapılan araştırmaların daha çok annenin çalışmasının aileye ve çocuğa yansımaları üzerinde durmakta, ya da annelerin çalışma hayatı ve aile hayatı arasındaki ilişkiyi vurgulamaktadır. Bu bilgiler ışığında; araştırmada yetişkin bireylerin annelerin çalışmasına yönelik tutumlarının çeşitli sosyo-demografik değişkenlere göre incelenmesi amaçlanmıştır. Bu çalışma tanımlayıcı tipte tasarlanmış nicel bir araştırmadır. Veri toplama yöntemi olarak araştırmacılar tarafından hazırlanan “Soru Formu” kullanılmıştır. Rastgele örneklem seçilerek gönüllü olan kitleye ulaşmak hedeflenmekte olup araştırmacılar tarafından Google üzerinden çevrimiçi ölçek formu hazırlanarak oluşturulan link çalışma kapsamına alınan yetişkin bireylere gönderilerek veriler toplanmıştır. Çalışmada sosyo-demografik bilgi formu, “Annelerin Çalışmasına Yönelik Tutum Ölçeği” kullanılmıştır. Araştırma sonucunda elde edilen veriler SPSS istatistik programında analiz edilmiştir. Sosyo-demografik özellikler için tanımlayıcı istatistik analizler (frekans, yüzde, ortalama, standart sapma vb), bağımlı ve bağımsız değişkenler arasındaki farklılıkların incelenmesinde ikili karşılaştırmalar t-test, ikiden fazla grubun karşılaştırmasında ise ANOVA kullanılmıştır. Araştırma sonucunda; çalışma kapsamına alınan yetişkinlerin annelerin çalışmasına yönelik ortalamasının üzerinde bir tutuma sahip olduğu, tutumların da cinsiyet ve yaş değişkenlerine göre anlamlı farklılık gösterdiği belirlenmiştir. Araştırmacıların gelecekte çalışmalarını bu değişkenlerin başka boyutlarını da göz önüne alarak düzenlemelerinin konuyla ilgili daha fazla çalışma yapılmasının kadının çalışmasına yönelik tutum ve diğer değişkenler arasındaki ilişkilerin daha iyi anlaşılması bakımından faydalı olacağı düşünülmektedir.

**Anahtar Kelimeler:** Çalışan anne, kadın, tutum



**COMPARISON OF ATTITUDES TOWARDS WORKING MOTHERS WITH SOME SOCIO-DEMOGRAPHIC CHARACTERISTICS****ABSTRACT**

Today, women turn to working life for a number of reasons such as economic obligations, providing a better future for themselves and their families, being more productive, advancing in their careers, raising their living standards, and gaining prestige in the society. On the other hand, many women who need or desire to work for these reasons give up working due to negative attitudes towards women working in the society, or even if they prefer to work, they may experience difficulties in many areas due to these attitudes. The research carried out in our country and internationally reflects more on the work of the mother to the family and the child, it focuses on emphasizes the relationship between the working life of mothers and family life. In the light of this information; in this study, it was aimed to examine the attitudes of adult individuals attitudes towards mothers' work according to various socio-demographic variables. This study is a quantitative research designed in descriptive type. The "Question Form" prepared by the researchers was used as the data collection method. It is aimed to reach the volunteer population by choosing a random sample, and the data was collected by sending the link created by the researchers to the adult individuals included in the study by preparing an online scale form on Google. In the study, a socio-demographic information form, the "The Scale of Attitudes Towards Working Mother" was used. The data obtained as a result of the research were analyzed in the SPSS statistical program. Descriptive statistical analyzes (frequency, percentage, mean, standard deviation, etc.) were used for socio-demographic characteristics, paired comparisons t-test was used to analyze the differences between dependent and independent variables, and ANOVA was used for the comparison of more than two groups. As a result of the research; it has been determined that the adults included in the study have an above-average attitude towards mothers' work, and attitudes differ significantly according to gender and age variables. Future studies of researchers to determine these variables taking into account other dimensions of the regulations attitude towards mothers work and other useful for better understanding the relationships between variables is thought to be.

**Keywords:** Working mother, women, attitudes

## 1.GİRİŞ

Kadın, içinde bulunduğu toplumun ekonomik, demografik ve sosyal ilerlemesini hızlandırabilen bir potansiyeldir. İş hayatında kadın, yalnızca öz gereksinimleri için değil, aynı zamanda genel refahı ve itibarı için de kariyer inşa etmektedir. Betz ve Fitzgerald'e göre (1987) kadınların kariyer seçimleri büyük ölçüde ev ve aile sorumluluklarından etkilenir. Sosyal sınıf, evlilikle gelen tutumlar, finansal kaynaklar, eğitim seviyesi, çekirdek ailenin kültürel değerleri meslek seçimini etkiler. Diğer bir bakışla seçilen meslek, kadının ev ve aile sorumluluklarından etkilenen faktör olmak yerine etkileyici bir faktör de olabilir.

Günümüzde kadınlar çocukluğundan bu yana ailesinin ve kendisinin gayretiyle bir meslek edinir ve çalışma hayatına atılır. Çalışan kadının icra etmekte olduğu mesleki kariyer, zamanla onun yaşam biçimi haline gelir ve önemli kararlarına yön vermeye başlar. Evlilik ve çocuk ile yeni bir kimlik kazanır, “çalışan kadın”dan “çalışan anne”ye dönüşür. Çalışan annelerin çalışma nedenlerinin başında ekonomik sebeplerin geldiği bilinmektedir. Daha sonrasında annelerin aldıkları eğitim doğrultusunda çalışma yaşamında yer aldıkları, bunun bilinçli bir seçimden ziyade zaten olması gereken doğal bir süreç şeklinde ilerlediği yönünde ortak bir görüş olduğu belirlenmiştir (Beyenal, 2019).

Kadınlara yönelik genel görüş ise, yerleşik hayata ve tarımsal üretime geçilmesiyle birlikte toplum yapısının kompleksleştiği ve işbölümünün arttığı; bu esnada da kadınların özel alana itilerek ücretsiz eviçi emek grubu olarak kodlandığı yönündedir (Sever, 2015). Toplumun geniş kesiminde kadın işgücüne yönelik geleneksel bakış tarzının halen kabul gördüğü gözlenmektedir. Toplumun ve kadının kendisine biçtiği öncelikli rol “eş ve anne” ve bunun doğal sonucu olarak “ev kadını”dır (Minibaş, 1998). Evin rutin işleri, iyi akraba ve komşu ilişkileri kurmak, gelecek nesilleri yetiştirme sorumluluğu da bu öncelikli rollerin devamı niteliğindedir. Bunların yanında koruyuculuk, çocuğa güven duygusu kazandırma ve topluma uyumlu bir kişilik geliştirme görevleri de ön plandadır (Demiriz ve Öğretir, 2007).

Hem iş hem eş hem de annelik rollerini birlikte yürütebilen kadınların çalışma hayatına katılmalarının olumlu etkileri olacağı savunulmaktadır. Ancak iş hayatını hiç deneyimlememiş veya uzak kalmış kadın aynı zamanda toplumsal hayatın birçok alanından da soyut ve kopuk kalmaktadır. Dolayısıyla kendini güçsüz ve günlük yaşamını etkileyecek kararların alımında etkisiz hissedebilmektedir (Adaman ve Keyder, 2006). Kısmi veya tam zamanlı fark etmeksizin iş yaşamında bir kadın ise ailesine, topluma ve nihayetinde kendisine maddi gelirin yanında manevi gelir de sağladığının farkındadır. Oluşan bu kendine ve topluma yetebilme duygusu

çalışan anneyi, iş yaşamında olduğu gibi aile yaşamında da daha etkin bir konumda tutacaktır. Yaklaşık son on beş yılda aktif iş hayatında bulunan kadınların yanı sıra çalışan annelerin sayısının da arttığı gözlemlenmiştir. Anneliğe adanmış bir hayat yerine ne annelikten ne de çalışma hayatından vazgeçen kadınların yoğun annelik ideolojisini aşınmaya uğratması ile annelik ideolojisi, yeni bir dengeye doğru ilerlemeye başlamıştır (Kılıç, 2019).

Annelik üzerine ortaya atılan farklı fikirler zamanla birtakım yeni tutumlar yaratır. Tutumlar, olumlu olduğunda destekleyici ve motive edici olmakla beraber, olumsuz olduğunda da suçlayıcı ve cezalandırıcı olabilmektedir (Aydın vd, 2017). Özellikle evlilik ve annelik söz konusu olduğunda tutumların daha çok olumsuz yönde olduğu, çalışan eş ve anne olarak geleneksel eş ve anne rollerinin daha ön plana çıkması gerektiği yönündedir (Özçatal, 2019). Günümüzde ekonomik gereklilikler ve kişisel tatmin olma ihtiyacı annenin çocuğu küçük yaştan itibaren çalışmasını normal kılmaktadır. Bu da annelik ve alışılan kadın rollerinin çatışmasına neden olarak suçluluk duygusu ve strese yol açmaktadır (akt. Ağaçhan, 2019). Çalışma hayatı ve ev ödevleri arasında sıkışıp kalan anne strese girer. Stresle baş etmede zorlandığında ise bu durumu evdekilere yansıtabilir. Birçok anne de, suçluluk duygusundan kurtulmak ve gündelik programını organize etmek için kendi normunu oluşturmaktadır. Aileden aileye, anneden anneye değişebilen kendi düzenine uygun çözümler aramaktadır.

Özek (2011)'e göre yaş arttıkça ev ve işte annenin taşıdığı sorumlulukların artması, yaşadığı olumsuz olayların birikiminin sonucunda iş stresiyle başa çıkma becerisinin azalması ve kendini daha fazla tükenmiş hissetmesi çalışan annelere yönelik olumsuz tutumları tetiklemektedir. ‘Her şeyi kusursuz yapmaya çalışan kadın, en çok kendisine eksik kalmıştır.’ sözünü Mehdiyev, (2019) iş, eş, çocuk üçgeninde kalmış anneyi vurgulayarak annenin tüm aile bireylerinin hayatına yetişmesine karşın kendisine yetişememesine dikkat çekmiştir.

Mehdiyev (2019) yine kadınlar için oldukça önemli bir noktaya değinmiştir: “Mesele çocuk büyütme değil insan yetiştirme” ise eğer şüphesiz ki bu konunun öznesi çocuk ancak başkahramanı kadındır” Çünkü çevremizdeki şu an her kadın, ya anne ya da anne adaydır. Haliyle önce kadın sonra da anne olarak yeni nesilleri şekillendirmeye devam eder. Gücünün el verdiğince çocuğuna en iyisini sunmaya çalışır. Çalışan bir anne, çocuğu için zaman zaman izin kullanma, işe ara verme veya bırakma kararı alabilir. Bu kararı almasında genellikle çocuğun bakımı etkili olsa da amaç, aslında çocuğu güçlü bir anne-çocuk bağı ile yetiştirmektir. Kadınlar çalışma hayatında çoğunlukla erkeklerle aynı sorumlulukları alsalar da çocuk bakımı söz konusu olduğunda ise geleneksel roller ve kültürel yaklaşımların da etkisiyle sorumluluk

anneye düşer (Nomaguchi vd., 2005). Yakın zamanda baba figürüne karşı tutum, toplumsal cinsiyet rollerinin etkisiyle de değişmeye başlamıştır. Anne-baba olarak çocuğun sorumluluklarını birlikte üstlenen bir anlayış evrilmiştir. Gerek annenin içgüdüsel kodları gerek toplumun kalıp yargıları ise anneyi çocuk bakımı konusunda her zaman babanın bir adım önde konumlandırmıştır ve vicdani yük yine anneye atfedilmiştir.

Cüceloğlu (2003) anne çocuk bağının, çocuk bakımdan daha kritik öneme sahip olduğunu şu sözlerle ifade etmiştir: “Çocuğuyla iyi bir iletişimde olan anne çocuğa güven ve huzur sağlar. Çocuk kendini içtenlikle ifade eder ve bu sayede de anne çocuğunu daha iyi tanır ve anlar” (akt. Ağaçhan, 2019).

Anne-çocuk arasında duygusal ve psikososyal gelişimin yanında bebeğin doğduğu ortam ve hayat standartlarını oluşturan sosyoekonomik ve sosyodemografik özellikler de çevrenin anneye bakış açısını ve tutumunu belirleyici etmenlerdendir. İnsanlar yaş, cinsiyet, meslek, medeni durum, çocuk sahibi olma ya da olmama gibi etmenlerle çalışan annelere yönelik tutum benimseyebilmektedir.

## **2. BULGULAR VE ARAŞTIRMALAR**

### **Materyal ve Yöntem**

#### **Araştırma Deseni**

Bu çalışma; annelerin çalışmasına yönelik tutumların ve bu tutumları etkileyen faktörlerin belirlenmesi amacıyla tanımlayıcı olarak yapılmıştır.

#### **Çalışma grubu ve katılımcılar**

Araştırmanın çalışma grubunu 18-65 yaş aralığındaki yetişkin bireyler oluşturmuştur. Araştırmaya katılmayı kabul eden ve ulaşılabilen 226 yetişkin veri toplama formunu doldurmuştur. Katılımcıların demografik bilgilerine ilişkin dağılımları Tablo 1’de gösterilmiştir.

**Tablo 1.** Katılımcıların sosyo-demografik özelliklerine göre dağılımı (N=226)

Değişken	n	%	Değişken	n	%
<b>Cinsiyet</b>			<b>Eğitim düzeyi</b>		
Kadın	146	64,6	Ortaokul	2	0,8
Erkek	80	35,4	Lise	18	8,0
<b>Yaş</b>			Üniversite ve üzeri	206	91,2
18-27	85	37,6	<b>Aile Yapısı</b>		
28-37	38	16,8	Çekirdek	188	83,2
38-47	52	23,0	Geniş	18	8,0
48-57	51	22,6	Ayrılmış	9	4,0
<b>Medeni Durum</b>			Yalnız	11	4,8
Evli	123	54,4	<b>Çocuk Sayısı</b>		
Bekar	103	45,6	1	44	19,5
<b>Meslek</b>			2	60	26,5
Çalışmıyor	69	30,5	3	28	12,4
Kamu personeli	89	39,4	Çocuğum yok	94	41,6
İşçi	17	7,5			
Emekli	18	8,0			
Serbest meslek	33	14,6			

Tablo 1 incelendiğinde; araştırma örnekleminin %64,6’sını kadınlar, %35,4’ünü ise erkekler oluşturmaktadır. Araştırma kapsamına alınan yetişkinlerin %37,6’sı 18-27 yaş aralığında olup yarısından fazlası (%54,4) evlidir. Araştırmaya alınanlar arasında; kamu personeli (%39,4), üniversite ve üzerinde eğitim gören (%91,2), çekirdek aile yapısına sahip olanlar (%83,2) ve çocuğu olmadığını belirtenler (%41,6) ilk sırada yer almaktadır.

### Veri Toplama Araçları

Araştırmanın verileri, 15 Eylül-15 Ekim 2022 tarihleri arasında araştırmacılar tarafından hazırlanan anket formu Google Form aracılığıyla çevrim içi elde edilmiştir. Katılımcılara çalışma hakkında bilgi verilmiş olup araştırmanın amacı, araştırmadan elde edilen bilgilerin bilimsel amaçlar dışında kullanılmayacağı, bilimsel etik kuralları çerçevesinde gizlilik içinde değerlendirileceği ve başka bir amaçla kullanılmayacağı belirtilmiştir. Araştırmaya katılımda gönüllülük esas alınmıştır.

Bu araştırmada veri toplama araçları olarak, araştırmacılar tarafından geliştirilen Kişisel Bilgi Formu ve “Annelerin Çalışmasına Yönelik Tutumlar Ölçeği” kullanılmıştır.

**Kişisel Bilgi Formu:** Kişisel Bilgi Formu araştırmaya katılanların; cinsiyet, yaş, medeni durum, meslek, eğitim düzeyi, aile yapısı, sahip olduğu çocuk sayısı gibi sosyo demografik özellikleri hakkında bilgi edinmek amacıyla araştırmacılar tarafından hazırlanmış bir formdur.

“**Annelerin Çalışmasına Yönelik Tutum Ölçeği**”: Aydın ve arkadaşları (2017) tarafından geliştirilen ölçek çalışan annelere yönelik tutumların değerlendirilmesini amaçlayan 21 maddeden oluşan likert tipte (1= kesinlikle katılmıyorum, 2=katılmıyorum, 3=kararsızım, 4=katılıyorum 5=kesinlikle katılıyorum) bir ölçektir. Ölçek; Önyargı/Stigma, Özerklik/Bağımsızlık, Aile ve Sosyal Uyum ile Annelik Becerileri olmak üzere 4 faktörlü bir yapıya sahiptir. Ölçekten alınabilecek en düşük puan 21, en yüksek puan 105 olup, ölçekten alınan yüksek puanlar annelerin çalışmasına yönelik olumlu tutumlara sahip olduğunu göstermektedir.

### **Verilerin Analizi**

Verilerin analizinde SPSS 22 programı kullanılmıştır. Annelerin çalışmasına yönelik tutumların ve bu tutumları etkileyen faktörlerin belirlenmesi amacıyla yapılan çalışmada, verilerin normal dağılıma uygunluğunun belirlenmesi amacıyla çarpıklık ve basıklık değerleri hesaplanmıştır. Annelerin çalışmasına yönelik tutum ölçeği toplam puanına ilişkin çarpıklık (.543) ve basıklık (.195) katsayılarının -1 ile +1 aralığında yer aldıkları görülmüştür (Tabachnick ve Fidell, 2013). Elde edilen sonuçlar dağılımların normal kabul edilebilecek sınırlarda olduğunu gösterdiğinden, ortalamaların karşılaştırılması amacıyla İlişkisiz Örneklemeler İçin Tek Faktörlü Varyans (ANOVA) ve t-testi analizinden yararlanılmıştır.

### **BULGULAR**

Annelerin çalışmasına yönelik tutumların (n=226) **sosyo-demografik özelliklere göre** değerlendirilmesi amacıyla yapılan çalışmadan elde edilen sonuçlar aşağıda yer almaktadır.

**Tablo 2.** Katılımcıların Annelerin Çalışmasına Yönelik Tutum Ölçeği'nden aldıkları puanlara ilişkin ortalama, standart sapma, minimum ve maksimum değerleri

Ölçek (n=180)	Ortalama	SD	Min.	Mak.
<b>Annelerin Çalışmasına Yönelik tutum</b>	57.89	8.19	41.00	84.00
<i>Önyargı/Stigma</i>	10.05	3.45	5.00	21.00
<i>Özerklik/Bağımsızlık</i>	18.40	4.62	10.00	25.00
<i>Aile ve Sosyal Uyum</i>	18.59	3.83	12.00	30.00
<i>Annelik Becerileri</i>	10.83	3.56	5.00	23.00

Analiz sonuçlarına göre araştırma kapsamına alınan yetişkinlerin (n=226) Annelerin çalışmasına Yönelik Tutum ölçeğine ilişkin puan ortalamaları 57.89 (SD=8.19) olup, katılımcıların annelerin çalışmasına yönelik tutumları olumlu düzeydedir.

**Tablo 3.** Annelerin çalışmasına yönelik tutumların çeşitli değişkenler açısından analiz sonuçları

Değişkenler	Değişken kategorileri	Önyargı/Stigma $\bar{X} \pm SS$	Özerklik/Bağımsızlık $\bar{X} \pm SS$	Aile ve Sosyal Uyum $\bar{X} \pm SS$	Annelik Becerileri $\bar{X} \pm SS$
Cinsiyet	<i>Kadın</i>	9.40±3.10	18.54±4.37	18.49±3.89	10.30±3.47
	<i>Erkek</i>	11.25±3.76	18.16±5.07	18.78±375	11.78±3.55
		<b>t=3.959</b> <b>p=0.27*</b>	<b>t=.587</b> <b>p=0.56</b>	<b>t=.550</b> <b>p=.737</b>	<b>t=3.034</b> <b>p=.621</b>
Yaş	<i>18-27 yaş</i>	9.71±3.89	18.64±4.42	18.54±2.83	11.01±3.83
	<i>28-37 yaş</i>	10.68±3.82	19.94±4.77	18.97±4.18	11.68±3.66
	<i>38-47 yaş</i>	10.51±3.09	18.09±4.71	19.44±4.71	10.36±3.07
	<i>48-57 yaş</i>	9.68±2.63	17.17±4.51	17.54±3.90	10.37±3.45
		<b>F= 1.197</b> <b>p=.312</b>	<b>F= 2.827</b> <b>p=.039*</b>	<b>F= 2.273</b> <b>p=.081</b>	<b>F= 1.379</b> <b>p=.250</b>
Medeni Durum	<i>Evli</i>	9.54±3.67	19.19±4.42	18.63±3.07	10.62±3.53
	<i>Bekar</i>	10.48±3.21	17.74±4.70	18.56±4.39	11.00±3.59
		<b>t=2.058</b> <b>p=.095</b>	<b>t=2.364</b> <b>p=.394</b>	<b>t=.121</b> <b>p=.001*</b>	<b>t=.811</b> <b>p=.064</b>
Eğitim Düzeyi	<i>Ortaokul</i>	11.50±2.12	22.00±1.24	17.50±3.53	15.00±5.65
	<i>Lise</i>	11.16±3.83	16.94±4.54	18.27±4.65	12.11±3.37
	<i>Üniversite ve üzeri</i>	9.94±3.42	18.50±4.62	18.63±3.78	10.67±3.54
		<b>F=1.207</b> <b>p=.301</b>	<b>F=1.551</b> <b>p=.214</b>	<b>F=.153</b> <b>p=.858</b>	<b>F=2.750</b> <b>p=.066</b>
Meslek	<i>Çalışmıyor</i>	9.11±3.49	19.55±4.59	18.30±2.91	10.49±3.70
	<i>Kamu personeli</i>	10.57±3.46	17.61±4.68	18.61±4.15	11.13±3.69
	<i>İşçi</i>	11.35±3.42	17.94±3.78	19.58±3.42	12.23±3.91
	<i>Serbest meslek</i>	10.72±3.388	17.90±4.91	18.84±4.95	10.69±3.06
	<i>Emekli</i>	8.88±2.47	19.27±4.02	18.22±3.62	9.55±2.50
		<b>F=3.232</b> <b>p=.013*</b>	<b>F=2.035</b> <b>p=.090</b>	<b>F=.458</b> <b>p=.766</b>	<b>F=1.577</b> <b>p=.181</b>
Aile Yapısı	<i>Çekirdek</i>	10.00±3.49	18.39±4.71	18.73±3.91	10.71±3.60
	<i>Geniş</i>	10.44±3.63	18.44±4.17	18.55±3.71	11.11±2.94
	<i>Ayrılmış</i>	10.88±1.53	18.11±5.08	17.11±3.55	12.55±3.35
	<i>Yalnız</i>	9.72±4.00	18.81±3.89	17.45±2.65	11.00±4.14
		<b>F=.296</b> <b>p=.828</b>	<b>F=.042</b> <b>p=.989</b>	<b>F=.859</b> <b>p=.463</b>	<b>F=.812</b> <b>p=.488</b>
Çocuk Sayısı	<i>1</i>	10.27±3.14	19.25±4.50	18.81±3.86	11.61±3.85
	<i>2</i>	10.06±3.38	17.56±4.48	18.50±4.82	10.38±3.49
	<i>3</i>	10.96±2.58	18.14±4.94	18.32±4.02	10.89±3.43
	<i>Çocuğum yok</i>	9.68±3.83	18.62±4.66	18.63±3.03	10.73±3.51
		<b>F=1.071</b> <b>p=.362</b>	<b>F=1.252</b> <b>p=.292</b>	<b>F=.112</b> <b>p=.953</b>	<b>F=1.047</b> <b>p=.373</b>

Analiz sonuçlarına göre, cinsiyet önyargı/stigma ( $t= 3.959, p<.05$ ) alt boyutunda anlamlı farklılık oluşturmaktadır. Erkeklerin annelerin çalışmasına yönelik önyargısı kadınlardan daha fazladır. Katılımcıların yaşı özerklik/bağımsızlık ( $F= 2.827, p<.05$ ) alt boyutunda anlamlı farklılık oluşturmaktadır. 48-57 yaş aralığındaki katılımcıların bağımsızlık düzeyi ( $17.17\pm 4.51$ ) en düşük, 28-37 yaş arasındakilerin ( $19.94\pm 4.77$ ) en fazladır. Aynı şekilde medeni durum aile ve sosyal uyum alt boyutunda ( $t= .121, p<.05$ ) anlamlı bir farklılık oluşturmakta olup evli olanların aile ve sosyal uyum puanları daha yüksektir.

Araştırmaya alınanların eğitim düzeyleri ile annelerin çalışmasına yönelik ölçeği alt boyutları arasında anlamlı bir farklılık bulunmamaktadır. Buna karşın üniversite ve üzeri eğitim alanların ön yargıları ( $9.94\pm 3.42$ ) ve annelik becerileri ( $10.67\pm 3.54$ ) en düşük bulunmuştur. Araştırmaya katılanların meslekleri ile önyargı/stigma ( $t= 3.232, p<.05$ ) alt boyutunu arasında anlamlı bir farklılık belirlenmiştir. Buna göre emekli katılımcıların önyargı puanları ( $8.88\pm 2.47$ ) daha yüksek olarak belirlenmiştir.

Çalışma kapsamına alınan katılımcıların aile yapıları ile annelerin çalışmasına yönelik ölçek alt boyutlarında anlamlı bir farklılık tespit edilmemiştir. Yalnız yaşayan katılımcıların önyargı puanları ( $9.72\pm 4.00$ ) diğer aile yapısına sahip katılımcılardan daha düşüktür. Özerklik ( $18.11\pm 5.08$ ) ile aile ve sosyal uyum ( $17.11\pm 3.55$ ) alt boyutunda ayrılmış olan kişilerin puanları, annelik becerileri alt boyutunda ( $10.71\pm 3.60$ ) ise çekirdek ailede yaşayanların puanları daha düşüktür. Araştırmaya katılanların sahip oldukları çocuk sayıları annelerin çalışmasına yönelik ölçek alt boyutlarında anlamlı bir farklılık tespit edilmemiştir. Çocuğu olmayan katılımcıların önyargı puanları ( $9.68\pm 3.83$ ) diğer katılımcılardan daha düşüktür. Özerklik ( $17.56\pm 4.48$ ) ve annelik becerileri alt boyutunda ( $10.38\pm 3.49$ ) iki çocuğa sahip olanların, aile ve sosyal uyum alt boyutunda üç çocuğa sahip olanların puanları daha düşüktür.

## **ARAŞTIRMALAR**

Amerika'da yapılan bir araştırmaya göre annelerin yoğun annelik ideolojisine uygun inançlara sahip oldukları ve çocuk sahibi olmayı kutsal, iyi gibi olumlu kavramlarla tanımladıkları ortaya çıkmıştır (Hays, 1996).

Ekonomik Kalkınma İşbirliği Örgütü (Organisation for Economic Co-operation and Development)'nin 2018 yılında yayınladığı raporda, 0-14 yaş arası en az bir çocuk sahibi olan kadınların işgücüne katılım oranı 2004 yılında % 21 iken 2013 yılında 9 puan artışla % 30 oranına ulaşmıştır. Ek olarak kadınların annelik ve çalışma hayatını bir arada yürütmeyi tercih



oranları artış eğilimine girmiştir ve özellikle yüksek eğitim seviyesine sahip kadınlarda bu oran(% 65,5) çok daha yüksektir(OECD, 2018a.).

Türkiye İstatistik Kurumu'nun araştırmasına göre, okuryazar olmayan kadınların işgücüne katılım oranı %12,4, lise altı eğitilmiş kadınların işgücüne katılım oranı %24,1, lise mezunu kadınların işgücüne katılım oranı %29,9, mesleki veya teknik lise mezunu kadınların işgücüne katılım oranı %37,0 iken yükseköğretim mezunu kadınların işgücüne katılım oranı %65,6 oldu(TÜİK, 2021).

Ulutaş (1999)'ın yapmış olduğu araştırmada, annenin iş saatlerinin düzensiz olması, sürekli seyahat etmesi, tehlikeli işlerde çalışması, evde geçirilen vaktin az olması ve gece nöbetlere gitmesi çocuğun ailesine karşı kaygı duymasına neden olur. Bu nedenle çalışan annenin çocuğu ile sınırlı olan vaktini nitelikli geçirmesi önem arz etmektedir.

### **3.SONUÇ**

#### **Tartışma**

Bu çalışmada Türkiye genelinde annelerin çalışmasına yönelik tutumların bazı sosyodemografik özelliklere göre karşılaştırması yapılmıştır. Yöneltilen sorular bazında değerlendirildiğinde; "Çalışmak, anneleri yaşam karşısında daha güçlü yapar" sorusuna katılımcıların %85,9'u olumlu yanıt vermiştir. Araştırmanın girişinde değindiğimiz çalışma hayatına atılan annenin kendine ve topluma yetebilme duygusu özgüven yaratır. Bu sayede anne, yaşamın zorluklarıyla daha kolay mücadele eder ve toplumun gözünde olumlu bir tutuma sahip olur.

"Çalışan anneler çocuklarına yeterli vakit ayıramaz" öncülünde ise kadın katılımcıların çoğunlukla işaretlediği "kesinlikle katılmıyorum" ve "katılmıyorum" yanıtları %53 iken erkek katılımcıların çoğunlukta işaretlediği "kesinlikle katılıyorum" ve "katılıyorum" yanıtları %31 ve "kararsızım" seçeneğini işaretleyenlerin oranı %16'dır. Kadınlar ve erkeklerin bu hususta zıt fikirlere sahip olduğu sonucuna ulaşılmıştır. "Çalışan annelerin çocukları sık hastalanır" sorusuna verilen cevaplarda ise %79 olumsuz ifadelerin yer aldığı seçenekler işaretlenmiştir. Dolayısıyla hem kadın hem erkek katılımcılar, çocuğun sık hastalanmasının annenin çalışmasıyla ilgili olmadığı konusunda hemfikirdir.

Ülkemizde kadının çalışmasına etki eden faktörleri inceleyen çalışmalar gözden geçirildiğinde; eğitim eksikliği, kocanın yaklaşımı, çocuk bakımı ve ev işlerinin önemli olduğu gözlenmektedir (Kuzgun ve Sevim, 2004). Araştırmada elde edilen bulgulara göre erkeklerin kadınlara göre

annelerin çalışmasına yönelik önyargıları daha fazla olması bu çalışmalarını destekler niteliktedir. Bulgulardan ulaştığımız diğer bir sonuç ise genç ve bekar erkek katılımcıların bağımsızlık düzeyi en yüksek, aile-sosyal uyum değişkeni en düşüktür. Ek olarak aynı yaş grubunun kadın katılımcılarla beraber çalışan annelere ön yargısı en düşüktür. Çalışmanın genelinde genç ve çocuk sahibi olmayan bireylerin annelerin çalışmasına oldukça pozitif yaklaştığı tespit edilmiştir. Evli ve çocuk sahibi katılımcıların ise aile sosyal uyum değişkeni en düşük puanı, 3 çocuk ve daha fazlası olan aileler almıştır. Çalışma hayatı, ev ve çocukları organize edemediğini hissettiği durumlarda annenin stres düzeyinin artması olasıdır. Bu stres ev ve aile ilişkilerine yansiyabilir. Üye sayısı fazla olan ailelerin etkileşim gücü de fazla olduğu için uyum problemlerinin daha sık yaşanması öngörülmektedir.

### **ÖNERİLER**

- Çalışan annelere yönelik önyargılı tutumun giderilmesi için toplumun her yaş grubuna yönelik bilgilendirme çalışmaları ve seminerler düzenlenmeli,
- Özel sektörde çalışanlar için iş ve aile hayatını uyumlulaştırmaya yönelik doğum izni, ebeveynlik izni ve kısmi süreli çalışma olanakları sunulabilir,
- Açık iletişimin olduğu ve olumlu eleştirilerin de yapılabileceği bir iş ortamı sağlanabilir,
- Okul öncesi eğitim kurumlarda erken çocuk bakım hizmetleri genişletilebilir,
- Kreş ve okul öncesi yuvaların çocuğun aile ve aile büyükleriyle daha dinamik bir iletişim kurulabilir,
- Aile danışmanlığı hizmeti toplumda bilinçlendirilebilir ve yaygınlaştırılabilir,
- Günümüz şartları kadınları iş hayatına atılmaya teşvik etmekte ve kadın istihdamının artmasıyla toplumsal hayat da değişmektedir. Toplumun norm ve devletin politikaları bu gelişimlere yönelik adımlar atarsa mutlu bireyler, aileler, toplumları oluşturabilir.

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## **6 YAŞ ALTINDAKİ ÇOCUKLARDA EV KAZALARININ İNCELENMESİ**

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### **ÖZET**

Çocuklar erken yaşlarda henüz gelişimlerini tamamlamadıkları için, ev içinde kazalara ve travmalara yatkındır, bu yüzden ebeveynlerin dikkatli olması ve çocukları kazalara karşı korumaları gerekmektedir. Bu çalışmamızda 6 yaş altındaki çocuklarda ev kazalarının sıklığını ve kaza çeşidini araştırmayı amaçlamaktayız. Araştırma Kahta devlet hastanesinde çocuk polikliniğine başvuran 100 anne ile yapılmıştır. İstatiksel analiz SPSS kullanılarak yapılmıştır. Araştırmada her 10 çocuktan birinin ev kazasına marus kaldığı ve ev içinde en sık düşmelere bağlı olarak basit yaralanmalar olduğu görülmüştür. Kazaları arttıran en önemli neden çocuk sayısının fazla olması olarak görülmüştür. Bu çalışmamızın sonucunda ailelerin ev kazaları hakkında bilgilendirilmesi gerektiği, özellikle 6 yaş altında çocuğu olan annelerin her poliklinik başvurusunda eğitilmesi gerektiğini görmekteyiz. Ev kazaları önemli bir halk sağlığı sorunu ve bilgilendirme ile bu kazalar en aza düşürülebilir.

**Anahtar kelimeler:** Ev kazaları, çocuklarda ev kazaları, ev kazalarında önlem

**INVESTIGATION OF HOME ACCIDENTS IN CHILDREN UNDER 6 YEARS OLD****ABSTRACT**

Since children have not completed their development at an early age, they are prone to accidents and traumas at home, so parents need to be careful and protect their children against accidents. In this study, we aim to investigate the frequency and type of home accidents in children under the age of 6 years. The research was conducted with 100 mothers who applied to the pediatric outpatient clinic in Kahta state hospital. Statistical analysis was performed using SPSS. In the study, it was observed that one out of every 10 children suffered from a home accident and the most common injuries were simple injuries due to falls. The most important reason increasing the accidents was seen as the high number of children. As a result of this study, we see that families should be informed about home accidents, especially mothers with children under the age of 6 should be educated at each polyclinic application. Home accidents are an important public health problem and these accidents can be minimized by informing the parents.

**Keywords:** Home accidents, home accidents in children, prevention in home accidents

## **GİRİŞ**

Dünya Sağlık Örgütü'ne göre; Aniden ve kişinin dışında, plansız bir şekilde meydana gelen, fiziksel ve ruhsal zarara yol açan durumlar 'kaza' olarak tanımlanmaktadır. Yaralanma, “insan vücudunun fizyolojik tolerans eşiğini aşan miktarlarda enerjiye aniden maruz kalması veya bir veya daha fazla hayati unsurun eksikliğinden kaynaklanan fiziksel hasar” olarak tanımlanmaktadır. Yaralanmalar, ölüm ve sakatlığın önde gelen nedenleri arasındadır. Tüm yaralanma türlerinin ortak temel nedenleri, sosyoekonomik ve çevresel belirleyicileri vardır. Kasıtsız yaralanmaların başında trafik kazaları, boğulma, zehirlenme, yanıklar ve düşme gelmektedir (1). Çocukların yaşadığı istenmeyen yaralanmalar da önemli bir küresel sağlık sorunudur. Kazalarda önemli bir yere sahip olan ev yaralanmaları, bir evde (çocuk odası, oturma odası, mutfak, banyo vb.) veya ona ait bir ortamda (bahçe, garaj vb.) meydana gelen olaylar olarak tanımlanabilir (2). Ev kazaları tüm yaş gruplarında meydana gelebilir, ancak çocuklar ve yaşlılar bu kazalara karşı daha hassastır. Çocuklar kendilerini kazalardan koruyacak zihinsel ve fiziksel düzeyde değildir. 0-6 yaş arası çocuklar, dünyalarını keşfetme istekleri nedeniyle merak duygusuna sahiptirler. Gelişimsel olarak kendilerini koruyamadıkları için yaralanmaya yol açabilecek eylemleri değerlendiremezler (3). Çocuklar yaralanmaya karşı özellikle savunmasızdır ve yaralanmayı önlemek için özel ilgiye ihtiyaçları vardır. Bu nedenle yaralanmaları önlemek ve güvenli bir yaşam alanı sağlamak için koruyucu önlemler almak yetişkinlerin sorumluluğundadır. Yaralanmalar ve şiddet, tüm ülkelerde başlıca ölüm ve hastalık yükü nedenidir; ancak, ülkeler arasında veya içinde eşit olarak dağılmamıştır. Bazı insanlar doğdukları, büyüdükleri, çalıştıkları, yaşadıkları ve yaşlandıkları koşullara bağlı olarak diğerlerinden daha savunmasızdır. Çocukların yetersiz yetişkin gözetimi, yoksulluk gibi sağlığın geniş toplumsal belirleyicileri; Güvenli olmayan barınma, alkole, uyuşturucuya, ateşli silahlara, bıçaklara ve böcek ilaçlarına kolay erişim, çocuklar için kaza riskini artıran faktörlerdir. Çocuklar erken yaşlarda henüz gelişimlerini tamamlamadıkları için, ev içinde kazalara ve travmalara yatkındır, bu yüzden ebeveynlerin dikkatli olması ve çocukları kazalara karşı korumaları gerekmektedir(4). Bu çalışmamızda 6 yaş altındaki çocuklarda ev kazalarının sıklığını ve kaza çeşidini araştırmayı amaçlamaktayız.

## **ARAŞTIRMA VE BULGULAR**

Araştırma kesitsel ve betimsel bir çalışmadır. Araştırma, Adıyaman ili Kahta ilçesinde 2021 yılında gerçekleştirilmiştir. Araştırmanın evrenini Kahta Devlet Hastanesi polikliniğine

başvuran 0-6 yaş arası çocukları olan ebeveynler oluşturmuştur. Çalışmaya %95 güven düzeyi ve 0,05 hata payı ile 100 anne dahil edilmiştir. Veri toplama aracı olan anket formu kullanılmış ve veriler yüz yüze görüşme yoluyla toplanmıştır. Katılımcılardan onam formu alındı.

Araştırmaya %30'u anne, %69'u baba ve %1'i bakıcı olmak üzere 100 kişi katılmıştır. Annelerin yaş ortalaması  $30 \pm 5$ , babaların yaş ortalaması  $35 \pm 5$  idi. Annelerin %28'i yükseköğretim mezunu, babaların %40'ı lise mezunudur. Annelerin %28'i çalışıyor. Ailelerin %32'sinin 2 çocuğu varken, çocukların %55'i 2-5 yaş arasındadır. Araştırmaya katılan ailelerin %45'i apartmanda yaşamaktadır. Çocukların birincil bakım verenleri %65 anne, %18, akraba ve %12 bakıcıdır. Ev kazası geçiren çocukların sıklığı %11'dir. Ev kazası geçirenlerin ortalama kaza sayısı 2'dir. En sık evde (%44) salonda ve annesi olmayan bakıcıların yanında (%60) ev kazası geçirildi. En sık rastlanan kaza türü (%38) ev eşyalarının üzerinden kayarak veya takılarak düşmektedir. Bu kazalar sonucunda 7 çocuk yatarak tedavi gördü ve ortalama 5 gün tedavi gördü.

1 yaş grubunda en sık ev kazası yüksekten düşme, 2-3 ve 4 yaş grubunda en sık ev kazası kayarak veya tökezleyerek düşme, 5 yaşındaki grup tökezleyerek veya kayarak ve bir şeylere çarparak düşüyor. 6 yaş grubunda en sık ev kazası kesici ve delici alet yaralanmaları nedeni ile oluyor. Yüksekten düşme, tökezleme ve düşme, cisimlere çarpma, elektrik çarpması, sıcak su ile yanma vakalarının ortalama görülme yaşı 2 ile 3 yıl arasında değişirken; boğulma, düşme tehlikesi için 4 ile 6 yaş arası daha sık görülmektedir.

## **TARTIŞMA**

İnsan yaşamının ilk altı yılı çocukların oldukça aktif olduğu bir dönem olarak kabul edilir. Bu dönem meydana gelen ev kazaları ve buna bağlı yaralanmalar için önemlidir. Çalışmamızda ev kazası geçiren çocukların sıklığı %11 idi. Türkiye'de yapılan çalışmalarda annelerin bildirdiği ev kazası oranları sırasıyla %15 ile %70 arasında değişmektedir (5,6,7). Çalışmamızda ev kazaları en sık (%44) oturma odasında meydana geldi. Benzer şekilde diğer çalışmalarda da en fazla kaza oturma odası ve mutfakta meydana gelmiştir. Ev kazalarının en çok oturma odası, oturma odası veya mutfakta meydana gelmesinin nedeni, ailelerin zamanlarının çoğunu burada geçirmeleri olabilir. Oturma odası, ebeveynler için bir dinlenme yeri ve aynı zamanda çocuklar için bir oyun ve eğlence alanıdır. Çeşitli aktiviteler için kullanıldığından çocuklar için kaza alanı olmaktadır(8,9).



En sık rastlanan kaza türü (%38) ev eşyalarının üzerinden kayarak veya takılarak düşmektedir. Benzer şekilde başka çalışmalarda da en sık görülen kaza tipinin düşme olduğu saptanmıştır (10,11). Ev kazalarının çocukların yaşlarına göre dağılımı incelendiğinde en sık düşmeler 1 yaş grubunda yüksekte düşme, 2, 3 ve 4 yaş gruplarında takılıp kayarak düşme, düşerek cisimlere çarpma olarak sıralanıyor. 5 - 6 yaş grubunda ise kesici ve delici aletlerle yaralanma idi. Düşme, çarpma, elektrik çarpması ve yanık kazalarının ortalama görülme yaşı 2 ila 3 yaş arasında iken, boğulma tehlikesi, büyük nesnenin düşme ve kesilme yaşları ortalama 4 ila 6 yaş arasındadır.

## **SONUÇ**

Ev kazaları önlenabilir durumlardır. Anneler ve diğer tüm bakıcılar özel gruplardır. Verilebilecek her türlü bilgiye açıktırlar. Çocukları her türlü riskten korumak ve sağlıklarını iyileştirmek için önlemleri öğrenmek ve uygulamak konusunda savunmasız gruplardır. Bu, önlenabilir sağlık sorunları olan ev kazaları hakkında farkındalık yaratmak için bir fırsattır. Annelerin düşme başta olmak üzere tüm ev kazaları konusunda sağlık, eğitim kurumları ve iletişim kanalları aracılığıyla bilgilendirilmesi öncelikli sağlık hedefleri arasında yer almalıdır.

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## **GİNGKO BİLOBA L. EKSTRAKTI ÜZERİNE KARŞILAŞTIRMALI ANTİOKSİDAN AKTİVİTE ÇALIŞMALARI**

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### **ÖZET**

*Ginkgo Biloba L.* terapötik etkinliğe sahip birçok biyoaktif bileşen içeren ve en yaygın kullanılan doğal tıbbi bitkilerden biridir. *G. biloba* yaprak ekstresi, serebrovasküler ve periferik vasküler yetmezliğin yanı sıra demans ve Alzheimer hastalıklarında da kullanılmaktadır. Standardize *G. biloba* ekstresi üzerine yapılan çok sayıda araştırmada ekstresi içeriğinin yaklaşık %24 flavonol glikozit (%22-%27) ve %6 terpen lakton (%2.6-% 3.2 biolabid, %2.8-%3.4 Ginkgolid A, Ginkgolid B, Ginkgolid C, Ginkgolid J) olduğu yönündedir. Özellikle fenolik asitler, flavonoidler ve polifenollerin, insan metabolizmasında oluşan serbest radikalleri temizleyerek, ateroskleroz, diyabet ve kardiyovasküler hastalıklar gibi birçok hastalığa yol açan oksidatif hasarı azalttığı bilinmektedir. *G. biloba* ekstresi ve *G. biloba* ekstresi içeren farmasötiklerde fenolik bileşik kompozisyonunu belirlemeye yönelik farklı çalışmalar olmakla birlikte *G. biloba* ekstresinin antioksidan aktivitesinin belirlenmesine yönelik yapılan çalışma sayısı tatmin edici değildir. Bu nedenle çalışmada *G. biloba* ekstresinin antioksidan aktivitesi DPPH (2,2-Difenil -1-pikrilhidrazil) ve CUPRAC (bakır iyonu indirgeme) antioksidan kapasitesi yöntemleri kullanılarak belirlendi. Yapılan antioksidan testleri sonucunda *G. biloba* ekstresinin antioksidan kapasite sonuçları DPPH yöntemi için IC<sub>50</sub> 0.33 µg/mL, CUPRAC yöntemi için 0.53 mmol Trolox/g örnek olarak belirlendi.

**Anahtar kelimeler:** *Ginkgo Biloba L.*, antioksidan, DPPH, CUPRAC

**COMPARATIVE ANTIOXIDANT ACTIVITY STUDIES ON *GINKGO BILOBA L.*  
EXTRACT****ABSTRACT**

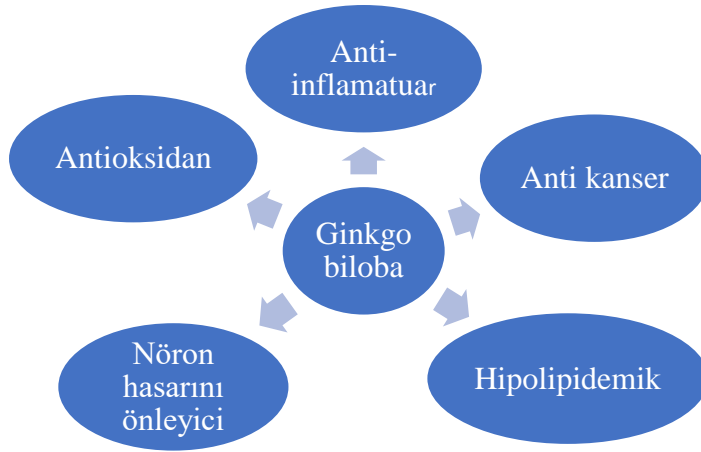
*Ginkgo Biloba L.* is one of the most widely used natural medicinal plants, containing many bioactive components with therapeutic efficacy. *G. biloba* leaf extract is used in cerebrovascular and peripheral vascular insufficiency and dementia and Alzheimer's disease. In many studies on standardized *G. Biloba* extract, approximately 24% flavonol glycoside (22%-27%) and 6% terpene lactone (2.6%-3.2% bilobalide, 2.8%-3.4% Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide J). Especially phenolic acids, flavonoids, and polyphenols are known to reduce oxidative damage that causes many diseases, such as atherosclerosis, diabetes, and cardiovascular diseases, by scavenging free radicals formed in human metabolism. Although there are different studies to determine the phenolic compound composition in pharmaceuticals containing *G. biloba* extract and *G. biloba extract*, the number of studies to determine the antioxidant activity of *G. biloba* extract is not satisfactory. Therefore, in this study, the antioxidant activity of *G. biloba* extract was determined using DPPH (2,2-Diphenyl-1-picrylhydrazyl) and CUPRAC (cupric reducing antioxidant capacity) methods. As a result of the antioxidant tests, the antioxidant capacity results of *G. biloba* extract were determined as IC<sub>50</sub> 0.33 µg/mL for the DPPH method and 0.53 mmol Trolox/g sample for the CUPRAC method.

**Keywords:** *Ginkgo Biloba L.*, antioxidant, DPPH, CUPRAC

## 1. GİRİŞ

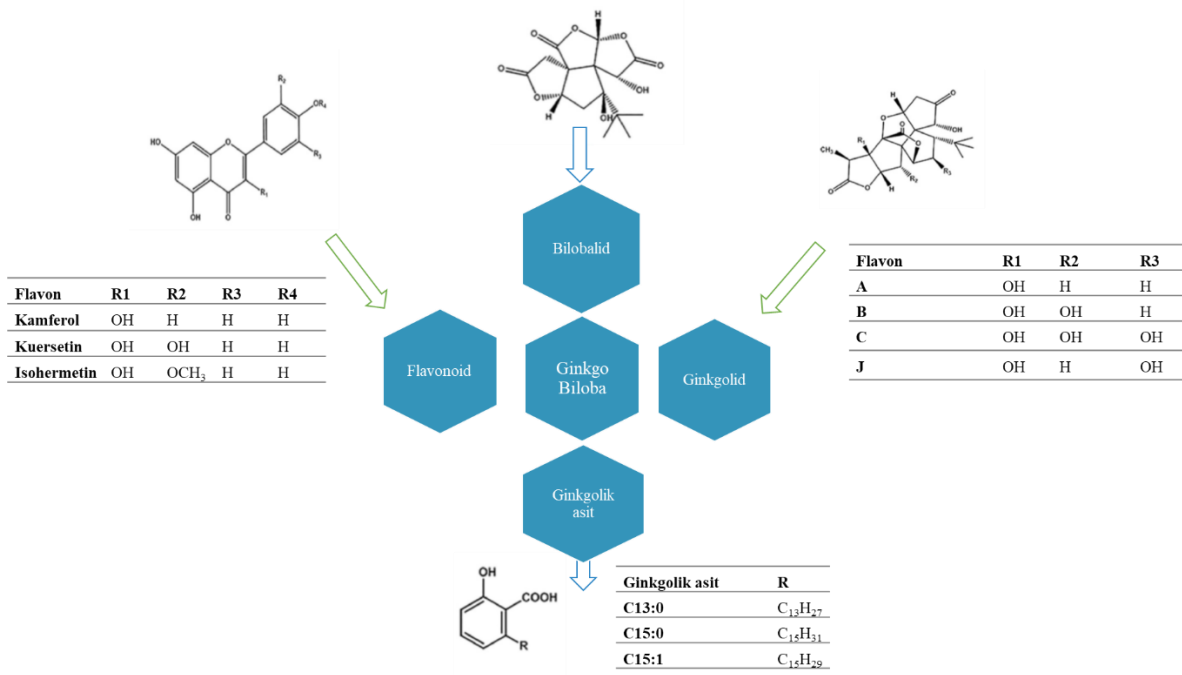
Ginkgoaceae familyasının üyesi olan *Ginkgo biloba* L. çok yaygın kullanılan doğal tıbbi bitkilerden biridir. Bu bitkinin tıbbi kullanımına dair ilk kayıtlar 16. Yüzyıla kadar uzanmaktadır. Günümüzde de standardize *G. biloba* ekstraktını içeren farmasötikler başta kulak çınlaması [1], kognitif bozukluk ve Alzheimer [2], retinal [3], kardiyovasküler [4], iskemi serebrovasküler [5], periferik vasküler [6] ve diyabetik nefropati [7] tedavisinde kullanılmaktadır.

Farmakolojik çalışmalar, *G. biloba*'nın anti-inflamatuar, antioksidan, anti kanser, nöron hasarını önleyici ve hipolipidemik [8] etkilere sahip olduğunu göstermektedir (Şekil 1).



**Şekil 1.** *G. biloba*'nın farmakolojik etkileri.

*G. biloba*'nın sahip olduğu önemli farmakolojik etkilerin nedeni, yapısında var olan biyoaktif bileşenlerdir. Standardize *G. biloba* ekstraktı esas olarak flavonoidler (serbest flavonoidler ve flavonoid glikozitler), terpen laktonlar (bilobalide, Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide J vb.) ve fenolik asitlerden oluşur. Bunlardan flavonoidler ve terpen laktonlar genellikle başlıca biyoaktif bileşenler olarak kabul edilir [9].



**Şekil 2.** *G. biloba* 'nın başlıca biyoaktif bileşenleri.

Tüm dünyada olduğu gibi ülkemizde de Sağlık Bakanlığı onaylı *G. biloba* ekstraktı içeren tablet, kapsül solüsyon vb. değişik formda farmasötik ürünlere rastlamak mümkün.

Bunun yanında *G. biloba* standardize ekstraktı dünyada en yaygın şekilde kullanılan bitkisel ürünlerden ve/veya besin takviyelerinden biridir [10-13].

Günümüzde insanlar, iş yoğunlukları ve hızlı hayat tempolarına yardımcı olmak üzere besin takviyelerini tercih edebilmektedirler. Bu ürünlerin tercih nedenleri arasında, doğal oldukları için zararsız olduklarının düşünülmesi, hekim tarafından reçete edilmeden farklı yollarla kolay ulaşılabılır olması gösterilmektedir [14].

Ayrıca *G. biloba* içerdiği yüksek flavonoid içeriği ile de tercih edilmektedir. Gerçekleştirilen çalışmalar, flavonoid alımının kardiyovasküler hastalıklar ve farklı kanser türleri üzerine olumlu etkilerinin olduğunu göstermektedir [15,16].

Ne yazık ki flavonoidler insan vücudunda biyolojik olarak sentezlenemezler bu nedenle dışarıdan alınmalıdır. Ancak kişi başına toplam flavonoid tüketimi yetersiz ve/veya dengesiz beslenme nedeniyle dünya genelinde önemli farklılıklar göstermektedir. Bu nedenle besin takviyelerinin kullanımı son yıllarda giderek artmaktadır [17]. Market, internet vs. gibi çok farklı kanallarla ulaşılır olan bu ürünlerin güvenliği, kalitesi ve etkinliği sağlık yetkilileri ve sağlık profesyonelleri için büyük endişe kaynağı haline gelmiştir. Çünkü bu ürünlerin toplam

fenol, flavonoid ve antioksidan kapasite değerlerine ulaşmak her zaman mümkün olmamaktadır.

Diyet takviyesi endüstrisinde doğal ürünlere olan talep, dünyanın çeşitli yerlerinde büyük ilgi uyandırmaya devam etmektedir Öyle ki bu amaç için dünyada da büyük ölçekli *G. biloba* ekimi yapılmaktadır. S. Gafner tarafından rapor edilen 2018 yılındaki çalışmaya göre [18], *G. biloba* yaprak ekstraktının, 2013'te 118 milyon ABD doları olan Pazar payı, 2016'da 162 milyon ABD dolarına yükselmiştir. Canadian Phytopharmaceutical Corp verilerine göre, 2015 yılında Çinli üreticiler, *G. biloba* ekstraktının maliyetinin kilogram başına 150 ABD Doları ile 240 ABD Doları arasında olduğunu bildirmişlerdir. Bu nedenle *G. biloba* ürünleri ile çalışırken flavonal glkozit içeriğini arttırmak için, düşük maliyetli başka kaynaklar ile tağşiş edilip edilmediğinin kontrolü son derece önemlidir. Kalite güvencesi ve kalite kontrol standartları gereği, bitmiş ürünün imalatında uygun bitki bölümlerinin ve doğru botanik taksonun kullanılması hem ürünü kullanan tüketiciler hem de üretimi endüstrisi için son derece önemlidir.

Standardize EGb 761 ekstraktı kullanan ürünlerin etiketlerinde söz konusu değerler belirtilmelidir. Ancak dünya pazarında *G. biloba* ekstraktı içeren ürünlere ilişkin gerçekleştirilen araştırmalarda büyük ölçüde değişen konsantrasyonlarda miktarlar tespit edildiği farklı çalışmalarda rapor edilmektedir [19-21]. Bu durum etken maddenin daha ucuz ve kolay bulunabilir daha ucuz botanik malzemelerle karıştırılabileceğini ortaya koymaktadır. Tüm farmasötik ürünlerde olduğu gibi, bitkisel kaynaklı besin takviyelerinin de kalite kontrolü kritik öneme sahiptir. Ne yazık ki ekonomik bazı kaygılar nedeniyle söz konusu ürünlere hala tağşişe rastlanılmaktadır. Bu durum ürün güvenilirliği için büyük tehlike kaynağıdır [22,23].

Bu bilgiler ışığında çalışmada *G. biloba* ekstraktının antioksidan aktivitesi DPPH ve CUPRAC yöntemleri kullanılarak belirlendi. Çalışmanın ilerleyen bölümlerinde *G. biloba* ekstraktı içeren besin takviyeleri de çalışmaya dahil edilerek daha fazla sayıda örneğin antioksidan kapasitesi ve kimyasal kompozisyonu belirlenecektir. Böylelikle *G. biloba* ekstraktı içeren besin takviyelerinde herhangi bir tağşiş olup olmadığı araştırılacaktır.

## **2. MATERYAL ve METOD**

### **2.1. Kullanılan Kimyasallar**

*G. biloba* ekstrakt standardı, troloks (6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid), butil hidroksi tolüen-BHT (2,6-Di-tert-butyl-4-methylphenol), neokuproin (2,9-dimetil

1,10-fenantrolin), DPPH (2,2-Difenil -1-pikrilhidrazil) ve etanol Sigma Aldrich firmasından temin edildi.

## **2.2. Kullanılan Antioksidan Tayin Yöntemleri**

### **2.2.1. CUPRAC Yöntemi**

*G. biloba* standartının antioksidan aktivitesini ölçmede kullanılan ilk yöntem Bakır (II) iyonu indirgeme esaslı antioksidan kapasite tayin yöntemi olan CUPRAC'dır [24]. Bunun için  $1.0 \times 10^{-2}$  M 1 mL bakır (II) klorür çözeltisi,  $7.5 \times 10^{-3}$  M neokuprin çözeltisi ve 1 M (pH=7) amonyum asetat tamponu sırasıyla test tüplerine eklendi. Tüplere etanol de hazırlanmış *G. biloba* standartı ve trolox eklenerek son hacim 4.1 mL olacak şekilde üzerleri su ile tamamlandı. Tüpler 30 dakika oda sıcaklığında karanlıkta bekletildi ve 450 nm'de absorbansları ölçüldü. Çalışma üç paralel olacak şekilde gerçekleştirildi. Pozitif standart olarak troloks kullanıldı ve sonuçlar troloks ekivalanı olarak (mg TE/g ekstraktı) ifade edildi.

### **2.2.2. DPPH• radikali giderim aktivitesi tayini**

*G. biloba* standartının antioksidan aktivitesini ölçmede kullanılan ikinci yöntem olarak DPPH kullanıldı. Bu amaçla *G. biloba* standartı etanolde çözülerek 1 mg/mL konsantrasyonlarda stok çözeltiler hazırlandı. Etanol de hazırlanan 100 µl 0.2 mM DPPH radikal çözeltisi üzerine farklı konsantrasyonlarda (0- 1000 µg/ml) hazırlanan her bir *G. biloba* standartından 100 µL eklendi. Örneklerin absorbansı, 517 nm'de ölçüldü [25]. Her bir örneğin radikal süpürme aktivite yüzdeleri aşağıdaki eşitlik kullanılarak hesaplandı.

$$\% \text{ DPPH radikal giderme aktivitesi} = \{(A_0 - A_1)/A_0\} \times 100$$

$A_0$ : kontrol absorbansı;  $A_1$ : örnek absorbansı

Bütün testler üç kez tekrarlandı ve ortalama değerler hesaplandı. Daha sonra konsantrasyona karşı yüzde inhibisyon grafiği çizilerek  $IC_{50}$  değeri hesaplandı. Pozitif kontrol olarak BHT kullanıldı.

## **3.BULGULAR**

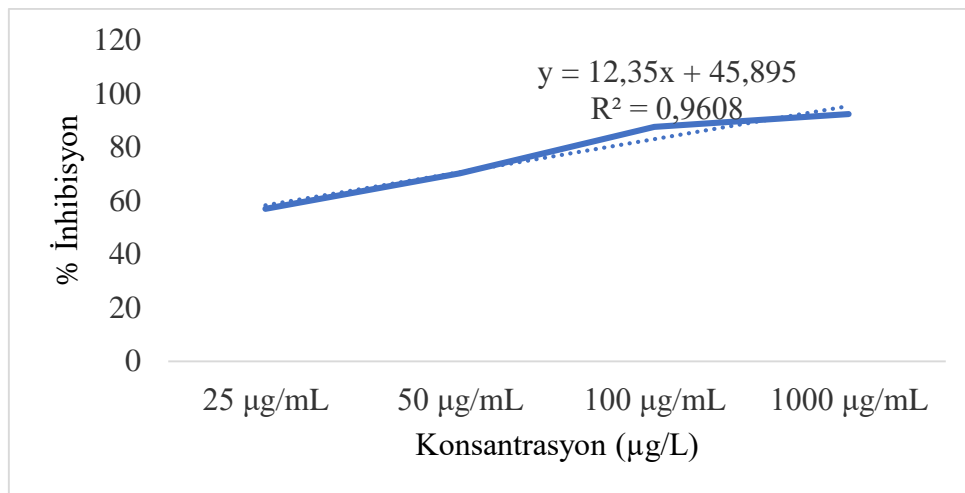
### **3.1. CUPRAC Yöntemi ile Elde Edilen Sonuçlar**

Antioksidan aktivite tayininde kullandığımız ilk yöntem, Apak ve arkadaşlarının geliştirdikleri CUPRAC yöntemi olup temel prensip antioksidanlar varlığında Cu (II) 'nin Cu (I)'e indirgemesidir. *G. biloba* standartının CUPRAC ile antioksidan aktivite tayin sonucu  $0.53 \text{ mmol} \pm 0.02$  Trolox/g örnek olarak belirlendi. Elde edilen bu değer *G. biloba* standartının standart olarak kullanılan antioksidanlar kadar etkili olduğu sonucunu gösterdi.



### 3.2. DPPH• Yöntemi ile Elde Edilen Sonuçlar

DPPH• radikali giderim aktivitesi tayininde temel prensip, DPPH• radikalinin, antioksidanların varlığında redoks tepkimesine göre süpürülmesidir. DPPH• radikal çözeltisine özgül olan koyu menekşe rengi antioksidanların varlığında zamanla açılır. Absorbans şiddetindeki azalma ise spektrofotometrik olarak ölçülür. *G. biloba* standartının DPPH• radikali süpürme aktivitesi incelediğinde, *G. biloba* standartının %92.4 gibi yüksek bir % inhibisyon değerine sahip olduğu belirlendi. Farklı konsantrasyonlarda bulunan % inhibisyon grafiği Şekil 3’de verildiği gibidir.



Şekil 3. % İnhibisyon grafiği

Serbest radikalleri %50 oranında gidermek için gerekli olan örnek konsantrasyonunu ifade eden IC<sub>50</sub> değeri hesaplanırken, örnek konsantrasyonuna karşılık gelen % inhibisyon grafiğinden elde edilen denklem kullanıldı. Elde edilen sonuçlar, *G. biloba* standartının IC<sub>50</sub> değerinin 0.33 ± 0.03 µg/mL olduğunu gösterdi. IC<sub>50</sub> değeri ne kadar düşükse o bileşiğin DPPH• radikalini giderme aktiviteside o kadar yüksektir. Bu nedenle *G. biloba* standartının yüksek antioksidan aktiviteye sahip olduğu görülmektedir.

### 4. SONUÇ ve DEĞERLENDİRME

*G. biloba* standardının antioksidan aktivitesi, CUPRAC ve DPPH yöntemleriyle belirlenmiş olup, sonuçlar Trolox ve BHT standart antioksidan maddelerle karşılaştırılarak değerlendirildi. Yapılan antioksidan testleri sonucunda DPPH için IC<sub>50</sub> 0,33 µg/mL, CUPRAC için ise 0,53 mmol Trolox/g ekstarkt olarak belirlendi. Elde edilen bu değerler *G. biloba* standardının yüksek antioksidan özellikte olduğunu kanıtladı. Elde edilen bu bulgular, planlanan çalışmanın öncü

verileri olup, çalışmanın detaylandırılması planlanmaktadır. Bu amaç için içeriğinde *G. biloba* ekstraktı olduğu belirtilen özellikle aktar ve web siteleri aracılığı ile temin edilen çok sayıda besin takviyeleri de çalışmaya dahil edilecektir. Söz konusu bu ürünlerin farklı ekstraksiyon yöntemleri ile elde edilen ekstraktlarının antioksidan kapasiteleri, toplam fenolik ve flavonoid içeriği tespit edilecektir. Bunun yanında kimyasal kompozisyonları farklı kromatografik yöntemlerle belirlenecektir. Böylelikle içeriğinde *G. biloba* ekstraktı olan besin takviyelerinin içeriği karşılaştırılacaktır.

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**FARKLI YETİŞKİN POPULASYONLARDA 3 METRE GERİ YÜRÜME TESTİNİN  
PSİKOMETRİK ÖZELLİKLERİ: DERLEME**

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**ÖZET**

Denge ve yürüyüş problemlerinin değerlendirilmesi, özellikle düşme riskinin belirlenmesi ve rehabilitasyon programının planlanması açısından gereklidir. Nörolojik ve ortopedik hastalıklarda, yaşlı bireylerde mobilite ve dengenin değerlendirilmesinde kullanılan birçok fonksiyonel test bulunmaktadır. Bilimsel araştırmalarda ve klinik uygulamalarda sıklıkla kullanılan bu testler genellikle öne yürüme, dönme ve adımlama gibi fonksiyonları değerlendirmektedir. Günlük hayatta kapı açmak, ani engellerden kaçınmak gibi durumlarda gerekli olan geri yürüme fonksiyonu öne yürümeden daha zordur. Görsel bilgi olmaksızın, alışılmış yürüme paterninden farklı bir fonksiyon gerektirdiğinden daha fazla kognitif yüklenme ve nöromuskuler kontrol gerektirmektedir. 3 metre geri yürüme testi nöromuskuler kontrol, propriosepsiyon, düşme riski ve dengeyi değerlendirmek için geliştirilmiş bir testtir. Fonksiyonel testlerin klinik uygulamada ve bilimsel araştırmalarda kullanılabilmesi için psikometrik özelliklerinin uygun olması gerekir. Bu derlemenin amacı farklı yetişkin populasyonlarda 3 metre geri yürüme testinin psikometrik özelliklerinin incelenmesidir. Literatür araştırmasında 3 metre geri yürüme testinin geçerlik ve güvenilirliğini araştıran çalışmalar incelendi. Genel tarama modeline göre ve ilgili literatürün sistematik derlenmesi ile gerçekleştirilen çalışma bulguları, “3 meter backward walk test” anahtar kelimeleri ile MEDLINE ve Google Scholar veri tabanlarında Ekim 2022 tarihine kadar yayınlanmış eserlerin taratılması ile ortaya konmuştur. Kriterlere uygun 7 çalışma değerlendirmeye alınmıştır. Bu çalışmalarda 3 metre geri yürüme testinin inme geçirmiş bireyler, yaşlı yetişkinler, demanslı bireyler, multiple sklerozlu bireylerde geçerlik ve güvenilirliği araştırılmıştır. Eş zamanlı geçerlik beş çalışmada incelenmiş, orta- yüksek korelasyon değerleri bulunmuştur. Test-tekrar test tutarlılığı yedi çalışmada incelenmiş ve yüksek olarak bulunmuştur (Sınıf içi korelasyon katsayısı=0,85-0,99). Değerlendiriciler arası tutarlılığı ise dört çalışmada incelenmiş ve yüksek bulunmuştur (ICC=0,83-0,99). 3 metre geri yürüme testinin multiple skleroz, inme, demans gibi nörolojik hastalıklarda ve yaşlı bireylerde geri yürüme hızını, mobilite ve denge performansını değerlendirmede kullanılabilecek geçerli ve güvenilir bir test olduğu belirlenmiştir.

**Anahtar Kelimeler:** Geri Yürüme, Geçerlilik, Güvenilirlik

**PSYCHOMETRIC PROPERTIES OF THE 3-METER BACKWARD WALK TEST IN  
DIFFERENT ADULT POPULATIONS: REVIEW****ABSTRACT**

Evaluation of balance and gait problems is necessary especially in terms of determining the risk of falling and planning the rehabilitation program. There are many functional tests used in the evaluation of mobility and balance in elderly individuals in neurological and orthopedic diseases. These tests, which are frequently used in scientific research and clinical applications, generally evaluate functions such as walking forward, turning and stepping. The backward walking function, which is required in situations such as opening a door and avoiding sudden obstacles in daily life, is more difficult than walking forward. Without visual information, it requires more cognitive load and neuromuscular control as it requires a different function from the usual walking pattern. The 3 meter backward walk test is a test developed to assess neuromuscular control, proprioception, fall risk and balance. In order to functional tests to be used in clinical practice and scientific research, their psychometric properties must be appropriate. The purpose of this review is to examine the psychometric properties of the 3 meter backward walk test in different adult populations. In the literature review, studies investigating the validity and reliability of the 3 meter backward walk test were examined. The study findings, which were carried out according to the general scanning model and by systematically compiling the relevant literature, were revealed by scanning the works published until October 2022 in MEDLINE and Google Scholar databases with the keywords "3 meter backward walk test". 7 studies that met the criteria were evaluated. In these studies, the validity and reliability of the 3 meter backward walk test were investigated in individuals with stroke, older adults, individuals with dementia, and individuals with multiple sclerosis. Concurrent validity was examined in five studies, and moderate-high correlation values were found. Test-retest consistency was examined in seven studies and found to be high.(Intraclass correlation coefficient=0.85-0.99) Inter-rater consistency was examined in four studies and found to be high (ICC=0.83-0.99). It has been determined that the 3 meter backward walk test is a valid and reliable test that can be used in neurological diseases such as multiple sclerosis, stroke, dementia, and in evaluating backward walking speed, mobility and balance performance in elderly individuals.

**Keywords:** Backward Walk, Validity, Reliability

## **GİRİŞ**

Denge; doğru postürü sağlama, bu postürün vücudun statik ve dinamik değişikliklerine uyum sağlayabilme ve planlı bir şekilde hareketi devam ettirebilme yeteneğidir. Denge statik ve dinamik olmak üzere ikiye ayrılır. Yürüyüş günlük yaşamda en fazla yaptığımız aktivitelerdendir ve dinamik dengenin kontrollü bir şekilde devamlılığını gerektirir. Fizyoterapide birçok hastada denge problemleri görülür ve bu problemler yürüyüşü de etkilemektedir. Literatüre bakıldığında ise birçok hastalıkta denge ve yürüyüş beraber değerlendirilmiştir (1, 2). Denge ve yürüyüş problemlerinin değerlendirilmesi, özellikle düşme riskinin belirlenmesi ve rehabilitasyon programının planlanması açısından gereklidir. Nörolojik ve ortopedik hastalıklarda, yaşlı bireylerde mobilite ve dengenin değerlendirilmesinde kullanılan birçok fonksiyonel test bulunmaktadır (3). Bilimsel araştırmalarda ve klinik uygulamalarda sıklıkla kullanılan bu testler genellikle öne yürüme, dönme ve adımlama gibi fonksiyonları değerlendirmektedir.

Günlük hayatta kapı açmak, ani engellerden kaçınmak gibi durumlarda gerekli olan geri yürüme fonksiyonu öne yürümeden daha zordur. Görsel bilgi olmaksızın, alışılmış yürüme paterninden farklı bir fonksiyon gerektirdiğinden daha fazla kognitif yüklenme ve nöromuskuler kontrol gerektirmektedir. Yapılan bir araştırma gösteriyor ki inme sonrası yürüyüşü ve dengeyi iyileştirmek için yararlı bir yöntem olarak bulunmuş, geleneksel tedaviye de uygulanabilen erişilebilir ve etkili bir rehabilitasyon eğitimi yöntemi olduğu belirtilmiştir (4). Geri yürümenin denge üzerine etkisinin araştırıldığı bir makalede geri yürüme eğitiminin, düşme riski yüksek olanlar arasında denge performansını artırmak için potansiyel yararlı bir araç olarak hizmet edebileceği gösterilmiştir (5).

3 Metre Geri Yürüme Testi (3MGYT) nöromuskuler kontrol, propriosepsiyon, düşme riski ve dengeyi değerlendirmek için geliştirilmiş bir testtir. İlk olarak Carter ve arkadaşları tarafından 2019 yılında geliştirilmiş, düşme riskini belirlemede kullanılacak tanısal doğruluğu yüksek bir test olduğu belirtilmiştir (6). Bu testte 3 metrelik işaretlenmiş düz bir zeminde katılımcıların arkasına bakmadan mesafeyi yürümeleri istenir. Test katılımcıya iyice anlatılır ve anladığından emin olunur. Katılımcıdan 3 metrelik mesafeyi geriye doğru en hızlı şekilde yürütmesi ve mesafe bitince durması istenir. Bu mesafeyi kaç saniyede yürüdüğü kronometre ile ölçülerek kaydedilir. Test üç kez tekrarlanır ve üç denemenin ortalaması alınarak kayıt edilir (6).

Fonksiyonel testlerin klinik uygulamada ve bilimsel araştırmalarda kullanılabilmesi için psikometrik özelliklerinin uygun olması gerekir. Farklı popülasyonlarda uygulanabilirliğinin

belirlenebilmesi için geçerliliği ve güvenilirliğinin yapılması gerekmektedir. 3MGYT'nin inme, multiple skleroz gibi çeşitli hastalıklarda geçerliliği ve güvenilirliği araştırılmıştır (7, 8). Ancak, 3MGYT'yi kullanmak isteyen klinisyenlere genel bir bakış sağlamak için yapılmış daha önce yapılmış bir derleme çalışmasına rastlanmamıştır. Bu derlemenin amacı 3MGYT'nin psikometrik özelliklerinin kanıtlandığı farklı yetişkin grupları tespit etmek, geçerlik ve güvenilirlikle ilgili sonuçları derlemektir.

## **METOD**

3 Metre Geri Yürüme Testinin yetişkin popülasyonunda geçerliliği ve güvenilirliği ile ilgili literatür taraması gerçekleştirildi. Genel tarama modeline göre ve ilgili literatürün sistematik derlenmesi ile gerçekleştirilen çalışma bulguları, “3 meter backward walk test” anahtar kelimeleri ile MEDLINE ve Google Scholar veri tabanlarında Ekim 2022 tarihine kadar yayınlanmış eserlerin taratılması ile ortaya koyuldu. Elde edilen çalışmalardan araştırma konusu ve amacına uygun olmayanlar ve tam metnine ulaşılamayan çalışmalar elendi. İki veri tabanındaki ortak makaleler belirlendi. Kriterlere uygun 7 çalışma değerlendirmeye alınmıştır.

### **Dahil Etme Kriterleri**

- Araştırma amacına ve konusuna uygun olması,
- Araştırmanın yetişkin popülasyonda yapılmış olması,
- 3 MGYT'nin geçerliliği ve güvenilirliğini araştırmış olması derlemeye dahil edilme kriterleridir.

### **Dışlanma Kriterleri:**

- Araştırmanın 18 yaş altı bireylerde gerçekleştirilmiş olması,
- Çalışmanın tam metnine ulaşılamaması,
- 3 MGYT'nin sonuç ölçümü olarak kullanılması ancak psikometrik özelliklerinin analiz edilmemesi dışlanma kriterleridir.

Çalışmaların istatistiksel sonuçlarını yorumlamak için tanınmış kılavuz puanlar kullanıldı. Pearson korelasyon katsayıları (r) için 0,1 ila 0,3 arasındaki puanlar zayıf, 0,4 ila 0,6 orta ve 0,7 ila 0,9 güçlü olarak kabul edildi (9). Sınıf İçi Korelasyon Katsayıları (ICC'ler) için 0,4'ten düşük puanlar zayıf, 0,4 ila 0,59 orta, 0,6 ila 0,74 iyi ve 0,75 ila 1,00 mükemmel olarak kabul edildi (10).



## **SONUÇLAR VE BULGULAR**

### **3 METRE GERİ YÜRÜME TESTİNİN (3MGYT) GEÇERLİLİĞİ**

#### **Eşzamanlı Geçerlilik**

İncelenen 7 çalışmanın hepsinde eşzamanlı geçerliliğe bakılmıştır.

İnmeli hastalarda yapılan araştırmada 3MGYT ile Berg Denge Ölçeği ( $r=-0,691$ ,  $p=0,001$ ) ve Zamanlı Kalk ve Yürü Testi ( $r=0,849$ ,  $p=0,001$ ) arasında güçlü bir korelasyon saptanmıştır (7). Hafif etkilenimli multiple skleroz hastalarında yapılan çalışmada 3MGYT ile Zamanlı Kalk ve Yürü Testi ( $r=0,968$ ,  $p=0,001$ ), Fonksiyonel Uzanma Testi ( $r=0,931$ ,  $p=0,001$ ), Zamanlı 25 Adım Yürüme Testi ( $r=0,879$ ,  $p=0,001$ ), Dinamik Yürüme İndeksi ( $r=-0,871$ ,  $p=0,001$ ), düşme hikayesi ( $r=0,932$ ,  $p=0,001$ ) arasında güçlü ilişki bulunmuştur (11). Multiple sklerozlu hastalarda yapılan başka bir çalışmada 3MGYT ve Zamanlı Kalk ve Yürü Testi ( $r = 0,374$ ,  $p=0,018$ ), 2 Dakika Yürüme Testi ( $r=0,319$ ,  $p=0,045$ ), 12 Madde Multiple Skleroz Yürüme Skalası ( $r=0,423$ ,  $p=0,007$ ) arasında anlamlı ilişki bulunmuştur (12). Yine Multiple sklerozlu ayaktan başvuran hastalarda yapılan başka çalışmada 3MGYT ile Zamanlı Kalk ve Yürü Testi ( $r = 0,814$ ;  $p<0,001$ ), Berg Denge ölçeği ( $r=-0,732$ ,  $p<0,001$ ), Dört Kare Adım Testi ( $r=0,644$ ,  $p<0,001$ ), Uluslararası Düşme Etkinlik Ölçeği ( $r=0,692$ ,  $p<0,001$ ), EDSS (Expanded Disability Status Scale) ( $r=0,692$ ,  $p<0,001$ ) arasında güçlü ilişki bulunmuştur (8). Toplumda yaşayan yaşlı yetişkinlerde yapılan çalışmada 3MGYT ile Zamanlı Kalk ve Yürü Testi ( $r= 0,649$ ,  $p<0,001$ ) arasında anlamlı ilişki olduğu belirtilmiştir (13). Demanslı yaşlı bireylerde yapılan çalışmada 3MGYT ile Zamanlı Kalk ve Yürü Testi ( $r= -0,82$ ,  $p<0,001$ ), 10 Metre Yürüme Testi ( $r=0,84$ ,  $p<0,001$ ), Berg Denge Ölçeği ( $r=0,60$ ,  $p<0,001$ ) arasında anlamlı ilişki bulunmuştur (14). Subakut ve kronik inmeli bireylerde 3MGYT ile GAITRite® yürüyüş analizi sistemi ile yapılan test arasında subakut inmeli bireylerde ( $ICC=0,96$ ) ve kronik inmeli bireylerde ( $ICC=0,97$ ) arasında anlamlı ilişki bulunmuştur (15).

Bu sonuçlar inmeli, multiple sklerozlu, hafif etkilenimli multiple sklerozlu, ayaktan multiple sklerozlu, demanslı bireylerde ve toplumda yaşayan yaşlı yetişkinlerde 3MGYT'nin eşzamanlı geçerliğinin yüksek olduğunu göstermektedir.

### **3 METRE GERİ YÜRÜME TESTİNİN (3MGYT) GÜVENİRLİĞİ**

#### **Değerlendiriciler Arası Güvenirlilik**

4 çalışma İnter-rater (değerlendiriciler arası) güvenilirliği ölçmüştür. Multiple sklerozlu hastalarda ICC değeri 0,932-0,935 arasında bulundu (12). Demanslı hastalarda  $ICC=0,97$

olarak bulunmuştur (14). Subakut inmeli bireylerde ICC=0,99 olarak, kronik inmeli bireylerde 0,99 olarak bulunmuştur (15). Ayaktan inmeli hastalarda ICC değeri 0,987 ve 0,989 olarak bulunmuştur (8).

#### **Test- Tekrar Test Güvenirlik**

7 çalışmada güvenilirliği değerlendirilmiştir. Test tekrar test değerlendirmesi için 3 gün, 7-10 gün aralıklar kullanılmıştır (8, 11). İnmeli hastalarda ICC=0,985 bulunmuştur (7). Hafif etkilenimli multiple sklerozlu hastalarda ICC=0,998 olarak bulunmuştur (11). Multiple sklerozlu hastalarda ICC değeri 0,944-0,945 arası bulunmuştur (12). Demanslı hastalarda ICC=0,96 olarak bulunmuştur (14). Toplumda yaşayan yaşlı bireylerde ICC=0,94 olarak bulunmuştur (13). Subakut inmeli bireylerde ICC=0,96 olarak, kronik inmeli bireylerde 0,94 olarak bulunmuştur (15). Ayaktan inmeli hastalarda ICC değeri 0,854 ve 0,889 olarak bulunmuştur (8).

#### **İç Tutarlılık**

Yalnızca iki çalışmada Cronbach's Alfa değeri incelenmiştir. İnmeli hastalarda Cronbach's alfa katsayısı 0,974 bulunmuştur (7). Hafif etkilenimli multiple sklerozlu hastalarda Cronbach's alfa katsayısı 0,998 olarak bulunmuştur (11).

#### **Standart Ölçüm Hatası**

Çalışmada standart ölçüm hatası (Standart Error of Measurement, SEM) analiz edilmiştir. İnmeli bireylerde 1,11 sn olarak bulunmuştur (7). Hafif etkilenimli multiple skleroz hastalarında 0,18 sn olarak bulunmuştur (11). Multiple sklerozlu bireylerde 0,4-0,476 sn arasında bulunmuştur (12). Demanslı yaşlı bireylerde 0,04 sn olarak bulunmuştur (14). Toplum içinde yaşayan yaşlı bireylerde 0,55 sn olarak bulunmuştur (13). Subakut inmeli bireylerde 0,025 m/sn olarak, kronik inmeli bireylerde 0,039 m/sn olarak bulunmuştur (15).

#### **Minimal Belirlenebilir Değişiklik**

Çalışmada minimal belirlenebilir değişiklik (Minimal detectable Change, MDC) analiz edilmiştir. İnmeli bireylerde 1,57 sn olarak bulunmuştur (7). Hafif etkilenimli multiple skleroz hastalarında 0,5 sn olarak bulunmuştur (11). Multiple sklerozlu bireylerde 1,1-1,3 sn arasında bulunmuştur (12). Demanslı yaşlı bireylerde 0,1 sn olarak bulunmuştur (14). Toplum içinde yaşayan yaşlı bireylerde 1,52 sn olarak bulunmuştur (13). Subakut inmeli bireylerde 0,07 m/sn olarak, kronik inmeli bireylerde 0,11 m/sn olarak bulunmuştur (15). Ayaktan başvuran inmeli hastalarda 1,69 sn olarak tespit edilmiştir (8).

## **TARTIŞMA**

Sonuçlar 3 Metre Geri Yürüme Testinin farklı yetişkin popülasyonlarda güçlü bir eşzamanlı geçerliğe sahip olduğunu göstermektedir. Güvenirlikle ilgili sonuçlar incelendiğinde ise iç tutarlılığının, test-tekrar test güvenilirliğinin, değerlendiriciler arası güvenilirliğinin yüksek olduğunu göstermektedir. Araştırmalardaki popülasyonlarda sonuçlar geçerlik ve güvenilirliği destekleyici nitelikte değerlere sahiptir. Test nispeten ucuz, uygulaması hızlı ve kolaydır.

2019 yılından beri 3MGYT'nin psikometrik özelliklerinin incelendiği popülasyonların genellikle düşme riski yüksek olan nörolojik hastalığa sahip veya geriatric bireyler olduğu görülmektedir. Psikometrik özelliklerinin geçerli ve güvenilir olduğunu göstermesi zamanla bu popülasyonlarda klinikte kullanımının artacağını da düşündürmektedir. Düşme riskini belirlemede klinikte sıklıkla kullanılan dinamik denge değerlendirme testlerine göre daha üstün çıkması da özellikle düşme riski bulunan grupta kullanılması gereken bir test olduğunu göstermektedir (16).

Eşzamanlı geçerlik inceleyen çalışmalar incelendiğinde en çok Zamanlı Kalk ve Yürü testinin kullanıldığı görülmüştür (7, 8, 11-14). Zamanlı kalk ve yürü testi klinikte çok tercih edilen bir test olsa da düşme riskini belirleme konusunda kısıtlılıkları vardır (17). Son zamanlarda yapılan çalışmalarda düşme riskinin belirlenmesinde sadece tek bir test değil, farklı parametreleri değerlendiren birden fazla test kullanılması gerektiğini belirtilmektedir (18). Düşmeler farklı yönlerde doğru hareketler esnasında görülebileceği için geri yürüme performansının değerlendirilmesi gerektiğinden 3MGYT bu konuda kullanışlı bir testtir.

Bu derlemede 3MGYT'nin psikometrik özelliklerinin en sık multiple skleroz hastalarında incelendiği dikkat çekmektedir (8, 11, 12). Dahil edilen çalışmalardan iki tanesi inmeli bireylerde gerçekleştirilmiştir (7, 15). Bir çalışmada demanslı bireylerde (14), bir çalışmada toplum içinde yaşayan yaşlı bireylerde (13) geçerlik ve güvenilirlik incelenmiştir. Bu çalışmalar özellikle denge problemi yaşayan, düşme riski bulunan bireylere yönelik gerçekleştirilecek müdahale çalışmalarında sonuç ölçümü olarak kullanılabilirliğini göstermektedir.

Sonuçlar 3MGYT'nin farklı popülasyonda geçerli ve güvenilirliği olduğunu göstermektedir. Bu sonuçlar sınırlı sayıda hastalığın değerlendirilmesi sonucu elde edilmiştir. Bu çalışmalar elde edilen sonuçlar diğer hastalıklarda da yapılmasının iyi sonuçlar çıkarabileceğini göstermektedir. Bu nedenle farklı hastalık gruplarında araştırılması literatür açısından da faydalı bilgiler sağlayacaktır.

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**BAZI JEL DOZİMETRELERİN RADYOLOJİK ÖZELLİKLERİNİN İNCELENMESİ**

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**ÖZET**

Radyoterapide dozimetri, tedavinin etkinliğini ve verilen hasta dozunun güvenilirliğini garanti etmek için son derece önemlidir. Uluslararası protokoller tarafından önerilen ana dozimetre malzemesi olarak su belirlenmiştir. Ancak son yıllarda katı su fantomu ile birlikte jel dozimetrelerde dozimetri aracı olarak kullanılmaktadır. Bu çalışmanın amacı, yüksek enerjilerde bazı jel dozimetrelerin radyolojik özelliklerinin direkt metod, XCOM, Auto  $Z_{eff}$  PhyX-PSD, ve XMuDAt programlarıyla belirleyip su ile elde edilen sonuçlarla karşılaştırmaktır. Jel dozimetre malzemesi olarak kullanılan FAX, MAGAT, PAGAT kütle azalım katsayısı bulunarak elde edilen sonuçlar yardımıyla etkin atom numarası ve etkin elektron yoğunlukları hesaplanmıştır. FAX için 6/18 MV foton enerjisinde denklem 4, XCOM, XMuDAt ve PhyX-PSD ile elde edilen kütle azalım katsayıları sırasıyla 0.0276/0.0184  $cm^2/g$ , 0.0276/0.0185  $cm^2/g$ , 0.0275/0.0184  $cm^2/g$ , 0.0260/0.0220  $cm^2/g$ ; MAGAT için 6/18 MV foton enerjisinde denklem 4, XCOM, XMuDAt ve PhyX-PSD ile elde edilen kütle azalım katsayıları sırasıyla 0.0265/0.0185  $cm^2/g$ , 0.0267/0.0180  $cm^2/g$ , 0.0266/0.0180  $cm^2/g$ , 0.0250/0.0210  $cm^2/g$ ; PAGAT için 6/18 MV foton enerjisinde denklem 4, XCOM, XMuDAt ve PhyX-PSD ile elde edilen kütle azalım katsayıları sırasıyla 0.0273/0.0184  $cm^2/g$ , 0.0275/0.0184  $cm^2/g$ , 0.0275/0.0185  $cm^2/g$ , 0.0250/0.0210  $cm^2/g$ ; su için 6/18 MV foton enerjisinde denklem 4, XCOM, XMuDAt ve PhyX-PSD ile elde edilen kütle azalım katsayıları sırasıyla 0.0276/0.0185  $cm^2/g$ , 0.0277/0.0185  $cm^2/g$ , 0.0275/0.0184  $cm^2/g$ , 0.0280/0.0188  $cm^2/g$  olarak bulunmuştur. Elde edilen kütle azalım katsayıları kullanılarak her bir hesaplama yönteminde etkin atom numarası ve etkin elektron yoğunluğu hesaplanmıştır. Yapılan çalışma sonucunda jel dozimetreler ile su sonuçları arasında iyi bir uyum olduğu, 6 MV ve 18 MV foton enerjilerinde kütle azalım katsayısı sonuçları arasındaki farkın %3'ü geçmediği görülmüştür. Bu sonuçlar kullanılan jel dozimetrelerinin suya alternatif olacağı konusunda bilgi vermektedir.

**Anahtar kelimeler:** Jel dozimetre, etkin atom numarası, kütle azalım katsayısı

**INVESTIGATION OF THE RADIOLOGICAL PROPERTIES OF SOME GEL DOSIMETERS****ABSTRACT**

Dosimetry in radiotherapy is extremely important to ensure the efficacy of the treatment and the safety of the dose given to the patient. Water was determined as the main dosimeter material recommended by international protocols. However, in recent years, it has been used as a dosimetry tool in gel dosimeters together with the solid water phantom. The aim of this study is to determine the radiological properties of some gel dosimeters at high energies with the direct method, XCOM, Auto  $Z_{\text{eff}}$ , PhyX-PSD, and XMuDat programs and compare them with the results obtained with water. The effective atomic number and effective electron densities were calculated with the help of the results obtained by finding the mass reduction coefficients of FAX, MAGAT, PAGAT, which were used as gel dosimeter materials. For FAX, the mass attenuation coefficients obtained by the eq. 4, XCOM, XMuDat and PhyX-PSD at 6/18 MV photon energy were 0.0276/0.0184 cm<sup>2</sup>/g, 0.0276/0.0185 cm<sup>2</sup>/g, 0.0275/0.0184 cm<sup>2</sup>/g, 0.0260/0.0220 cm<sup>2</sup>/g; For MAGAT, the mass attenuation coefficients obtained by the eq. 4, XCOM, XMuDat and PhyX-PSD at 6/18 MV photon energy were 0.0265/0.0185 cm<sup>2</sup>/g, 0.0267/0.0180 cm<sup>2</sup>/g, 0.0266/0.0180 cm<sup>2</sup>/g, 0.0250/0.0210 cm<sup>2</sup>/g; For PAGAT, the mass attenuation coefficients obtained by the eq. 4, XCOM, XMuDat and PhyX-PSD at 6/18 MV photon energy were 0.0273/0.0184 cm<sup>2</sup>/g, 0.0275/0.0184 cm<sup>2</sup>/g, 0.0275/0.0185 cm<sup>2</sup>/g, 0.0250/0.0210 cm<sup>2</sup>/g; For Water, the mass attenuation coefficients obtained by the eq. 4, XCOM, XMuDat and PhyX-PSD at 6/18 MV photon energy were 0.0276/0.0185 cm<sup>2</sup>/g, 0.0277/0.0185 cm<sup>2</sup>/g, 0.0275/0.0184 cm<sup>2</sup>/g, 0.0280/0.0188 cm<sup>2</sup>/g, respectively. Effective atomic number and effective electron density were calculated in each calculation method using the obtained mass attenuation coefficients. As a result of the study, it was seen that there was a good agreement between the gel dosimeters and the water results, and the difference between the mass attenuation coefficient results at 6 MV and 18 MV photon energies did not exceed 3%. These results give information that the gel dosimeters used will be an alternative to water.

**Keywords:** Gel dosimeter, effective atomic number, mass attenuation coefficients

## 1. GİRİŞ

Radyoterapide fantomlar kullanılarak yapılan dozimetrik ölçümler kalite kontrol işlemlerinde ve hasta güvenliğinde çok önemlidir. ICRU 44 raporunda, fantomların soğurulan dozun hesaplanmasındaki belirsizliği %1'in altındaysa bu fantomları su eşdeğeri olarak tanımlamaktadır (ICRU, 1989). Radyoterapide yüksek enerjili ışınlar kullanılarak bir materyalin su eşdeğerliliğinin değerlendirilmesi, etkileşim tesir kesiti, enerji ve atomik bileşiminin birbirleriyle bağımlılığının dikkate alınmasını gerektirir (Gargetta ve ark., 2020). İdeal bir katı su fantomu suya eşdeğer radyolojik özellikler (etkin atom numarası, elektron yoğunluğu, kütle sönüm veya lineer azalım katsayısı) sergilemeli ve su ile benzer etkin atom numarasına ( $Z_{eff}$ ), elektron yoğunluğuna ( $n_{eff}$ ) ve kütle yoğunluğuna sahip olmalıdır (Baldock ve ark., 2010). Radyoterapide dozimetri, tedavinin etkinliğini ve verilen hasta dozunun güvenilirliğini garanti etmek için son derece önemlidir. Uluslararası protokoller tarafından önerilen ana dozimetre malzemesi olarak su belirlenmiştir. Ancak son yıllarda katı su fantomu ile birlikte jel dozimetrelerde dozimetri aracı olarak kullanılmaktadır. Absorbe edilen doz ölçümlerinde, kalite güvencesi/kontrolü son derece önemlidir. Hedef hacimde ve komşu dokularda doz dağılımları dikkatle değerlendirilmelidir (Garibaldi ve ark., 2017; Yonai ve ark., 2010). Jel dozimetri, sulu jellerin kimyasal türlerde radyasyonun neden olduğu değişiklikleri uzamsal olarak depoladığı bir kimyasal dozimetri sınıfıdır. Doza bağlı değişiklikler daha sonra çeşitli tekniklerle üç boyutta incelenebilir (Schreiner ve ark., 2010).

Megavoltaj ve kilovoltaj fotonları, megavoltaj elektronları, nötronlar ve protonlar gibi farklı tedavi modaliteleri ve radyasyon nitelikleri dahil olmak üzere çok çeşitli uygulamalar için birkaç jel dozimetri formülasyonu literatürde verilmiştir (Gorjiara ve ark., 2011). Jel dozimetreler, görüntüleme prosedürlerinde, konformal/IMRT terapilerde ve diğer karmaşık uygulamalarda doğrudan doz ölçümlerinde, wedgeli ve wedgesiz profil sonuçlarını elde etmede ve radyasyon dozunu değerlendirmede kullanılmıştır (Cosgrove ve ark., 2000; Baldock ve ark., 2010; Ibbott, 2006).

Bu çalışmanın amacı, yüksek enerjilerde bazı jel dozimetrelerin radyolojik özelliklerinin direkt metod, XCOM, PhyX-PSD, Auto  $Z_{eff}$  ve XMuDat programlarıyla belirleyip su ile elde edilen sonuçlarla karşılaştırmaktır. Jel dozimetre malzemesi olarak kullanılan FAX, MAGAT, PAGAT kütle azalım katsayısı bulunarak elde edilen sonuçlar yardımıyla etkin atom numarası ve etkin elektron yoğunlukları hesaplanmıştır.



## 2. MATERYAL VE YÖNTEM

Bu çalışmada jel dozimetri olarak kullanılan FAX, MAGAT, PAGAT malzemelerinin 6 MV ve 18 MV foton enerjisindeki radyolojik özellikleri incelenmiştir. Malzemelerin yoğunlukları ve elementel ağırlıkları tablo 1’de verilmiştir.

**Tablo 1.** Malzemelerin yoğunlukları ve elementel ağırlıkları

Elementler	Su	MAGAT	PAGAT	FAX
H	0.1111	0.0747	0.0899	0.111114
C		0.4298	0.0499	0.004769
N		0.0964	0.1715	0.000033
O	0.8889	0.3085	0.6882	0.883142
S			0.000204	0.000871
Na				0.000015
Fe				0.000056
P		0.0427	0.000015	
Cl		0.0482	0.000023	
$\rho$ (g/cm <sup>3</sup> )	1	1.019	1.038	0.9896

### 2.1 Kütle azalım katsayısı

Lineer zayıflatma katsayısı,  $\mu$  ile ifade edilir ve soğurucu ortamda birim uzunluk başına etkileşim olasılığıdır (Hubbell, 1982).

$$I=I_0 e^{-\mu x} \quad (1)$$

Burada  $I_0$  başlangıçtaki radyasyon şiddeti,  $I$  malzemeyi geçtikten sonraki radyasyon şiddeti,  $\mu$  (cm<sup>-1</sup>) toplam sönüm katsayısı,  $x$  (cm) ise malzeme kalınlığıdır. Burada toplam sönüm katsayısı ( $\mu$ ), fotoelektrik ( $\tau$ ), Compton ( $\sigma$ ) ve çift oluşum ( $\kappa$ ) katsayılarının toplamıdır. Kütle sönüm katsayısı ( $\mu_m$ ), lineer sönüm katsayısının ( $\mu$ ) malzemenin yoğunluğuna ( $\rho$ ) oranı ile bulunur ve birimi cm<sup>2</sup> g<sup>-1</sup>’dir.

$$\mu_m = \mu / \rho \quad (2)$$

Farklı elementlerin oluşturmuş olduğu malzeme için toplam sönüm katsayısı, malzemeyi oluşturan elementlerin sönüm katsayılarının toplamıdır.

$$\mu / \rho = \sum_i w_i (\mu / \rho)_i \quad (3)$$

Burada,  $w_i$  i. elementin karışım içindeki ağırlıksal yüzdesi,  $\mu_i$  i. elementin lineer zayıflatma katsayısı,  $\rho_i$  ise i. elementin yoğunluğudur.  $Z_{eff}$  için hesaplama yöntemleri aşağıda açıklanmıştır.

## 2.2 Direkt Yöntem

Malzemelerin toplam foton etkileşimleri için  $Z_{\text{eff}}$  hesaplamalarında kullanılan pratik bir metoddur. Direkt yöntem olarak isimlendirilen bu yöntemde, herhangi ek bir interpolasyona ihtiyaç duyulmadan hesaplama yapılabilmektedir. Denklem 4, hem bileşiklerin hem de karışımların  $Z_{\text{eff}}$ 'lerini hesaplamak için kullanılabilir (Manohara ve ark., 2008).

$$Z_{\text{eff}} = \frac{\sum_i f_i A_i (\mu/\rho)_i}{\sum_j f_j A_j (\mu/\rho)_j} \quad (4)$$

Burada  $f_i$  molar fraksiyon,  $A_i$  atom ağırlığı (15),  $Z_j$  atom numarası,  $(\mu/\rho)_i$  kütle zayıflama katsayısıdır. Direkt yöntem kullanılarak yapılan hesaplamalarda malzemeyi oluşturan elementlerin toplam kütle zayıflama katsayıları WinXCom bilgisayar programından elde edilmiştir.

## 2.3 XMuDat

XMuDat bilgisayar programı bileşikler için tek değerli  $Z_{\text{eff}}$  değeri üretebilmektedir.

$$Z_{\text{eff}} = (\alpha_i Z_i^{m-1})^{1/(m-1)} \quad (5)$$

where  $\alpha_i$  is the fractional number of the electrons of the  $i$ th element, and  $m$  is a constant between 3 and 5. It is preferred that  $m$  is set to 3.6 for material with  $Z_{\text{eff}} < 6$  and 4.1 for material with  $Z_{\text{eff}} > 6$ .

## 2.4 Phy-X/PSD

Enerji bölgesi 1 keV – 20 MeV arasındaki fotonlar için  $Z_{\text{eff}}$ 'i (hem foton etkileşimi hem de foton enerji soğurması için) hesaplamak üzere kullanıcı dostu bir GUI arayüzü ile geliştirilmiştir (Şakar ve ark., 2020). Ayrıca 1 MeV -1 GeV enerji aralığında elektronlar, protonlar, alfa parçacıkları ve C iyonları içinde  $Z_{\text{eff}}$  hesaplanabilmektedir.

## 2.5 XCOM

XCOM ve WinXCom gibi programların veri tabanlarında elementlerin foton etkileşim tesir kesitleri ve  $\mu/\rho$  verilmektedir. Ayrıca 1 keV'den 100 GeV'ye kadar mono enerjik foton enerjilerinde kullanıcılar bileşikler ve karışımlar için tesir kesitleri ve  $\mu/\rho$  tanımlayabilmektedir.  $Z_{\text{eff}}$  ile  $n_{\text{eff}}$  birbiri ile yakından bağlantılıdır.  $n_{\text{eff}}$  değerleri,  $Z_{\text{eff}}$  değerleri kullanılarak farklı yöntemler aracılığıyla hesaplanabilmektedir. Malzemelerin  $n_{\text{eff}}$  değerleri denklem 7 kullanılarak hesaplanmıştır.

$$n_{\text{eff}} = N_A \frac{n Z_{\text{eff}}}{\sum_i n_i A_i} = N_A \frac{Z_{\text{eff}}}{\langle A \rangle} \quad (7)$$

burada  $\langle A \rangle$  malzemenin ortalama atomik kütesidir.  $n$  bileşiği oluşturan toplam atomların sayısı,  $N_A$  Avogadro sayısıdır.

### 2.6 Auto\_ $Z_{eff}$

Auto- $Z_{eff}$ , Microsoft Visual Basic .NET programlama dili kullanılarak yazılmıştır. Auto- $Z_{eff}$  programı, enerjiye bağlı etkin atom numarasının, ortalama atom sayılarının ve spektral ağırlıklı ortalama atom sayılarının hızlı hesaplanması için kullanılır. Bu bilgisayar programında, 10 keV–10 GeV enerji aralığı ve  $Z=1$  ile  $Z=100$  arasında değişen elementler için foton etkileşim kesit matrisleri oluşturulmuştur. Malzemeler için katsayıların hesaplanması, kesirli bileşenlerin doğrusal toplanabilirliğine dayalıdır ve tek enerjilerde önceden hesaplanmış matrisle karşılaştırılır. Bu nedenle, etkin atom numaraları, bitişik kesit verilerinin enterpolasyonu yoluyla elde edilir. (Taylor ve diğerleri, 2012).

## 3. BULGULAR VE TARTIŞMA

Tablo 2’de malzemelerin kütle azalım katsayıları farklı yöntemler ile hesaplanarak gösterilmiştir. Tablo 3 ve 4’de çeşitli hesaplama yöntemleri kullanılarak 6 MV ve 18 MV için etkin atom numaraları ve etkin elektron yoğunlukları gösterilmiştir.

**Tablo 2.** 6 MV ve 18 MV foton enerjisi için farklı yöntemlerle elde edilen kütle zayıflama katsayılarının karşılaştırılması ( $\text{cm}^2 \text{g}^{-1}$ )

Malzemeler	6 MV ( $\text{cm}^2 \text{g}^{-1}$ )				18 MV ( $\text{cm}^2 \text{g}^{-1}$ )			
	Den_4	XCOM	Phy- X/PSD	XMuDAt	Den_4	XCOM	Phy- X/PSD	XMuDAt
Su	0.0276	0.0277	0.0280	0.0275	0.0185	0.0185	0.0188	0.0184
MAGAT	0.0265	0.0267	0.0250	0.0266	0.0181	0.0180	0.0210	0.0180
PAGAT	0.0273	0.0275	0.0250	0.0275	0.0184	0.0184	0.0210	0.0185
FAX	0.0276	0.0276	0.0260	0.0275	0.0184	0.0185	0.0220	0.0184

**Tablo 3.** 6 MV ve 18 MV foton enerjisi için farklı yöntemlerle elde edilen etkin atom numaraları

Malzemeler	6 MV $Z_{eff}$			18 MV $Z_{eff}$			XMuDAt
	Direkt	Auto_ $Z_{eff}$	Phy- X/PSD	Direkt	Auto_ $Z_{eff}$	Phy- X/PSD	
Su	3.52	3.52	3.51	4.07	3.92	4.07	7.51
MAGAT	4.04	4.05	4.03	4.59	4.43	4.40	8.89
PAGAT	3.59	3.58	3.62	4.14	3.98	3.97	12.40
FAX	3.53	3.51	3.55	4.08	3.92	3.94	7.50

**Tablo 4.** 6 MV ve 18 MV foton enerjisi için farklı yöntemlerle elde edilen etkin elektron yoğunlukları

Malzemeler	6 MV $n_{eff}$ ( $\times 10^{23}$ e/g)			18 MV $n_{eff}$ ( $\times 10^{23}$ e/g)			XMuDat
	Direkt	Auto_Zeff	Phy-X/PSD	Direkt	Auto_Zeff	Phy-X/PSD	
Su	1.48	1.48	1.47	1.71	1.68	1.71	3.34
MAGAT	1.67	1.66	1.66	1.75	1.74	1.70	3.22
PAGAT	1.53	1.52	1.55	1.73	1.69	1.69	3.32
FAX	1.47	1.45	1.46	1.69	1.67	1.68	3.34

Tablo 2’de kütle azalım katsayıları karşılaştırıldığında, 6 MV ve 18 MV foton enerjisi için su ve jel dozimetreler arasındaki farkın %3’ün altında olduğu görülmektedir. Tablo 3’de direkt metod yöntemi ile elde edilen  $Z_{eff}$  değerlerinin Auto\_Zeff ve Phy-X/PSD programında elde edilen değerler ile uyum içerisinde olduğu görülmüştür. XMuDat programı gibi enerjiden bağımsız olarak elde edilen  $Z_{eff}$  değerleri, enerjiye bağlı olan diğer yöntemlerle karşılaştırıldığında değerler arasında farklılıklar olduğu görülmektedir. 6/18 MV foton enerjilerinde kısmen Compton saçılması ve çift oluşum olayı baskın olduğundan dolayı farklılığın bundan kaynaklandığı düşünülebilir. Tablo 4’de elde edilen  $Z_{eff}$  değerleri kullanılarak  $n_{eff}$  değerleri hesaplanmıştır. Asady ve ark. (2022) yapmış olduğu çalışmada MAGAT polimer jel dozimetre formülasyonlarının radyolojik özelliklerini (lineer ve kütle azalım katsayısı, CT değerleri) Amerisyum gama kaynak kullanarak belirlemiştir. Ayrıca elde edilen sonuçları su ve yumuşak doku ile karşılaştırılmış ve uyum içerisinde olduğunu bulmuştur. Bizim çalışmamızda da 6 MV ve 18 MV foton enerjisinde su ve MAGAT için farklı yöntemlerle elde edilen kütle azalım katsayısı ve etkin atom numaraları arasında uyum olduğu gözlenmiştir. Mariotti ve ark. (2022) yapmış olduğu çalışmada, BANG, Fricke, ITABIS, MAGIC, NBT-Pluronic, NIPAM, PAGAT ve PRESAGE gibi jel dozimetrelerin doz dağılımlarına bakmış ve sonuçları su ile karşılaştırmıştır. Bu çalışmaya göre jel dozimetrelerden elde edilen sonuçlar su ile uyumlu çıkmış ve ortalama uyarılma enerjileri ve kütle yoğunlukları arasındaki belirsizlik  $\pm\%10$  olarak bulunmuştur. Bizim çalışmamızda da  $Z_{eff}$  ve  $n_{eff}$  değerleri su ile karşılaştırıldığında elde edilen sonuçlar arasındaki farkın %3’ü geçmediği görülmüştür.

#### **4. SONUÇ**

Bu çalışmada farklı jel dozimetre malzemelerinin suya göre radyolojik özellikleri farklı metodlar kullanılarak karşılaştırılmıştır. Bu malzemelerin kütle azalım katsayıları,  $Z_{eff}$  ve  $n_{eff}$  değerleri su ile elde edilen sonuçlarla uyum içerisinde olduğu bulunmuştur. Elde edilen sonuçlar su ile kıyaslandığında aralarındaki farkın %3'ün altında olduğu görülmüştür. Bundan dolayı bu malzemelerin günlük veya haftalık dozimetrik ölçümlerde kullanılmasında bir sakınca olmadığı düşünülmektedir.

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### ÖZET

Dünya Sağlık Örgütü'ne göre; madde kötüye kullanımı, sigara, alkol ve yasa dışı uyuşturucular da dâhil olmak üzere psikoaktif maddelerin zararlı veya tehlikeli kullanımınıdır. Birleşmiş Milletler Uyuşturucu ve Suç Ofisi (UNODC) tarafından yayınlanan 2021 Dünya Uyuşturucu Raporuna göre, 2020 yılında dünya genelinde yaklaşık 275 milyon kişi uyuşturucu kullanıyordu ve 36 milyondan fazla kişi madde kullanım bozukluğundan muzdaripti. Emniyet Genel Müdürlüğü'nün (EGM), 2021 yılını baz alarak, 2022 yılında 27.779 kişi ile yaptığı çalışmanın raporuna göre; hayatında en az bir kez herhangi bir uyuşturucu madde kullanan bireylerin %26,6 sının lise ve üzeri öğrenime sahip olduğu, ve eğitim düzeyinin düşük olmasının uyuşturucu kullanımında etkili olduğu belirtilmiştir. Madde kullanımı ve bağımlılığı sorunu tüm dünyada olduğu gibi ülkemizde de hızla artmaya devam eden çok önemli bir toplumsal sorun haline gelmiştir, bireyin tüm yaşamını, ailesini, sosyal çevresini ve toplumu etkileyen önemli bir sorundur. Bağımlılıklar; sağlık, eğitim, iş, sosyal, kültürel alan gibi birçok alanı etkilemekte, çeşitli kayıplara neden olmakta ve şiddet, suç eylemleri, sağlık bakım ihtiyaçları, rehabilitasyon hizmetleri, işgücü verimliliğinin azalması ve yargı şeklinde insani, sosyal, sağlık ve ekonomik maliyetleri artırmaktadır. Dolayısıyla bağımlı kişiyi etkileyen bu sorunlar, bağımlı kişinin yaşam hakkı, sağlık hakkı, eğitim hakkı, çalışma hakkı gibi haklarının da ihlaline neden olmaktadır. Bu nedenle madde bağımlılığına yönelik politikalar ve koruyucu önlemler önemli bir yere sahiptir. Buna göre bu yazıda madde bağımlılığının toplumsal bir sorun olduğu, birey ve toplum üzerindeki etkileri, madde bağımlılığına yönelik politikalar, önlemler ve hemşirelik müdahalelerinden bahsedilecektir

**Anahtar Sözcükler:** Madde bağımlılığı, toplumsal sorunlar, önlem, politika.



## **SUBSTANCE ADDICTION AS A SOCIAL PROBLEM**

### **ABSTRACT**

According to the World Health Organization; Substance abuse is the harmful or dangerous use of psychoactive substances, including cigaret, alcohol and illegal drugs. According to the 2021 World Drug Report published by the United Nations Office on Drugs and Crime (UNODC), approximately 275 million people worldwide were using drugs in 2020, and more than 36 million people suffered from substance use disorders. According to the report of the General Directorate of Security (EGM), based on the year 2021, with 27,779 people in 2022; It has been stated that 26.6% of individuals who use any drug at least once in their life have a high school or higher education, and the low level of education is effective in drug use. The problem of substance use and addiction has become a very important social problem that continues to increase rapidly in our country as well as all over the world. It is an important problem that affects the whole life of the individual, his family, social environment and society. Addictions; It affects many areas such as health, education, business, social, cultural area, causes various losses and increases human, social, health and economic costs in the form of violence, criminal acts, health care needs, rehabilitation services, decreased labor productivity and justice. Therefore, these problems affecting the addicted person also cause the violation of the rights of the addicted person, such as the right to life, the right to health, the right to education, and the right to work. For this reason, policies and protective measures for substance abuse have an important place. Accordingly, in this article, it will be mentioned that substance addiction is a social problem, its effects on the individual and society, policies, precautions and nursing interventions for substance addiction.

**Keywords:** Substance abuse, social problems, prevention, policy.

## 1. GİRİŞ

Bağımlılık, geniş anlamı bir kavram olup, bir kişiye, nesneye veya varlığa karşı engel olunamayan bir istek duyma halidir. Bireyin ruhsal, bedensel ve sosyal yaşamına zarar verse de birey takıntılı şekilde durumunu sürdürmektedir. Aynı zamanda yasadışı uyuşturucu kullanımının toplum üzerinde de önemli etkileri bulunmaktadır. Toplum ve birey üzerindeki etkileri, ailelerin ve toplumun yaşadıkları olumsuz sağlık sonuçları ve ağır bir mali yüküdür (Bayram, 2013). Avrupa'da 80 milyon kadar kişinin hayatlarının bir döneminde herhangi bir uyuşturucu madde kullandığı belirtilmektedir. Ülkemizde ise bu durumun 1/10 oranında olduğu düşünülmektedir. Bu yüzden, madde kullanımı ve yaygınlığının gençlerde yüksek düzeyde seyretmesi uluslar için ciddi ve ehemmiyet verilmesi gereken bir sorun aynı zamanda bir endişe kaynağıdır. Madde bağımlılığından korunmaya yönelik çalışmalarda, madde kullanımının engellenmesi işyerleri, okul, emniyet, toplum sağlığı merkezleri gibi kurumlarda çalışan bireylerin rol ve sorumlulukları bulunmaktadır. Özellikle okul sağlığı alanında ve sağlık merkezlerinde yer alan hemşirelerin ise hedefi öncelikli olarak rol ve sorumluluklarını yerine getirmek olmalıdır. Bu kurumlarda çalışan hemşireler, her bir bireyi ailesi ile beraber değerlendirmeli, madde kullanımı açısından riskli kişileri belirlemeli ve danışmanlık hizmetlerinin sunulması için psikiyatri hemşireleri ve psikiyatrist gibi sağlık çalışanlarına yönlendirmelidir (Soy ve Zorlu, 2020).

## 2. BAĞIMLILIK VE MADDE BAĞIMLILIĞI

Bağımlılık, vücudun fonksiyonlarına zarar veren bir maddenin bırakma isteğine rağmen engel olunamayan bir arzu ile kullanım durumunun devam etmesi, maddenin bireyi kontrol etmesi ve sonucunda birçok yoksunluk belirtisi ve sorun yaşamasına rağmen maddeyi bırakamama halidir (Özkan, 2022). Madde bağımlılığı, tütün, alkol ve yasadışı uyuşturucuları (opioidler, kanabinoidler, kokain vb.) ve psikoaktif maddelerin zararlı kullanımını ifade etmektedir (Khatib ve ark., 2018). Dünya Sağlık Örgütü madde bağımlılığını, alkol ve yasadışı uyuşturucular da dâhil psikotrop maddelerin tehlikeli ve zararlı kullanımı olarak, ifade etmiştir (WHO, 2022). Madde bağımlılığı yerine uyuşturucu bağımlılığı terimi günlük hayatta sıklıkla kullanılmaktadır. Ancak Dünya Sağlık Örgütü (WHO) madde bağımlılığı yerine madde bağımlılığı terimini kullanmayı tercih etmektedir. Çünkü esrar, eroin, afyon gibi bilinen narkotik maddelerin yanı sıra sentetik olarak üretilmiş birçok uyuşturucu, uyarıcı vb. maddeler, uçucu maddeler veya halüsinojenler gibi diğer ana işlevleri olan maddelerin kötüye

kullanılması da söz konusu olabilir. Bu nedenle uyuşturucu, uçucu maddeler, alkol, sigara, sentetik narkotik-uyarıcı maddeler gibi tüm maddelere tekabül eden bağımlılığı madde bağımlılığı olarak ifade etmek mümkündür (Bayram, 2013).

### **Toplumsal Sorun Olarak Madde Bağımlılığı**

Madde bağımlılığı problemi, tüm uluslarda olduğu gibi ülkemizde de çok hızlı bir şekilde artmış ve bir toplumsal sorun olma özelliği kazanmış (Bayram, 2013) olup, bireyin ailesini, sosyal çevresini, tüm yaşamını ve dolayısıyla da tüm toplumu etkileyen önemli bir sorundur. Madde bağımlılığı; sağlık, eğitim, çalışma, sosyal, kültürel gibi birçok alanı etkilemekte, çeşitli kayıplara yol açmakta (Karadağ, 2021; WHO, 2022) ve şiddet, suç eylemleri, sağlık hizmetleri ihtiyaçları, rehabilitasyon hizmetleri, azalan işgücü verimliliği ve yargı harcamaları şeklinde insani, sosyal, sağlık ve ekonomik maliyetlerde artışa neden olmaktadır (Lo ve ark., 2020). Bunun dışında suça yatkınlık, trafik kazaları, özkıyım, iş hayatının aksamaması, aile parçalanması ve ekonomik sorunlar gibi bireye ve topluma birçok zararı olan çok boyutlu biyopsikososyal bir sorun olarak da nitelendirilmektedir (Yıldırım ve ark., 2011). Bunun dışında, özellikle gençler üzerinde ciddi etkilerine bağlı olarak suça yönelim çok fazla görülmektedir. Madde kullanımına çok küçük yaşlarda ya da ileri yaşlarda başlanabilmesine karşın son zamanlarda genellikle adölesan döneminde başlanmaktadır. Gençlerin madde kullanımına yönelmesinin nedenleri arasında gençlerin sosyal ve duygusal ihtiyaçlarını karşılamak, daha çok eğlenmek, yaşadığı problemlerden kaçmak ve heyecan yaşamak gibi nedenlerdir (Altundağ, 2020).

Madde bağımlılığı, Psikolojik (Psişik) Bağımlılık ve Fizyolojik (Fiziksel) Bağımlılık şeklinde sınıflandırılmaktadır (Altundağ, 2020; Karadağ, 2021).

**-Psikolojik (Psişik) Bağımlılık:** Bireyin kullandığı maddeye alışması, arzu etmesi ya da ihtiyaçlarını gidermek amacıyla maddeye düşkünlüktür. Bireyde bağımlılığın oluşması kullanılan madde türüne, madde kullanım süresine ve kişilik özelliklerine göre değişebilmektedir. Maddenin, yalnızca psikolojik bağımlılık geliştirmesi, fiziksel bağımlılık yaratmaması, maddenin çekilmesi durumunda yoksunluk sendromuna yol açmamaktadır.

**-Fizyolojik (Fiziksel) Bağımlılık:** Tolerans veya yoksunluk belirtilerinden en az birinin veya her ikisinin bulunması fizyolojik bağımlılığı tanımlamaktadır. Maddenin kesilmesi veya azalması, sinirlilik, uykusuzluk, baş ağrısı, kasılmalar, ishal, iştahsızlık, terleme, kusma, mide bulantısı, epilepsi ve diğer yoksunluk belirtilerine yol açıyorsa buna fizyolojik bağımlılık denir. Yoksunluk belirtilerinin şiddeti, fiziksel bağımlılığın yoğunluğu ile doğru orantılıdır. Fizyolojik bağımlılık ve psikolojik bağımlılık, kişide birlikte görülebilmekle birlikte, fizyolojik bağımlılığın

tedavisi kolay olup, psikolojik bağımlılıktan kurtulmak için bireyin istekli olması gerekmektedir (Altundağ, 2020).

### **MADDE BAĞIMLILIĞINDA DSM-V'E GÖRE TANI KRİTERLERİ**

DSM V'e göre, madde bağımlılığı ruhsal bir hastalıktır fakat madde kullanımı ruhsal bir hastalık değildir. Bağımlı olarak teşhis edilebilmesi için, son bir yıl içinde klinik olarak belirgin bir sıkıntıya ve işlevsellikte azalmaya neden olan aşağıdaki belirtilerden en az ikisinin ortaya çıkması gerekir:

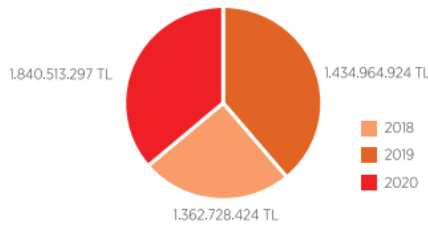
1. Maddeyi bırakma ya da kontrol etme isteği ya da başarısız çabaları,
2. İstenilenden fazla veya uzun süreli kullanım,
3. Maddeyi bulmak, kullanmak veya zararlı etkilerinden kurtulmak için gerekli faaliyetlere çok fazla vakit harcamak
4. Maddeyi kullanmak için güçlü bir istek ya da duyguya sahip olmak,
5. Tekrarlı kullanım (işte, okulda, evde) sonucu sorumluluklarını yerine getirememe
6. Kullanım (iş, boş zaman vb.) nedeniyle günlük aktivitelerin kesilmesi veya azaltılması
7. Olumsuz etkilere (sosyal ve kişilerarası sorunlar) rağmen kullanmaya devam etmek,
8. Tehlikeli olması muhtemel hallerde bile kullanmaya devam etmek,
9. Olumsuz fiziksel ya da ruhsal etkilerine rağmen kullanmaya devam etmek,
10. Maddeye karşı tolerans gelişmiş,
11. İstenilen etkiyi yaratmak için maddeye olan ihtiyacın arttırılması,
12. Aynı nicelikte olan maddenin sürekli kullanımı sonucu etkinin azalması,
13. Mide bulantısı, kusma, uykusuzluk, sinirlilik, kaygı, saldırganlık, huzursuzluk, ishal, titreme, terleme, kas ağrıları, ateş vb. yoksunluk belirtilerinin gelişmesi

Yukarıdaki semptomlardan özellikle yoksunluk krizi, tolerans gelişimi ve bağımlılık yapan madde aldıktan sonra krizin ortadan kalkması bağımlılık tanısını belirlemede en etkili ve yeterli semptomlardır. Her madde yoksunluk belirtileri göstermeyebilir. 1 yıl içinde belirtilerden 2 veya 3'ü varsa hafif, 4 veya 5 varsa orta, 6 veya daha fazla varsa şiddetli olarak kabul edilir. Birçok madde bağımlısında, ajitasyon, titreme, kas krampları ve nöbetler gibi yoksunluk krizi semptomlarının bazılarının diğer hastalıkların semptomlarıyla karıştırılabileceğine yönelik dikkat edilmelidir. Madde ile ilgili krizler ancak ilgili maddeleri alarak tamamen ortadan kaldırılabilir (Karadağ, 2021).

### MADDE BAĞIMLILIĞININ PREVELANSI

Birleşmiş Milletler Uyuşturucu ve Suç Ofisi (UNODC) tarafından yayınlanan 2021 Dünya Uyuşturucu Raporu'na göre, 2020 yılında dünya çapında yaklaşık 275 milyon kişi uyuşturucu kullanırken, 36 milyondan fazla insan madde kullanım bozukluklarından muzdarip olduğunu belirtmiştir. Aynı rapora göre; 2010-2019 yılları arasında, kısmen küresel nüfus artışına bağlı olarak, uyuşturucu kullanan insan sayısı yüzde 22 artmıştır. Sadece demografik değişikliklere dayanarak, mevcut bulgular, 2030 yılına kadar küresel olarak uyuşturucu kullanan insan sayısında yüzde 11'lik ve hızla büyüyen aynı zamanda genç nüfusu nedeniyle Afrika'da yüzde 40'luk belirgin bir artış olacağını düşündürmektedir. En son küresel tahminlere göre, 15 ila 64 yaş arasındaki nüfusun yaklaşık yüzde 5,5'i geçen yıl en az bir kez uyuşturucu kullanırken, 36,3 milyon kişi veya uyuşturucu kullanan toplam kişi sayısının yüzde 13'ü madde kullanım bozukluklarından muzdariptir. Ayrıca, veriler göstermektedir ki 1995-2019 yılları arasında, esrarı zararlı olarak algılayan ergenlerin yüzdesi Amerika Birleşik Devletleri'nde yüzde 40 ve Avrupa'da yüzde 25 oranında azalmıştır (UNODC, 2021).

Emniyet Genel Müdürlüğü'nün (EGM), 2022 yılında yayınladığı, 2021 yılının baz alınarak "Hayatında herhangi bir maddeyi en az bir kez kullandığımı beyan etme" ile ilgili olarak 27.779 kişi ile yaptığı çalışmanın raporuna göre; %26,6 sının lise ve üzeri öğrenime sahip olduğu belirtilmiştir. Düşük eğitim ya da eğitimsizliğin uyuşturucu kullanımında etkili olduğu söylenebilirse de maddeye bağlı eğitimi tamamlamanın göz ardı edilmemesi ve üzerinde çalışmalar yapılması gerekmektedir. Yine aynı rapora göre madde kullanımına başlama yaşının 21,22 olduğu, 15-24 yaş arası gençlerin risk grubunda olduğu belirtilmiştir. Uyuşturucu madde kullanımı öncesi tütün kullananların oranının %82,4 olduğu, başlama yaş ortalamasının 16,72; benzer şekilde alkol kullanımının %37,9 ve alkol kullanmaya başlama yaş ortalamasının 18,04 olduğu belirlenmiştir. Her iki raporda da kadınlarda madde kullanım oranı, erkeklere göre daha düşüktür.



Tablo 1'e göre; kamu harcamaları 2020 yılında 2019 yılına göre yaklaşık %28,2 artarak 1 milyar 840 milyon 513 bin TL olarak gerçekleşmiştir (Türkiye Uyuşturucu Raporu, 2021).

## **BAĞIMLILIK YAPICI MADDELER**

Uyuşturucu maddeler, tıp literatüründe psikoaktif madde olarak isimlendirilmektedir ve alındıklarında ruhsal, bedensel, davranışsal etkilere yol açan ve bağımlılık yapabilen kimyasallardır. Önceleri yabancı verilerde ilaç anlamına gelen “drug” adı verilmiştir. Ancak bu kullanımın yanlış olduğu anlaşılmış ve “substance” olarak isimlendirilmişlerdir.

Bağımlılık yapıcı maddelerin sınıflandırılması şu şekildedir:

- Tütün
- Alkol
- Uyarıcılar: Kokain, Amfetamin, Ecstasy, Kafein
- Opiyatlar: Eroin, Esrar, Morfin, Kodein ve benzerleri
- Merkezi Sinir Sistemini etkileyenler: Amfetamin, Benzodiazepinler, Barbitüratlar
- Uçucu maddeler: Tiner, Gazolin, Glue (Bali), Benzen,
- Halüsinojenler: LSD (LiserjikAsidDietilamid), Psilocybin, Meskalin, DMT(dimetiltriptamin), DET (dietiltriptamin), MDA (metilendioksi amfetamin) DOM (dimetoksimetil amfetamin),
- Fensiklidin (PCP).

Birçok madde uyuşturucu niteliğindedir. Alkol ve sigara, halk dilinde kullanılan uyuşturucu ifadesi içinde geçmez fakat alkol ve sigaranın birer şiddetli bağımlılık yapıcı madde olma özelliği değerlendirilmiş ve dünya çapında uyuşturucu maddeler içinde yer almasına karar verilmiştir (Karadağ, 2021). Tütün ve alkol, farklı toplumlarda ve kültürlerde farklı sosyal gruplar tarafından sık olarak kullanılan ve yasal olarak kullanılması onaylanmış iki madde çeşidi (Lo ve ark., 2020) olarak karşımıza çıkarken, en çok kullanılan madde ise esrardır (Nawi ve ark., 2021; Karakaş ve Söğütçü, 2016).

## **MADDE BAĞIMLILIĞINDA RİSK FAKTÖRLERİ**

Madde kullanım bozukluğu konusunda risk faktörleri bireysel, ailevi riskler ve çevresel riskler olarak 4 gruba ayrılmaktadır (Altundaş, 2020; Yeişlay, 2022; Islam ve ark., 2022; Gökler ve Koçak, 2008; Nawi ve ark., 2021; Brumback ve ark., 2021). Bu risk faktörlerin içinde, özellikle bireysel risk faktörleri madde bağımlılığının gelişiminde önemlidir (Nawi ve ark., 2021).

**-Bireysel Faktörler:** Agresif, benlik saygıları düşük, sorunları ile baş edemeyen, hayır deme becerisi olmayan, okul başarısında düşüş, mesleki olarak başarısız olan bireyler ile depresyon, stres gelişimi, meraklı bir kişiliğe sahip olmak, cinsiyet, duygu düzenleme bozukluğunun olması ve çocuk esirgeme kurumlarında kalmış olmak madde kullanım bozukluğunda bireysel

faktörler olarak sıralanmaktadır. Opioid kötüye kullanımı için detoksifikasyon tedavisi gören 112 genci içeren bir çalışmada, etkilenen katılımcıların çoğunluğunun duygularını düzenlemekte zorlandığı saptanmıştır (Wilson ve ark., 2017). Boylamsal yapılan bir çalışmada, Çocuk esirgeme kurumlarında kalanlarda esrar kullanım oranlarının 36 ay sonra % 9'dan % 18'e yükseldiği gözlenmiştir (Schleimer ve ark., 2019). Bunlarla birlikte, ergenlerin rutin ağrı tedavisine ihtiyaç duyduğu bir hastalığının olması (genellikle opioid kullanımı) ve ilacı zararsız olarak algılama da bireysel risk faktörlerindedir. Odak grup tartışmasında gençler kullanım esnasında motivasyonlarının arttığını ifade etmişlerdir (Nawi ve ark., 2021). Önceden başka bir madde kullanım varlığı; e-sigara içen kişilerde özellikle de esrar, alkol ve yaygın olarak reçete edilen ilaç kullanımının olduğu saptanmıştır. Araştırmacılar, e-sigara kullanımının, muhtemelen davranışın normalleştirilmesi yoluyla daha ciddi madde bağımlılığına yol açabileceğini ifade etmektedirler.

**-Ailevi Riskler:** Ebeveynlerde madde kullanımı varlığı, ebeveynlerden birinin yokluğu ya da parçalanmış aileler, ebeveyn ve aile arasındaki iletişim sorunları, ebeveynin düşük eğitime sahip olması, ailenin denetiminin zayıf olması, fiziksel şiddet başta olmak üzere aile içi şiddete maruz kalmak.

**-Akran Grupları:** Akran gruplarına dâhil olma isteği, akranların baskısı ve madde kullanımı.

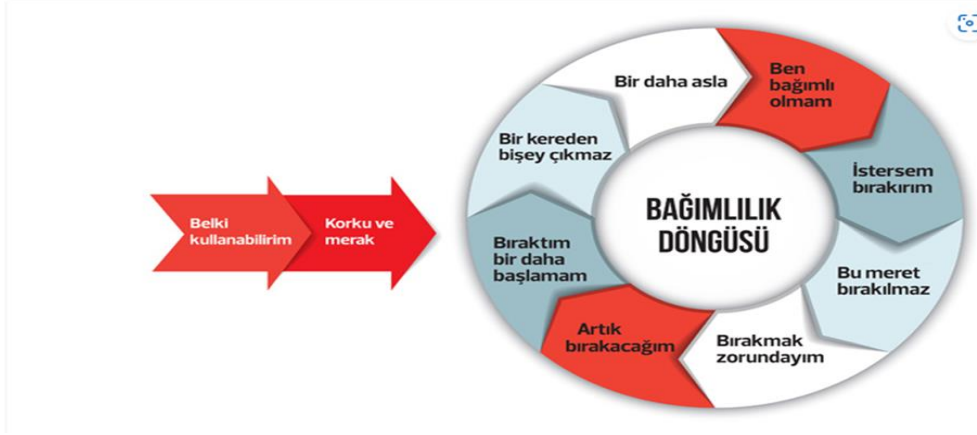
**-Çevresel Faktörler:** Düşük sosyoekonomik bir çevreye bağlı olma ve buna bağlı olarak maddeye kolay ulaşım.

### **MADDE BAĞIMLILIĞINDA KORUYUCU FAKTÖRLER**

Bireylerde, yüksek benlik saygısı, dindarlık, cesaret, akran faktörleri, öz kontrol, ebeveynin kontrolü , akademik yeterlilik ve güçlü mahalle bağlılığı belli başlı koruyucu faktörlerindedir (Nawi ve ark., 2021). İyimser bir kişiliğe sahip olan kişilerin, madde kullanımına karşı güçlü bir inancı olan ve sağlıklarını korumak için güçlü bir arzusu olan bireylerin uyuşturucu bağımlılığına karışmaktan korunma olasılıkları daha yüksektir (Nawi ve ark., 2021; Marin ve ark., 2019). Özellikle baba figürü kendisini yeterli bilgi ile donattığında koruyucu etkisinin olduğu belirlenmiştir (Nawi ve ark., 2021). Bireyin güçlü dini inançlara sahip olması, ergenlerin uyuşturucu bağımlılığına karışmasını önleyebilecek çok önemli bir koruyucu faktör olarak hizmet etmektedir. Buna ek olarak, okul bağlılığı ve yetişkin desteği de madde bağımlılığında koruyucu faktör olarak rol oynamaktadır (Nawi ve ark., 2021). Ayrıca, 1104 öğrenci ile yapılan

bir araştırmada iyimser bir özelliğe sahip gençlerin uyuşturucu bağımlısı olma ihtimalinin daha düşük olduğu şeklindedir (Marin ve ark., 2019).

## MADDE KULLANIMI DÖNGÜSÜ



**Tablo 2.** Madde Kullanım Döngüsü

Bağımlılık Döngüsü aşırı merak ve madde kullanma isteğiyle başlar, sanki bir anda hiçbir şey olmuyormuş gibi kişinin yavaş bir şekilde kontrolünü kaybettiği düşünceleriyle ilerleyen bir sonu olmayan döngüdür. Bu döngünün ileri aşamalarında birey maddeyi kullanmaya devam eder, istediği anda bırakabileceğini düşünür ancak zaman geçtikçe bırakmakta zorlanacağını anlar. Bu kısır döngü böyle devam ediyor

## MADDE BAĞIMLILIĞININ SONUÇLARI

Çağımızın en önemli sorunlarından biri olan madde bağımlılığının sonuçları da önem kazanmaktadır. Bireyi ve çevresini dolayısıyla tüm toplumu etkileyen madde bağımlılığına tek bir perspektiften bakmak doğru değildir. Bağımlılık teşhisi konan bir birey; genetik arka planı, bireysel yapısı ve çevresi bir bütün olarak düşünülmelidir. Sebepleri çok boyutlu olmakla birlikte, bu sorunun sonuçları da birçok farklı alanı etkilemektedir (Yılmaz, 2019). Madde bağımlılığının sonuçları bireysel, çevresel ve toplumsal sonuçlar olarak ele alınmıştır.

**-Bireysel Sonuçlar:** Madde kullanımı, bireyde psikolojik, fizyolojik ve zihinsel işlevlerde kayıp ve zararlara yol açmaktadır. Maddeler, türlerine göre birçok zararlı etki yaratırlar. Gözler, solunum sistemleri, sindirim, karaciğer, iç organlar ve böbrekler gibi birçok organ üzerinde olumsuz etkileri vardır. Merkezi sinir sistemine verdiği zarar nedeniyle bunama, halüsinasyonlar ve hafıza kaybı gibi zihinsel işlevlerde de olumsuz sonuçlara neden olur.



Bireyin işini ve okulunu kaybetmesi, toplumun bakış açısına bağlı olarak kişide gelişen sorunlar, fizyolojik etkiler ve zihinsel işlevlerdeki değişiklikler de bireyde değersizlik, saldırganlık ve yalnızlık gibi olumsuz sonuçlara neden olmaktadır (Yılmaz, 2019).

**-Çevresel Sonuçlar:** Birey, madde bağımlılığı tanısı aldıktan sonra çevresindekilerle iletişimde büyük değişiklikler yaşamaktadır. Özellikle toplumumuzda sosyal olarak yakın bağların varlığı, bağımlı bireyin çevresi tarafından kısa sürede fark edilmesine ve toplumdan dışlanmasına neden olabilmektedir. Bu durum bireyi olumsuz yönde etkileyerek okuldan, akrabalarından, işten ve çevresinden uzaklaşmasına ve maddeye daha fazla bağımlı hale gelmesine neden olur (Yılmaz, 2019).

**- Toplumsal Sonuçlar:** Toplumumuzda ve birçok toplumda madde kullanımı ve satışı suç olarak kabul edilmektedir. Bu durum madde kullanıcılarının suçlu olarak görülmesine ve toplumdan dışlanmasına neden olmaktadır. Madde bağımlısı okul çağındaysa, rollerini yerine getirmediği için sosyal sorunlar yaşamaya başlar. Bunun sonucunda kişide oluşturduğu etkiler, kişiyi yine toplumsal olarak kabul görmeyen davranışlara itecektir. Böylece toplumun bireyi dışlaması sonucunda, dışlanan birey kendisini maddeye iten ortama daha fazla sığınacak ve böylece bağımlılığı daha da artacaktır (Yılmaz, 2019).

## **MADDE BAĞIMLILIĞINA YÖNELİK POLİTİKALAR, ÖNLEMLER VE HEMŞİRELİK GİRİŞİMLERİ**

Madde bağımlıları bağımlılıktan pek çok zarar görmekte ve kullanılan maddenin yol açtığı sağlık sorunları, işlerinden ayrılma, eğitimlerini tamamlayamama, sosyal izolasyon, aile hayatının parçalanması, suç işleme gibi sonuçlarla karşılaşmaktadırlar. Dolayısıyla bağımlı kişinin bu sorunları yaşamamasına neden olanlar, bağımlı kişinin yaşam hakkı, eğitim hakkı, sağlık hakkı, çalışma hakkı gibi haklarının da ihlaline neden olmaktadır (Bayram, 2013). Bu nedenle madde bağımlılığında yapılacak politikalar ve koruyucu önlemler önemli bir yere sahiptir. Madde bağımlılığına yönelik politikalar ve önleme programları, bağımlılık sürecini belirleyen ve önleme çalışmaları için girişimlerin yapılacağı etki alanlarını içermektedir. Bu etki alanları birey aile, okul, akran grupları ve çevresel faktörlerden oluşmaktadır (Altundağ, 2020).

Bağımlılık dünyada olduğu gibi ülkemizde de bireyi ve toplumu olumsuz etkileyen önemli bir sağlık sorunudur. Bu sorunun tedavisi oldukça uzun bir süreçtir ve kişiden kişiye değişir. Bu sürecin uzunluğu, olumsuz fiziksel ve duygusal durum, kişinin değişime ve motivasyona hazır olma duygusunu azaltan ve maddeye yeniden başlama riskini artıran dürtü ve istekler gibi

faktörlere veya kişilerarası çatışmalar ve sosyal baskılar gibi faktörlere bağlı olarak değişmektedir. Bununla birlikte, bağımlığın önlenmesinde ve tedavi sürecinde ekip çalışmasının önemli bir konumunun olduğu belirtilmektedir (Evli ve Albayrak, 2020). Bağımlılık, ailevi, duygusal, kişilerarası ve çevresel sorunlarla birlikte bütüncül bir kavram olarak düşünülmelidir. Hemşirelerin madde bağımlılığında korunma ve rehabilitasyon sürecinde multidisipliner bir ekiple birlikte çalışması gerekmektedir. Madde kötüye kullanımı veya madde bağımlılığı sorunu olan bireylerin bakımının nihai amacı, bireylerin madde kullanımından uzak durmalarını sağlamaktır. Bireylerin maddeden uzak durmaları ancak iyi çalışma düzeni, sağlığının iyi olması, olumlu kişilerarası ilişkiler ve genel sosyal uyum ile sağlanabilir (Karakaş ve Ersöğütçü, 2016).

Hemşirenin rollerine bakıldığında ise birincisi önleme, bir kişinin hiç bağımlılık yapıcı maddeye başlamaması; ikinci olarak madde kullanan bireyin bağımlılıktan kurtulmasını sağlayacak tedavi programlarının oluşturulması ve bunlara katılım sağlanması; üçüncüsü, bireye ve madde bağımlılığından kurtulamayan diğer kişilere zarar verme riskini azaltmayı amaçlamaktadır (Evli ve Albayrak, 2020).

1. Madde bağımlılığına yönelik hemşirelik bakımında ilk aşamada, bireyin kendisini değerlendirilmelidir. Hemşire, bireyi değerlendirirken, öncelikle ne tür bir madde kullandığını, maddeyi hangi yolla ve ne kadar aldığını, ne kadar süredir kullandığını ve en son kullanım zamanını, madde kullanım miktarını ve sıklığını değerlendirir. Bununla birlikte, madde kullanımını bırakmayı düşünüp düşünmediği ve kullanım sonunda ne olduğu gibi doğrudan maddeye yönelik bilgileri edinmelidir.

2. Madde kullanımında önleme çalışmaları önemli bir yer tutmakta olup, ebeveynlerin çocukları ile etkili iletişim kurması sağlanmalı ve arkadaş çevresi konusunda sınırlamalara özen göstermeleri sağlanmalıdır.

3. Bireylere ve ailelere destek vermek. Gittikçe artan madde kullanımı ve kullanma yaşının düşmesiyle birlikte konu hakkında aileler bilinçlendirilmelidir.

4. Bireylere ve gençlere yönelik hayır diyebilme, problem çözme, iletişim teknikleri, öfke kontrolü, stresle baş edebilme becerilerine yönelik eğitimler verilmelidir.

5. Okul ortamları çocuklara göre düzenlenmeli ve okul dışında, çeşitli sosyal, kültürel ve bilimsel etkinlikler düzenlenmeli.

6. Madde kullanımına yönelik özellikle devlet tarafından yasal düzenlemeler yapılmalıdır.

7. Yapılan bu uygulamaların madde bağımlılığından kurtulmaya yardım ettiği, ruhsal durum ve yaşam kalitesine olumlu etkisinin olduğu da hatırlatılmalıdır (Altundağ, 2020; Evli ve Albayrak, 2020; Karakaş ve Ersöğütçü, 2016).

#### **-Madde Bağımlılığına Yönelik Politikalar**

Madde bağımlılığını önleme faaliyetleri bir bütün olarak ele alınması gereken bir sorundur ve bu sorunla mücadelede birçok aktörün yer alması gerekmektedir. Devlet tarafından madde kullanımını önlemek için bazı yasal düzenlemeler yapılmış, talebin azaltılmasına yönelik plan ve politikalar oluşturulmuş, birçok devlet kurumuna görev ve sorumluluklar verilmiştir. Bu kapsamda Türkiye'de önleme faaliyetleri çeşitli sivil toplum kuruluşları ve TUBİM ile birlikte Milli Eğitim Bakanlığı, Adalet Bakanlığı, Sağlık Bakanlığı, Aile ve Sosyal Politikalar Bakanlığı, üniversiteler, Radyo ve Televizyon Üst Kurulu (RTÜK), Diyanet İşleri Başkanlığı ve Belediyeler gibi birçok kurum tarafından sürdürülmektedir. (Albayrak ve Balcı, 2014).

Ülkemizde uyuşturucuyla mücadelenin temelini olan belge 2018-2023 Uyuşturucuyla Mücadele Strateji Belgesi ve Eylem Planıdır. 2018-2023 Uyuşturucuyla Mücadele Strateji Belgesi ve Eylem Planı'nın temel amacı, tüm toplumu her türlü maddeden uzak tutmaktır. Önleme çalışmaları, maddeye olan talebin engellenmesi odaklı yürütülmektedir. Bu boyutta başta gençler olmak üzere tüm toplumu uyuşturucuya karşı korumak, maddeyi bir veya daha fazla kez denemiş ancak henüz bağımlılık geliştirmemiş kişilere danışmanlık ve tedavi hizmeti vermek, uyuşturucu bağımlılarının tedavisi ve tedavi gören bağımlıların sosyal entegrasyonunun desteklenmesi amacıyla çeşitli çalışmalar yapılmaktadır. İnsanların uyuşturucu kullanma eğilimlerini birçok sosyal ve kültürel faktörün etkilediği ve çocuk ve gençlerin uyuşturucunun olumsuz etkilerini anlaması durumunda kullanım oranlarının düştüğü belirtilmektedir. Bu anlayış doğrultusunda, gençleri madde kullanımından uzak tutmak için önleyici faaliyetler uygulanmaktadır. ALO 191 Uyuşturucuyla Mücadele Danışma ve Destek Hattı, okul bazlı önleme çalışmalarının yanı sıra, uyuşturucu kullanımını önlemek ve insanları tedaviye yönlendirmek için 7 gün 24 saat hizmet vermektedir. Alkol ve Madde Bağımlılığı Tedavi Merkezleri (AMATEM) tedavi hizmetlerinin verilmesinden sorumlu kurumlar arasındadır. Madde bağımlılığı tedavisi tamamen ücretsizdir ve sağlık sigortası olmayan kişilerin tedavisi ücretsiz olarak uygulanmaktadır. Sağlık Bakanlığı'na bağlı ve ülke genelinde hizmet veren AMATEM sayısı 33 olup, AMATEM'lerin toplam yatak kapasitesi 704 kişidir. Ergen ve çocukların tedavisinden sorumlu tedavi merkezleri olan Çocuk ve Ergen Alkol Madde Bağımlılığı Tedavi Merkezlerinin (ÇEMATEM) sayısı ise 6'dır. Ülkemizde bağımlılıkla

mücadelenin her kademesinde kurumlar arası işbirliğine öncelik verildiği, önleme, tedavi ve rehabilitasyonu içerir ve bu doğrultuda faaliyetler yürütülür. Aslında bağımlılık sorununu tek bir kurumun sorumluluğuna bırakılmadan topyekûn bir mücadele ile çözmeye çalışmak, sorunla etkili bir şekilde mücadele etmek açısından önemlidir (Dönmez ve Aydoğdu, 2020).

#### **-Madde Bağımlılığına Yönelik Önlemler**

Önleme çalışmaları, maddeye talebin engellenmesi odaklı gerçekleşmektedir. Bu kapsamda başta gençler olmak üzere tüm toplumu madde kullanımına karşı korumak, bir veya daha fazla kez madde kullanmış fakat hala bağımlılık geliştirmemiş kişilere danışmanlık ve tedavi hizmeti vermek, madde bağımlılığı tanısını almış kişilerin tedavisi ve tedavi gören bağımlı olanların sosyal entegrasyonunun desteklenmesi amacıyla türlü programlar uygulanmaktadır (Johnston ve ark., 2014) ve madde kullanımının önlenmesine yönelik çalışmalar genellikle risk grubuna odaklanmaktadır. (Albayrak ve Balcı, 2014).

#### **-Çevresel Önleme**

Çevresel önleme politikaları, insanların madde kullanımına ilişkin seçimler yaptığı sosyal, kültürel, ekonomik ve fiziksel ortamları değiştirmeyi amaçlamıştır. Kurumların bu alanda uygulayacakları politikalar kendi inisiyatiflerine bırakılmak yerine kanunlarla güvence altına alınmıştır. Örneğin, alkol ve tütün gibi maddelerin kullanımının yaygın olduğu umumi dinlenme ve eğlence mekanlarının açılmasını ve işletilmesini düzenleyen 25902 sayılı İşyeri ve Çalışma Ruhsatları Hakkında Yönetmelik'in 30. maddesinde “Kamu ve özel okul binaları, ilkokul ve ortaokul öğrencilerinin barınmaları yurt ve anaokullarına 100 metre mesafede tespit edilemez”; 32. maddede “Meyhane, kahvehane, kıraathane, bar, elektronik oyun merkezi gibi halka açık yerler ve açık alkollü içki satışı yapılan yerler, resmi ve özel okul binaları ve ilkokul ve ortaokul öğrencilerinin barındığı yurtlar ve anaokullarından kapıdan kapıya en az 100 m uzaklıkta olması zorunludur” ve 36. Maddede “Yasal istisna olmaksızın; 18 yaşından küçük çocuklar eğlence, oyun, içki ve benzeri amaçlarla umuma açık yerlerde çalıştırılmaz. Bu kural ve uygulamalar; alkol ve tütün bağımlılığı riski altındaki öğrencilerin ve çocukların korunması açısından devletin “çevresel önleme”ye verdiği önemin açık bir kanıtıdır (Albayrak ve Balcı, 2014).

#### **-Okul Odaklı Önleme**

Çocukların ve gençlerin en önemli risk grupları olduğu ve zamanlarının çoğunda eğitim kurumlarında oldukları düşünüldüğünde, okul merkezli talep azaltma çalışmaları ehemmiyet kazanmaktadır. Toplumun farkındalığını artırmayı ve bireysel, ailesel ve toplumsal tüm

düzeylede sorumluluk geliřtirmeyi amalayan okul odaklı önleme alıřmalarında Milli Eđitim Bakanlıđı tarafından yürütölen alıřmalar ön plandadır. Milli Eđitim Bakanlıđı, ocukları ve gençleri olası risklerden (madde kötüye kullanımı, řiddet, cinsel istismar vb.) korumak amacıyla *Eđitim Ortamlarında řiddetin Önlenmesi ve Azaltılması Stratejisi ve Eylem Planı*’nı (2006-2011) hazırlamıřtır. Bu Eylem Planı’nda ve madde bađımlılıđının gençler arasında giderek yaygınlařtıđından bahsedilmektedir. Bu soruna özüm olarak öđrencilerde řiddet davranıřlarını önlemeye ve azaltmaya yönelik eylem biçimleri belirlenerek uygulamaya konulmuřtur. Bu dođrultuda tüm öđrencilere temel önleme, koruma ve müdahale hizmetlerinin sunulması, risk altındaki tüm ocukların belirlenmesi ve sunulacak hizmetlerde bütüncöl bir yaklařımın izlenmesi stratejik hedefler olarak belirlenmiřtir. Okullarda tüm öđrencilere verilen uyuruřturucu ve madde kullanımını önleme eđitimi, okullarda TUBİM İl İrtibat Görevlileri (İLTEM), psikolojik danıřmanlar ve rehber öđretmenler tarafından yürütölmektedir (Albayrak ve Balcı, 2014).

#### ***-Aile Odaklı Önleme***

Genlerin madde kullanımını önlemek amacıyla öncelikle aile ortamında erken ocukluk döneminden bařlayarak ocuđun ruhsal geliřimi güçlendirilmeli, ocuđun madde kullanımına karřı direncini artırmak ve sosyal yeteneklerini geliřtirmek için aileler desteklenmelidir (Albayrak ve Balcı, 2014).

#### ***-Toplum Odaklı Önleme***

Aile ve okul merkezli önleme faaliyetlerine göre toplum odaklı önleme faaliyetleri yürüten kurum sayısı daha fazladır. Kamuya bađlı kurum ve kuruluşlar, faaliyet alanlarına uygun olarak hazırladıkları program ve projeler sayesinde madde bađımlılıđı ile mücadele ve bađımlılıđın önlenmesi konusunda toplumu bilinlendirmek için alıřmaktadır. MEB, TUBİM, Sađlık Bakanlıđı, Aile ve Sosyal Politikalar Bakanlıđı, Diyanet İřleri Başkanlıđı ve eřitli sivil toplum kuruluşları toplum merkezli önleme faaliyetlerinde önde gelen aktörlerdir. Toplum odaklı önleme faaliyetleri yürüten bir diđer birim olan İl Halk Sađlıđı Müdürlükleri, madde kullanımını önlemeye yönelik projeler yürütmüř ve bu projeler kapsamında birçok madde bađımlılıđı tanısını almıř bireyleri tedaviye yönlendirmiř, bu konuda bilgilendirme ve bilinlendirme eđitimi de vermiřtir (Albayrak ve Balcı, 2014).

#### ***-Ulusal ve Yerel Medya Kampanyaları***

Görsel ve iřitsel medya, toplumun bütün kesimleri için insan hayatını řekillendiren önemli unsurlardır. Medyanın gücünden yararlanmak, madde kullanımıyla mücadelede en etkili

yöntemlerden biridir. Madde kullanımına karşı medyada kültür ve normların yaygınlaştırılması, bu konuyla ilgili yayınların kontrol edilmesi ve sorumsuz, teşvik edici ve caydırıcı yayınlara yaptırım uygulanması, alkol ve sigara reklamlarının yasaklanması, medyada aktif olan bireylerin olumlu tutumları ve mesajları madde bağımlılığı alanında birincil korumada önemli bir role sahiptir (Albayrak ve Balcı, 2014).

## **SONUÇ**

Madde bağımlılığı önemli bir toplumsal sorun olmakla birlikte, önleme ve koruma çalışmalarında birçok kurum, kuruluş ve medyanın etkisi olduğu gibi psikiyatri hemşirelerinin de önemli yetki ve etkileri vardır. Psikiyatri hemşireleri özellikle toplumsal sorunlar, madde kullanım oranları, özellikle çocuk ve gençlerin madde kullanımının önlenmesi konusunda farkındalık yaratacak eğitimler vermeli ve danışmanlıklar sürdürmelidir. Disiplinler arasında yer almalı ve sahada farkındalık çalışmalarına yön vermelidir.

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## **RUH SAĞLIĞINI TEHDİT EDEN TOPLUMSAL SORUNLAR**

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### **ÖZET**

Toplumsal sorunlar, toplumsal yaşamın başlangıcından beri süregelen olgulardır. Günümüz dünyasında kamuoyunda belli başlı toplumsal sorunlara işsizlik, her türlü bağımlılık, zorunlu göç, şiddet, cinsiyet eşitsizliği, eğitim eşitsizliği, terör, intiharlar, aşırı nüfus artışı ve insan hakları ihlalleri, eğitim, sağlık ve aile kurumlarına ilişkin sorunlar örnek olarak verilebilir. Ruh sağlığı, sağlık ve esenliğin ayrılmaz bir parçasıdır ve bir dizi biyolojik, sosyal, ekonomik ve çevresel faktör tarafından belirlenir. Dünya çapında, zihinsel bozukluklar en yaygın ancak kronik ve engelleyici sağlık koşulları arasındadır. Ruhsal bozuklukların biyolojik veya kalıtsal nedenleri olsa da sosyal, ekonomik ve çevresel faktörlerden de etkilenirler. Bu nedenle ruhsal bozukluklar birçok ülkede önemli ekonomik ve sosyal yük haline dönüşmekte ve düşük gelirli insanlar, işsizler, evsizler, düşük eğitimliler, göçmenler, şiddet mağdurları, mülteciler, istismara uğramış kadınlar ve ihmal edilen yaşlılar arasında ruhsal bozukluk riski artmaktadır. Toplumsal sorunların ruhsal bozukluklara yol açmasını önlemek için; öncelikle sağlık politikalarında işsiz ve yoksul bireylerin sağlığının korunması koruyucu sağlık hizmetlerine ağırlık verilmesi ve uluslararası işbirliğinin artırılması gerekmektedir. Kadınların ve yaşlıların ekonomik alanda güçlendirilmesi ve sosyal destek programlarının oluşturulması son derece önemlidir. Sosyal sorunların neden olduğu ruhsal bozuklukların önlenmesi için multidisipliner bir ekip içerisinde yer alan psikiyatri hemşirelerine de önemli görevler düşmektedir. Buna göre bu çalışmada sosyal sorunlar ile ruhsal bozukluklar arasındaki ilişki ve bu duruma yönelik önerilerde bulunulacaktır.

**Anahtar Sözcük:** ruhsal bozukluk, toplumsal sorunlar, psikiyatri hemşireliği

## **SOCIAL PROBLEMS THAT THREAT MENTAL HEALTH**

### **ABSTRACT**

Social problems are phenomena that have been going on since the beginning of social life. In today's world, unemployment, all kinds of addiction, forced migration, violence, gender inequality, education inequality, terrorism, suicides, overpopulation and human rights violations, problems related to education, health and family institutions can be given as examples. Mental health is an integral part of health and well-being and is determined by a range of biological, social, economic and environmental factors. Worldwide, mental disorders are among the most common yet chronic and disabling health conditions. Although mental disorders have biological or hereditary causes, they are also affected by social, economic and environmental factors. Therefore, mental disorders are turning into a significant economic and social burden in many countries, the risk of mental disorders is increasing among low-income people, the unemployed, the homeless, the low-educated, immigrants, victims of violence, refugees, abused women and the neglected elderly. To prevent social problems from causing mental disorders; first of all, it is necessary to protect the health of unemployed and poor individuals in health policies, to focus on preventive health services and to increase international cooperation. It is extremely important to empower women and the elderly in the economic field and to establish social support programs. Psychiatric nurses, who work in a multidisciplinary team, have important duties to prevent mental disorders caused by social problems. Accordingly, in this paper, the relationship between social problems and mental disorders and suggestions for this situation will be made.

**Keywords:** mental disorder, social problems, psychiatric nursing

## GİRİŞ

İnsan; biyolojik, sosyal, kültürel ve ruhsal yönlerinin hem kendi içinde hem de çevreyle sürekli bir etkileşim içinde olan, bu yönlerin bütününden oluşan bir varlıktır. Bir bütün içinde iyi ve sağlıklı olabilmesi, insanın, tüm bu yönlerinin en uygun düzeyde işlev gösterebilmesi ile mümkündür (Kaya ve Hiçdurmaz, 2018). Bununla birlikte, içinde yaşadığımız çağda özgürleşen bireyler, özgürlüğün karşılığı olarak, daha çok belirsizlik ve riskle karşı karşıya kalmak zorunda kalmış olup, gittikçe gelişen ve değişen dünyada bulunan toplulukların yaşamlarındaki problemler farklılaşmakta ancak hiçbir zaman tamamıyla çözülememektedir (Yılmaz ve ark., 2017; Bozkurt, 2000). Toplumların yaşadığı bu sorunlar toplumun içindeki birçok insan tarafından değerlerine uymadığına ve düzeltilmesi için harekete geçilmesi gerektiğine inanılan bir durum olup, alanların birisinde oluşan bir problem diğer alanları da etkileyerek bireyin iyilik halinin ve sağlık durumunun bozulmasına yol açabilmektedir (Kaya ve Hiçdurmaz, 2018; Çoban, 2021).

Toplumsal sorunlar; toplumsal çevrenin koşullarında ortaya çıkan, toplumun büyük bir bölümünü sarsan, topluma ait bazı değerlerle bağdaşmayan ve bu nedenle çekinilen ve düzelebilmesi için de topluma ait güç ile araçların kullanılması gereken durumlardır. Günümüz şartlarında yoğun olarak gözlenen bu toplumsal sorunlara; yoksul olmak, işsiz olmak, çocuk istismarı, suç ve şiddet problemleri, engelli olma problemleri, madde bağımlılığı başta olmak üzere her türlü bağımlılık, yanlış/çarpık kentleşme, göçler, terörle ilgili problemler, nüfus yoğunluğu, açlıkla ilgili problemler, çevresel sorunlar, eğitim, sağlık, aile gibi kurumlara ilişkin sorunlar (Yılmaz ve ark., 2017) örnek olarak verilebilir.

Toplumsal sorunlara konu oluşturan bu durumlar yaşamın başlangıcından beri var olan olgular olup, toplumdan topluma ve zamandan zamana değişiklik göstermekte ve insanlığın tamamı için büyük riskli durumlara neden olmaktadır. Bu sorunların çözümü ise ulusal ve uluslararası alanda ciddi çabalar gerektirmektedir çünkü toplumsal problemler genellikle tüm dünyayı ilgilendiren problemlerdir (Çoban, 2021; Aydemir, 2020). Ruh sağlığı ise sağlık ve esenliğin ayrılmaz bir parçası olup, bir dizi biyolojik, sosyal, ekonomik ve çevresel faktörlerden etkilenmekte, buna bağlı olarak toplumda gelir ve istihdamda azalmaya neden olmakta ve bu durum yaşam boyu devam edebilmektedir (Akkaş&Emsen, 2022). Toplumsal sorunların ve bu toplumsal sorunlara bağlı olarak ortaya çıkan ruhsal hastalıkların gelişiminin önlenmesinde bireyler başta olmak üzere multidissipliner ekip içerisinde yer alan psikiyatri hemşirelerine de

önemli görevler düşmektedir. Aşağıda günümüzde sıkça karşılaştığımız bazı toplumsal sorunlar ve ruhsal bozukluklar ile ilişkisi ele alınmış olup, önlenmesine yönelik önerilere yer verilmiştir.

### **İŞSİZLİK/YOKSULLUK**

Yoksulluk, toplumun en düşük yaşam ölçütünün beklentilerini yansıtan, insanlık başlangıcından beri bulunan ve endüstriyel devrimle daha belirgin sınırlara ulaşan toplumsal bir sorun olup, bireylerin yalnızca gelir, tüketim gibi ekonomik olanaklardan yoksunluk durumlarını değil, paralel olarak sağlık, ulaştırma, eğitim, sosyal güvence ile toplum ile ilgili hizmetlerden de yoksun kalmalarını ifade etmektedir (Karadağ&Mermer, 2020). Gelişmiş ve gelişmekte olan toplumlarda yoksulluk probleminden özellikle yaşlı bireyler, engelli bireyler, kadın ve çocuklar daha fazla etkilendiği söylenebilir. Maddi durumu yetersiz olan yoksul ailelere bakıldığında en çok sıkıntıyı çocuklar yaşamakta (Karadağ&Mermer, 2020) olup, bu durum, özellikle çocuk yoksulluğunu gündeme getirmektedir. Çocuk yoksulluğu, çocukların gelişimi ve refahı üzerinde kalıcı etkileri olan dünya genelinde bir toplumsal sorundur. Birleşmiş Milletler Uluslararası Çocuklara Acil Yardım Fonu (UNICEF) (2016) tarafından yayınlanan bir rapora göre, dünya çapında yaklaşık 900 milyon insan, günde 1,9 dolardan az harcama yapan yeni bir yoksulluk standardı altında yaşamakta ve çocuklar bu nüfusun neredeyse yarısını oluşturmaktadır. Dünya Bankası Grubu ve UNICEF (2016), dünya çapında 89 ülke arasında yapılan bir anket sonuçlarına göre, aşırı yoksulluk içindeki çocuk sayısının 385 milyona ulaştığı belirtilmiştir. Çin'de çocuk sayısı yoksulluk oranı %2'ye ulaşmış ve aşırı yoksul çocukların oranı %1,8 olmuştur. Bu durum, Çin'de çok sayıda çocuğun yoksulluk yaşadığını göstermektedir (Li ve ark., 2019).

Yoksul bireyler eğitim olanaklarından daha çok mahrum olduğundan dolayı, yoksulların iş ve meslek edinme şansını azaltmasına ve vasıfsız ve güvencesiz işlerde çalışmasına daha az para kazanmasına, işsiz kalmasına neden olmaktadır. İşsizliğin artmasıyla yoksullukta artmakta ve bu süreç kısır döngü biçiminde devam etmektedir, kendilerinin ve sorumlu oldukları aile üyelerinin yaşamlarını idame ettirme çabaları yoksul bireylerin ruh sağlığına zarar vermekte, stres, anksiyete ve depresyon gibi rahatsızlıklar sıklıkla görülmektedir. Yoksul aile çocukları, ailelerinde ihmale ve istismara, şiddet ve sömürüye toplumun diğer kesimlerine göre daha yüksek oranda kalmaktadır. Ek olarak diğer sosyo-ekonomik seviyelerde olan akranlarına imrenerek suça işleme yatkınlıkları artmaktadır, öz güvenleri ve benlik saygıları sağlıklı olarak gelişmemekte mutsuzluk, anksiyete ve bağımlılık riskleri artmaktadır (Karadağ&Mermer, 2020). İş faktörü, yoksulluk ve ruh sağlığı arasında önemli bir ilişki söz konusudur. Bir işe sahip

olma durumu; yetişkin bireyde, sağlıklı bir benlik için gerekli olan, öz yeterliliği, öz saygıyı ve kendini gerçekleştirme destekler, bu yetilerin sağlıklı gelişimi de toplumsal yapı ile önemli bir köprü oluşturur, bu sebeple işe sahip olma önemli belirleyicilerdendir (Kaya, 2007). İşsizlik ise bireyin hem sosyal hem de ekonomik yönden etkileyerek fiziksel ve psikolojik açıdan yıpranmasına, yaşam standardının düşmesine, uzun vadede yoksulluk çekmesine neden olur (Batic-Mujanovic ve ark., 2017). Kolombiya’da 13.201 hanede 44.988 kişiyi kapsayan çalışmada, 2-17 yaşları arasındaki toplam 1754 ergen yapılan görüşmelerde yoksul hanede yaşayan ergenlerin, yoksul olmayan hanelerdeki ergenlere göre ruh sağlığı sorunlarına sahip olma riskinin% 50 daha yüksek olduğu tespit edilmiştir (Díaz ve ark., 2022). Çanakkale’de 315 üniversite mezunu işsiz genç ile yapılan çalışmada, işsiz üniversite mezunlarının yarısından fazlasında yüksek depresyon riski belirlenmiş olup, işsizlik süresiyle depresyon riski arasında anlamlı bir ilişkinin olduğu saptanmıştır (Polat ve Bacak, 2018). Bu çalışmalara dayanarak, ruh sağlığının ülkelerin sosyoekonomik gelişimini engelleyebileceği için sadece bireysel bir sorun olmadığını, bir ülkenin geniş kalkınma planını hazırlarken sürdürülebilir kalkınma için potansiyel bir tehdit olarak görülmesi gerektiğini (Cénat ve ark., 2022) söyleyebiliriz.

Multidisipliner bir ekip içerisinde, ruh sağlığı ve sosyal alanda önemli bir yeri olan psikiyatri hemşirelerinin yoksulluğun ekonomik, politik, sosyal etkilerini azaltan programlar, proje ve yapısal yeniliklerin desteklenmesinde, yoksul bireylerin toplumsal hayatın içerisine katılımının sağlanmasında ve yaşam kalitelerinin artırılmasında mesleki rollerini kullanmaları önemlidir. Aynı zamanda işsiz/yoksul kişi ve onun ailesi, ruhsal açıdan sağlıklarının etkilenmemesi ve bozulmamasına dikkat edilmeli, sağlıkta sosyal ölçütlere dikkat çekilmeli, sağlığı geliştirmede etkin yaklaşımlar geliştirmede liderlik rolü üstlenilmeli, toplumda işsiz ve yoksulların savunucusu olunmalı, işsiz ve yoksul ailelerin başa çıkma etme becerileri geliştirilmeli, hayatlarını devam ettirme çabaları ile kaynakları desteklemelidir, uygun olan toplumsal kaynakları kullanmalarında aileye rehberlik edilmelidir (Karadağ&Mermer, 2020).

### **ZORUNLU GÖÇ**

Göç; toplumsal, siyasi ya da ekonomik olan nedenlerle kişinin ya da topluluğun yaşadığı ülkeden farklı bir ülkeye, herhangi bir yerleşim yerinden farklı bir yerleşim yerine gitmesi, bölgesel olarak mekân değiştirme durumunu kapsayan sosyal olan değişim durumudur. Türkiye’de 1950’li yıllardan beri iç göç, 1980’li yıllardan sonra terör olaylarında kaynaklı batıya göç hızlanmıştır. Bununla birlikte, 2011 yılından itibaren Ortadoğu’dan Türkiye’ye göç sürekli göç almaktadır (Solgun ve Durat, 2017). Savaş, etnik veya dinsel özellikli

anlaşmazlıklar, siyasi/politik baskılar, ağır yoksulluk, işsizlik, kariyerde yükselme, istendik olan iş imkânları, eş ve ailesel sebepler, sağlık imkânlarına yakın olma isteği, iklimsel nedenler, doğal afetler, evlilik gibi sebepler göç nedenleridir. Toplum sisteminde mekân olarak eşitsizlik veya dengesizlik durumları da göç yaşanmasına sebep olabilmektedir (Solgun ve Durat, 2017; Topçu ve Başer, 2006).

Göçmenlerin, kamp ortamlarında zorlu yaşam şartlarında yaşaması, güvensizliği deneyimleten yaşantılara maruz kalmaları, uyum göstermeye zorunlu hissetme, sosyal ve kültürel açıdan yalnız hissetme, toplumsal desteğin yetersizliği, sosyal yönden pasiflik durumu ve suçlu hissetme duyguları onların ruhsal olarak yıpranmasına ve ruh sağlıklarının bozulmasına neden olmaktadır. Göçmenlerde toplumun diğer kesimlerine göre; depresyon, anksiyete, intihar, dikkat eksikliği, bunaltı, agorofobi, psikosomatik belirtiler, uyku bozuklukları ve travma sonrası stres bozukluğu gibi psikiyatrik bozukluklar fazla görülmektedir (Aktaş ve ark., 2017). Solgun ve Durat (2017)'ın Veiling ve ark. (2008)'dan aktardığına göre; Hollanda'daki göçmen bireylerle yaptıkları çalışmada, göçmen bireylerin yoğun yaşadığı yerleşim yerlerindeki göçmenlerde şizofreni riskinin daha az olduğu saptanmıştır. Bu çalışmaya göre kendi kültürel ortamında yaşıyor olmanın kişilerarası ilişkileri arttırarak kendini yabancı ve kimsesiz olma hissini duygusunu azalttığı için koruyucu olduğu söylenebilir. Hollanda'da 648 Türk, 102 Fas ve 311 Surinamlı ile yapılan çalışmada şizofreninin haricinde, madde kullanımı sorunları ile duygu durum bozuklukları göçmen gruplarda yüksek olarak tespit edilmiştir. Hollanda'da yapılmış olan araştırmalarda, depresif bozuklukların en fazla Türk olan göçmen gruplarda olduğu saptanmıştır (Kamperman ve ark. 2007).

Tüm bu sonuçlara dayanarak, klinisyenlerin ve hizmet sağlayıcıların mültecilerin ruhsal sorunlarının ve ihtiyaçlarının ve sosyal zorluklarının farkında olmaları gerektiğini, mülteci çocuklara etkili ruh sağlığı hizmetleri sunmak için, hizmetlere erişimi kolaylaştıran ve tedaviye uyumu artıran politikaların geliştirilmesi gerektiğini söyleyebiliriz. Bu bağlamda ruh sağlığı ve psikiyatri hemşiresinin, diğer sağlık disiplinleri ile birlikte, göçmen bireylerin problemlerini ve ihtiyaçlarını saptaması, göçmen bireylere yönelik koruyucu müdahaleleri yapması gerekmektedir. Hemşireler, göçmenlere depresyon ve psikososyal sorunları ile ilgili farkındalıklarını artırma ve uygun baş etme becerilerini geliştirmeye yönelik danışmanlık hizmeti vermelidir. Ayrıca, göçmenlerin çevredeki kişilerle iletişim kurmaları için ortam oluşturulmalı ve önyargılarının en aza indirilmesi hedeflenmelidir. Hemşireler başta sağlık hakkı olmak üzere göçmenlerin sosyal haklarının da savunuculuğunu yapmalı, göçten etkilenen

aile ve çocuklara yönelik psikososyal destek sağlamalıdır, özellikle bu gruplara öncelik verilmeli, özel grup olarak kabul edilmeli, mevcut sağlık durumlarının devam ettirilmesi ve daha iyi duruma getirilmesi için destek olunmalıdır (Gümüş ve Bilgili, 2015; Kaya ve Hiçdurmaz, 2018).

## **TERÖR**

Terör olgusu, günümüzün en çok tartışılan kavramlarından biridir. Köken olarak Latince “terrere” kelimesinden gelen terör, “korktuğu için sarsıntı yaşama”, “korktuğu için titreme, titremeye sebep olma”, “korktuğu için dehşet yaşama” gibi anlamlara gelir. Terör, kişilerde yılgınlık yaratan, büyük çaplı korku veren bir eylem olarak tanımlanmaktadır (Şen, 2015). Terör olayları yoğun travmaya neden olan olgular olup, travma etkisi yaratan durumun peşinden bu duruma maruz kalan bireylerin yanında; aile, yakınlar, yardıma çalışan bireyler, gönüllü olanlar, olayı basından izleyen kişiler de bu travmatik olaya dolaylı biçimde maruz kalmaktadır (Aktaş ve ark., 2017). Yapılan araştırmalara bakıldığında; terör saldırılarının ardından saldırıya görerek işiterek tanık olan bireylerde diğer dönemlerde TSSB ortaya çıktığı belirlenmiştir (Mazurkiewicz ve ark., 2022; Gabriel ve ark., 2007; Aktaş ve ark., 2017). Terör olayını yaşamış kişilerde sonrasında şok yaşama, korkma, öfkelenme, suçlu hissetme, kaygılı olma, çaresiz ve umutsuz hissetme, yorgun ve gergin olma, uyku problemleri, yeme bozukluğu, kalp ritim bozuklukları, ani irkilme, huzursuz ve güvensiz olma, reddedilmiş hissetme, her şeyi kontrol etme isteği, aşırı yargılayıcı, suçlayıcı olma, çevresine ve olaylara yönelik ilgi azalması görülmüştür (Aktaş ve ark., 2017). Zeytinoglu-Saydam ve arkadaşlarının (2020) Türkiye’de 282 kişi ile yaptığı çalışmanın sonuçları dikkate alındığında, katılımcıların terör olaylarından çok fazla etkilendiği, kendini güvende hissetme durumlarının orta seviyede olduğu, TSSB tanısını almış olanların da oranının %9,2 olduğu saptanmıştır. Bu sonuç, terörle ilgili olumsuz durumları ve travmaları yaşayan farklı ülkelere göre düşüktür, terörle ilgili olayları devamlı olarak yaşayan ülkelerdeki (ör: İsrail) oranlara (%9,4) benzerdir (Bleich ve ark., 2003).

Teröre maruz kalan, travma yaşayan kişiler; yüksek oranda iç ya da dış uyaranlara maruziyet yaşamakta, etkili olmayan başa çıkma mekanizmaları sonunda ruhsal problemler ile fiziksel problemleri yaşayabilmektedir. Bu bağlamda psikiyatri hemşireleri; kişinin yaşam olaylarını anlamlandırma, hissettiği duygusal baskı ve problemlerle başa çıkma ve pozitif ilişkiler geliştirebilmede desteklemeli; Travmaya maruz kalanlara yönelik olarak güvenli bir çevre oluşturmalı; bakımlarını sağlarken, kişilerin ve toplulukların kültürel değer ve inançlarına dikkat edilmeli; travma etkisi yaratan durum esnasında bireyin yaşadığı duygularla tepkilerine



dikkat edilmeli ve bireyin yaşadığı duyguyu tanımlayabilmesine yardım edilmeli; hastayla güvene dayalı bir ilişki kuralı, duygu ve düşüncelerini ifade edebilmesi konusunda cesaretlendirmelidir. Ayrıca psikiyatri hemşireleri tecrübeleriyle bireylere yönelik psikolojik destek aşamasında öncelikle ele alınması gereken grupları tespit ederek, sonrasındaki süreçlerde mağdur olanlarla onların yakını olanlara psikoöğitimler yapabilirler (Aktaş ve ark., 2017; Büyükbayram ve ark., 2016).

### **MADDE BAĞIMLILIĞI**

Bağımlılık, bir nesneye, kişiye veya varlığa karşı önüne geçilemeyen bir istek duyma, bireyin ruhsal, bedensel ve sosyal yaşamına zarar verse de devamlı şekilde engellenemeyen istek duyarak kişinin bu durumu sürdürmesi halidir (Bayram, 2013). Madde bağımlılığı, tütün, alkol ve yasadışı uyuşturucuları (kokain, kanabinoidler ve opioidler) ve ayrıca psikoaktif ilaç ilaçlarını da içine alan psikoaktif maddelerin zararlı kullanımını ifade etmektedir (Khatib ve ark., 2018). Dünya Sağlık Örgütü madde bağımlılığını; alkol ile yasadışı olan uyuşturucu maddeleri de içeren psikoaktif maddelerin zararlı ya da tehlikeli kullanımını biçiminde tanımlamıştır (WHO, 2022). Dünya Sağlık Örgütü 2014 yılı istatistiklerinde sigara içiminin dünyada bir senede hemen hemen 6 milyon kişinin ölümüne neden olduğu, tütün ve türevlerinin 2030'a kadar yıllık 8 milyonun üzerinde kişinin hayatını kaybetmesine sebep olacağına dikkat çekmektedir. Yine bu raporda değişik ülkelerde, 13-15 yaş arası gençlerin sigara kullanımlarına bakıldığında erkeklerin %8-34 arasında, kızlarda ise %4-30 oranında olduğu görülmektedir (Mete ve ark., 2020).

Madde kullanımıyla birlikte bağımlılık problemi dünya genelinde ki gibi ülkemizin de giderek artan, sağlık, eğitim, çalışma, sosyal, kültürel gibi birçok alan başta olmak üzere bireyin tüm yaşamını, ailesini, sosyal çevresini ve toplumu etkileyen çok önemli bir toplumsal sorun olma niteliği kazanmıştır (Bayram, 2013; Karadağ, 2021; WHO, 2022). Buna bağlı olarak şiddet, suç eylemleri, sağlık hizmetleri ihtiyaçları, rehabilitasyon hizmetleri, azalan işgücü verimliliği ve yargı harcamaları şeklinde insani, sosyal, sağlık ve ekonomik maliyetlerde artış olmaktadır (Lo ve ark., 2020). Madde bağımlılığının, aynı zamanda trafik kazası, özkıyım, suça yönelim, ailelerde parçalanma, iş yaşamında bozulma, mesleki kayıp ile parasal sorunlar biçiminde, kişiye ve topluma pek çok zararı olup, özellikle gençler üzerinde ciddi etkilere yol açmaktadır. Madde kullanımına genellikle adölesan döneminde başlanmaktadır. Bireylerde suça yönelim çok fazla görülmektedir. Gençler daha çok eğlenebilmek, sosyal ve duygusal ihtiyaçlarını karşılamak, problemlerinden uzaklaşmak, heyecanlanmak şeklinde farklı nedenlerden dolayı

maddeyi kullanmaya yönelmektedir (Altundağ, 2020; Yıldırım ve ark., 2011). Altıntaş ve arkadaşlarının (2007) ifade ettiğine göre; psikoaktif maddenin kötüye kullanım durumu ya da bağımlılık durumu olan bireylerde psikiyatrik hastalıkların görülme oranı 2,7 kat fazla olup, psikiyatrik hastalıkların bir tanesinin eşlik etme oranının ise %70-75 arasında değiştiği vurgulanmıştır. Madde bağımlılığı olan bireylerde psikoz görülme durumu toplumun diğer kesimlerine göre daha yüksektir.

Tüm bilgiler ışığında, psikiyatri hemşireleri, bağımlı hastaların baş etme davranışları ile ilgili ilgili veriler toplayıp, olası hemşirelik tanılarını koyarak bakım sürecini yönetebilirler, uygun etkin baş etme stratejilerini geliştirip, sosyal destek sistemlerini harekete geçirip, duygularının ifade etmeleri sağlanarak, problem çözme becerilerini artırılabilir. Bununla birlikte bir psikiyatri hemşiresinin nihai hedefi, bağımlı bireyin olumsuz duygularını tamamen ortadan kaldırmaktan da öte, olumsuz duygular üzerinde kontrol sağlayabilme, motivasyonunu sürdürebilme, istenilen başarıyı elde etmek amacıyla duyguları düzenlemeye destekleyerek bireyin güçlenmesini sağlamak olmalıdır (Arabacı ve ark., 2018).

## **ŞİDDET**

Türk Dil Kurumu (TDK); şiddeti, *karşıt görüşte olanlara kaba kuvvet kullanma* olarak tanımlamaktadır (TDK, 2022). Şiddet, kişinin kendine ya da bir başkasına zarar verme kastıyla güç kullanma durumunu da kapsayan, ekonomik, biyolojik, kültürel, sosyal, politik ve psikolojik nedenleri olan, kişinin düşünce ve davranışlarıyla ilişkili olan çok boyutlu bir olgudur (Yorulmaz ve Karadeniz, 2021). Ana özellikleri ne olursa olsun, zamana ve topluma göre değişen şiddet olgusu, birçok toplumsal sorunun da kaynağını oluşturmakta, bireylere fiziksel ve ruhsal olarak zarar vermekle kalmayıp, sosyal olarak da olumsuz etkilemektedir. Ayrıca, günümüz toplumunda en önemli sorunlarından birisi olup, sağlıklı toplumların oluşmasında önemli bir engeldir (Özerkmen ve Gölbaşı, 2010). Özellikle kadına yönelik şiddet, kalkınma hedeflerine ulaşmada ilerleme kaydedilmesinin önündeki en büyük engeldir ki bunu ele almayan hiçbir devletin binyıl kalkınma hedeflerine ulaşma şansı çok azdır. Bu rağmen, aile içi şiddet konusu, uluslararası kalkınma gündeminde, planlamada, programlamada ve bütçe lemede düşük bir önceliğe sahip olmaya devam etmektedir (Semahegn ve Mengistie, 2015). Dünyada hiçbir ülke kadınları şiddete karşı güvende değildir. Dünya çapında, kadınların %40-70'i yakın partnerleri tarafından öldürülüyor. DSÖ'nün çok ülkeli çalışmasına göre, aile içi şiddet Japonya'da %15'ten Etiyopya'da %71'e kadar değişmiştir (Semahegn ve Mengistie, 2015).

Şiddete maruz kalan çocuklarda özgüven eksikliği, korkular taşıma, iletişim sorunları yaşama, öğrenme gücü, okul başarısında düşüklük, korku, sinirlilik, duygu ve davranış bozuklukları, anksiyete, depresyon görülebilmekte, bununla birlikte çocuklar madde kullanımı, intihar , sonraki yaşamlarında daha fazla şiddete maruz kalma ve kendilerinin de şiddet uygulaması açısından da risk altında olmaktadır (Lök ve ark., 2016). Çocuklar kadar kadınlara yönelik şiddet de aile şiddet kapsamına giren, insan hakları ihlalleri ve kadınları fiziksel, ruhsal, zihinsel ve üreme sağlığını olumsuz etkileyen toplumsal bir sorundur (Semahegn ve Mengistie, 2015). Psikiyatri hemşirelerinin de içinde bulunduğu, çok sektörlü bir yaklaşımla birlikte, şiddetin önlenmesi ve bunlara yanıt verilmesi için; şiddete maruz kalan kadın ve çocuklar erken teşhis edilmeli ve uygun yönlendirme ve desteğin sağlanması yoluyla şiddetin tekrarlanmasını önlenmeli; yaşam becerilerinin ve gençlere öğretilen kapsamlı cinsellik eğitimi müfredatının bir parçası olarak eşitlikçi cinsiyet normları teşvik edilmeli; ergenlerin, oluşturulacak şiddet önleme programlarına katılması sağlanarak, şiddet ve şiddet nedenlerine ilişkin görüşlerinden yararlanmaları sağlanmalı; gençlere şiddet karşısında “hayır” diyebilecekleri ortamlar oluşturmaları sağlanmalı ve okullarda öğrencilere şiddetin fiziksel boyutu kadar, duygusal, cinsel ve ekonomik boyutu konusunda da farkındalık kazandırılmalı; okullarda, gerçekleşebilecek olası şiddet olaylarının önlenmesinde görev alabilecek okul sağlığı hemşirelerinin istihdam edilmesi ve bu hemşirelerin,

- Ergenlerde ailesel risk faktörlerinin belirlenmesinde,
- Şiddet uygulayan veya şiddete uğrayan çocuklara gerekli yardımın sağlanmasında,
- Ergenlerde düzenli ruh sağlığı taramalarının yapılmasında aktif olarak rol almaları sağlanmalıdır (WHO, 2021; Özgür ve ark., 2011).

### **SUÇ İŞLEMENE YATKINLIK**

Suç, nicelik ve nitelik olarak çok yönlü bir kavram olmakla birlikte, Türk Ceza hukukunda *yasanın cezalandırdığı hareket* olarak tanımlanmış ve toplumsal yapı gibi birçok değişkene bağlı olarak değişen sosyal bir olgudur (Çopur ve ark., 2015). Giddens’e göre suç kavramı, geleneksel kural ve değerlere denk olmayan davranışlarda bulunma ve bu uygun olmayan davranışların yıkıcı özellik taşıması nedeniyle toplumsal yapıya yönelen bir tehdittir (Karakartal, 2020). Bu tanıma göre suç kavramı toplumsal bir sorun olmakla birlikte, diğer toplumsal sorunlar ile rölatif bir ilişki içerisinde olmakta, göç, madde bağımlılığı ve şiddet gibi olgularla ilişkili olduğu bilinmektedir.

Madde bağımlılığı, bireyi suç işlemeye yönelten nedenler arasında olup, uyuşturucu; kişilerin durum ve davranışlarında değişime yol açarak bireyin suç mağduru olmasına ve şiddet, saldırganlık ve hırsızlık suç türlerinin dışında trafik kazaları, medde kuryeliği ve cinsel saldırı gibi suçları işlemesine yol açmaktadır (Boles ve Miotto, 2003; Karakartal, 2020). Toplumu tehdit eden işsizlik sorunu ise bireylerin yaşam standardını düşürmekte, yoksullaşmasına ve toplumdaki izole olmalarına yol açarak, türlü sosyal ve psikolojik sonuçların ortaya çıkmasına neden olmaktadır. Bu gençler, işsizliğin getirdiği sorunlara karşılık olarak intihara yönelmekte, evliliklerini ertelemekte, boşanmalarla birlikte aile kurumuna yönelmiş tehditler artmakta ve tüm bu durumlara bağlı olarak suça yönelmektedir (Özer ve Topal, 2017). Yoksulluk, işsizlik ve eşitsizliğin ötesinde cinayet gibi şiddet içeren suçlarla ilgili ve yaygın olarak inanılan önemli bir faktör de göç olup, 2017'de Çin'de tahmini 287 milyon kırsal göçmen işçinin olduğu, bir popüler medya analizi sonuçlarına göre göçmenler toplam şiddet içeren suçların %80'inden fazlasını oluşturduğu saptanmıştır (Dong ve ark., 2020).

Toplumsal sorunların sonuçları ile ortaya çıkan suç gibi sorunları önlemenin en önemli yolu, toplumun yapısını, temel ihtiyaçlarını ve önceliklerini tanımak, en kısa sürede ve istenen düzeyde bunlara cevap vermek olup, bu durum etkin yönetimin bir gereği olmaktadır. Şiddete ya da cinsel istismara maruz kalmış, aile içinde suç işlemiş bireyler bulunan ve göç etmiş düşük gelirli ailelerin çocuklarının suça yönelmesi ihtimali yüksek olduğundan, böyle çocuklar tespit edilip gerekli psikolojik desteğin sağlanmalı ve düzenli ziyaretler yapılmalıdır (Çopur ve ark., 2015).

## **SONUÇ**

Toplumsal sorunlar insanlık tarihiyle var olan olgular olup, birbirini etkilemekte ve desteklemektedir. Bu sorunlar, bireylerde istihdam ve gelir kaybına yol açmakta ve toplumsal dışlanmaya kadar sonuçlara yol açmaktadır. Ruh sağlığı ise esenliğin önemli bir parçası olup, ruh sağlığının korunması amacıyla psikiyatri hemşireleri başta olmak üzere tüm ruh sağlığı profesyonellerine ve elbette devlet kurumlarına da önemli görevler düşmektedir.

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**SPORCULARIN AHLAKTAN UZAKLAŞMA DÜZEYLERİNİN İNCELENMESİ**

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**ÖZET**

Bu araştırmanın amacı sporcuların ahlaktan uzaklaşma düzeylerini bazı demografik bilgilere göre incelemektir. Çalışmada, betimsel nitelik taşıyan tarama modeli kullanılmıştır. Araştırmanın evreni, spor yükseköğretim kurumlarındaki sporculardan, örneklem grubu ise, Ordu Üniversitesi Spor Bilimleri Fakültesi sporcuları arasından tesadüfi örneklem yöntemi ile seçilmiş 159 katılımcı oluşturmaktadır. Araştırmada veri toplama aracı olarak, araştırmacılar tarafından geliştirilen “Kişisel Bilgi Formu” ile Boardley ve Kavussanu (2008) tarafından geliştirilen Gürpınar (2015) tarafından Türkçeye uyarlanan “Sporda Ahlakdan Uzaklaşma Ölçeği” kullanılmıştır. Araştırmada ölçek maddelerinin iç tutarlılığını belirlemek için güvenirlik katsayısı (cronbach alfa katsayısı) hesaplanmıştır. Ölçeğin güvenirlik katsayısı (cronbach alfa katsayısı) 0,733 olarak tespit edilmiştir. Çalışmada elde edilen verilerin değerlendirilmesinde, normallik varsayım analizine göre; ikili kıyaslamalarda Student t-testi, üç ve daha fazla grup karşılaştırmalarında ise tek yönlü varyans analizi ve Tukey çoklu karşılaştırma testleri kullanılmıştır. Sporcuların Yaş, spor yaşı, anne eğitim durumu ve baba eğitim durumu değişkenlerine göre sporda ahlaktan uzaklaşma ölçeği toplam puanları arasında anlamlı bir farklılık tespit edilmemiştir. Cinsiyet ve spor türüne göre toplam puanlar da ise anlamlı farklılık belirlenmiştir. Yapılan analiz sonucu, erkek sporcuların kadın sporculara göre toplam puan ortalamalarının daha yüksek olduğu saptanmıştır. Bir diğer bulgu da ise takım sporcularının bireysel sporculara göre ahlaktan uzaklaşma puanlarının daha yüksek olduğu görülmüştür. Bu anlamda erkek sporcuların kadın sporculara göre spor ahlakından daha uzak olduğu yorumu yapılabilir. Aynı şekilde takım sporu yapan sporcuların bireysel spor yapan sporculara göre spor ahlakından daha uzak olduğu söylenebilir. Bu anlamda erkek sporcular ve takım sporu yapan sporcular için sporun etik ve norm değerlerini vurgulayacak, fair-play kavramını açıklayacak etkinlikler ve seminerler yapılması tavsiye edilmektedir.

**Anahtar kelimeler:** Ahlak, ahlaktan uzaklaşma, spor

## **EXAMINATION OF ATHLETES' LEVELS OF MORAL DISENGAGEMENT**

### **ABSTRACT**

The aim of this research is to examine the level of athletes' demoralization according to some demographic information. In the study, descriptive screening model was used. The universe of the study consists of 159 participants selected by random sampling method from among the athletes of Ordu University Faculty of Sports Sciences and the sample group consists of athletes from sports higher education institutions. In the study, the "Personal Information Form" developed by the researchers and the "Moral Disengagement Scale in Sports" developed by Boardley and Kavussanu (2008) and adapted to Turkish by Gürpınar (2015) were used as data collection tools. The reliability coefficient (cronbach alpha coefficient) of the scale was determined as 0,733. In the evaluation of the data obtained in the study, according to the normality assumption analysis; Student's t-test was used for binary comparisons, one-way analysis of variance and Tukey multiple comparison tests were used for three or more group comparisons. According to the variables of age, sports age, maternal education status and father education status of the athletes, no significant difference was found between the total scores of the scale of demoralization in sports. Total scores according to gender and type of sport were also significantly differentiated. As a result of the analysis, it was determined that the total average score of male athletes was higher than female athletes. Another finding was that team athletes had higher scores of demoralization than individual athletes. In this sense, it can be interpreted that male athletes are more distant from sports ethics than female athletes. In the same way, it can be said that athletes who do team sports are more distant from sports ethics than athletes who do individual sports. In this sense, it is recommended to organize events and seminars for male athletes and team sports that will emphasize the ethical and normative values of sports and explain the concept of fair play.

**Keywords:** Morality, moral disengagement, sport

## **GİRİŞ**

Son yıllarda alan yazın incelendiğinde, fair play ve sportmenlik ile ilgili birçok çalışmanın olduğu bilinmektedir (Akpınar ve Küçükkatçeken 2019; Başaran ve ark. 2017). Yapılan çalışmalar, spor içerisindeki düzen ve sistem yönünden önemi tartışılmaz bir durumdur. Spor içerisinde ahlaki normlara göre hareket etmenin yanında ahlaktan uzaklaşabilecek davranışların da olduğu söylenebilir. Bu noktada sporcu ve antrenörlerin ahlaki kurallara uygun olmayan davranışları sergilerken, yeri geldiği zaman bu davranışları uygularken haklı olduklarını ifade edebilmektedirler.

Spor içerisindeki işleyişin düzeni ve sisteminin bozulmaması açısından, sporcuların ahlaktan uzaklaşabilecek davranışlardan sakınmaları önemlidir. Ahlaktan uzaklaşma mekanizmaları, sergilenen davranışlar yönünden rehberlik ettiği ifade edilebilir. Bu mekanizmalar; ahlaksızlığı meşrulaştırma, örtmeceli sınıflandırma, avantajlı karşılaştırma, sorumluluğun yer değiştirmesi, sorumluluğun dağılmaması, sonuçların saptırılması, insani özelliklerden uzaklaşma ve suça dayanak oluşturma olarak sınıflandırılmaktadır. Açıklanan mekanizmaların daha detaylı incelenmesi önemli olacaktır. Genel olarak sporcuların galibiyet için uygulamış oldukları davranışlar hatalı olsa bile, övgüye değer olarak nitelendirilmektedir. Bu olay ahlaksızlığı meşrulaştırmaktadır. Örtmece kelime anlamı bir takım kaba ve çirkin kavramları değiştirerek daha uygun hale getirme durumu olarak tanımlanabilir. Bu durum sporda örtmece yaparak, ahlaki kurallara uygun olmayan kavramları esneterek ifade edebilmektedir. Bunların yanında sporcular bazı kötü davranışları daha çirkin davranışlarla karşılaştırarak, masum göstermekte ve bazı kötü davranışları ise toplumun ve üstlerinin sorumlu olduğunu aktarmaktadır. Sorumluluğun dağılması mekanizması incelenecek olunursa, takım olarak şiddet içeren davranışlar sergilenmesi sonucunda, sorumluluğun bireyler tarafından kabul edilmeme durumu olarak açıklanabilir. Sporcuların şiddet içeren davranışları ve çirkin söylemlerinin daha sonra önemsiz olduğunu düşünmektedirler. Yani sonuçları saptırmaktadırlar. Son olarak sporcular, rakiplerini insani özelliklerden yoksun olduklarını ve yapılan şiddet içerikli davranışlarının, tahrik sonucunda gerçekleştirdiklerini ifade etmektedirler. Bunlar ise, insani özelliklerden uzaklaşma ve suça dayanak oluşturma mekanizmalarını nitelemektedir (Gürpınar 2015). Bu tanımlamalar neticesinde; sporda ahlaktan uzaklaşma durumu, sporun içerisinde kural, ilke ve etik prensiplere uygun olmayan davranışlar bütünü olarak açıklanabilir. Böylece bu çalışmanın amacı, sporcuların ahlaktan uzaklaşma düzeylerinin incelenmesidir.

## **ARAŞTIRMA VE BULGULAR**

Araştırmada, mevcut durumu tespit etmeyi amaçladığı için betimsel nitelik taşıyan tarama modeli kullanılmıştır. Tarama modelleri, geçmişte ya da halen var olan bir durumu var olduğu şekliyle betimlemeyi amaçlayan araştırma yaklaşımlarıdır (Karasar, 2015).

### **Evren ve Örneklem**

Araştırmanın evreni, spor yükseköğretim kurumlarındaki öğrencilerden, örneklem grubu ise, Ordu Üniversitesi Spor Bilimleri Fakültesi öğrencileri arasından tesadüfi örneklem yöntemi ile seçilmiş 159 katılımcıdan oluşmaktadır.

### **Veri Toplama Araçları**

Araştırmada veri toplama aracı olarak, araştırmacılar tarafından geliştirilen “Kişisel Bilgi Formu” ile Boardley ve Kavussanu (2008) tarafından geliştirilen, Gürpınar (2015) tarafından uyarlanan “Sporda Ahlaktan Uzaklaşma Ölçeği” kullanılmıştır. Kişisel bilgi formunda; cinsiyet, yaş, spor yaşı, spor türü, anne ve baba eğitim durumu değişkenleri yer almaktadır. Sporda Ahlaktan Uzaklaşma Ölçeği 7’li likert tipi olup, tek faktörlü yapı olarak 8 maddeden oluşmaktadır. Sporda Ahlaktan Uzaklaşma Ölçeği Cronbach’s Alpha ( $\alpha$ ) değeri 0,78 olarak hesaplanmıştır.

### **İstatistiksel Analiz**

Verilerin istatistiksel analizinde öncelikli olarak normallik varsayımı KolmogorovSmirnov ve Shapiro-Wilk testi ile incelenmiştir. Normal dağılım gösteren ölçeğin, elde edilen verilerin değerlendirilmesinde ikili gruplar (spor türü, cinsiyet, yaş) için Student t-testi, ikiden fazla gruplar (anne ve baba eğitim durumu ve spor yaşı) için Tek Yönlü Varyans Analizi ve Tukey çoklu karşılaştırma testi uygulanmıştır. Araştırmada elde edilen verilerin analizinde SPSS 22.0 V. istatistik paket programı kullanılmıştır. Araştırma bulguları, n (%), ortalama, standart sapma değerleri olarak verilmiş olup, bulgular  $p < 0,05$  düzeyinde anlamlı kabul edilmiştir.

**Tablo 1.** Araştırmaya Katılan Sporcuların Demografik Özelliklerine Göre Dağılımı

		n	%
Cinsiyet	Erkek	84	52,8
	Kadın	75	47,2
Yaş	18-21	91	57,2
	21 yaş ve üzeri	68	42,8
Anne Eğitim Durumu	İlköğretim	113	71,1
	Lise	34	21,4
	Üniversite	12	7,5
Baba Eğitim Durumu	İlköğretim	95	59,7
	Lise	48	30,2
	Üniversite	16	10,1
Spor Türü	Bireysel	75	47,2
	Takım	84	52,8
Spor Yaşı	0-2	14	8,8
	3-4	28	17,6
	5 yıl ve üzeri	117	73,6

**Tablo 2.** Cinsiyet Değişkenine Göre Sporcuların Ahlaktan Uzaklaşma Düzeyleri

Cinsiyet	n	Ort.	Ss.	P
Erkek	84	27,69	7,25	<0,001
Kadın	75	22,60	7,66	

Araştırmada, sporcuların cinsiyet açısından ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olduğu tespit edilmiştir.

**Tablo 3.** Yaş Değişkenine Göre Sporcuların Ahlaktan Uzaklaşma Düzeyleri

Yaş	n	Ort.	Ss.	P
18-21	91	25,42	7,14	0,797
21 yaş ve üzeri	68	25,10	8,76	

Çalışmada, sporcuların yaş değişkeni açısından ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olmadığı tespit edilmiştir.

**Tablo 4.** Anne Eğitim Durumu Değişkenine Göre Sporcuların Ahlaktan Uzaklaşma Düzeyleri

Anne Eğitim Durumu	n	Ort.	Ss.	P
İlköğretim	113	25,47	7,88	0,895
Lise	34	24,82	8,12	
Üniversite	12	24,83	7,25	

Araştırmada, sporcuların anne eğitim durumu değişkeni açısından ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olmadığı tespit edilmiştir.

**Tablo 5.** Baba Eğitim Durumu Değişkenine Göre Sporcuların Ahlaktan Uzaklaşma Düzeyleri

Baba Eğitim Durumu	n	Ort.	Ss.	P
İlköğretim	95	24,47	7,62	0,270
Lise	48	26,66	7,82	
Üniversite	16	26,00	8,83	

Çalışmada, sporcuların baba eğitim durumu değişkeni açısından ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olmadığı tespit edilmiştir.

**Tablo 6.** Spor Türü Değişkenine Göre Sporcuların Ahlaktan Uzaklaşma Düzeyleri

Spor Türü	n	Ort.	Ss.	P
Bireysel	75	23,73	6,74	0,016
Takım	84	26,67	8,52	

Araştırmada, sporcuların spor türü değişkeni açısından ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olduğu tespit edilmiştir.

**Tablo 7.** Spor Yaşı Değişkenine Göre Sporcuların Ahlaktan Uzaklaşma Düzeyleri

Spor Yaşı	n	Ort.	Ss.	P
0-2	14	24,07	5,23	0,816
3-4	28	25,67	8,82	
5 yıl ve üzeri	117	25,34	7,91	

Çalışmada, sporcuların spor yaşı değişkeni açısından ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olmadığı tespit edilmiştir.

## SONUÇ

Çalışmada, sporcuların yaş, anne eğitim durumu, baba eğitim durumu ve spor yaşı değişkenlerine göre ahlaktan uzaklaşma düzeylerinde anlamlı bir farklılık tespit edilmemiştir. Cinsiyet ve spor türü değişkenlerinde ise ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olduğu tespit edilmiştir.

Cinsiyet değişkenine göre incelendiğinde, sporcuların ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olduğu saptanmıştır. Yapılan analize göre, erkeklerin kadınlara göre puan ortalamalarının yüksek olduğu belirlenmiştir. Bu durum erkeklerin kadınlara göre daha hırslı olmalarına bağlanabilir. Alan yazın incelendiğinde Sarıkol (2021), Eroğlu ve ark. (2020), Turan (2020), Akoğlu ve ark. (2019), Yıldız (2019)'ın çalışma sonucu ile mevcut araştırma sonucu benzerlik gösterirken, Eriş (2020)'in çalışma sonucu ise örtüşmemektedir. Yaş değişkenine

göre incelendiğinde, sporcuların ahlaktan uzaklaşma düzeylerinde herhangi bir anlamlı farklılık olmadığı tespit edilmiştir. Yaşın ahlaktan uzaklaşma düzeyine bir etkisi olmadığı görülmektedir. Literatür incelendiğinde, Çavdar (2019)'ın çalışma sonucu ile araştırma sonucu benzerlik göstermektedir. Anne ve baba eğitim durumu değişkenine göre, sporcuların ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olmadığı bulunmuştur. Alan yazın incelendiğinde, Çavdar (2019)'ın çalışma sonucu ile mevcut araştırma sonucu benzerlik gösterirken, Eroğlu ve ark. (2020)'nin araştırma sonucuyla ise uyuşmamaktadır. Spor türü değişkenine bakıldığında, sporcuların ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olduğu tespit edilmiştir. Yapılan analizde, takım sporcularının bireysel sporculara göre puan ortalamalarının yüksek olduğu belirlenmiştir. Bu durum, takım sporcularının diğer takım arkadaşlarının baskısından kaynaklı olabileceği söylenebilir. Literatür incelendiğinde, Eriş (2020)'in çalışma sonucu ile araştırma sonucu benzerlik göstermektedir. Spor yaşı değişkenine göre incelendiğinde, sporcuların ahlaktan uzaklaşma düzeylerinde anlamlı farklılık olmadığı tespit edilmiştir. Alan yazın incelendiğinde, Çavdar (2019)'ın çalışma sonucu ile mevcut araştırma sonucu benzerlik gösterirken, Eroğlu ve ark. (2020)'nin araştırma sonucuyla ise örtüşmemektedir. Araştırma sonuçlarına göre, takım sporcuları ile erkek sporcuların ahlaktan uzaklaşma düzeylerinin yüksek olduğu tespit edilmiştir. Erkek sporcuların hırs ve azimlerini olumsuz şekilde göstermemeleri açısından antrenörlerin disiplinli davranmaları ve kurallara göre hareket edilmesi noktasında uyarılarda bulunması önerilebilir. Bunun yanında takım sporcularının daha adil ve sportmence davranmaları yönünde birbirlerini tetiklemeleri gerekmektedir. Sonuç olarak, sporculara fair-play kavramını açıklayacak etkinlikler ve seminerler yapılması tavsiye edilmektedir.

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**SPORCULARDA BAŞARI AMACI DÜZEYİNİN İNCELENMESİ**

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**ÖZET**

Bu araştırmanın amacı sporcularda başarı amacı düzeylerini bazı demografik bilgilere göre incelemektir. Çalışmada, betimsel nitelik taşıyan tarama modeli kullanılmıştır. Araştırmanın evreni, spor yükseköğretim kurumlarındaki sporculardan, örneklem grubu ise, Ordu Üniversitesi Spor Bilimleri Fakültesi sporcuları arasından tesadüfi örneklem yöntemi ile seçilmiş 111 katılımcı oluşturmaktadır. Araştırmada veri toplama aracı olarak, araştırmacılar tarafından geliştirilen “Kişisel Bilgi Formu” ile Karanfil ve ark. (2021) tarafından geliştirilen “Sporda Başarı Amacı Ölçeği” kullanılmıştır. Araştırmada ölçek maddelerinin iç tutarlılığını belirlemek için güvenirlik katsayısı (cronbach alfa katsayısı) hesaplanmıştır. Ölçeğin güvenirlik katsayısı (cronbach alfa katsayısı) 0,851 olarak tespit edilmiştir. Çalışmada elde edilen verilerin değerlendirilmesinde, normallik varsayım analizine göre; ikili kıyaslamalarda Student t-testi, üç ve daha fazla grup karşılaştırmalarında ise tek yönlü varyans analizi ve Tukey çoklu karşılaştırma testleri kullanılmıştır. Sporcuların cinsiyet, anne eğitim durumu, baba eğitim durumu ve spor türü değişkenlerine göre sporda başarı amacı ölçeği toplam puanları arasında anlamlı bir farklılık tespit edilmemiştir. Ancak, yaş değişkenine göre toplam puan ve ego alt boyut puanları açısından anlamlı farklılık olduğu tespit edilmiştir. Spor yaşında ise ustalık alt boyut puanları arasında anlamlı farklılık belirlenmiştir. Yapılan analiz sonucu, yaşı 21 ve üzeri olan sporcuların toplam puan ortalamalarının daha yüksek olduğu saptanmıştır. Böylece sporcuların yaşı arttıkça sporda başarı amaçlarının da artacağı düşünülmektedir. Sporun içerisinde bulunan rekabet, hedefe ulaşma, hırs ve azim gibi özellikler sporcular için önemli yer edinmektedir. Bu özelliklerin tümüne sahip olan sporcuların spordaki başarı amaçlarını da etkilediği düşünülmektedir. Sonuç olarak, yaşı küçük olan ve tecrübe sahibi olmayan sporculara tecrübeli ve başarılı sporcular dahilinde eğitim ve öğretim verilmesi tavsiye edilmektedir.

**Anahtar kelimeler:** Amaç, Başarı, Spor

**EXAMINATION OF THE LEVEL OF ACHIEVEMENT PURPOSE IN ATHLETES****ABSTRACT**

The aim of this research is to examine the success goal levels in athletes according to some demographic information. In the study, descriptive screening model was used. The universe of the study consists of 111 participants selected by random sampling method from among the athletes of Ordu University Faculty of Sports Sciences and the sample group consists of athletes from sports higher education institutions. As a data collection tool in the study, the "Personal Information Form" developed by the researchers and the "Achievement Goal Scale In Sports" developed by Karanfil et al. (2021) were used. In the study, reliability coefficient (cronbach alpha coefficient) was calculated to determine the internal consistency of the scale items. The reliability coefficient (cronbach alpha coefficient) of the scale was determined as 0.851. In the evaluation of the data obtained in the study, according to the normality assumption analysis; Student's t-test was used for binary comparisons, one-way analysis of variance and Tukey multiple comparison tests were used for three or more group comparisons. According to the variables of gender, maternal education status, father education status and sports type of athletes, no significant difference was found between the total scores of the achievement purpose in sports scale. However, according to the age variable, it was found that there was a significant difference in terms of total score and ego sub-dimension scores. In sports age, a significant difference was determined between the mastery sub-dimension scores. As a result of the analysis, it was found that the total score averages of the athletes aged 21 and over were higher. Thus, it is thought that as the age of athletes increases, their success goals in sports will also increase. Features such as competition, goal reaching, ambition and perseverance in sports have an important place for athletes. It is thought that athletes who have all of these characteristics also affect their success goals in sports. As a result, it is recommended that young athletes who are young and do not have experience be given education and training within experienced and successful athletes.

**Keywords:** Goal, Achievement, Sports

## 1. GİRİŞ

Başarı amacı teorisi, bireyin hedeflediği amaca yönelik duygu, düşünce, motivasyon ve azim gibi isteklerini açıklamaktadır. Bireyin hedeflerine yaklaşım şekillerini, performansını ve potansiyelini ortaya koymaktadır (Bodmann, Hulleman ve Harackiewicz, 2011). Tanımlardan da yola çıkarak bir kişinin amacına ulaşmasında “neden başarmalıyım?” sorusuna cevap aramaktadır. Bu anlamda başarı amacı teorisinin iki farklı yönelim durumu ortaya çıkmaktadır. Bunlar; ego ve görev yönelimidir. Ego yönelimi; bireyin dışarıya karşı üstünlük sağlamak ve yeteneklerini kanıtlamak için gösterdiği performanstır. Görev yönelimi ise; bireyin başarıya ulaşmakta gösterdiği performansın yeterliliğidir (Nicholls, 1989; Fry ve Newton, 2003). Başarı amacı teorisi eğitim alanı ile yakından ilgilidir. Özellikle öğrenci ve öğretmenlerin hedefe ulaşmak için girdiği yönelimi açıklamada birçok kez çalışma konusu olmuştur (Wolters, 2004; Anderman ve Patrick, 2012)

Başarı amacı teorisinin bir diğer çalışma alanı ise içerdiği bolca rekabet, mücadele ve yarışmanın olduğu spor alanıdır. Bir sporcu, antrenör ya da spor kurumunun hedefine “neden?” ulaşmak istemesi bu teori ile yakından ilgilidir. Spor alanında yapılan çalışmalar bireyin hedefine yönelimini farklı şekillerde ortaya koymuştur. Bir sporcunun diğer sporculara yeteneğini kanıtlama çabasına girmesi ve hedefine bu şekilde ulaşmak istemesi ego yönelimi ile ilgilidir. Sporcunun hedefine ulaşması için kendini geliştirmesi ve azim göstermesi ise ustalık yönelimi ile ilgilidir. Görev yönelimi, sporcunun başarı elde etmesi için azim, istek, çaba ve güç göstermesi olarak tanımlanırken ego yönelimi sporcunun hedefe ulaşmaya yönelik karakteristik inançlarını ortaya koymaktadır (Duda, 1993; Kristiansen, Halvari ve Roberts, 2012).

Tanımlardan da anlaşıldığı gibi bir sporcunun hedefine ulaşması iki farklı yönelimle gerçekleşmektedir. Ego yönelimi bireyin karakteristik özellikleri, yetenek gösterme çabaları, motivasyonu ve inançları ile ilgiliyken görev yönelimi doğrudan hedefe ulaşmak istemesi ve görevi başarıyla tamamlaması ile açıklanmaktadır. Sporun temasında güç ve rekabet vardır. Rekabetin artması ise doğrudan çekişmeli mücadelelere zemin hazırlamaktadır. Sporcular bu zeminde kazanmak ve rakiplerine üstünlük sağlamak istemektedir. Bu üstünlüğün sağlanması ise şüphesiz çalışmak ve inanmak ile ilgilidir. Bir diğer unsur ise sporcunun amacına ulaşmak istemesinin nedeni ile ilgilidir. Bu anlamda çalışmanın amacını sporcularda başarı amacı düzeyinin incelenmesi oluşturmaktadır. Çalışmadan elde edilecek bulgular ile literatürdeki bahsi geçen soruların cevaplanacağı düşünülmektedir.

## 2. YÖNTEM

Araştırmada, mevcut durumu tespit etmeyi amaçladığı için betimsel nitelik taşıyan tarama modeli kullanılmıştır. Tarama modelleri, geçmişte ya da halen var olan bir durumu var olduğu şekliyle betimlemeyi amaçlayan araştırma yaklaşımlarıdır (Büyüköztürk, 2010; Karasar, 2015).

### **Evren ve Örneklem**

Araştırmanın evreni, spor yükseköğretim kurumlarındaki öğrencilerden, örneklem grubu ise, Ordu Üniversitesi Spor Bilimleri Fakültesi öğrencileri arasından tesadüfi örneklem yöntemi ile seçilmiş 105 katılımcıdan oluşmaktadır. Örneklem grubu belirlemede Tavşancıl (2002)'in "örneklem grubu ölçek madde sayısının 5 katı kadar olmalıdır" önerisi ile belirlenmiştir.

### **Veri Toplama Araçları**

Araştırmada veri toplama aracı olarak, araştırmacılar tarafından geliştirilen "Kişisel Bilgi Formu" ile Karanfil ve ark. (2021) tarafından geliştirilen "Sporda Başarı Amacı Ölçeği" kullanılmıştır. Kişisel bilgi formunda; cinsiyet, yaş, anne ve baba eğitim durumu, spor türü ve spor yaşı değişkenleri yer almaktadır. Sporda Başarı Amacı Ölçeği 5'li likert tipinde olup, 2 faktörlü (ego ve ustalık) yapı olarak 11 maddeden oluşmaktadır. Ölçeğin Cronbach's Alpha ( $\alpha$ ) değerleri incelendiğinde, ego alt boyutu için 0,88, ustalık 0,91 ve Sporda Başarı Amacı Ölçeği toplam Cronbach's Alpha ( $\alpha$ ) değeri için 0,87 olarak hesaplanmıştır.

### **İstatiksel Analiz**

Verilerin istatistiksel analizinde öncelikli olarak normallik varsayımı KolmogorovSmirnov ve Shapiro-Wilk testi ile incelenmiştir. Normal dağılım gösteren Sporda Başarı Amacı Ölçeği'nden elde edilen verilerin değerlendirilmesinde ikili gruplar (cinsiyet, yaş, spor türü) için Student t-testi, ikiden fazla gruplar (anne ve baba eğitim durumu ve spor yaşı) için Tek Yönlü Varyans Analizi ve Tukey çoklu karşılaştırma testi uygulanmıştır. Araştırmada elde edilen verilerin analizinde SPSS 22.0 V. istatistik paket programı kullanılmıştır. Araştırma bulguları, n (%), ortalama, standart sapma değerleri olarak verilmiş olup, bulgular  $p<0,05$  düzeyinde anlamlı kabul edilmiştir.

### 3. BULGULAR

**Tablo 1.** Araştırmaya Katılan Sporcuların Demografik Özelliklerine Göre Dağılımı

Değişken	Kategori	n	%
Cinsiyet	Kadın	49	46,7
	Erkek	56	53,3
Yaş	18-20	86	81,9
	21 ve üzeri yaş	19	18,1
Anne Eğitim Durumu	İlköğretim	74	70,5
	Lise	23	21,9
	Üniversite	8	7,6
Baba Eğitim Durumu	İlköğretim	60	57,1
	Lise	31	29,5
	Üniversite	14	13,3
Spor Türü	Bireysel	53	50,5
	Takım	52	49,5
Spor Yaşı	0-2	11	10,5
	3-4	13	12,4
	5 ve üzeri yıl	81	77,1

**Tablo 2.** Cinsiyet Değişkenine Göre Sporcuların Sporda Başarı Amacı Durumları

Ölçek ve Alt Boyutlar	Cinsiyet	n	Ort.	S.s.	t	p
Ego	Erkek	49	22,59	3,054	,244	,696
	Kadın	56	22,37	2,625		
Uсталık	Erkek	49	28,79	2,700	-,018	,986
	Kadın	56	28,80	1,633		
Toplam Puan	Erkek	49	51,38	5,183	,391	,808
	Kadın	56	51,17	3,547		

Tablo 2.'de sporcuların cinsiyetine göre sporda başarı amacı puanları arasında anlamlı bir farklılık tespit edilmemiştir.

**Tablo 3.** Yaş Değişkenine Göre Sporcuların Sporda Başarı Amacı Durumları

Ölçek ve Alt Boyutlar	Yaş	n	Ort.	S.s.	t	p
Ego	18-20	86	22,29	3,032	-2,337	<b>,003*</b>
	21 ve üzeri	19	23,31	1,293		
Uсталık	18-20	86	28,72	2,364	-,787	,134
	21 ve üzeri	19	29,15	1,014		
Toplam Puan	18-20	86	51,01	4,734	-2,322	<b>,006*</b>
	21 ve üzeri	19	52,47	1,576		

Tablo 3.'te sporcuların yaşlarına göre sporda başarı amacı puanları arasında ego alt boyutu ile toplam puanlarında istatistiksel olarak anlamlı farklılık tespit edilmiştir.

**Tablo 4.** Anne Eğitim Durumu Değişkenine Göre Sporcuların Sporda Başarı Amacı Durumları

Ölçek ve Alt Boyutlar	Anne Eğitim Durumu	n	Ort.	Ss.	f	p
Ego	İlköğretim	74	22,20	2,960	1,181	,311
	Lise	23	23,13	2,473		
	Üniversite	8	23,12	2,232		
Uсталık	İlköğretim	74	28,71	2,361	,251	,778
	Lise	23	29,08	1,729		
	Üniversite	8	28,75	1,752		
Toplam Puan	İlköğretim	74	50,91	4,666	,855	,855
	Lise	23	52,21	3,502		
	Üniversite	8	51,87	3,603		

Tablo 4.'te sporcuların anne eğitim durumuna göre sporda başarı amacı puanları arasında anlamlı bir farklılık tespit edilmemiştir.

**Tablo 5.** Baba Eğitim Durumu Değişkenine Göre Sporcuların Sporda Başarı Amacı Durumları

Ölçek ve Alt Boyutlar	Baba Eğitim Durumu	n	Ort.	Ss.	f	p
Ego	İlköğretim	60	22,45	3,010	,510	,602
	Ortaöğretim	31	22,22	2,871		
	Önlisans ve üzeri	14	23,14	1,703		
Uсталık	İlköğretim	60	28,56	2,540	1,611	,205
	Ortaöğretim	31	29,38	1,453		
	Önlisans ve üzeri	14	28,50	1,698		
Toplam Puan	İlköğretim	60	51,01	4,897	,244	,784
	Ortaöğretim	31	51,61	3,800		
	Önlisans ve üzeri	14	51,64	3,103		

Tablo 5.'te sporcuların baba eğitim durumuna göre sporda başarı amacı puanları arasında anlamlı bir farklılık tespit edilmemiştir.

**Tablo 6.** Spor Türü Değişkenine Göre Sporcuların Sporda Başarı Amacı Durumları

Ölçek ve Alt Boyutlar	Spor Türü	n	Ort.	Ss.	t	p
Ego	Bireysel	53	22,16	2,998	-1,057	,215
	Takım	52	22,78	2,622		
Uсталık	Bireysel	53	28,66	2,766	-,663	<b>,048*</b>
	Takım	52	28,94	1,377		
Toplam Puan	Bireysel	53	50,83	5,063	-1,125	,083
	Takım	52	51,73	3,509		

Tablo 6.'da sporcuların spor türü değişkenine göre sporda başarı amacı puanları arasında ustalık alt boyutu puanlarında anlamlı farklılık olduğu tespit edilmiştir.

**Tablo 7.** Spor Yaşı Değişkenine Göre Sporcuların Sporda Başarı Amacı Durumları

Ölçek ve Alt Boyutlar	Spor Yaşı	n	Ort.	S.s.	t	p
Ego	0-2	11	21,454	3,615	1,346	,265
	3-4	13	21,846	3,387		
	5 ve üzeri yıl	81	22,716	2,594		
Ustalık	0-2	11	27,181	4,976	4,029	<b>,021*</b>
	3-4	13	28,461	1,761		
	5 ve üzeri yıl	81	29,074	1,481		
Toplam Puan	0-2	11	48,636	8,333	1,346	,265
	3-4	13	50,307	4,210		
	5 ve üzeri yıl	81	51,790	3,473		

Tablo 7.'de sporcuların spor yaşı değişkenine göre sporda başarı amacı puanları arasında ustalık alt boyutu puanlarında anlamlı farklılık olduğu tespit edilmiştir.

#### 4. SONUÇ VE DEĞERLENDİRME

Bu çalışmanın amacı sporcularda başarı amacı düzeyinin bazı değişkenlere göre belirlenmesidir.

Çalışma sonuçlarına göre sporcuların cinsiyet, anne eğitim durumu, baba eğitim durumu ve spor türü değişkenlerine göre sporda başarı amacı ölçeği toplam puanları arasında anlamlı bir farklılık tespit edilmemiştir. Ancak yaş, spor türü ve spor yaşı değişkenlerine göre puanlar arasında anlamlı farklılık olduğu tespit edilmiştir. Yapılan analiz sonucunda yaşı 21 ve üzeri olan sporcuların toplam puan ve ego puanlarının 18-20 yaş kategorisine göre daha yüksek olduğu saptanmıştır. Spor türüne göre ustalık alt boyut puanlarında takım sporcuları lehine anlamlı farklılık belirlenmiştir. Spor yaşında ise ustalık alt boyut puanları arasında spor yaşı 5 yıl ve üzeri olan sporcular lehine anlamlı farklılık görülmektedir.

Bu sonuçlara göre sporcuların cinsiyet, anne eğitim durumu ve baba eğitim durumlarının başarı amaçlarını etkilemediği sonucuna ulaşılabilir. Yaşları 21 ve üzeri olan sporcuların 18-20 yaş kategorisindeki sporculara göre başarıya ulaşma çabalarının daha yüksek olduğu söylenebilir. Sporcular deneyim ve tecrübe kazandıkça mücadele ve azimlerinin de artacağı düşünülmektedir. Bunun sonucu olarak başarıya ulaşma çabalarında da artış olacağı öngörülmektedir. Ayrıca 21 ve üzeri yaş kategorisindeki sporcuların 18-20 yaş kategorisindeki sporculara göre ego puanlarının daha yüksek olduğu görülmektedir. Ortaya çıkan bu sonucun sporcuların yaşlarının artmasıyla başarı amaçlarının ego ile ilişkili olduğu yorumu yapılabilir. Sporcuların spor türlerinde takım sporcularının bireysel sporculara göre ustalık puanlarının

daha yüksek olduğu tespit edilmiştir. Bu bulgu; takım uyumu, takım içerisindeki aile ortamı ve birden fazla sporcu ile mücadele ile açıklanabilir. Aynı sayıdaki müsabakaya çıkan bir takım sporcusu ile bireysel sporcunun karşılaşacağı rakip sayısı daha fazla olacaktır. Bu nedenle takım sporcuları bireysel sporculara göre daha fazla rakiple mücadele edecektir. Bunun sonucunda ise daha fazla tecrübe ve deneyim kazanacağı düşünülmektedir. Bir diğer bulguda ise spor yaşı 5 yıl ve üzeri olan sporcuların diğer spor yaşı kategorisindeki sporculara göre ustalık puanlarının daha yüksek olduğu belirlenmiştir. Bu bulguya göre tecrübeli ve deneyimli sporcuların daha tecrübesiz sporculara göre başarı amaçlarının daha yüksek olduğu öngörülmektedir.



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**TEMASLI VE TEMASSIZ ÖN ÇAPRAZ BAĞ SAKATLIĞI YAŞAYAN  
PROFESYONEL ERKEK FUTBOLCULARDA COL3A1- rs1800255 GEN VARYANT  
DAĞILIMININ İNCELENMESİ**

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## **ÖZET**

Bu çalışma, temaslı ve temassız olarak ön çapraz bağ (ÖÇB) sakatlığı yaşamış olan profesyonel erkek futbolcuların, COL3A1 (rs1800255) gen polimorfizmlerinin genotip ve alel dağılımlarını incelemek amacıyla yapılmıştır. Çalışmaya en az 2 kez ön çapraz bağ ameliyatı geçirmiş 40 profesyonel erkek futbolcu (Temaslı: 14, Temassız: 26) gönüllülük esası ile katılmıştır. Sporculardan elde edilen kan örneklerine DNA izolasyon kitleri kullanılarak DNA izolasyonu yapılmıştır. Temaslı ve temassız ÖÇB sakatlığı yaşayan futbolcuların genotip ve alel dağılımları Ki-kare testi veya Fischer's exact testi ile karşılaştırılmıştır. Elde edilen bulgular, temaslı ya da temassız ÖÇB sakatlığı yaşayan futbolcuların genotip (AA-AG-GG) dağılımları bakımından istatistiksel olarak farklılaşmadıklarını göstermektedir ( $p>0.05$ ). Alel dağılımları (A-G) incelendiğinde de yine istatistiksel olarak bir farklılığa rastlanmadığı tespit edilmiştir ( $p>0.05$ ). Sonuç olarak, profesyonel erkek futbolcuların ön çapraz bağ sakatlığı yaşama biçimleri (temaslı-temassız) ile COL3A1 rs1800255 polimorfizmi arasında bir ilişkinin olmadığı düşünülmektedir.

**Anahtar kelimeler:** Ön çapraz bağ, COL3A1, polimorfizm, genotip, alel, futbol

**INVESTIGATION OF COL3A1- rs1800255 GENE VARIANT DISTRIBUTION IN PROFESSIONAL MALE FOOTBALL PLAYERS WITH CONTACT AND NON-CONTACT ANTERIOR CRUCIATE LIGAMENT INJURIES****ABSTRACT**

This study was conducted to examine the genotype and allele distributions of COL3A1 (rs1800255) gene polymorphisms in professional male football players who had contact and non-contact anterior cruciate ligament (ACL) injuries. 40 professional male football players (Contact: 14, Non-Contact: 26) who had undergone anterior cruciate ligament surgery at least 2 times participated in the study on a voluntary basis. DNA isolation was performed on blood samples obtained from athletes using DNA isolation kits. Genotype and allele distributions of football players with contact and non-contact ACL injuries were compared with Chi-square test or Fischer's exact test. The findings show that football players with contact or non-contact ACL injuries do not differ statistically in terms of genotype (AA-AG-GG) distributions ( $p>0.05$ ). When the allele distributions (A-G) were examined, it was determined that there was no statistical difference ( $p>0.05$ ). As a result, it is thought that there is no relationship between the way (contact-non-contact) professional male football players experience anterior cruciate ligament injury and the COL3A1 rs1800255 polymorphism.

**Keywords:** Anterior Cruciate Ligament, COL3A1, polimorphism, genotype, allele, football

## 1. GİRİŞ

Futbol, fizyolojik talepleri yüksek olan ve yüklenme-dinlenme döngüsünü içeren aralıklı bir takım sporudur. Profesyonel futbolcuların bir maç boyunca yaklaşık olarak 8000-12.000m mesafe kat ettikleri bilinmektedir ve bu mesafenin yaklaşık %20'si maksimal ya da maksimale yakın koşu hızlarında olmaktadır (Bishop ve ark., 2011; Stolen ve ark., 2005). Sıçrama ve müdahale gibi anlık hareketler de bir maç sırasında futbolcular tarafından sıklıkla gerçekleştirilir (Bangsbo, 1994; Zois ve ark., 2011). Futbolun yüksek fizyolojik talepleri göz önüne alındığında, futbolcuların çok sayıda sakatlıklarla karşılaşması da beklenen bir sonuç olarak kabul edilmektedir (Agel ve ark., 2007; Dvorak ve ark., 2000). Bu sakatlıklardan biri olan ön çapraz bağ (ÖÇB) yaralanmaları, spor popülasyonundaki en ağır yaralanmalardan biri olarak kabul edilmektedir (Brooks ve ark., 2005). Futbolcular, özellikle ani yavaşlama ve yön değişikliği içeren aksiyonlarda risk altındadır. ÖÇB yaralanmalarının görülme sıklığı sedanter bireylerde (toplumda) düşük olmasına rağmen (10.000'de 1) (Marshall ve ark., 2007), düzenli olarak spor yapan bireylerde 10 kat artabilmektedir (Parkkari ve ark., 2008).

ÖÇB, diz eklemine bulunan dört ana ligamentten biridir. Ligamentler, bir eklemi çevreleyen ve iki ucundaki kemiğin birbirine bağlantısını sağlayan yoğun kolajenöz doku bantları olarak tanımlanmaktadır (Frank, 2004). Kolajen, ligamentlerin ana bileşenidir. Tip I kolajen, kolajenlerin %85'ini oluşturmaktadır. Geri kalanı ise Tip III, VI, V, XI ve XIV türlerinden oluşmaktadır (Szumilo, 2014). Tip III kolajen, Tip III kolajen pro- $\alpha$ 1 zincirlerini üreten COL3A1 geninin bir ürünüdür (O'Connel ve ark., 2013). COL3A1 geni, kromozom 2q31 üzerinde bulunmaktadır (Fujiwara ve ark., 2010). Tip III kolajen, tendonlar için önemli bir fibriller kolajendir. İyileşme sürecinde ve fibrilogenez sırasında önemli olduğu düşünülmektedir (Banos ve ark., 2005; Liu ve ark., 1995). Tendon gelişimi sırasında tip I kolajen ile birlikte lokalize olur ve bazı durumlarda heterotipik fibriller oluşturabilir (Banos ve ark., 2005). Kolajen tip III, ifade edildiği dokuların gücünü ve esnekliğini ayarlama da önemli bir role sahiptir. Stepien-Slodkowska ve arkadaşları (2015), kayakçılar ile yapılan bir çalışmada, AA genotipine sahip olanların AG+GG genotipine sahip olanlardan yaklaşık 5 kat daha yüksek ÖÇB yaralanma riskine sahip olduğunu tespit edilmiştir. O'Connel ve arkadaşları (2013) ise aşıl tendinopatisi yaşayan ve yaşamayan insanlarda COL3A1 genini incelediği çalışmada, polimorfizmler ve aşıl tendinopatisi arasında herhangi bir ilişki olmadığını belirtmiştir.

Futbol gibi çok sayıda aksiyonun anlık olarak gerçekleştiği bir branşta sporcuların sakatlık ile karşılaşmaları da kaçınılmazdır. Özellikle diz, ayak bileği ve kalça eklemine oluşturan yapılardaki (kemik, kas, tendon, ligament gibi) sakatlıklar çok sık yaşanmaktadır. Bu sakatlıkların en çok karşılaşılanlarından biri de ÖÇB sakatlıklarıdır. Temaslı veya temassız olarak ön çapraz bağ sakatlığı yaşayan profesyonel erkek futbol oyuncularının COL3A1 rs1800255 polimorfizmlerinin genotip ve alel dağılımları bakımından incelenmesi bu çalışmanın amacını oluşturmaktadır.

## **2. ARAŞTIRMA VE BULGULAR**

### **2.1. Araştırma Grubu**

Çalışmaya dahil edilen araştırma grubu, en az 10 yıl futbol geçmişine sahip 40 profesyonel erkek futbol oyuncusundan (Temaslı=14, Temassız=26) oluşmaktadır. Tüm örneklem grubu Türkiye profesyonel futbol liglerinde (Süper Lig, 1.Lig, 2.Lig, 3.Lig) mücadele eden, 18 yaşından büyük profesyonel futbolculardan oluşmaktadır. Sporcuların sakatlıkları MR görüntülemeleri ile tespit edilmiştir. Özel ve genel sağlık durumundan ötürü kan vermesi sakıncalı olan, sağlık açısından risk taşıyan, araştırmanın denek ve kontrol gruplarına uygun nitelik taşımayan futbolcular araştırmaya dahil edilmemiştir. Çalışmaya katılacak olan tüm sporculara araştırma hakkında detaylı bilgilendirme yapılmış ve gönüllü olarak katıldıklarına dair formlar doldurtulmuştur. Araştırma süreci, Helsinki Deklarasyonu ilkelerine uygun olarak yürütüldü. Araştırmanın etik olarak uygunluğu, Tokat Gaziosmanpaşa Üniversitesi Klinik Araştırmalar Etik Kurulu'nun 28/01/2021 tarih ve 21-KAEK-028 sayılı kararı ile onaylandı.

### **2.2. Genetik Analiz**

Genomik DNA (gDNA), bir DNA izolasyon kiti (GeneAll) kullanılarak periferik kandan izole edildi. COL3A1 rs1800255 (Ala531Thr) gen polimorfizmi, polimeraz zincir reaksiyonu (PCR) tabanlı restriksiyon fragmanı uzunluk polimorfizmi (RFLP) yöntemi kullanılarak analiz edildi. COL3A1 polimorfizmi için kullanılan primerler F: 5' AAG TATACA AAT TTC TAG ATT G 3', R: 5' ATA AAT GAT CAG AAG GAA ATC A 3' idi. PCR, 2 µl gDNA, her primerden 0.8 nmol/µL, 1.5 µL MgCl<sub>2</sub> (25mM), 2.5 µL 10× PCR tamponu, 0.3 µL dNTP (25mM) ve 1 Unite Taq polimeraz (Thermo) içeren toplam 25 µL hacimde gerçekleştirildi.

İlgilenilen bölgeyi büyötmek için aşağıdaki koşullar kullanılmıştır: 3 dakika boyunca 94 °C, ardından 30 saniye boyunca 94 °C'de 30 döngü denatürasyon, 30 saniye boyunca 50 °C'de tavlama, 60 saniye boyunca 72 °C'de uzatma ve 10 dakika boyunca 72 °C'de son bir uzatma

adımı. Restriksiyon endonükleazı, COL3A1 rs12722 polimorfizmini ayırt etmek için Alu I kullanıldı.

### 2.3. İstatistiksel Analiz

Elde edilen verilerin istatistiksel analizleri Open Epi Info Software Version 3.2.2 (CDC, Atlanta GA, ABD) kullanılarak gerçekleştirilmiştir. Temaslı ve temassız ÖÇB sakatlığı yaşayan futbolculardan oluşan gruplara ait sonuçlar Ki-kare veya Fischer's exact test ile karşılaştırılmıştır. Tüm analizlerde anlamlılık değeri  $p < 0.05$  olarak kabul edilmiştir.

**Tablo 1.** Temaslı veya temassız olarak ön çapraz bağ sakatlığı yaşayan profesyonel futbolcuların COL3A1 (rs1800255) polimorfizminin genotip ve minör alel frekans dağılımları.

		Temaslı	Temassız	p	OR (95%CI)
COL3A1	n	14	26	,807	-
	AA	28,6 (4)	38,5 (10)		
	AG	28,6 (4)	26,9 (7)		
	GG	42,9 (6)	34,6 (9)		
	G	53,6 (15)	50,0 (26)	,817	-

\* $p < 0,05$ , OR: Olasılık Oranı

COL3A1 (rs1800255) polimorfizminin genotip ve minör alel frekans dağılımları Tablo 1'de gösterilmiştir. Analiz sonuçları incelendiğinde, temaslı veya temassız olarak ÖÇB sakatlığı yaşayan profesyonel erkek futbol oyuncularının genotip ve alel dağılımları bakımından farklılaşmadıkları görülmektedir ( $p > 0.05$ ).

### 3. SONUÇ

Bu çalışma temaslı veya temassız olarak ÖÇB sakatlığı yaşayıp ameliyat geçmişine sahip olan profesyonel erkek futbol oyuncularının sakatlığa maruz kalma biçimlerinin COL3A1 (rs1800255) polimorfizmi ile açıklanıp açıklanamayacağını incelemek üzere gerçekleştirilmiştir. Çalışmada elde edilen ana bulgular, temaslı ya da temassız ÖÇB sakatlığı yaşayan futbolcuların genotip (AA-AG-GG) ve alel (A-G) dağılımları bakımından istatistiksel olarak farklılaşmadıklarını göstermektedir.

ÖÇB kopukları, tüm branşlardaki sporcular için korkulan ve yaygın olarak karşılaşılan sakatlıklardır. ÖÇB kopmaları hem yarışmacı hem de rekreasyonel spor aktiviteleri anında sıklıkla yaşanabilmektedir (Tifford ve Jackson, 2001). Stepien-Slodkowska ve arkadaşları (2015) yaptıkları çalışmada, ACL kopuğu geçmişine sahip Polonyalı erkek kayakçılar ile sağlıklı rekreasyonel kayakçıların COL3A1 rs1800255 gen polimorfizminin incelendiği bir çalışmada, AA genotipine sahip kayakçıların, AG+GG genotipine sahip kayakçılardan neredeyse 5 kat daha yüksek sakatlık riskine sahip oldukları tespit edilmiştir. Bu çalışmadaki

profesyonel erkek futbolcularda ise anlamlı bir farklılığın olmadığı belirlenmiştir. O'Connell ve arkadaşları (2015), Güney Afrika ve Polonya'lı katılımcılardan oluşan örneklem grubu ile gerçekleştirilen araştırmada, Güney Afrika kohortunda COL3A1 rs1800255 gen polimorfizmi ve ACL yırtığı arasında anlamlı bir ilişkiye rastlanmadığını belirtmişlerdir. Aynı çalışmada Polonya kohortunda COL3A1 rs1800255 AA genotip görülme sıklığı ACL grubunda kontrol grubuna kıyasla daha yüksek bulunmuştur. Sivertsen ve arkadaşlarının (2019), Norveç ve Finlandiya'da takım sporlarında mücadele eden elit kadın sporcular ile yaptıkları araştırmada, belirlenen 6 kolajen gen polimorfizminin (COL1A1 rs1800012-rs1107946, COL3A1 rs1800255, COL5A1 rs12722-rs13946, COL12A1 rs970547) ACL sakatlık riskini açıklamadığı tespit edilmiştir.

Sonuç olarak, temaslı ya da temassız şekilde ön çapraz bağ sakatlığı yaşayan profesyonel erkek futbol oyuncularının, sakatlığa maruz kalma biçimlerinin COL3A1 (rs1800255) polimorfizmi ile açıklanamayacağı düşünülmektedir. Futbol gibi çok çeşitli aksiyonu içeren ve sakatlık riski yüksek olan bir branşta, sporcuların ÖÇB yaralanma potansiyelleri hakkında fikir sahibi olabilmek için bu sonuçların önemli olduğu söylenebilir.

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**REDUCING AND MANAGING ENERGY CONSUMPTION IN THE PRODUCTION  
OF VARIOUS FOODS**

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**ABSTRACT**

**Background and purpose:** Energy is one of the main components of sustainable development strategy in every country. In every society, from traditional to industrial, lack of access to energy costs create a crisis, and energy management is the only and closest way to exploit more fuels. And energy resources , and very country must determine the solution to the energy crisis within the framework of its economic development strategy. The increase in energy consumption , in addition to the increase in cost , undoubtedly increases the emission of greenhouse gases and other environmental pollutants, pollutants that have a direct negative impact on the public health of communities and the ecosystem, and impose a very high social cost on society.

**Result:** Today , due to energy limitations , manufacturers and large industries are looking for ways to reduce and optimize energy in order to have the ability to remain competitive in the market in addition to meeting the needs in this field. As one of the important energy consumers, the food industry needs to manage its resource consumption.

**Conclusion:** Therefore, in this research, we review the studies conducted in the field of energy consumption optimization for the production of various foods.

**Key words:** Energy management, food industry, reducing environmental pollution

## **INTRODUCTION**

The increasing population of the world , especially developing countries on the one hand and the need to provide food for this population on the other hand , has not resulted in the indiscriminate harvesting of resources , and in pursuit of setting the goals of the third millennium of the United Nations . Researchers have presented various interdisciplinary approaches to achieve a kind of dynamic balance in the production and consumption of resources , one of the most important of which is the approach of combining energy and food. Due to the limitations of available resources , which are increasing day by day .This approach increases productivity by using the integration of energy and food cycles. The increase in population , excessive use of available resources , significant growth of industrial production and less attention to the issue of pollution and waste caused industrial and household waste to be produced at a faster rate than the earth can absorb it . Energy resources are consumed at a faster rate than they are stored . However , in order to achieve the goals of sustainable development , it is necessary to search for the production process of goods and services and the optimal use of energy resources and to prevent possible risks to the environment . Energy is one of the main components of sustainable development strategy in any country . In every society , from traditional to industrial , the lack of access to energy and high energy costs create a crisis , and energy management is the only and closest way to exploit more of the available fuels and energy sources , and every country must find a solution to the energy crisis. Determine in the framework of its economic strategy. The increase in energy consumption , in addition to increasing the cost , undoubtedly increases the emission of greenhouse gases and other environmental pollutants. Pollutants that have a direct negative impact on the impose very high social cost on society. Hydroponics and greenhouse production are ways to obtain profitable products. A sustainable crop production system requires maintaining high harvest quality while keeping energy and raw material consumption low. Today , due to the limitation of energy resources , manufactures and large industries are looking for ways to reduce and optimize energy consumption so that in addition to meeting the needs in this field , they have the ability to remain competitive in the market. The evolution of environmental protection strategies indicates the evolution of environmental approaches that are related to the expansion of the concept of sustainable development. Energy saving is one of the most important problems in all industrialized countries. Therefore , in this research , we focus on the researches carried out to optimize and reduce energy in the food industry.

## **SOLAR ENERGY**

It is the most unique source of renewable energy in the world and is the energies on earth .The sun is a huge and infinite source of energy on which the life of the earth depends. Although the use of solar energy is still not developed as much as it should be , but the energy needed by about 160 thousand villages in the world is based on solar energy. The use of solar energy is one of the best ways to produce energy compared to other energy transfer models , which can be used in the food industry to dry food , which is one of the most important unit operations in food processing , because the most important step in the process after from the harvest of agricultural products , it is the drying process. Drying is a complex process that consumes a lot of energy. Choosing the right drying method can preserve the color and appearance of the product in addition to economic savings. Currently , two traditional and industrial methods are used to dry agricultural products. If the product is dried in the traditional way(spreading out in the sun), the time required for drying is long , on the other hand , the attack of insects and birds, such as dust and rain in this method are factors that reduce the quality of the dried product. They turn industrial dryers are also not cost- effective due to high initial cost and high energy consumption and have not attracted the attention of farmers , so using a solar dryer was cost – effective .As one of the important consumers of energy , the food industry needs to manage its resource consumption. Steam supply systems , compressors and pumps are among the most important energy-consuming sectors in the food industry , and new solutions are always introduced to optimize consumption in these sectors. In addition to the industry , the role of planning and monitoring system and industrial equipment suppliers in reaching energy management goals is significant. Sweet bread production industry also requires the use of advanced equipment related to energy consumption, which is obtained from diesel fuel , natural gas and electricity. Regarding the evaluation of energy flow and the environmental effects caused by energy consumption in the production of various foods , including industrial breads and similar foods , various researches have been done. For example in a research on the production of industrial bulky bread whose energy sources was natural gas and electricity , it was said that 22 and 14 Megajoules of energy were used to produce one kilograms of bulky bread , respectively. In the field of energy consumption in the production of bulky breads , the result of Barakat et al.s study show that 4 Megajoules of energy were used to produce each kilograms of industrial bulky bread. The result of the research on the evaluation of environmental pollutants in the production of bulk bread with a life cycle approach in Belgium

have shown that the removal of coal and the use of other energy carriers in recent years lead to a decrease in global warming potential indicators and photochemical oxidation.

### **CONCLUSION**

Therefore , you should try to be able to use the least amount of energy as possible in setting up food industry factories , and also use new ways of working to minimize their energy consumption for the use of devices.

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**OSMANLI DİYARBEKİRİ'NDE MÜSLÜMAN VE GAYRİMÜSLİMLERİN  
İKTİSADİ İLİŞKİLERİNE GENEL BİR BAKIŞ (1800-1853)**

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**ÖZET**

Döneme ait şer'iyeye sicilleri Osmanlı Diyarbekiri'ndeki Müslüman ve gayrimüslimlerin iktisadi ilişkilerinin oldukça sıkı ve kapsamlı olduğunu ortaya koymuştur. Bunun yanı sıra iktisadi ilişkiler çerçevesindeki bilimum tüm belgeler, münferit vakalar müstesna Müslim veya gayrimüslimler açısından herhangi bir umumi mağduriyet durumunun söz konusu olmadığını da göstermiştir. Toplumlar arası iktisadi ilişkilere dair belge sayıları kimi başlıklarda sınırlı bir sayıda ortaya çıkmışsa da bu durum, ilişkilerin sınırlı bir çerçevede olduğu anlamına gelmemektedir. Zira belgelere doğrudan yansıyanların haricinde muhtelif belgeler içerisinde dolaylı olarak yer alan ilişkiler de mevcuttur. Bilhassa tereke kayıtlarında zikredilen alacaklı veya verecekli Müslüman ve gayrimüslimlerin isimleri söz konusu ilişkilerin belgelere doğrudan yansıyan ilişkilerden çok daha geniş ölçüde olduğuna işaret etmiştir.

**Anahtar kelimeler:** Osmanlı Diyarbekiri, İktisadi İlişkiler, Diyarbakır, Sosyal Tarih

**AN OVERVIEW OF THE ECONOMIC RELATIONS BETWEEN MUSLIMS AND  
NON-MUSLIMS IN OTTOMAN DIYARBEKIR (1800-1853)****ABSTRACT**

The shar'iyye registers of the period reveal that the economic relations between Muslims and non-Muslims in Ottoman Diyarbekir were quite close and extensive. In addition, all documents in the framework of economic relations show that there was no general victimization of Muslims or non-Muslims, except in isolated cases. Although the number of documents on inter-communal economic relations is limited in some chapters, this does not mean that these relations were limited in scope. For, in addition to those directly reflected in the documents, there are also relations that are indirectly mentioned in various documents. In particular, the names of Muslim and non-Muslim creditors and debtors mentioned in the probate records indicate that these relations were much broader than those directly reflected in the documents.

**Keywords:** Ottoman Diyarbekir, Economic Relations, Diyarbakir, Social History



## GİRİŞ

Osmanlı Devleti tebaasını dinî olarak Müslim ve gayrimüslim (zimmî) olmak üzere esasen iki kategoriye ayırmıştır.<sup>25</sup> Hâkimiyeti altındaki gayrimüslimlerle zimmet anlaşmaları yaparak onlarla olan hukuki ilişkilerini belirli bir çerçevede yürüten Osmanlı,<sup>26</sup> Tanzimat öncesi ve sonrası olmak üzere temelde iki farklı hukuki yaklaşım üzerinde hareket etmiş; zaman içerisinde gayrimüslimlerin hukuki statülerinde birtakım değişim ve dönüşümler meydana getirmiştir.<sup>27</sup>

Tanzimat öncesi dönem itibarıyla toplum içerisinde meydana gelen hukuki ihtilaflarda esas müracaat mercii şer‘î mahkemeler olmuştur.<sup>28</sup> Binaenaleyh Osmanlı coğrafyasında bilumum tüm toplumun hususen de yüzyıllarca birlikte yaşayan Müslüman ve gayrimüslimlerin karşılıklı olarak kurmuş oldukları ilişkilerin en açık, güvenilir ve zengin biçimde gözlenebileceği kaynaklar şer‘î mahkemelerce tutulan *şer‘iyye sicilleri*dir.<sup>29</sup> Bu hususiyetinden mütevellit şer‘iyye sicilleri, Osmanlı sosyal tarihi araştırmalarının temel kaynağı mesabesindeir.<sup>30</sup>

İslam coğrafyasının yüzyıllar boyu iç içe yaşamış birçok etnik ve dinî grubunun adeta bir buluşma noktası olan<sup>31</sup> ve bu niteliği sebebiyle Osmanlı’nın küçük bir nüvesi olarak adlandırılan Diyarbakır,<sup>32</sup> öncesinde olduğu gibi Osmanlı döneminde de kozmopolit bir sosyal dokuya sahiptir.<sup>33</sup> Bunun yanı sıra gayrimüslimler, 1895 yılı itibarıyla Diyarbakır kazasının %33.7 gibi dikkate değer bir nüfus oranını teşkil etmekteydiler.<sup>34</sup> Diyarbakır’ın, mezkûr

<sup>25</sup> Gülnihal Bozkurt, *Alman – İngiliz Belgelerinin ve Siyasi Gelişmelerin Işığında Gayrimüslim Osmanlı Vatandaşlarının Hukukî Durumu (1839-1914)* (Ankara: Türk Tarih Kurumu Basımevi, 1989), 14; Mehmet Öz, *Osmanlılar (Sosyal Hayat), DİA*, 33/535, 532-538.

<sup>26</sup> M. Macit Kenanoğlu, *Osmanlı Millet Sistemi: Mit ve Gerçek* (İstanbul: Klasik Yay., 2012), 395.

<sup>27</sup> Bozkurt, *Alman – İngiliz Belgelerinin ve Siyasi Gelişmelerin Işığında Gayrimüslim Osmanlı Vatandaşlarının Hukukî Durumu (1839-1914)*, 2.

<sup>28</sup> Ümit Güler, *Osmanlı’da Suç ve Ceza (Kıbrıs Örneği)* (Ankara: Fecr Yayınları, 2019).

<sup>29</sup> Ümit Güler, *Osmanlı Kıbrısı’nda Müslim-Gayrimüslim İlişkileri* (Ankara: Fecr Yayınları, 2019), 5; Güler, *Suç ve Ceza*, 39.

<sup>30</sup> Şer‘iyye sicillerine dair geniş bilgi için bk. Güler, *Suç ve Ceza*, 39-40; Saadet Maydaer, *XVI. Yüzyılda Bursa’da Asayiş* (Bursa: Emin Yay., 2016), 9; Celal Erdönmez, *Şer‘iyye Sicillerine Göre Kıbrıs’ta Toplum Yapısı (1839-1856)* (Isparta: Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü, Doktora Tezi, 2004), VI. Ahmet Akgündüz, *Şeri’iyye Sicilleri* (İstanbul: Türk Dünyası Araştırmaları Vakfı, 1988), 1/12; Osman Çetin, *Sicillere Göre Bursa’da İhtida Hareketleri ve Sosyal Sonuçları (1472-1909)* (Ankara: Türk Tarih Kurumu Basımevi, 1994), IX; Yunus Uğur, “Şer‘iyye Sicilleri”, *Türkiye Diyanet Vakfı İslâm Ansiklopedisi* (İstanbul: TDV Yayınları, 2010), 39/8; İsmail Hakkı Uzunçarşılı, “Şer‘î Mahkeme Sicilleri”, *Ülkü Halkevleri Dergisi* 5/29 (Temmuz 1935), 365-368; T. Mümtaz Yaman, “Şer‘î Mahkeme Sicilleri”, *Ülkü Halkevleri Dergisi* 12/68 (İlk Teşrin 1938), 153-164.

<sup>31</sup> İbrahim Özcoşar, “Bir İslam ve Osmanlı Şehri Olarak Diyarbakır/Amid”, *Osmanlı’dan Günümüze Diyarbakır*, ed. İbrahim Özcoşar v.dğr. (İstanbul: Ensar Yay., 2018), 20; İlhan Kaya, “Azınlıklar, Çok Kültürlülük ve Diyarbakır”, *Nebiler, Sahabiler, Azizler ve Krallar Kenti Diyarbakır 2* (Diyarbakır: Diyarbakır Valiliği Kültür ve Sanat Yayınları, 2011), 216 vd.; Suavi Aydın – Jelle Verhei, “Diyarbakır Vilâyetinde Etnik-Dinî Gruplar, Yerel Güçler ve Osmanlı Devleti Üzerine Birkaç Not (1800-1870)”, *Osmanlı Döneminde Diyarbakır’da Toplumsal İlişkiler (1870-1915)*, der. Joost Jongerden – Jelle Verhei (İstanbul: İstanbul Bilgi Üniversitesi Yayınları, 2015), 15-16.

<sup>32</sup> Ümit Güler, *Osmanlı Toplumunda Cinayet* (Ankara: İlahiyât Yayınları, 2020), 22.

<sup>33</sup> Kenan Ziya Taş, *Tarih Işığında Güneydoğu ve Diyarbakır* (Ankara: Berikan Yayınevi, 2012), 21.

<sup>34</sup> 1895 yılı itibarıyla Diyarbakır şehrindeki gayrimüslim dinî gruplar ve nüfus oranları şöyledir: Gregoryen Ermeniler (%57.3), Süryani kadim kilise mensupları (%19), Katolikler (%5.2), Protestan Ermeniler (%5.1), Keldaniler (%4.4),

kozmpolit yapısıyla devletin merkezi bölgelerinden ve devlet otoritesinin daha güçlü olduğu İstanbul'dan uzakta bulunmasının, oradaki toplumsal ilişkileri daha hassas ve önemli kılması da önem arz eden bir diğer husustur.<sup>35</sup>

### **1. Alacak Verecek Meseleleri**

Döneme ait şer'iyeye sicilleri Osmanlı Diyarbakiri'nde Müslüman ve gayrimüslimlerin şer'i mahkemeye yansıyan iktisadi ilişkilerinin en büyük kısmının alacak verecek meselelerine dair olduğunu göstermektedir. Bu kapsamda 41 vaka tespit edilmiş olup bunların 25'inde (%60.97) davacılar Müslümanken, 16'sında (%39.02) gayrimüslimdir. Dolayısıyla davalılar da aynı doğrultuda 25 vakada (%60.97) gayrimüslimlerden, 16 vakada (%39.02) Müslümanlardan müteşekkildir. Ortaya çıkan bu netice gayrimüslimlerin iktisadi hayat içerisinde aktif ve etkili olduklarına dair dikkate değer bir görünümdür. Söz konusu davaların tamamına yakınında davacılar bizzat mahkemeye müracaat etmekle birlikte vekil kullandıkları da olmuştur.<sup>36</sup> Söz konusu vakaların tamamına yakınında erkekler tarafları oluşturmuştur. Nitekim sadece bir vakada davacı, iki vakada da davalı olarak Müslüman kadınlar yer almıştır. Gayrimüslim herhangi bir kadının alış veriş meselelerinde Müslümanlar karşısında taraf olmaması dikkat çekici bir bulgudur. Bu da gayrimüslim kadınların ticari hayat içerisinde pek fazla etkinlik göstermediklerine işaret etmektedir.

Taraflar arasında söz konusu olan alacak verecek meseleleri daha çok ticari alış verişlerden kaynaklanmış; mal satımı sonrası ödemenin yapılmaması veya ödemeye dair diğer ihtilaflar mahkemeye yansımıştır. Kimi vakaların karz, yani borç para verme sebebiyle oluştuğu da gözlenmektedir. Bu da Müslüman ve gayrimüslimlerin gündelik hayat içerisinde birbirlerine borç alıp verdiklerine işaret etmektedir. Taraflar arasındaki kimi ihtilafların terekeler üzerindeki alacak iddialarıyla ortaya çıktığı da olmuştur.<sup>37</sup>

İlgili dönemde birçok gayrimüslimin davasını Müslüman tanıkların şahitlikleriyle ispatlanmış olması dikkat çekicidir. Bu durum Müslüman ve gayrimüslimlerin toplumsal ilişkilerine dair müspet bir görünüm olmakla birlikte Müslüman ahalinin adaletin tecelli etmesi için gerekli hallerde kendi dindaşlarının aleyhine de olsa mahkeme huzuruna çıkıp gayrimüslimleri

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Yezidiler (%3.8), Yahudiler (%1.5), Katolik Süryaniler (%1.8), Katolik Rumlar (%0.3), Kıbtiler (%0.04). bk. Bülent Çukurova & Bülent Erantepli, "XIX. Yüzyılda Diyarbakır'ın Sosyal ve İdari Yapısı", *Osmanlı'dan Cumhuriyet'e Diyarbakır*, ed. Bahaeddin Yediyıldız & Kerstin Tomenendal (Ankara: Diyarbakır Valiliği, 2010), II/359-360.

<sup>35</sup> Aydın – Verhei, "Diyarbakır Vilâyetinde Etnik-Dini Gruplar", 15-16.

<sup>36</sup> DŞS, 3745, 22a-2.

<sup>37</sup> DŞS, 3803, 28b-1; DŞS, 3803, 27b-1.

desteklediklerini göstermektedir.<sup>38</sup> Herhangi bir ayırım yapılmaksızın mahkemede deliller doğrultusunda hüküm verildiği gözlenmiş; bunun yanı sıra alacak verecek davalarında Müslim veya gayrimüslimler açısından herhangi bir umumi mağduriyet durumuna rastlanmamıştır.

## **2. Alım Satım İlişkileri**

Müslüman ve gayrimüslimlerin iktisadi ilişkilerine dair döneme ait belgeler, alacak verecek davalarından sonra en yoğun ilişkinin alım satım kayıtları olduğunu göstermektedir. Bu kapsamda 23 belge tespit edilmiştir. Tarafları itibariyle 23 kaydın 13'ünde (%56.52) Müslümanlar, 10'unda da gayrimüslimler satıcı konumundadır. Dolayısıyla alıcıların da 10'u (%43.47) Müslüman olup 13'ü (%56.52) gayrimüslimdir. Ortaya çıkan bu durum dikkate değerdir. Zira ilgili belgeler alım satım işlemlerinde gayrimüslimlerin Müslümanlara nazaran daha fazla alıcı konumda olduklarını ortaya koymaktadır. Bu da toplumlar arasındaki gayrimenkul mal hareketinin daha çok gayrimüslimler lehine geliştiğine işaret etmektedir. Bu da gayrimüslimlerin iktisadi düzeylerine ve toplumlar arası ilişkilere ışık tutan önemli bir görünümdür.

Alım satım işlemlerinde bulunan taraflara cinsiyetleri açısından bakıldığında satıcıların 6'sının (%26), alıcıların da 2'sinin (%8) kadın olduğu görülür. Dolayısıyla alım satım işlemlerinde kadınların daha çok satıcı, nadiren de alıcı olarak yer aldıkları anlaşılmaktadır. Bu da cinsiyetler açısından gayrimenkul mal hareketinin daha çok erkekler lehine geliştiğine işaret etmektedir. Mezkûr satış işlemlerinde bulunan kadınların 4'ü Müslüman olup ikisi gayrimüslimdir. Alış işleminde bulunan her iki kadının da Müslüman olduğu anlaşılmaktadır. Dolayısıyla kadınların taraf olduğu sekiz alım satım işlemi bağlamında Müslüman kadınların %75 oranında gayrimüslim kadınlardan daha aktif oldukları anlaşılmaktadır.

## **3. Mülkiyet Davaları**

Osmanlı Diyarbekiri'nde müslim-gayrimüslim iktisadi ilişkilerine dair belgelere yansıyan bir diğer önemli görünüm de mülkiyet davalarına dairdir. Tarafların birbirlerine yönelik herhangi bir suç iddiası olmamakla birlikte zaman zaman bazı menkul - gayrimenkul mallar üzerinde mülkiyet ihtilafı yaşadıkları olmuştur. Bu kapsamda 14 vaka tespit edilmiştir. Bu vakaların 10'unda (%71.42) Müslümanlar, dördünde de (%28.57) gayrimüslimler davacı konumdadır. Bu doğrultuda davalıların da %71.42'sini gayrimüslimlerin, %28.57'sini Müslümanların oluşturduğu söylenebilir. Tarafların tamamı erkeklerden müteşekkildir. Görüldüğü üzere mülkiyet davalarında gayrimüslimler büyük oranda davalı konumdadırlar. Gayrimüslimlerin

<sup>38</sup> DŞS, 3746, 55a-2; DŞS, 3745, 23a-1; DŞS, 3702, 7b-4.

neden bu denli yüksek bir oranda davalı konumda bulduklarına yönelik net bir cevap verebilmek mümkün olmamakla birlikte muhtemelen bunun temel sebebi çalıntı veya kayıp malların daha çok gayrimüslimlere satılmış olmasıdır. Şöyle ki, söz konusu vakalarda mülkiyet davasına konu olan malların niteliğine bakıldığında bunların biri hariç<sup>39</sup> tamamının menkul mallardan oluştuğu görülür. Bu menkullerin tamamına yakını da merkep, eşek, beygir, öküz ve inek gibi büyük baş hayvanlardan oluşur. Bunların dışında menkul olarak sadece bir vakada çalıntı iddia edilen bir fistan dava konusu edilmiştir.<sup>40</sup> Davacılar mezkûr malları talep ederken davacı oldukları şahısları hırsızlık veya gasp gibi herhangi bir suçla itham etmeksizin o kişilerin ellerinde bulunan söz konusu malların daha önce çalıntı olduğunu veya kaybolduğunu iddia ederek kendilerine iade edilmesini talep etmişlerdir. Davalıların da tamamına yakını iddiaya konu olan malları başkalarından satın aldıklarını, dolayısıyla kendi mülkleri olduğunu iddia etmişlerdir. Davacıların şahitler vasıtasıyla dokuz vakada (%69.23) söz konusu malların kendilerine ait olduklarını ispatlayabildikleri gözlenmiştir. Dört vakada da (%30.76) davalar delil yetersizliğinden ötürü sonuçlandırılmamıştır. İddiaya konu olan malların dokuz vakada kaybolduğu, dört vakada da çalıntı ifade edilmiştir. Dolayısıyla söz konusu kayıp hayvanları bulan veya bunları çalan bazı kişilerin bu malları bir başkasına sattıkları kuvvetle muhtemeldir. Esas mal sahibi olan kişiler de hayvanlarını tespit ettiklerinde mahkemeye müracaat ederek bunları talep etmişler ve genellikle de iddialarını tanıklar vasıtasıyla ispatlayarak mallarına kavuşmuşlardır.

#### **4. Ticari Hayatta Yaşanan İhtilaflar**

Osmanlı Diyarbakiri'nde Müslüman ve gayrimüslim reayaya müntesip kişilerin hayatın olağan akışı içerisinde birbirleriyle geniş ölçüde ve rahat biçimde ticari ilişki içerisinde oldukları gözlenmiştir. Elbette ticaretin olduğu yerde taraflar arasında zaman zaman birtakım ihtilafların çıkması kaçınılmazdır. Bu bağlamda Diyarbakir'de de Müslüman ve gayrimüslimler arasında birtakım anlaşmazlıklar çıkmıştır. Bunlardan biri de şüfa hakkıdır. Şüfa, ön alım hakkı anlamına gelmektedir.<sup>41</sup> Bu dönemde Müslüman ve gayrimüslimler arasında vaki olan iki şüfa davası sicillere yansımıştır. Her ikisinde de davacılar gayrimüslim olup davalılar Müslümandır. Bunların birinde davalı, davacının şüfa hakkının olduğunu ikrar ederek iddiayı kabul etmiş ve

<sup>39</sup> Penbeciler çarşısında yer alan bir dükkânın mülkiyeti hususunda bir ihtilaf yaşanmış olup taraflar sulh anlaşmasıyla meseleyi çözüme kavuşturmuşlardır. bk. DŞS, 3731, 30a-1.

<sup>40</sup> DŞS, 3791, 8a-2.

<sup>41</sup> Şüfa, satılan veya bedel şartı ile hibe edilen bir gayrimenkulü veya o hükümde olan bir malı alıcıya veya kendisine hibe edilen şahsa her kaç mal olmuş ise o miktar ile alıcıdan veya satıcıdan ya da hibe edilenden cebren alıp temellük etmek anlamına gelir. bk. Mehmet Erdoğan, *Fıkıh ve Hukuk Terimleri Sözlüğü*, (İstanbul: Ensar Neşriyat, 2015), 529. Geniş bilgi için bk. İbrahim Kâfi Dönmez, "Şüfa", *DİA*, 39/248-252.

hâkim de satışı iptal ederek şüfa hakkı gereği satışın davacı şahsa yapılmasına hükmetmiş ve işlem kayıt altına alınmıştır.<sup>42</sup> Bir diğer şüfa davasında da Eto v. Haçador adlı zimmi, satın aldığı evdeki şüfa hakkı iddiasıyla Seyyid Ahmed b. Mustafa'dan davacı olmuştur. Davalı şahıs, alım işlemi öncesinde şüfa hakkı gereği davacıyı bilgilendirdiğini, ancak onun şüfa hakkından vaz geçtiğini savunarak iddiayı reddetmiştir. Mahkeme, davalının bu iddiasını ispatlaması için kendisine süre tanımış ancak kendisi bunu gerçekleştirememiştir. Buna binaen davacı haklı görülmüş ve satışın iptal edilerek evin kendisine satılmasına hükümlenmiştir.<sup>43</sup>

### **5. Bazı İktisadi ve Hukuki Uygulamalar**

Döneme ait belgeler, Osmanlı Diyarbekiri'nde Müslümanlar ve gayrimüslimler arasında günlük ticari hayat içerisinde cari olan bazı iktisadi ve hukuki uygulamalara da ışık tutmaktadır. Bunların başında rehin uygulaması gelmektedir. Bu kapsamda olduğu tespit edilen dört belgede Müslümanlar ve gayrimüslimler arasında alış veriştiren veya karzdan kaynaklı bazı borçlara mukabil rehin verildiğini göstermektedir. Söz konusu uygulamalarda rehin bırakanların tamamının zimmilerden, rehin alanların da Müslümanlardan olduğu gözlenmiştir ve tarafların tamamı erkeklerden müteşekkildir. Büyük çaplı borçlara mukabil rehin bırakılan mallar arasında ev gibi kıymetli gayrimenkuller bulunurken, karz edilen bazı küçük çaplı meblağlara karşılık olarak bir vaka da bir çift sim kemer; bir başka vakada da sim kemer, sini, testi ve kürk gibi eşyalar verilmiştir. Alacaklı kişiler borçların ödenmemesine istinaden mahkemeye müracaat ederek rehnedilen evin satışını müzayede usulüyle gerçekleştirebilmişlerdir. Bazen de rehnedilen evin boşaltılarak alacaklıya teslimi istenmiş ve mahkeme bu talebi haklı bulmuştur. Karz mukabili verilen rehinler de alacaklının elindeyken kaybolabilmiş ve bu durum borçlunun borcunu ödemesiyle ortaya çıkınca süreç mahkemeye taşınabilmiştir. Bu durumda mahkeme kaybolan rehin eşyasının bedelinin, rehin veren kişiye ödenmesine hükmetmiştir.

Döneme ait belgeler Müslüman ve gayrimüslimlerin zaman zaman birbirlerine bazı eşyalarını emanet bırakabildiklerini ve kiraladıklarını da göstermektedir.

<sup>42</sup> DŞS, 3774, 5b-3.

<sup>43</sup> DŞS, 3775, 3a-3.

## SONUÇ

Döneme ait şer‘iyye sicilleri Osmanlı Diyarbekiri’ndeki Müslüman ve gayrimüslimlerin iktisadi ilişkilerinin oldukça sıkı ve kapsamlı olduğunu ortaya koymuştur. Bunun yanı sıra iktisadi ilişkiler çerçevesindeki bilumum tüm belgeler, münferit vakalar müstesna Müslim veya gayrimüslimler açısından herhangi bir umumi mağduriyet durumunun söz konusu olmadığını da göstermiştir. Toplumlar arası iktisadi ilişkilere dair belge sayıları kimi başlıklarda sınırlı bir sayıda ortaya çıkmışsa da bu durum, ilişkilerin sınırlı bir çerçevede olduğu anlamına gelmemektedir. Zira belgelere doğrudan yansıyanların haricinde muhtelif belgeler içerisinde dolaylı olarak yer alan ilişkiler de mevcuttur. Bilhassa tereke kayıtlarında zikredilen alacaklı veya verecekli Müslüman ve gayrimüslimlerin isimleri söz konusu ilişkilerin belgelere doğrudan yansıyan ilişkilere çok daha geniş ölçüde olduğuna işaret etmektedir.

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**OSMANLI DİYARBEKİRİ'NDE MÜSLÜMAN VE GAYRİMÜSLİM  
TOPLUMLARIN SUÇ İLİŞKİLERİ  
(1800-1853)**

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**ÖZET**

Bu araştırmada ortaya çıkan netice, bir İslam devleti olan Osmanlı'nın hâkimiyeti altında yaşayan Diyarbekir gayrimüslimlerinin umumi bir mağduriyet ve hukuksuzluğa maruz kalmadıkları yönündedir. Bunun da ötesinde Müslüman ve gayrimüslimlerin toplumsal ilişkilerinin genel itibarıyla olumlu bir nitelik arz ettiği, toplumsal entegrasyon düzeylerinin yüksek olduğu gözlenmiştir. Bilhassa dinî hak ve hürriyetler açısından toplumlar arası ilişki oldukça müspet bir görünüm arz etmiştir. Müslüman toplumun gayrimüslimlere yönelik umumi bir baskı ve hukuksuzluğa başvurmamaları ve toplumlar arası ilişkinin müspet bir görünüm arz etmesi bilhassa ilgili dönem konjonktürü açısından son derece kıymetli bir neticedir. Birçok belgeden de gözlendiği üzere gayrimüslimler, bir Müslüman tarafından hukuksuzluğa maruz kaldıklarını düşündüklerinde doğrudan şer'î mahkemeye ve patrikleri veya temsilcileri vasıtasıyla Dîvân-ı Hümâyun'a ulaşabilmişlerdir. Bu merciler de Müslümanların karşısında gayrimüslimlerin hukukunu korumaya ve adaleti tesis etmeye gayret etmişlerdir. Netice itibarıyla Osmanlı Diyarbekiri'ndeki Müslüman ve gayrimüslim toplumlar arasında vaki olan suç hadiselerinin son derece az sayıda ve genel itibarıyla gündelik hayatta karşılaşılabilecek basit nitelikte olduğu söylenebilir.

**Anahtar kelimeler:** Osmanlı Diyarbekiri, Müslim-Gayrimüslim İlişkileri, Suç İlişkileri, Sosyal Tarih.

**CRIMINAL RELATIONS BETWEEN MUSLIM AND NON-MUSLIM  
COMMUNITIES IN OTTOMAN DIYARBEKIR (1800-1853)****ABSTRACT**

The conclusion of this study is that the non-Muslims of Diyarbekir living under the rule of the Ottoman Empire, an Islamic state, were not subjected to any general victimization and lawlessness. Moreover, it was observed that the social relations between Muslims and non-Muslims were generally positive and that their level of social integration was high. Especially in terms of religious rights and freedoms, the relationship between the communities was quite positive. The fact that the Muslim society did not resort to general oppression and lawlessness against non-Muslims and that the relationship between the communities was positive is an extremely valuable result, especially in terms of the conjuncture of the relevant period. As observed in many documents, when non-Muslims felt that they had been subjected to unlawful treatment by a Muslim, they could reach the Sharia court directly and through their patriarchs or representatives to the Dîvân-ı Hümâyûn. These authorities endeavored to protect the law of non-Muslims against Muslims and to establish justice. In conclusion, it can be said that the incidents of crime between Muslim and non-Muslim communities in Ottoman Diyarbekir were extremely few and generally of a simple nature that could be encountered in daily life.

**Keywords:** Ottoman Diyarbekir, Muslim-Muslim Relations, Crime, Social History.

## GİRİŞ

Osmanlı Devleti esas itibarıyla İslam hukukunun üstünlüğü ilkesini takip etmiş<sup>44</sup> ve toplumu oluşturan bireyleri, etnik kökenlerini dikkate almayarak dinî açıdan gruplandırmıştır.<sup>45</sup> Dinî aidiyetleri temelinde müslim ve gayrimüslim (zimmi) olmak üzere iki kategoriye ayrılan Osmanlı vatandaşları içerisinde Müslümanlar, hukukî olarak tek bir yapı arz ederken gayrimüslimlerin belirgin biçimde dinî ve mezhepsel farklılıkları vardı.<sup>46</sup> Tanzimat öncesi dönemde Müslüman toplumu içerisinde meydana gelen hukuki meselelerde yegâne müracaat mercii şer‘î mahkemeler iken gayrimüslim toplum içerisinde meydana gelen ihtilaflarda her iki tarafın da rızası olduğu takdirde ruhani reislerinin sınırlı bazı alanlarda hukuki yetkileri bulunmaktaydı.<sup>47</sup> Ancak taraflardan birinin Müslümanlardan diğerinin gayrimüslimlerden olduğu durumlarda yegâne müracaat mercii şer‘î mahkemelerdi.<sup>48</sup> Dolayısıyla Osmanlı Devleti hâkimiyetindeki coğrafyada bilumum tüm toplumun hususen de yüzyıllarca birlikte yaşayan Müslüman ve gayrimüslimlerin karşılıklı olarak kurmuş oldukları ilişkilerin en açık, güvenilir ve zengin biçimde gözlenebileceği kaynaklar şer‘î mahkemelerce tutulan *şer‘iyye sicilleri*dir. Bu niteliği sebebiyle şer‘iyye sicilleri Osmanlı sosyal tarihi araştırmalarında temel kaynak konumundadır.<sup>49</sup>

Döneme ait müslim-gayrimüslim suç ilişkilerini yansıtmaları bakımından şer‘iyye sicillerinin yanı sıra ahkâm defterleri de son derece önemlidir. Dîvân-ı Hümâyün’dan sadır olan hüküm, kanunname ve nizam mahiyetindeki kararların kaydedildiği defterlere *ahkâm defterleri* denilir.<sup>50</sup> Bu tür kayıtların mahfuz olduğu defterler, esas itibarıyla Müslüman ve gayrimüslim tebaanın şikâyet ve problemlerini çözüme kavuşturmak ve adaleti tesis etmek amacıyla Dîvân-ı Hümâyün tarafından düzenlenmişlerdir.<sup>51</sup>

<sup>44</sup> Halil İnalçık, *Osmanlı’da Devlet, Hukuk, Adâlet* (İstanbul: Eren Yayıncılık, 2005), 39.

<sup>45</sup> Gülnihal Bozkurt, *Alman – İngiliz Belgelerinin ve Siyasi Gelişmelerin Işığı Altında Gayrimüslim Osmanlı Vatandaşlarının Hukukî Durumu (1839-1914)* (Ankara: Türk Tarih Kurumu Basımevi, 1989), 1, 14.

<sup>46</sup> Bozkurt, *Gayrimüslim Osmanlı Vatandaşlarının Hukukî Durumu*, 9.

<sup>47</sup> M. Macit Kenanoğlu, *Osmanlı Millet Sistemi: Mit ve Gerçek* (İstanbul: Klasik Yay., 2012), 397.

<sup>48</sup> Ümit Güler, *Osmanlı’da Suç ve Ceza (Kıbrıs Örneği)* (Ankara: Fecr Yayınları, 2019).

<sup>49</sup> Şer‘iyye sicillerinin önemine dair geniş bilgi için bk. Güler, *Suç ve Ceza*, 39-40; Saadet Maydaer, *XVI. Yüzyılda Bursa’da Asayiş* (Bursa: Emin Yay., 2016), 9; Celal Erdönmez, *Şer‘iyye Sicillerine Göre Kıbrıs’ta Toplum Yapısı (1839-1856)* (Isparta: Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü, Doktora Tezi, 2004), VI. Ahmet Akgündüz, *Şer‘iyye Sicilleri* (İstanbul: Türk Dünyası Araştırmaları Vakfı, 1988), 1/12; Osman Çetin, *Sicillere Göre Bursa’da İhtida Hareketleri ve Sosyal Sonuçları (1472-1909)* (Ankara: Türk Tarih Kurumu Basımevi, 1994), IX; Yunus Uğur, “Şer‘iyye Sicilleri”, *Türkiye Diyanet Vakfı İslâm Ansiklopedisi* (İstanbul: TDV Yayınları, 2010), 39/8; İsmail Hakkı Uzunçarşılı, “Şer‘î Mahkeme Sicilleri”, *Ülkü Halkevleri Dergisi* 5/29 (Temmuz 1935), 365-368; T. Mümtaz Yaman, “Şer‘î Mahkeme Sicilleri”, *Ülkü Halkevleri Dergisi* 12/68 (İlk Teşrin 1938), 153-164.

<sup>50</sup> Mehmet Zeki Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü* (İstanbul: Milli Eğitim Basımevi, 1993), I/30.

<sup>51</sup> Ramazan Günay, *XIX. Yüzyılın İlk Yarısında Diyarbakır’da Sosyal ve Ekonomik Hayat (Ahkâm-Şikâyet Kayıtlarına Göre)* (Kayseri: Erciyes Üniversitesi Sosyal Bilimler Enstitüsü, Doktora Tezi, 2009), 3.

Tarihsel olarak çok kültürlü ve renkli bir sosyal yapıya sahip olan Diyarbakır, Osmanlı döneminde de İslam coğrafyasının yüzyıllar boyu iç içe yaşamış birçok etnik ve dinî grubunun adeta bir buluşma noktasıydı <sup>52</sup>ve bilhassa dinî açıdan Anadolu'nun diğer şehirlerine nazaran çok daha fazla çeşitlilik ihtiva etmekteydi.<sup>53</sup> Nitekim 1895'te Diyarbakır kazasının %33.7'sini gayrimüslimler oluşturmaktaydı.<sup>54</sup> Bu kozmopolit yapısının yanı sıra Diyarbakır'ın, Osmanlı İmparatorluğu'nun Rumeli ve Batı Anadolu gibi merkezi bölgelerinden ve devlet otoritesinin daha muhkem olduğu İstanbul'dan uzakta bulunması oradaki toplumsal ilişkileri daha hassas ve önemli kılmaktadır.<sup>55</sup>

### **I. Cinayet**

19. yüzyıl Osmanlı Diyarbakır'ına ait kadı sicilleri ve ahkâm defterleri üzerine yapmış olduğumuz incelemede, Müslüman ve gayrimüslimler arasında meydana gelen altı cinayet hadisesi tespit edilmiştir. Bu altı vakanın tamamında katiller değil, katil zanlıları söz konusudur. Zira bunların hiçbirinde cinayet iddiası hukuken ispatlı değildir. Katil zanlılarının müntesibi oldukları toplumlara bakıldığında biri hariç tamamının Müslümanlardan olduğu gözlenmiştir. Bu da gerçekleşen cinayet hadiselerinde Müslümanların gayrimüslimlere nazaran daha fazla cinayet suçuna karıştıklarına işaret etmektedir. Ancak bu noktada dikkatlerden kaçırılmaması gereken husus, incelenen dönemin genişliğine ve belgelerin zenginliğine mukabil vaka sayısının son derece az olmasıdır. Dolayısıyla gayrimüslimler açısından umumi bir mağduriyet durumunun ortaya çıkmadığı, hatta toplumlar arası cinayet hadiselerinin son derece düşük olduğu ifade edilebilir. Cinsiyetleri açısından katil zanlılarına bakıldığında bunların tamamının erkeklerden müteşekkil olduğu görülür. Bir başka ifadeyle bu dönemde toplumlar arası suç ilişkilerinde hiçbir kadının cinayet suçuyla itham edilmediği ortaya çıkmaktadır.

Sözü edilen altı vakada yedi maktul yer almaktadır. Zira bu vakaların birinde iki maktul söz konusudur. Maktullerin müntesibi oldukları topluma bakıldığında altısının gayrimüslim, birinin Müslüman olduğu görülür. Bu vakaların birinde katil zanlısı gayrimüslim, maktul ise

<sup>52</sup> İbrahim Özcoşar, "Bir İslam ve Osmanlı Şehri Olarak Diyarbakır/Amid", Osmanlı'dan Günümüze Diyarbakır, ed. İbrahim Özcoşar v.dğr. (İstanbul: Ensar Yay., 2018), 20; İlhan Kaya, "Azınlıklar, Çok Kültürlülük ve Diyarbakır", *Nebiler, Sahabiler, Azizler ve Krallar Kenti Diyarbakır 2* (Diyarbakır: Diyarbakır Valiliği Kültür ve Sanat Yayınları, 2011), 216 vd.; Suavi Aydın – Jelle Verhei, "Diyarbakır Vilâyetinde Etnik-Dinî Gruplar, Yerel Güçler ve Osmanlı Devleti Üzerine Birkaç Not (1800-1870)", *Osmanlı Döneminde Diyarbakır'da Toplumsal İlişkiler (1870-1915)*, der. Joost Jongerden – Jelle Verhei (İstanbul: İstanbul Bilgi Üniversitesi Yayınları, 2015), 15-16.

<sup>53</sup> Kenan Ziya Taş, *Tarih Işığında Güneydoğu ve Diyarbakır* (Ankara: Berikan Yayınevi, 2012), 21.

<sup>54</sup> Şehirdeki gayrimüslim dinî gruplar ve nüfus oranları (1895 yılı itibarıyla) şöyledir: Gregoryen Ermeniler (%57.3), Süryani kadim kilise mensupları (%19), Katolikler (%5.2), Protestan Ermeniler (%5.1), Keldaniler (%4.4), Yezidiler (%3.8), Yahudiler (%1.5), Katolik Süryaniler (%1.8), Katolik Rumlar (%0.3), Kıbtiler (%0.04). bk. Bülent Çukurova & Bülent Erantepli, "XIX. Yüzyılda Diyarbakır'ın Sosyal ve İdari Yapısı", *Osmanlı'dan Cumhuriyet'e Diyarbakır*, ed. Bahaeddin Yediylidiz & Kerstin Tomenendal (Ankara: Diyarbakır Valiliği, 2010), II/359-360.

<sup>55</sup> Aydın – Verhei, "Diyarbakır Vilâyetinde Etnik-Dinî Gruplar", 15-16.

Müslümandır. Diğer vakalarda katil zanlılarını Müslümanlar, maktulleri gayrimüslimler oluşturmuştur. Ancak yukarıda da ifade edildiği gibi vaka sayısı son derece az olduğu için umumi bir mağduriyet durumundan bahsedilmesi mümkün değildir. Buna karşın Müslümanların cinayet bağlamındaki suç hadiselerine daha fazla karıştıkları açıktır. Cinsiyet açısından maktullerin büyük çoğunluğunu erkekler oluşturmuş, sadece bir vakada Ketrine bnt. Bolos adlı gayrimüslim bir kadının bilinmeyen bir sebeple azatlı köle Şakir b. Abdullah tarafından katledildiği anlaşılmaktadır.<sup>56</sup>

Bu dönemde toplumlar arası cinayetlerin hangi şekil ve yöntemlerle işlendiğine dair bazı bilgi ve bulgulardan da bahsedilebilir. Nitekim mezkûr cinayet vakalarının ikisi boğma suretiyle gerçekleşmiştir. Bunun dışında birer vakanın da sopa ile darp, hançerleme ve kaza kurşunuyla vuku bulduğu anlaşılmaktadır. Toplumlar arasında meydana gelen mezkûr cinayetlerin hangi sebeplerle işlendiği sorusu önemlidir. Acaba vuku bulan eylemler, toplumsal grup ayrışmasıyla meydana gelen cinayetler mi yoksa hayatın tabii seyri içerisinde meydana gelen olaylar mıdır? Maalesef şer‘iyye sicilleri ve ahkâm defterleri formatları gereği bu hususlara dair pek fazla bilgi sunmamaktadır. Ancak olaylar üzerine yapılan incelemede cinayetlere sebebiyet verecek bir toplumsal grup ayrışmasına veya toplumsal grup asabiyetiyle işlenen herhangi bir cinayete rastlanmamıştır. Zira vaki olan cinayetlerin benzerleri, hayatın normal akışı içerisinde Müslümanlar arasında da meydana gelebilmiştir.<sup>57</sup>

Toplumlar arası cinayet suçlarında dikkati celbeden bir diğer husus, cinayet vakalarının hiçbirinin ispatlanamamış olmasıdır. Ancak dikkat edilmesi gerekir ki cinayet vakalarının ispatında yaşanan güçlük sadece toplumlar arası ilişkilerde değil, döneme ait genel bir sorundur.<sup>58</sup> Dolayısıyla bunun Müslim-gayrimüslim suç ilişkileri yönü itibarıyla özel bir durum olduğu söylenemez. Yine dönemdeki genel temayüle uygun olarak<sup>59</sup> taraflarını Müslüman ve gayrimüslimlerin teşkil ettiği iki cinayet davasının sulh ile sonuçlandığı da olmuştur. Bu da toplumlar arası cinayet hadiselerinde zaman zaman tarafların sulh uygulaması ile uzlaşmaya gittiklerini göstermektedir. Bunun yanı sıra bir gayrimüslim tarafından Dîvân-ı Hümâyün’a cinayet de ihtiva eden kimi suçların ulaştırılmasıyla Dîvân’ın zimmi reayanın hak ve hukukunun korunması yönünde birçok ferman sadır ederek cinayet hadiselerinin sonuçsuz kalmaması ve reayanın hukukunun korunması hususunda gayret ettiğini göstermektedir.

<sup>56</sup> DŞS, 3803, 13a-3.

<sup>57</sup> Ümit Güler, *Osmanlı Toplumunda Cinayet* (Ankara: İlahiyât Yayınları, 2020), 37.

<sup>58</sup> Güler, *Osmanlı Toplumunda Cinayet*, 54.

<sup>59</sup> Güler, *Osmanlı Toplumunda Cinayet*, 55-56.

Cinayet hususunu bitirmeden önce son olarak ilgili fermanlarda yer alan, konuya dair şu pasajlara yer verilebilir:

“...imdi sen ki buldukları kazânın nâib-i mûmâileyhisin, ma‘rifetinle eşkıyâ-yı merkûmları buldurup huzûr-ı şer‘e ihzâr ve terâfu‘-ı şer‘-i şerîf ederek husûs-ı mezbûr inhâ olduğu üzere olduğu hâlde emlâk ü eşyâ-yı mağsûbe ba‘de’s-sübût alıverilip ve mâdde-i katl dahi kimin üzerine şer‘an sâbit olur ise ber-muktezâ-yı şer‘-i enver edâ-yı şer‘-i şerîf ve ihkâk-ı hakka dikkat ve kazıyyede alâkası olmayan bî-cürm kesâna azv û töhmet ve isnâd-ı kabâhat ile bî-vech ta‘addî etdirilmemesi husûsuna mübâderet olunmak bâbında...”<sup>60</sup>; “...mâdde-i katl kimin üzerine şer‘an sâbit olur ise ba‘dehû icâbı icrâ olunmak üzere sûret-i hâli bâ-i‘lâm ve tahrîrât Dersaadet‘ime inhâya mübâderet ve kazıyyede alâka vü medhali olmayan bî-cürm kesâna azv [ü] töhmet ü kabâhat ile bî-vech ta‘addî olunmaması husûsuna dikkat...”<sup>61</sup>

## **II. Gasp**

Döneme ait belgelerde Müslüman ve gayrimüslimler arasında gerçekleşen dört gasp vakası tespit edilmiştir. Bu vakaların tamamında suç isnadının ispatlı olmadığı, dolayısıyla davalıların zanlı statüsünde buldukları gözlenmiştir. Dört vakanın ikisinde Müslümanlar, diğer ikisinde gayrimüslimler zanlıdır. Bu vakaların ikisinde gasp eyleminin eşkıya çetesi tarafından gerçekleştirildiği anlaşılmaktadır. Dolayısıyla tespit edilen gasp eylemlerinde eşkıyalık faaliyetlerinin önemli bir yerinin olduğu söylenebilir. Ayrıca gerek Müslümanlar gerekse gayrimüslimler arasından da eşkıyalık faaliyetinde bulunanlar çıkabilmiştir. Kimi Müslüman ve gayrimüslimlerin eşkıyalık faaliyetlerinde işbirliği yaptığı da anlaşılmaktadır.<sup>62</sup>

## **III. Zabt**

Döneme ait belgeler içerisinde taraflarını Müslümanların ve gayrimüslimlerin oluşturduğu dört zabt vakası tespit edilmiştir. Bu vakaların üçünde davacı şahıslar gayrimüslim olup birinde Müslümandır. Davalılar da üç vakada Müslüman, bir vakada gayrimüslimdir. Bir vaka hariç tarafların tamamı erkeklerden müteşekkildir.

## **IV. Hırsızlık**

Döneme ait belgeler içerisinde hırsızlığa dair altı vaka tespit edilmiştir. Bu vakaların beşinde davalılar Müslüman iken birinde gayrimüslimdir. Üç vakada suç ispatlı iken diğer vakalarda

<sup>60</sup> DAD, 7, 147-1.

<sup>61</sup> DAD, 8, 14-1; Ayrıca bk. DAD, 8, 42-3; DAD, 8, 60-3; DAD, 8, 81-2.

<sup>62</sup> DŞS, 3746, 4b-2.

ispatlı değildir. Mağdurlar cenahında ise beş vakada gayrimüslimler, bir vakada ise Müslüman bir şahıs yer almıştır. Söz konusu olaylarda tüm tarafların erkeklerden müteşekkil olduğu gözlenmiştir. İlgili vakalara toplumlar arası suç ilişkisi açısından bakıldığında bu vakaların dördünde davalının Müslüman, davacının gayrimüslim; birinde davalının gayrimüslim, davacının Müslüman olduğu görülür. Hırsızlığa konu olan mallar da genellikle para, altın, direk, merkep veya katırdır.

#### **V. Mala Zarar Verme**

Döneme ait belgeler, taraflarını Müslümanların ve gayrimüslimlerin oluşturduğu üç mala zarar verme vakasının meydana geldiğini göstermektedir. Bu vakalarda davalıların ikisi gayrimüslimken biri Müslümandır. Vakaların ikisinde davalılar zanlı konumundayken gayrimüslimin davalı olduğu vakada suç ispatlıdır. Davacı cenahında da iki Müslüman, bir zimmi yer almaktadır ve tarafların tamamı erkeklerden müteşekkildir. Zararın söz konusu olduğu mallar, iki vakada beygir, bir vakada da katırdır. Davacılar, bir vakada beygirin ölümüne, bir vakada beygirin sakatlanmasına, bir başka vakada da katırın elden çıkmasına sebebiyet verilmesinden dolayı dava açmışlardır. Mezkûr davaların biri fetvaya havale edilmiş,<sup>63</sup> biri ispatlanmış,<sup>64</sup> bir diğeri de delil yetersizliği sebebiyle düşmüştür.<sup>65</sup>

#### **VI. Dinî Hak ve Hürriyetlere Yönelik Suçlar**

Osmanlı Diyarbakiri'nde sosyal hayatta iç içe ve temas halinde yaşayan Müslüman ve gayrimüslim ahalinin birbirlerinin dinî hak ve hürriyetlerine yönelik nasıl bir tutum takındıkları hususu son derece önemlidir. Zira bir İslam devleti olan Osmanlı'nın tebaası konumunda olan gayrimüslimler, acaba bu konuda Müslüman ahali tarafından taciz ve baskılara maruz kalmışlar mıdır? Böylesi olaylar olmuşsa devletin tutumu ne yönde olmuştur? Bu gibi sorular çerçevesinde yapmış olduğumuz inceleme, ilgili dönemde her iki ahali arasında<sup>66</sup> meydana gelen iki vakayı ortaya koymuştur. Bu vakaların her ikisinde müştekilerin Ermeni reayadan, zanlıların da Müslümanlardan oldukları anlaşılmıştır. Bunların birinde Ermenilerin kendi cemaatlerini kiliseye davet için tahta çaldıklarını ancak bazı Müslümanların buna engel olduğunu; bir diğer vakada da Ermenilerce *zangoç* adı verilen kilise görevlilerinin kendilerinin

<sup>63</sup> DŞS, 3767, 5a-3.

<sup>64</sup> DŞS, 3702, 5b-3.

<sup>65</sup> DŞS, 3774, 16b-1.

<sup>66</sup> (Devlet görevlileri ile gayrimüslim reaya arasında meydana gelen sorunlar bu çalışmanın kapsamına girmemektedir.)

sakini oldukları mahallede kimi Müslümanlar tarafından saldırıya uğrayıp darp edildiklerini ifade etmişlerdir.

İlgili belgeler, Osmanlı Diyarbekiri'nde Müslüman ve gayrimüslim toplumlar arasında dinî hak ve hürriyetlere yönelik tacizlerin son derece az gerçekleşen suçlardan olduğunu göstermiştir. Ortaya çıkan bu durum, toplumların birbirlerinin kutsallarına, dinî hak ve hukuklarına genel itibarıyla saygı ve hoşgörülle yaklaştıklarını ortaya koymaktadır. Zira şayet bu hususta bilhassa gayrimüslimlerin umumi bir mağduriyet durumları söz konusu olsaydı bu çerçevede patrikleri vasıtasıyla durumun padişaha iletilmesi ve buna binaen mağduriyetin giderilmesi babında birçok yazışmanın yapılması beklenirdi. Nitekim padişaha gönderilen arzuhâllerin dikkate alınarak sözü edilen olumsuzlukların menî sadedinde çok ciddi talimatların yerel mahkemeye gönderildiği belgelerden açık biçimde gözlenebilmektedir. Ortaya çıkan bu durum, Osmanlı devlet yönetiminin ve Müslüman toplumun gayrimüslimlerin hak ve hürriyetlerine gösterdikleri müspet tutumu ve farklı dinlere mensup toplulukların barış içerisinde yüzyıllarca birlikte yaşama tecrübelerini yansıtmaları bakımından son derece kıymetlidir.

## **VI. SONUÇ**

Döneme ait Diyarbekir şer'iyeye sicilleri ve ahkâm defterlerine dayalı olarak ortaya çıkan bu çalışma, Osmanlı'nın Müslüman ve gayrimüslim tebaasının toplumsal ilişkilerine dair dikkate değer görünümeler ortaya koymuştur. Bunların ilki her iki toplum arasında vaki olan suç hadiselerinin son derece sınırlı olmasıdır. Buradan hareketle ilgili dönemde toplumlar arasındaki ilişkinin genel itibarıyla olumlu bir niteliğe sahip olduğu söylenebilir. Nitekim vaki olan suç hadiseleri genel olarak basit nitelikli suçlardır. Örneğin ilgili dönemde toplumlar arasında herhangi bir tecavüz, taciz veya iffet davası söz konusu olmamıştır. Bu gibi hadiseler vaki olmuşsa dahi döneme ait mahkeme sicillerine ve ahkâm defterlerine yansıtılacak düzey ve ciddiyette olmadığı açıktır. Ciddi nitelikli suçların da son derece az sayıda olduğu ortaya çıkmıştır. Örneğin dinî hak ve hürriyetlere yönelik suçların sadece iki; cinayet hadiselerinin de altı vakayla sınırlı olması bu yönde dikkate değer bir bulgudur. Şüphesiz insanın olduğu yerde münferit de olsa birtakım suç hadiselerinin olması kaçınılmazdır. Bu durum tüm toplumlarda böyledir ve insan doğasının bir gereğidir. Burada esas önem arz eden, umumi bir mağduriyetin ve hukuksuzluğun olup olmadığıdır. Bu araştırmada ortaya çıkan netice, bir İslam devleti olan Osmanlı'nın hâkimiyeti altında yaşayan Diyarbekir gayrimüslimlerinin umumi bir mağduriyet ve hukuksuzluğa maruz kalmadıkları yönündedir.



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## **ÇOCUK İHMAL VE İSTİSMARINA YÖNELİK MÜDAHALELER ÜZERİNE BİR DEĞERLENDİRME**

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### **ÖZET**

Geçmişten günümüze toplumun en temel yapı taşı aile olarak kabul edilmektedir. Aile, çocuğun ilk eğitim aldığı yer olması açısından aileye farklı sorumluluk ve görevler yüklenmektedir. Çünkü aile, gerek çocuğun bakımı ve güvenliği gerekse sosyalizasyonu açısından büyük önem arz etmektedir. Bu görev ve sorumlulukları yerine getiren aileler sağlıklı aileler olarak kabul edilebilir. Bunun dışında, işlevlerinde aksamaların gerçekleştiği aileler ise sağlıksız aileler olarak tanımlanmaktadır. Sağlıksız ailelerde çocuğa yönelik ihmal istismar gibi çocuğun fiziksel ve ruhsal bütünlüğünü bozacak durumlar gerçekleşebilir. Bu durumlar şiddet, cinsel içerikli davranışlar ya da çocuğun onur ve haysiyetini zedeleyici söylemler olarak karşımıza çıkabilmektedir. Sosyal hizmet mesleği çeşitli dezavantajlı gruplarla çalışsa da bunlardan en önemli olanlardan birisi çocuklar olarak kabul edilmektedir. Çünkü toplumun temel yapı taşı aile, ailenin temel yapı taşı da çocuk oluşturmaktadır. Multidisipliner bir çalışma alanı olan sağlıkta da çocuğa yönelik tıbbi, psikolojik ve sosyal olarak müdahale alanları bulunmaktadır. Bu çalışmada çocuk ihmal ve istismarına yönelik müdahaleler konusu üzerinde durulmuştur. İhmal ve istismar kavramları ile ilgili tanımlar yapılmış, çocuk ihmal ve istismarına yönelik müdahalelerde kuramların rolüne yer verilmiştir. Buna bağlı olarak çocuk ihmal ve istismarına yönelik müdahale basamakları incelenmiştir.

**Anahtar kelimeler:** İhmal, istismar, çocuk, sosyal hizmet.

**AN EVALUATION ON INTERVENTIONS TO CHILD NEGLECT AND ABUSE****ABSTRACT**

From past to present, the most basic building block of society is accepted as family. Since the family is the first place where the child receives education, different responsibilities and duties are assigned to the family. Because the family is of great importance in terms of both the care and safety of the child and its socialization. Families thatful fill these duties and responsibilities can be considered healthy families. Apart from this, families in which dys functions ocur are defined as unhealthy families. In unhealthy families, situations such as neglect of the child and abuse may ocur that will disrupt the physical and mental integrity of the child. These situations may appear as violence, sexually explicit behaviors or statements that harm the honor and dignity of the child. Although the social work profession works with various disadvantaged groups, one of the most important ones is considered to be children. Because the basic building block of the society is the family, and the basic building block of the family is the child. Health, which is a multidisciplinary field of study, also has medical, psychological and social intervention areas for the child. This study focuses on interventions for child neglect and abuse. Definitions have been made about the concepts of neglect and abuse, and the role of theories in interventions for child neglect and abuse has been given. Accordingly, the steps of intervention for child neglect and abuse were examined.

**Key Words:** Neglect, abuse, child, social work.

## **1. GİRİŞ: ÇOCUK İHMAL VE İSTİSMARI**

Amerikan Psikoloji Birliği'nin (2002) yaptığı tanıma göre çocuğa yönelik kötü muamele, *"Etkileri, yoğunluğu ve içeriği sebebiyle çocuğun ruhsal ve sosyal sağlığını etkileyen önemli bir toplumsal bir sorundur"* biçiminde tanımlanmıştır (Sürsavur ve Demirel, 2018: 64). Çocuk istismarı, ebeveyn ya da bakımını üstlenen yetişkin bir birey tarafından çocuklara uygulanan, ahlaki değerler ve alanında uzman olanlar tarafından uygun olmayan ya da zarar verebilecek şekilde tanımlanan, çocukların gelişim sürecini güçleştiren ya da sınırlandıran davranışların bütünü olarak ifade edilmektedir (Yaşar, 2016: 1). Kısaca, çocuklarda ciddi fiziksel veya psikolojik yıkımlara ve çocuk ölümlerine neden olan sosyal ve tıbbi bir problem olarak tarif edilebilir.

Çocuklara yönelik gerçekleşen ihmal ve istismar olayları kültürel yapıdan, coğrafi yapıdan, sosyal ve ekonomik gelişmişlikten ayrı olarak uzun yıllardır hayatımızda var olan bir gerçekliktir (Vizard, 1991 aktaran Uğurlu ve Gülşen, 2014: 9). Çocuklara yönelik ihmal ve uygulanan istismar olayı oldukça eski bir geçmişe dayandığı söylenebilir. Eski bir geçmişi olsa da, bu konunun toplum gündeminde yerini alması oldukça yakın zamanda gerçekleşmiş bir durum olarak ifade edilebilir (Taş, 2017: 1). Çocuğun bedensel sağlığı, ruhsal ve sosyal gelişimi üzerinde olumsuz etkileri olan çocuk istismarı konusunun sosyal bir sorun haline gelecek şekilde Türkiye'de gündeme taşınması 2000'li yılların başından itibaren gerçekleşmiştir (Güner vd., 2010: 109; Küçük, 2016: 262 aktaran Kaya Kılıç ve Tekin, 2019: 845). Ancak hâlâ bu konu üzerinde gerçekleştirilen çalışmalar sadece çocukla ilgili kurum ve kuruluşlara yöneliktir (Dallar Bilge vd., 2013: 33).

Aile, toplumun temel yapı taşıdır ve her toplumda aile kurumundan söz edilebilir. Aile kurumu, toplumdaki topluma ve zamandan zamana değişen, farklılık gösteren bir yapıya sahiptir (Dikici, 2020: 58). Fakat her aile, farklı sosyo-kültürel özellikler bağlamında çocuk yetiştirme konusunda da farklılıklar göstermektedir. Her toplum, çocuk yetiştirme konusunda birbirinden farklı yöntemler kullansa da, zaman içerisinde çocukların fiziksel olarak cezalandırıldıkları, beraberinde psikolojik parçalanmaların meydana geldiği ve hatta cinsel olarak yıpratıldıkları bilinmektedir (Bilir vd., 1991: 58). Çocuğun ilk sosyal çevresi, ailesidir. Çünkü aile kurumunun önemli fonksiyonlarından birisi, çocukların ihtiyaçlarının karşılanması ve geleceğe yönelik atacağı adımlarda yardımcı olmaktır. Ailenin bu fonksiyonlarına rağmen, çocuk istismarı vakalarının aile ortamında gerçekleştiği görülmektedir (Özyürek vd., 2018: 437). İstismarcı ebeveyn tüm etnik, coğrafi, dini, eğitimsel, mesleki ve sosyo-ekonomik düzeylerde yer alan

kişilerden olabilsede, sosyo-ekonomik açıdan dezavantajlı olarak ifade edilen kesimden olma ihtimali daha yüksektir (Kara vd., 2004: 141).

## **2. ÇOCUK İHMAL VE İSTİSMARININ ÇOCUK ÜZERİNDEKİ ETKİLERİ**

Çocuk istismarı oldukça önemli bir sosyal sorundur. Uzun vadede olumsuz etkileri gözlemlenmektedir (Taner ve Gökler, 2004: 84). Anne-babalar, bakımını üstlenen kişiler bilerek veya bilmeyerek dogmatik olarak var olan tavır ve davranışlarla çocuklara ihmal ve istismarda bulunabilmektedirler. Bu davranışlar çocukların gelişimini engellemektedir (Taş, 2017: 2). Yetişkinlik çağına kadar etkisi devam eden, asosyal davranışlar sergileme, ikili ilişkiler kurmada güçlük çekme, toplumun ahlaki değerleriyle ters düşen hareketlerde bulunma, madde bağımlılığı ve suça yönelme gibi davranışlar sergileyebilmektedirler (Finkelhor 1994 aktaran Ak, 2015: 26). Yapılan çalışmalar, erken çocukluk döneminde istismara maruz kalmanın, uzun vadede genç suçluluğu, yetişkin suçluluğu ve şiddet suçları ile sonuçlandığını ortaya çıkarmaktadır (Topçu, 2009: 13).

Çocukluk dönemindeki olumsuz deneyimler ile yetişkinlik döneminde meydana gelen ruhsal sorunların ilişkisine değinen birçok araştırmanın bulunduğu bilinmektedir (Yiğit ve Erden, 2015: 48). Garrison (1987), Hort ve Brassord (1987) gerçekleştirdikleri literatür araştırması sonucunda, doğrudan doğruya ve şiddetli bir duygusal istismar olayı, birçok davranış bozukluklarının çocuklarda görülmesine neden olduğunu ve buna bağlı olarak öğrenme güçlükleriyle ilişkili olduğunu ortaya koymuşlardır (Kozcu, 1991: 383). Duygusal olarak ihmal ve istismara maruz kalan çocuklar üzerinde gerçekleştirilen on sekiz çalışmanın değerlendirilmesi sonucunda, duygusal olarak kötü muameleye maruz kalan çocukların duygularını ifade etme ve duyguların farkındalığında: duygusal olarak kötü muameleye uğramamış çocuklarla karşılaştırıldığında önemli ölçüde daha yetersiz oldukları gözlemlenmiştir (Luke ve Banerjee, 2013 aktaran Üstündağ, 2020: 137). Mullen vd. (1996) intihara başvurma girişimlerinin fiziksel açıdan istismar olaylarında beş kat artarken, duygusal içerikli istismarda bu oranın 12 kata kadar yükseldiğini ifade etmiştir (Dinleyici ve Şahin Dağlı, 2016: 6).

Fiziksel istismara maruz kalmış çocukların on iki yıl takip edildiği bir araştırmada, istismara uğramış çocukların, istismar deneyimlememiş olan çocuklara göre okul devamsızlığı oranlarının, depresyon, kaygı bozukluğu, travma sonrası stres bozukluğu ve pasif agresif

davranış düzeylerinin daha yüksek olduğu ve daha fazla sosyal sorunlar yaşadığı görülmüştür (Lansford, 2002 aktaran Sofuoğlu ve Cankardaş Nalbantçılar, 2018: 6).

Cinsel istismara uğramış çocuklarda da anksiyete meydana gelebilmektedir. Bununla birlikte uyku yönünden birtakım sıkıntılar, kâbus görmeler, yeni fobiler, fizyolojik şikâyetler ve korkuya yönelik refleksler gözlenmektedir (Tıraşçı ve Gören, 2007: 72).

İstismara uğrayan çocuklarla detaylı bir görüşme gerçekleşmeden ve fiziki muayene yapılmadan gönderildiklerinde, bu çocukların sonraki zamanlarda yaklaşık olarak %5-10'unun cinayete kurban gittiği, %35-50'sinin ise ağır derecede yaralandığı gözlenmiştir (Kara vd., 2004: 149).

Çocuk istismarı konusu çocukların üzerinde bırakmış oldukları etkiler bağlamdan son derece önemli bir konudur. İstismara uğrayan çocuklarda fizyolojik etkilerine ek olarak istismar mağduru çocuğun, güven duygusu sarsılır ve sevgisizliği öğrenir. Bu nedenle anne-babaları ya da çocuklara bakan kişilerce gerçekleştirilen istismar olayları ve ihmal durumları sadece aileleri değil, toplumu da ilgilendirmektedir. Bu nedenle önemli bir sosyal sorun olarak kabul edilmektedir (Altıparmak vd., 2013: 355).

### **3. ÇOCUK İHMAL VE İSTİSMARINDA ROL OYNAYAN ETMENLER**

İstismar ve ihmalin gerek ruhsal ve sosyal gerekse biyolojik incelemelere göre çeşitli nedenleri bulunmaktadır (Polat Külcü ve Karataş, 2016: 49). Barınma sorunları, işsizlik sorunu, madde ve alkol bağımlılığı, aile içi şiddet ve ailede bulunan ruhsal hastalıklar çocuk istismarına yol açabilecek risk etmenlerinin başında gelmektedirler (Ayvaz ve Aksoy, 2004: 27). Bu etmenler 3 başlık altında incelenecek olursa:

#### **3.1. Aileden Kaynaklı**

Ebeveynlerin çocuklarına ihmal ve istismar uygulamasının nedeni, onların çocuklarına değer vermemeleri ya da onları umursamamaları değil, ebeveynlik becerilerinin yeteri kadar olmamasıdır (Yaşar, 2016: 4). Gerçekleştirilen çalışmalarda çocuk sayısının fazla olması, işsizlik, anne-babadan birinin üvey olması ya da tek ebeveynlik, ailenin izole bir yaşam tarzı içerisinde olması, ailenin güçlü yönlerinin yetersiz olması fiziksel şiddete neden olan risk faktörleri olarak görülmektedir (Cowen, 1999 aktaran Güler vd., 2002: 129). Fiziksel olarak gerçekleşen istismar ve ihmal olayları için, ebeveyne ilişkin risk etkenlerine ek olarak: ağır psikolojik rahatsızlıklar, madde bağımlılığı, sosyal destek yokluğu, çocuklukta istismara maruz kalması gibi etkenler etkili olabilmektedir (Power, 1990 aktaran Taner ve Gökler, 2004: 82).

Ayrıca çocuk annelerin çocukları daha sağlıksızdır. Kötü muameleye maruz kalma olasılıkları daha fazladır. Beslenme sorunu ve yasadışı davranışlarla birlikte, maddi ve manevi açıdan daha düşük bir düzeyde yaşarlar (Turan ve Dokgöz, 2007: 138).

Çocukların davranışları üzerinde ebeveynlerin rolü oldukça fazladır. Çünkü çocuklar gözlemedikleri anne-babalarını rol model olarak alırlar. Onları tekrarlama yoluyla öğrenirler ve onları bu şekilde taklit ederler. Çocukların, ebeveynlerince kötü muameleye maruz kalması, ebeveynleri arasındaki şiddete şahit olması yaşam tarzlarını, aralarındaki bağı etkiler ve kendi çocuklarına kötü muamelede bulunmasına neden olur (Kutlu, 2007 aktaran Dallar Bilge vd., 2013: 28).

İstismar uygulayan ebeveynler çoğunlukla şahsi çıkarlarını çocuklarından üstün görmektedir. Onlara göre çocuklar, birer cinsel obje ve araçtır. Çocuk hakkında çok fazla gerçekçi beklenti içerisine girmezler. Ayrıca sosyal ilişkileri de oldukça zayıf kişiler olarak tanımlanmaktadır (Berkowitz, 2004 aktaran Yıldız vd., 2017: 306). Cinsel içerikli istismarlar aile içerisinde çok fazla görülmektedir. Bu aileler, işlevselliği bozuk aileler olarak da ifade edilmektedir. Bu tarz ailelerde ihmal ve istismara neden olduğu varsayılan çeşitli patolojiler bulunmaktadır (Turan ve Traş, 2016: 44). Gerçekleştirilen çalışmalar sonucu çocuğu kötü muameleye maruz kalmış anneler, diğer annelere göre daha az sorun çözme yeteneğine sahiptir ve sorunların üstesinde gelme yetenekleri düşüktür. Babaların durumuna bakıldığında ise, iletişim becerilerinin yetersiz olduğu görülmüştür (Paradise vd., 1994 aktaran Ünal, 2017: 23).

### **3.2. Çocuktan Kaynaklı**

Çocuğun yaşı, cinsiyeti, doğum ağırlığı, doğum sırası, fiziksel engelinin varlığı gibi etkenler çocuğun kötü muameleye maruz kalma riskini artırmaktadır (Ünal, 2008: 15). Planlanmayan veya istenmeyen gebelik ya da evlilik dışı dünyaya gelen çocuk olması gibi durumlarda da ebeveyni ya da bakım veren kişinin çocuğa kötü muamelede bulunduğu görülmektedir (Aral, 1991 aktaran Acehan, 2013: 605). Çocuğun zor karakteristik özellikleri sahip olması ve çocukta bulunan ruhsal hastalıklar bu riski artırabilmektedir (Dinleyici ve Şahin Dağlı, 2016: 5). Ayrıca huysuzluk yaşayan, devamlı ağlama halinde olan, yemek ve uyku konusunda sorunlu ve ebeveynleri ile ikili ilişkilerde yetersiz olan çocukların ihmal ve istismar edildiği belirtilmektedir (Cüceloğlu, 1998: 379).

Yapılan bir araştırmada: engelli çocukların diğer çocuklara göre daha çok kötü muameleye maruz kaldığı, engel sahibi olan çocuklar içinden ise mental rahatsızlığı bulunan çocukların, diğer engelli olan çocuklardan daha çok duygusal, fiziksel ve cinsel istismara maruz kaldığı



tespit edilmiştir (Bilge ve Baykal, 2010). Fiziksel istismara maruz kalması sebebiyle sosyal hizmet kuruluşlarınca bakım tedbir kararı uygulanan çocukların %9,3'ünde mental, %4,2'sinde ise bedensel engel olduğu verisine ulaşılmıştır (Kutsal, 2004 aktaran Paslı, 2017: 104). Minnesota'da sosyal hizmetler ve eğitim idaresi veri tabanları taranarak gerçekleştirilen bir araştırmada istismar öyküsü olan 10.394 çocuğun % 32'sinin özel eğitim ve rehabilitasyon aldığı, bu çocukların da %73'ünün hafif düzeyde mental retardasyonu olan çocuklar olduğu sonucuna ulaşılmıştır (Haigh, 2013 aktaran Yıldırım Sarı vd., 2016: 502).

İstismarcı kişiler ile gerçekleştirilen görüşmeler sonucu, istismarda bulunacakları çocuğun suskun ve içe kapanık kişilik özelliklerine sahip olmasının ve çocuğun ebeveyninin ya da bakım verenin kendisini tanıması ve güven duymasının istismarı kolaylaştırdığı sonucuna ulaşılmıştır (Elliot, 1995 aktaran Kaytez vd., 2018: 19).

### **3.3. Çevresel ve Toplumsal Etmenler**

Ebeveynlerin sınırlı bir sosyal çevre içerisinde yer alması, arkadaşlarının ve sosyal destek sistemlerinin olmaması ya da çevrelerindeki bireylerle anlaşmazlık yaşamaları birtakım sorunları ortaya çıkarmıştır. Bununla birlikte aile etrafında ortaya çıkan hastalıkların ve yaşanan kazaların, ailede yer alan sistem ve alt sistemler arasındaki uyumsuzluğu etkilediği çocuk ihmal ve istismarına neden olduğu düşünülmektedir (Bilir vd., 1991: 59).

Konu ile ilgili gerçekleştirilen bir çalışmada, özellikle gelişmişlik düzeyi yüksek toplumlarda istismar ve ihmale yol açan etmenler arasında ailenin toplumdan tecriti, düzenli bir ekonomik gelire sahip olmama ve sabit bir adreste ikamet edememe gibi faktörler de gösterilmiştir (Bahçecik ve Kavaklı, 1993:13). Sosyal destekten yoksun olmak ya da bir dereceye kadar sosyal izolasyon içerisinde yaşamak olarak açıklanabilir (Bee ve Boyd, 2009: 245).

## **4. ÇOCUK İHMAL VE İSTİSMARINA YÖNELİK MÜDAHALELER**

### **4.1 Çocuk İhmal ve İstismarına Yönelik Müdahalelerde Kuramların Rolü**

#### **4.1.1. Sosyal Öğrenme**

Bireyin cinsel ve psişik kimliği doğuştan değil hayatı süresince etkileşim içerisinde olduğu etmenler tarafından meydana gelmektedir (Kurtay ve Kurtay, 2020;203). Bu etmenlerden en önemlisi aile içi iletişim ve aile içi dinamiklerdir. Anne-babalar küçükler için rol model olarak sosyalizasyonunu sağlar. Anne-baba rol model olarak çocuğun davranışlarını sosyalleşmesine olanak sağlarken, çocuklar da anne-babaların eylemlerini etkilemektedir. Öyle ki anne-babasının saldırganca hareketleri çocuk için saldırganlık modeli oluşturur (Aydın, 1997; 89-

90). Şiddet eğilimli annelerle gerçekleştirilen bilimsel araştırmalara göstermektedir ki, annelerin çocuklarına karşı ihmal ve istismar davranışlarında bulunmalarının temel nedeni küçüklüklerinde kötü muameleye maruz kalmaları ve bundan kaynaklı olarak kendi annelerini içselleştirmeleridir (deMause, 2020; 219)

#### **4.1.2. Ekolojik Model**

Sorunlar, birey ile çevre arasında ortaya çıkan uyumsuzluklar sosyal sorunların ortaya çıkmasına neden olmaktadır (Turan, 2012; 319). Bu sebeple ekolojik yaklaşımda kişi ve/veya kişiler dâhil oldukları çevre ile kurdukları etkileşimleri sonucu ayak uyduran ve gelişim gösteren canlılar olarak değerlendirilir. Çevresi içerisinde birey ekolüyle ilerlemesi sebebiyle ekolojik model hem içsel hem de dışsal faktörleri inceler (Duyan vd., 2008; 52).

Çocuklar fiziksel, biyolojik ve sosyal çevreden en çok etkilenen önemli bir çalışma grubudur (Güler ve Çobanoğlu, 1994; 11). Günümüzde mutlu ve üretken bir hayat süren çoğu birey yorucu ve meşakkatli koşullarda yetişmektedir. Bu bireyler suç oranı yüksek sorunlu bir fiziksel ve sosyal ortamda büyütülmüş, ebeveyni ya da bir akrabası ya da bir başkası tarafından istismar ve ihmal edilmiş; devlete bağlı kurum ya da kuruluşlarda kalmış olabilir (Zastrow, 2010;13). Aynı zamanda çocuğun kişisel gereksinimleri mikro düzeyde incelenmeden yalnızca aileyle birlikte çalışmak, senelerce ihmal ve/veya istismara maruz kalan kişilerde meydana gelen bağlanma sorunlarını çözemez (BoydWebb, 2011; 298). Bu nedenle sosyal ve siyasi akımlar, sağlık hizmetlerinin sadece hasta bireylere değil, tüm topluma eşit olarak ulaştırılması ve bireyin çevresi ile birlikte ele alınması fikrini savunmaktadır (Afşar Çelik, 2005; 5).

#### **4.1.3. Psikolojik Model**

Yaşadığımız günün her anı, görünüşte unutulmuş bir geçmişin gölgesi altında kalır (Öneş, 1972; 55). Geçmişte meydana gelen sorunlar, kişinin günümüzde yaşamını olumsuz yönde etkilediği zaman önem kazanırlar ve araştırılırlar. Ancak geçmişte olup bitenlere müdahale etme gibi bir imkân bulunmamaktadır. Ama onların tesir ettiği duygu, düşünce ve davranışlar yatıştırılabilir ve tedavi edilebilir (Turan, 2012; 255).

Bu konuda gerçekleştirilen araştırmalarda çocuklarını istismar eden ebeveynlerin onlara karşı realist olmayan beklentilerde buldukları, yerine getirilmemiş bağımlılık gereksinimlerinin olduğu ve kendilerinin de çocukluk zamanlarında ihmal ve istismara maruz kaldıkları düşünülmektedir (Polat, 2001; 33). Çocukken cinsel, fiziksel, duygusal olarak istismara uğrayan ve ihmal edilen bir ebeveyn, kendi çocuğuna şefkat ve merhamet göstermesini beklemek zordur. Ebeveynler de insandır ve tarihte çoğu birey küçükken bağlanma sorunu

yaşadıkları, özel bölgelerine yönelik kötü davranışlarda bulunuldukları, şiddete maruz kaldıkları, cinsel olarak sömürüldükleri ve duygusal olarak istismara maruz kaldığı için ebeveyn olarak çocuklarının sevgi dolu bakım verenleri olmamaları pek şaşırtıcı değildir (deMause, 2020; 59)

#### **4.1.4. Psikiyatrik Model**

Psikiyatrik sosyal hizmet; zihinsel ve psikolojik sorunları sebebiyle psikiyatrik müdahale çerçevesinde değerlendirilmesi gereken birey ya da bireylerin; sosyal uyumsuzlukları ve gereksinimleri üzerine odaklanan bir işlev bir görevdir (French, 1948 aktaran Özdemir, 2019; 60)

Çocukluklarında istismara uğrayan bireyler maruz kaldıkları cinsel istismarın meydana getirdiği psikolojik nevrozları bastırırlar. Ama bu kişiler hayatları boyunca diğer bireylerle etkileşim içinde olmakta ve ikili ilişkiler kurmakta zorlanırlar çünkü cinsel istismara maruz kalan çocuklar yetişkin bir birey olduklarında güven sorunu yaşamaktadırlar (Zastrow, 2010; 295)

Harvard Akıl Sağlığı Yazısına göre (Çocuk İstismarı, 1993), cinsel veya fiziksel istismar mağduru çocuklar ve yetişkinlere nasıl davranılacağına yönelik kabul görmüş bir davranış kalıbı bulunmamaktadır. Semptomların, değişkenlik göstermesinden kaynaklı olarak çeşitli psikoterapi ve ilaç tedavisi gerekebilmektedir. (BoydWebb, 2011; 425)

#### **4.1.5. Sosyolojik Model**

Sosyolojik modelde ise psikiyatrik modelin tersine toplumsal değerler, toplumsal kurumlar, kültürel yapı, aile yapısı ve sosyoekonomik durum istismarın ortaya çıkmasında etkili olan nedenler olarak kabul edilmektedir (Kurtay ve Kurtay, 2020; 178).

Psikopatolojinin aileden çocuğa aktarılışında hem çevre hem de kalıtsal etmenler tesir etmektedir. Parçalanmış aile olmak, aile içi iletişim bozuklukları, aile içi dinamiklerde bozulmalar, ailede psikolojik sorunlar gibi çevresel etkiler ile çocuklukta psikolojik rahatsızlıkların varlığı arasında bir bağlantı olduğu ileri sürülmektedir (Yöntem Fidan, 2011; 2). Bu açıdan çocuğun korunması, desteklenmesi ve üstün yararının sağlanmasına yönelik farkındalıklar direkt sosyoekonomik sınıf ve aileyle ilgili olduğu öne sürülmektedir (Zastrow, 2010;687)

Aile içi sorunlar yaşayan, aile sistemi tam olarak oturmamış ailelerde büyüyenlere ne olmaktadır? Herkes bu tür ailelerde dünyaya gelen ve büyüyen çocukların aileden ayrılma sürecinde daha istekli ve gayretli olacağını düşünmektedir. Ancak aksi gerçekleşmektedir. Aile

sistemi ne kadar düzensiz ve alt sistemler ve üst sistemler arasındaki çatışma ne kadar büyükse, aile içi roller ne kadar karmaşıkça bireylerin aileden ayrılma ihmali o kadar düşüktür. Çünkü ayrılmak için kişi o bilgi ve beceriye sahip değildir. Dışlanma korkusuyla ailelerine daha da bağımlı hale gelirler (Yalom, 1980; 619).

#### 4.2. Çocuk İhmal ve İstismarını Önlemeye Yönelik Müdahale Basamakları

Çocuk ihmal istismarında önleme iki sebeple önem arz etmektedir. Birincisi, çocuk ihmal ve istismarı meselesine insancıl yaklaşım bunu gerektirir. İkincisi ise, yerinde ve zamanında müdahale ile çocukların evden kaçmalarının, okulda problemler yaşamalarının, suça sürüklenmelerinin ve madde bağımlısı olmalarının, önemli ölçüde psikolojik ve gelişimsel bozukluklardan zarar görmelerinin önüne geçmiş olunur (Şirin, 2007; 93).

15. yy İtalya’da ebeveyn ensesti ve anne-babaların erkek çocuklarını cinsel ilişki için para karşılığında pazarlamasından 1900’lü yıllarda İngiltere’de bulaşıcı hastalıklarının iyileşmelerinin tek çözümünün çocuklarla cinsel birliktelik yaşaması gerektiğini savunan pedofililere kadar, çocuklara yönelik kötü muameleye çok az müdahale edilmiş ve bu suçlar nadiren cezalandırılmıştır (deMause, 2020; 307). Çocuğa yönelik kötü muamelenin önlenmesinde en etkili yöntemler Türk Ceza Hukukunda yer almaktadır (Akkaş, 2021;91). 1989 yılında Birleşmiş Milletler Genel Kurulu tarafından kabul edilen ve 27 Ocak 1995 yılında Türkiye’de yürürlüğe giren BM Çocuk Haklarına Dair Sözleşme, günümüzde çocukların ihmal ve istismardan korunmasında önemli bir yere sahiptir (Derin ve Öztürk, 21; 50). İhmal ve istismara uğrama riski bulunan ya da kötü muamele görmüş çocuklara yönelik koruyucu ve destekleyici tedbirler de Çocuk Koruma Kanunu ile yasalaştırılmıştır (Özdemir ve Asil, 2021: 3).

Çocuğa yönelik kötü muameleyle mücadelede önleme çalışmaları üç aşamalı olarak gerçekleştirilmektedir.

##### 4.2.1. Birincil Koruma

Bir ülkenin yaşam kalitesi, o ülkede yaşayan çocukların refah seviyeleri ile paralellik göstermektedir (Polat, 1999;32). Refah seviyesini belirleyen en önemli etmen de çocukların fiziksel ve ruhsal olarak tam iyilik halinde olmalarıdır. Günümüzde sağlık sisteminde çocukların fiziksel ve ruhsal sağlığını koruma ve geliştirme uygulamalarının yer alması çocuk sağlığı açısından önem arz etmektedir. Bunun temel nedeni bireyin uygulanacak tıbbi müdahale yönelik bilgi sahibi olma, tedavi sürecine etkin olarak katılabilme ve kendi geleceğini tayin edebilme hakkına sahip olmasıdır (Çınar vd., 2018; 27)

Toplum, sorumluluğunun farkında olarak problemleri çözmek için bir şeyler yapmak, olaylara ve toplumsal sorunlara müdahale edilmesi gerektiğini düşünmek ve harekete geçmek zorundadır. Yalnızca o zaman güvenilir ve sorumluluğunun farkında bir toplum olma özelliği kazanılabilir

1960'lı yıllar öncesinde kısmen ailenin gizli bir kurum ve özel bir alan olarak görülmesi nedeniyle aile içi şiddet, ihmal ve istismar dikkat çekmemekteydi. Aile sisteminde var olan bu sorunlar yalnızca ailede yer alan bireyleri ilgilendiren bir durum olarak görülürdü. Ama son 40 yılda bu durum değişti ve toplumsal sorunlara yönelik farkındalıklar gelişti (Zastrow, 2010;270)

Çocuklara yönelik kötü muameleyi, ebeveynlerin çocukların poposuna şamar atmasını dahi onaylamayan cezaları yürürlüğe sokan- Amerika da dahil Avrupa, Afrika ve Asya'daki- 36 ülkede gelişen çocuk yetiştirme uygulamalarının olumlu sonuçları alenen görülmektedir. Bu uygulamalara göre anne-babalar, çocuklarına şiddet uyguladıkları için ağır cezalarla cezalandırılmamakta, aksine terapötik görüşme gerçekleştirmek ve ebeveynin çocuk yetiştirme konusundaki becerilerini artırmak amacıyla hane ziyaretleri gerçekleştirilmektedir (deMause, 2020; 365-366).

Sağlık çalışanları tarafından da gerçekleştirilen hane ziyaretleri esnasında ailenin ihtiyaçlarını belirlemek, anne-babaya ve çocuğa yönelik risklerin tespiti ve var olan risklere yönelik psiko-sosyal ve sosyoekonomik müdahalelerin gerçekleştirilmesi konusunda aileye destek olmak da birincil koruma kapsamındadır (Turhan vd., 2006;156).

#### **4.2.2. İkincil Koruma**

Çocuklara yönelik kötü muamelenin gerçek boyutları tam olarak tespit edilememektedir. Kesin sonuçların elde edilmesi iki nedenle gerçekleştirilememektedir: toplumun ve toplumsal sorunların çözümünde yer alan profesyonellerin riskli durumların üzerine gitmemesi ve ihmal ve istismara maruz kalan çocukların uğradıkları kötü muameleyi konuşmamalarıdır (Zastrow, 2010; 277)

Çocuklara yönelik kötü muamele suçunun çeşitli sebeplerden kaynaklı olarak çoğu zaman gizli kaldığı ve bu nedenle istismarcının hak ettiği cezayı almadığı gerçeği göz önüne alındığında, çocuklara yönelik ihmal ve istismar suçuyla mücadelede en temel husus bu suçla ilgili en ufak şüphe, delil ya da itiraf gibi çeşitli bilgilere sahip olan ya da ulaşan profesyonellerin bu durumu yetkili mercilere bildirmesidir (İltaş ve Işık-Yılmaz, 2021; 107).

Bildirim sonrasında adli sürecin en kısa sürede başlatılması hem ihmal ve istismara maruz kalan çocukların hak ve adalet duygularının gelişmesi hem de başka çocukların olası istismarlardan korunması açısından önemlidir (Kurtay ve Kurtay, 2020; 221). Çünkü yargı bir sosyal denetim aracıdır (Duyan vd., 2008;188)

#### **4.2.3. Üçüncül Koruma**

Tüm dünya da insanların nevrozları, psikolojik sorunları ve ruhsal bunalımlarından kaynaklı şiddetli duygularını değiştirmek, şüphesiz zor ve uzun yıllar alabilecek bir süreçtir. Lakin tarihin tekrarlanmasına gerek yoktur. Sadece erken travmalar tekerrür talep eder (deMause, 2020; 377). Bu amaçla sosyal hizmet uzmanları ve profesyoneller çocuğa yönelik kötü muamele şüphesinin ardından çocuğun hem bedensel hem de psikolojik olarak iyilik halinin sağlanması ve toplumsal entegrasyonu için terapötik çalışmalar gerçekleştirirler. Bu çalışmalar sorunun varlığı ve boyutuna göre mikro, mezzo ve makro düzeylerde olabilir (Shuder, 2004; 75). Hangi düzeyde olursa olsun tüm bu çalışmalar üçüncül koruma kapsamında değerlendirilmektedir.

#### **4.3. Çocuk İhmal ve İstismarına Yönelik Bireysel ve Kurumsal Yükümlülükler**

Tomanbay (1999)'a göre çocuğa kötü davranma, çocukla farkına varmadan ya da bilerek, onun bedensel, ruhsal, sosyal yapısında zararlara ve bozulmalara yol açacak biçimde iletişim kurmak ve sürdürmektir (Tomanbay, 1998). Çoğu zaman bugün sorun olan vakalar, son çöküntüden yıllar önce belirti vermiş, hatta fark edilmişlerdir. O zaman durumu gören ya da hissedenden birçok kişi veya kurum yetkili mercilerden haberdar olmamış, müdahale için gerekli girişimlerde bulunmamış veya bulunamamıştır. Hoş olmayan her şeyin üzerinden bakışlarımızı çabucak çeviriniz, her zaman hiçbir şey görmüyormuş gibi yapınız: 19. yy ahlak yasası kısaca budur (Öneş, 1972; 13).

Anayasanın 5,17 ve 56. Maddelerinde yer alan kuralların dayandığı temel ilke, kişilerin devletçe her türlü zarardan korunmaları gerekliliğidir (Duyan vd., 2008; 10). Bu amaçla kötü muamele mağduru çocukla derinlemesine görüşmeler ve ailesi hakkında sosyal incelemeler gerçekleştirmek ve bu doğrultuda müdahaleler gerçekleştirmek gerekir. Ancak çocuk ihmal ve istismarında çocuklarla bireysel görüşmeler çoğunlukla çocuk tarafından herhangi bir eylemle başlamaz. Farklı kaynaklardan yararlanır. Bu kaynaklar çeşitli meslek grupları ya da profesyoneller olabilir. Doktorlar, öğretmenler ve diş hekimleri de dâhil olmak üzere profesyoneller, yasa gereği herhangi bir çocuğa yönelik kötü muameleyi yetkili mercilere bildirmek ve bunu raporlaştırmak zorundadır (Kadushın ve Kadushın, 2013; 298).

Çocuk Koruma Kanununun 6. Maddesinin 1. Fıkrasına göre; adli ve idari merciler, kolluk görevlileri, sağlık ve eğitim kurumları, sivil toplum kuruluşları korunmaya ihtiyacı olan çocuğu aile ve sosyal hizmetler bakanlığına bağlı kurum/kuruluşlara bildirmekle yükümlüdür (Gürel,2020;26). Ancak göstermektedir ki çocuk ile ilgili çalışan sivil toplum kuruluşlarının çevre ve kadın sorunları ile ilgili çalışan kuruluşlara göre yeterince organize olamadıkları dikkat çekmektedir (Polat, 1999;35)

Kamu çalışanları arasında çocuğa yönelik kötü muameleyi bildirenlerin başında rehber öğretmenler gelmekte, sağlık ve sosyal hizmet çalışanları ise ender olarak yetkili makamlara bildirimde bulunmaktadır (Keser, 2021;97)

Sağlık profesyonelleri tarafından şüpheli ihmal ve istismar vakalarının bildirimi çeşitli ülkelerde yasal olarak zorunludur (Pash, 2017; 94). Ülkemizde de çocuk ihmal ve istismar konularında etkili bir şekilde etkin mücadele verebilmek adına için ihtiyaç duyulan yasal düzenlemeler yapılmış, çocuğa yönelik fiziksel ve cinsel şiddet içerikli istismar eylemlerine ek olarak ihmal de Türk Ceza Kanunu'nda suç olarak nitelendirilmiş, çeşitli hukuki düzenlemeler şeklinde sağlık alanında çalışanlara, kamu kurum ve kuruluşlarında görevli olanlara ve bütün insanlara bildirim zorunluluğu getirilmiştir (Özdemir ve Asil, 2021; 3).

Bir suçu işleyen veya bu suça yardım ve yataklık eden kişi/kişilerin gerçekleştirmiş oldukları suçu bildirmesi faillerden beklenen bir hareket değildir. Bu sebeple bu kişilerin gerçekleştirdikleri ve faili oldukları bir suçu yetkili mercilere bildirmemesi hukuki olarak cezalandırılması gereken bir davranış olarak görülmemektedir (Akkaş, 2021; 102). Buna ek olarak gerçekleştirilmekte olan ya da gerçekleştirilmesine yardım edilmiş bir suçu yetkili mercilere bildirmeyen herkes suçun fail olabilir (Ünver, 2012; 278)

Ceza bir toplumda bozulmuş bir dengeyi ve sükûneti tekrar sağlamayı hedefler (Picca,1992; 45). TCK ya göre hukuki yaptırımlar sadece çocuğa yönelik kötü muameleyi gerçekleştiren istismarcılara uygulanmaz. Yasaya göre aynı zamanda çocuğa yönelik ihmal ve istismardan haberdar olan ya da bireylerin de sorumlulukları ve yükümlülükleri vardır (Derin ve Öztürk, 2021; 51). Sorumluluğun birçok tanımı mevcuttur. Güvenilir, emniyet edilir kişiler sorumluluk sahibi olarak adlandırılır. Sorumluluk aynı zamanda kanuni, ekonomik veya ahlaki sorumluluğu da ifade etmektedir (Yalom, 1980; 341). Çocuklarla çalışma gerçekleştiren ya da iş yükümlülüğü gereği birebir iletişimde bulunan sağlık personellerinin görev ve sorumlulukları büyüktür. Olağan durumlar dışında gerçekleşen vakalarda var olan tıp ve sağlık bilgisine ek

olarak yapılması gereken iş ve işlemler ya da sorumluluk çerçevesi hakkında bilgi sahibi olmak çok önemlidir (Gözübüyük vd., 2015; 324).

Sağlık mesleği mensuplarının bir suçun işlendiğini öğrenmesi durumunda nasıl hareket etmesi gerektiği TCK m.280 de ayrı bir suç türü olarak düzenlenmiştir. Buna göre;

*(1) Görevini yaptığı sırada bir suçun işlendiği yönünde bir belirti ile karşılaşmasına rağmen durumu yetkili makamlara bildirmeyen veya bu hususta gecikme gösteren sağlık mesleği mensubu bir yıla kadar hapis cezası ile cezalandırılır (Akkaş, 2021;108).*

Kanun metninde adı geçen sağlık hizmeti veren kişiler ise; doktorlar, hemşireler, ebeler, sağlık memurları ve hasta bakıcılarıdır (Aydın, 2014;43).

Hekimin çocuğa yönelik ihmal ve istismarı içeren fiziki belirtilerle karşılaşması ve bu belirtilerden şüphelenmesi durumunda ilk olarak bildirim yükümlülüğünü gerçekleştirilmesi beklenmeyip öncelikle tıbbi müdahalede bulunması ve müdahale sonrasında vakit kaybetmeksizin bildirimini gerçekleştirilmesi gerekmektedir (Kocasakal, 2017; 203).

Yapılan bir çalışmada sağlık çalışanlarının ve çocukla çalışan uzman personelin istismar, ihmal ve aile içi şiddet vakaları ile oldukça sık karşılaştıkları ve bu olayların yönetimi açısından daha çok bilgiye ve beceriye ihtiyacı oldukları ifade edilmiştir. (Kurt ve Gün, 2017; 66).

## **SONUÇ YERİNE**

Çocuğun yaşamış olduğu istismar olayından kurtarılması ve istismar vakalarının önlenmesinde hekimlerin de önemli görev ve sorumlulukları bulunmaktadır. Ancak yaşanan istismar olayları neticesinde suçun ispatlanmasında yasal olarak hekimlerin herhangi bir sorumluluğu bulunmamaktadır. Hekimlere düşen en önemli sorumluluk, istismara uğramış çocukları tespit etmek ve bu çocukların yaşadıkları durumu ihbar ederek adli ve hukuki makamları bilgi sahibi etmektir. Yaşanan olayın ardından gerçekleşen ihbarın ardından bu sürecin yönetimi, adli ve hukuki makamlardır. Günümüzde çocuklara yönelik gerçekleşen istismar ve ihmal vakalarının önlenmesi hususunda hekimlere önemli görevler düşmektedir (Tınmaz Pehlivan, 2016; 72).



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**SÜRDÜRÜLEBİLİRLİK RAPORLARINDA GÜVENCE DENETİMİ: BIST  
SÜRDÜRÜLEBİLİRLİK ENDEKSİNDEKİ İŞLETMELER ÜZERİNDE BİR  
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**ÖZET**

İşletmelerin sundukları bilgiler bilgi kullanıcılarının alacakları kararları etkilediğinden, bu bilgilerin güvenilirliğine ilişkin güvence ihtiyacı ortaya çıkmaktadır. Bağımsız denetim ve sınırlı denetim dışındaki denetimi ifade eden güvence denetimi, sürdürülebilirlik raporları gibi finansal olmayan bilgilere güvence sağlamaktadır. Bu çalışmanın amacı, BIST Sürdürülebilirlik Endeksindeki işletmelerin yayınladıkları sürdürülebilirlik raporlarına bağımsız dış güvence denetimi yaptırıp yaptırmadıklarını tespit etmektir. Yapılan araştırma sonucunda, araştırma kapsamındaki 51 işletmenin %31'i (16 işletme) bağımsız dış güvence denetimi yaptırdığı, bu işletmelerin 8'i üretim, 7'si mali sektörde, 1 işletmenin de ticaret sektöründe faaliyet gösterdiği tespit edilmiştir. Bağımsız dış güvence raporlarının tamamına yakınının dört büyük denetim firmasından alındığı görülmüştür.

**Anahtar Kelimeler:** Sürdürülebilirlik Raporları, Güvence Denetimi, Denetim

**ASSURANCE AUDIT IN SUSTAINABILITY REPORTS: A RESEARCH ON  
BUSINESSES IN BIST SUSTAINABILITY INDEX****ABSTRACT**

As the information provided by the enterprises affects the decisions of the information users, the need for assurance regarding the reliability of this information is also increasing. Assurance, which refers to audit other than independent audit and review, provides assurance to non-financial information such as sustainability reports. The purpose of this study is to determine whether businesses in the BIST Sustainability Index have independent external assurance performed on the sustainability reports they publish. As a result of the research, it was determined that 31% (16 enterprises) of the 51 enterprises within the scope of the research had independent external assurance audits, 8 of these enterprises were operating in the production sector, 7 in the financial sector and 1 enterprise in the trade sector. It has been observed that almost all of the independent external assurance reports were obtained from the four big audit firms.

**Key Words:** Sustainability Reports, Assurance, Audit

## **1. GİRİŞ**

İşletmelerin varlıklarını sürdürebilmeleri için finansal yapısının güçlü olmasının yanında toplumsal sorumluluğa da sahip olması gerektiği son yıllarda daha fazla ön plana çıkmaktadır. Ancak finansal raporlar işletmenin finansal durumu, finansal performansı ve nakit akışları hakkında paydaşlara karar almalarında faydalı bilgiler sunarken; işletmenin çevre, malzeme temini ve tüketimi, atık yönetimi, enerji tüketimi ve verimliliği, sera gazı emisyonları gibi toplumsal sorumlulukla ilgili faaliyetleri hakkında gerekli bilgileri sunamamaktadır. Günümüzde işletmelerin bir yandan toplum karşısındaki gücü artarken, bir yandan da paydaşlarından bağımsız bir yapıya sahip olmadıkları ve paydaş beklentilerini görmezden gelerek varlık gösterilemeyeceği gerçeği kabul edilmeye başlanmıştır. Bilgiye ulaşmanın çok kolay olduğu günümüz koşullarında, işletmelerin kurumsal kimlik ve itibar kazanabilmeleri için hesap verebilirliği yüksek, şeffaf, çevreye ve toplumsal ihtiyaçlara duyarlı bir yapıya sahip olmaları gerekmektedir. Bunun yolu ise paydaşlarla doğru iletişimden geçmektedir (Özbay, 2019:446). Finansal olmayan bu bilgilerin sunulmasında günümüzde kullanılan en etkili yöntemlerden birisi de sürdürülebilirlik raporlarıdır.

Sürdürülebilirlik raporu, sürdürülebilir kalkınmayı temel alan ve bir işletmenin sosyal, çevresel ve ekonomik faaliyetleri üzerinde ortaya çıkan etkinin raporlamasında kullanılan kurumsal raporlama aracıdır (Yüksel, Kayalı ve Kayalı, 2018: 112). Sürdürülebilirlik raporlaması finansal ve finansal olmayan bilgilerin hissedarlardan daha geniş bir alanı kapsayan paydaş grubuna raporlanmasını içeren bir alandır. Raporlar, raporlama yapan kurumun, paydaşları ilgilendiren faaliyetleriyle ilgili temel konuları yönetme yeteneği konusunda bilgi sağlamaktadır. Bu bilgiler ekonomik, operasyonel, sosyal, hayırseverlik ve çevresel hedefler konularını kapsamaktadır (Ballou, Heitger & Landes, 2006: 3). Sürdürülebilirlik odaklı bir şirket, farklı paydaşlara karşı sorumluluklarının tamamen farkındadır. Bu şirketler sosyal ve ekolojik performansının iyileştirmesine fırsat veren yöntem ve araçları benimsemektedirler. Bu nedenle yeni muhasebe sistemlerine ihtiyaç duymaktadırlar (Perrini& Tencati, 2006: 297-298). Sürdürülebilirlik raporlaması, rekabet gücünü ve itibarı artıran, geleceğe yönelik kararlar aldırın, sürekli gelişmeyi ve öğrenmeyi sağlayan bir etkidir. Sürdürülebilirlik risklerin yönetilmesinin yanında sosyal ve çevresel konularla ilgili uygulamaların faaliyete geçmesine yardımcı olmaktadır (Şahin ve Çankaya, 2018: 863).

Sürdürülebilirlik raporlarında yer alan bilgiler paydaşlar tarafından alınacak kararlarda kullanılmaktadır. Bu nedenle söz konusu bilgilerin açıklığı, şeffaflığı ve doğruluğu bu

raporlardan yararlanacak olan paydaşlar açısından önem taşımaktadır (Manetti & Toccafondi, 2012). Sürdürülebilirlik raporlarındaki finansal olmayan bilgilerin güvenilir olup olmadığının tespit edilmesi için yapılan denetim faaliyetleri de güvence raporlamasını ortaya çıkarmıştır. Sürdürülebilirlik raporlarının standartlara uygun bir şekilde hazırlanması için güvence denetiminden geçmesi önemlidir (Mammatt, 2009:7). Bu bağlamda güvence; karar alıcılar açısından yararlanacakları herhangi bir bilginin kalitesini artırmak adına verilen ve bilginin kalitesini ve değerini yükselten bağımsız mesleki hizmetler olarak tanımlanmaktadır (Bozkurt, 2012). Güvence ve doğrulama ile ifade edilen; raporun güvenilirliğini, doğruluğunu ve ilgi düzeyini değerlendiren bir dış denetimdir. Böyle bir denetimin amacı, raporun güvenilirliğini ikna edici bir şekilde ortaya koymaktır (Celayır, 2020:28). Sürdürülebilirlik raporlaması için küresel raporlama standartlarının arkasındaki teşvik edici güç olan Global Reporting Initiative (GRI), raporlama sürecinin bir parçası olarak üçüncü taraf doğrulamasını tavsiye etmektedir (Willaert, 2016). İşletmelerin finansal tablolarının denetime tabi olması , denetlenmeyen finansal tablolara göre daha güvenilir ve yararlı bilginin sunulması anlamına gelmektedir. Ancak işletmelerin gönüllülük esaslı hazırladıkları sürdürülebilirlik raporları açısından bağımsız denetim olgusu , yani finansal olmayan bilginin bağımsız denetime tabi tutulması değil, dış güvence alınması daha uygun olmaktadır (Uçma ve Yazıcı, 2016).

Bu çalışmanın temel amacı, BIST Sürdürülebilirlik Endeksi kapsamındaki şirketlerin 2015-2020 yıllarına ait sürdürülebilirlik raporlarının bağımsız güvence denetiminden geçme düzeylerini belirlemektir.

## **2. SÜRDÜRÜLEBİLİRLİK RAPORLAMASI**

Sürdürülebilirlik raporlaması, kuruluşların ekonomik, çevresel, sosyal ve yönetim performanslarını ölçmelerine, anlamalarına ve aktarmalarına, hedef belirlemelerine ve değişimi daha etkin bir şekilde yönetmelerine yardımcı olmaktadır. Bu açıdan, sürdürülebilirlik raporu, sürdürülebilirlik performansını ve etkilerini (olumlu veya olumsuz) aktarmak için temel platformdur (GRI, 2020b). Sürdürülebilirlik raporlaması aynı zamanda, kuruluşların çok çeşitli sürdürülebilirlik konularının etkilerini göz önünde bulundurmalarını sağlayarak, karşılaştıkları riskler ve fırsatlar hakkında daha şeffaf olmalarını sağlamaktadır (GRI, 2020).

Sürdürülebilirlik raporlaması kuruluşun faaliyetlerini daha sürdürülebilir hale getirmek için hedef belirlemelerine, finansal olmayan performanslarını ölçmelerine ve değişimi yönetmelerine yardımcı olan bir raporlama türüdür. Sürdürülebilirlik raporlarının



hazırlanmasına rehberlik eden Küresel Raporlama Girişimi (Global Reporting Initiative: GRI) standardı etkili bir sürdürülebilirlik raporlaması için düzenli olarak gözden geçirilmektedir (Sultankhanova, 2019:25).

Sürdürülebilirlik raporları hazırlamalarının işletmeler için yararları aşağıdaki gibi sıralanabilir (Kolk, 2004: s.54):

- İşletmelerin hedeflerini gerçekleştirme kabiliyetlerini artırır,
- Çevresel stratejilerin uygulanmasını kolaylaştırır,
- İşletme içinde çevresel konularda bilinçlenmeyi sağlar,
- İşletme mesajının açık olarak ifade edilmesini sağlar,
- Şeffaflığı arttırdığı için kredibilitiyi de artırır,
- İşletme itibarını artırır,
- Maliyet tasarrufu sağlar,
- Verimlilik artışı sağlar,
- Çalışanları motive eder.

GRI G4 kapsamında sürdürülebilirlik raporunun kategorileri aşağıdaki tabloda özetlenmiştir.

**Tablo 1.** Sürdürülebilirlik Raporunun Kategorileri

<b>Ekonomik Kategori</b>	<b>Çevresel Kategori</b>	<b>Sosyal Kategori</b>
Sürdürülebilirliğin ekonomik boyutu kuruluşun paydaşlarının ekonomik durumları ve yerel, ulusal ve küresel seviyedeki ekonomik sistemler üzerindeki etkileriyle ilgilidir. Ekonomik kategori sermayenin farklı paydaşlar arasındaki akışını ve kuruluşun toplum genelindeki temel ekonomik etkilerini göstermektedir.	Sürdürülebilirliğin çevresel boyutu kuruluşun kara, hava, su ve ekosistemler de dâhil olmak üzere yaşayan ve yaşamayan doğal sistemler üzerindeki etkisiyle ilgilidir. Çevresel Kategori (enerji ve su gibi) girdilerle ve (emisyonlar, atık sular ve atıklar gibi) çıktılarla ilgili etkileri kapsamaktadır. Buna ek olarak biyolojik çeşitlilik, nakliye, ürün ve hizmetle ilgili etkilerle beraber çevresel uyum ve harcamaları kapsamaktadır.	Sürdürülebilirliğin sosyal boyutu, kuruluşun içinde faaliyet gösterdiği sosyal sistemler üzerindeki etkileriyle ilgilidir. Sosyal Kategori aşağıdaki alt kategorileri içermekte: <ul style="list-style-type: none"><li>• İşgücü Uygulamaları</li><li>• İnsana Yaraşır İş</li><li>• İnsan Hakları</li><li>• Toplum</li><li>• Ürün Sorumluluğu</li></ul>

**Kaynak:** GRI, 2014:48, 52-64

### **3. SÜRDÜRÜLEBİLİRLİK RAPORLARINA İLİŞKİN GÜVENCE DENETİMİ**

Güvence denetimi, sorumlu taraf dışındaki hedef kullanıcıların, denetime konu bilgiye (diğer bir ifadeyle dayanak denetim konusunun kıstaslar uygulanmak suretiyle ölçümünün veya

değerlendirilmesinin bir çıktısına) ilişkin güven seviyesini artıracak şekilde tasarlanmış bir sonuç bildirmek üzere, denetçinin yeterli ve uygun kanıt elde etmeyi amaçladığı denetimdir (KGK, 2020).

Kuruluşlar tarafından yayınlanan sürdürülebilirlik raporlarındaki bilgilerin güvenilirliği konusunda çeşitli yollarla güvence sağlayıcıları tarafından güvence sağlanmaktadır. Güvence sağlayıcılar bağımsız denetim kuruluşları veya uzman kuruluşlardır. Bu şekilde raporlara, üçüncü taraflar tarafından doğrulanması esasıyla güvence sağlanmaya çalışılmaktadır. Güvence sağlayıcısı bağımsız denetim kuruluşlarının da kendi sürdürülebilirliklerine verdikleri önemi ve sürdürülebilirliği kurum kültürünün bir parçası olarak benimsediğini sürdürülebilirlik raporu yayınlarken ortaya koyması beklenmektedir. Bu raporlarla, denetim kuruluşları sürdürülebilirlik yaklaşımlarını ve uygulamalarını paydaşlarına iletmelidirler (Yeşilçelebi, 2020:234).

#### **4. ARAŞTIRMANIN AMACI ve KAPSAMI**

Bu çalışmanın temel amacı, BIST Sürdürülebilirlik Endeksi'nde yer alan işletmelerin 2015-2020 yıllarına ait sürdürülebilirlik raporlarında sunulan bilgilerin doğruluğuna ilişkin güvence denetiminden geçme düzeylerinin tespit edilmesidir. Gönüllülük esasına dayalı olarak hazırlanan sürdürülebilirlik raporlarının bağımsız dış güvence denetiminden geçmesi, işletmelerinin şeffaflık ve hesap verilebilirlik ilkelerine uyumu hakkında da fikir verecektir.

1 Aralık 2020 tarihinden itibaren BIST sürdürülebilirlik endeksinde 58 şirket yer almıştır. Ancak araştırmamız 2015-2020 yıllarını kapsadığından, bu döneme ilişkin raporlarına ulaşılan 51 şirketin sürdürülebilirlik raporları incelenmiş ve bu raporlarda sunulan bilgilere ilişkin bağımsız dış güvencenin alınıp alınmadığı araştırılmıştır.

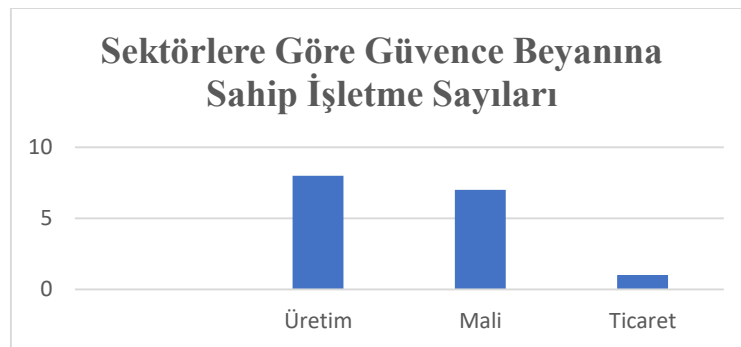
#### **5. BULGULAR**

Çalışmada 2015-2020 dönemini kapsayan, bu döneme ilişkin 51 şirketin sürdürülebilirlik raporları incelenmiştir. Güvence raporlarını incelemek için BIST Sürdürülebilirlik Endeksinde yer alan işletmelerin web sayfalarında yayınladıkları sürdürülebilirlik raporları içerik analizine tabi tutulmuştur. Analiz sonucunda elde edilen bilgiler aşağıda Tablo 2.'de gösterilmiştir.

**Tablo 2.** BIST Sürdürülebilirlik Endeksindeki İşletmelerden 2015-2020 Yıllarına İlişkin Sürdürülebilirlik Raporlarına Güvence Beyanı Alan İşletmeler

Sıra No	İşletme Adı	Sektör	YILLAR İTİBARI İLE GÜVENCE RAPORLARININ ALINMASI					
			2015	2016	2017	2018	2019	2020
1	Arçelik	Üretim	Evet	Evet	Evet	Evet	Evet	Evet
2	Anadolu Efes	Üretim	Evet	Evet	Evet	Evet	Evet	Evet
3	Brisa	Üretim	Evet	Evet	Yayınlamadı	Evet	Evet	Evet
4	Çimsa	Üretim	Evet	Evet	Evet	Evet	Evet	Evet
5	Coca Cola	Üretim	Evet	Evet	Evet	Evet	Evet	Evet
6	Eczacıbaşı	Üretim	Evet	Evet	Evet	Evet	Evet	Yayınlamadı
7	Tofaş	Üretim	Evet	Evet	Evet	Evet	hayır	hayır
8	Ülker	Üretim	Evet	Evet	Evet	Evet	Evet	Evet
9	Halkbank	Mali	Evet	Evet	Evet	Evet	Evet	Evet
10	TSKB	Mali	Hayır	Hayır	Hayır	Evet	Evet	Evet
11	Yapı kredi	Mali	Evet	Evet	Evet	Evet	Evet	Evet
12	İş Bankası	Mali	Evet	Evet	Evet	Evet	Evet	Evet
13	Vakıf Bank	Mali	Hayır	Hayır	Hayır	Hayır	Evet	Evet
14	Garanti Bankası	Mali	Evet	Evet	Evet	Evet	Evet	Evet
15	Yapı Kredi	Mali	Evet	Evet	Evet	Evet	Evet	Evet
16	Migros	Hizmet	Hayır	Hayır	Hayır	Evet	Evet	Evet

Tablo 2 incelendiğinde BIST Sürdürülebilirlik Endeksinde yer alan işletmelerden 16'sı 2015-2020 dönemine ilişkin sürdürülebilirlik raporlarına bağımsız dış güvence raporu almışlardır. Bağımsız dış güvence raporu alan işletmelerin 8'i üretim, 7'si mali sektörde faaliyet göstermektedir.



Araştırma kapsamındaki işletmelerin %31'i bağımsız dış güvence beyanına sahip olduğu görülmüştür. Sürdürülebilirlik raporlarının gönüllülük esasına dayanması ve güvence raporunun zorunlu olmayıp sadece tavsiye edilmesi nedeniyle işletmelerin yaklaşık üçte biri oranında bağımsız dış güvence beyanına sahip olduğu söylenebilir. Güngör (2019) tarafından

yapılan arařtırmada benzer durumun yurtdıřındaki iřletmeler için de geçerli olduđu görölmektedir.

Arařtırmada, bağımsız dıř güvence raporlarının tamamına yakınının dört büyük denetim firmasından alındıđı görölmüřtür.

## **6. SONUÇ**

Bu çalıřmada, Türkiye’de BIST Sürdürülebilirlik Endeksinde yer alan iřletmelerin 2015-2020 yıllarına iliřkin yayınladıkları raporlarına ne ölçüde bağımsız dıř güvence raporu aldıkları arařtırılmıřtır. Arařtırma kapsamındaki iřletmelerin %31’i bağımsız dıř güvence beyanına sahip olduđu görölmüřtür. Sürdürülebilirlik raporlarının gönüllülük esasına dayanması ve güvence raporunun zorunlu olmayıp sadece tavsiye edilmesi nedeniyle iřletmelerin yaklaşık üçte biri oranında bağımsız dıř güvence beyanına sahip olduđu görölmektedir. Bağımsız dıř güvence raporlarının tamamına yakınının dört büyük denetim firmasından alındıđı tespit edilmiřtir.

İřletmelerin sundukları finansal ve finansal olmayan bilgiler, bilgi kullanıcılarının iřletme ile ilgili aldıkları kararları etkilemektedir. Finansal bilgiler için bağımsız dıř denetim zorunlu iken, finansal olmayan bilgiler için böyle bir zorunluluk bulunmamaktadır. Bu durum, iřletmelerin sundukları bilgilerin, bilgi kullanıcılarını yanıltması ihtimalini ortaya çıkarmaktadır. Sürdürülebilirlik raporları gibi finansal olmayan raporlara iliřkin bağımsız güvence raporlarının alınmasının zorunlu kılınması, bilgi kullanıcılarının daha sađlıklı karar almalarına yardımcı olacaktır.

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**TREATMENT OF PAPER INDUSTRY WASTEWATER BY  
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**ABSTRACT**

Water is one of the essential elements of life and is vital for the survival of living things. Therefore, the quality of water is very important for human and environmental health. With rapid industrialization, developing technology and population growth, tons of wastewater is discharged to the environment every year and water resources are rapidly depleted. Paper production processes, which have an important place in industrial production, have become environmentally critical due to the high amount of water used and pollutants that are difficult to biologically remove. In this study, the treatment of waste water taken from the paper production factory in Mersin region by electrocoagulation method was investigated. Electrocoagulation experiments were carried out at room temperature using iron electrodes as anode and cathode at pH value of wastewater. In the study, in which the effect of the current density was investigated, the change in the removal rates of organic pollutants in the wastewater was investigated as a result of the experiments carried out at 4 different current values ranging from 50 mA to 300 mA. The amount of treatment performed during the electrocoagulation of the paper waste water was followed by the Total Organic Carbon (TOC) measurement. As a result of the experimental studies, a maximum TOC removal of 88.95% was obtained after 1 hour of treatment at 100 mA flow in paper industry wastewater, while the minimum TOC removal was determined as 35,88% at 300 mA flow. At the end of the electrocoagulation process, the amounts of  $Fe^{+2}$  and  $Fe^{+3}$  transferred from the electrodes to the waste water were determined spectrophotometrically with UV-vis. In experimental conditions where 88.95% of the maximum TOC removal was achieved,  $Fe^{+2}$  and  $Fe^{+3}$  concentrations were determined as 10.32 ppm and 0.72 ppm, respectively. In conditions where TOC removal was minimum (35.88%),  $Fe^{+2}$  and  $Fe^{+3}$  concentrations were found to be 507,91 ppm and 1.70 ppm, respectively.

**Keywords:** Paper Industry Waste Water, Electrocoagulation, Electrochemical Treatment, Mineralization

## **INTRODUCTION**

Water is one of our most important natural resources, which is essential for the survival of living things. Population growth, developing technology and rapid industrialization bring along the problem of water pollution, which is increasingly difficult to overcome. Environmental pollution increases with the wastewater generated as a result of industrial applications, and the ecological balance is adversely affected. The most affected by this situation is the aquatic environment [1].

Paper, a product with a long history all over the world, and accordingly, the paper industry still constitutes one of the most important industrial branches for both developed and developing countries [2]. The Paper Industry is one of the processes with the strongest environmental impact with the excessive water consumption per unit product and the non-biodegradable chemicals in the wastewater it produces [3]. During the pulping of wood, which is the main raw material of the paper industry, lignin, carbohydrates and various types of decomposers pass into the wastewater through dewatering, screening and washing processes. In addition, it was determined that many toxic compounds such as resins, unsaturated fatty acids, inorganic chlorinated compounds, volatile organics, and sulfur are present in wastewater, depending on the process applied [4]. As a result, it is possible that the wastewater of the paper industry has significant harmful effects on the environment. It is essential that such wastewater is treated effectively and delivered to appropriate receiving environments [5]. With wastewater treatment, very valuable water resources can be regained and depending on their post-treatment properties, they can be used in-process, as well as used as irrigation and even drinking water.

Electrochemical treatment methods are increasingly used in wastewater treatment due to their features such as being easy to control, reducing pollution at the maximum level in a short time, being easy to operate, being made with simple and low-cost equipment, using limited chemicals, and forming less sludge [6]. The chemicals in the paper wastewater make the wastewater conductive and provide the appropriate condition for the electrochemical process [4]. Electrocoagulation is a treatment method in which more than one conventional treatment process is used together. In this sense, the process combines the functions and advantages of electrochemistry with coagulation, flotation, oxidation, adsorption, and precipitation processes in water and wastewater treatment [7]. Al and Fe electrodes are primarily preferred in electrocoagulation process [8-9]. The electrocoagulation cell basically consists of an anode, a cathode metal plate pair, a conductive solution, and a power source [10].



The principle of the electrocoagulation (EC) process in removing pollutants is the anodic dissolution and hydrolysis of metal anodes such as aluminum and iron and the formation of slightly soluble metal hydroxides such as  $\text{Al}(\text{OH})_3$ ,  $\text{Fe}(\text{OH})_2$  and  $\text{Fe}(\text{OH})_3$  and their adsorption capacity is very high. It is based on removing adsorbed various pollutants on metal hydroxides from water by precipitation [11].

In this method, metal ions at the anode pass into the solution (oxidation process) and the  $\text{H}_2\text{O}$  molecule at the cathode is reduced so that  $\text{OH}^-$  ions and  $\text{H}_2$  gas (reduction process) are released. As a result, the reaction between  $\text{Al}^{3+}$  or  $\text{Fe}^{2+}$  and  $\text{OH}^-$  ions forms coagulants ( $\text{Al}(\text{OH})_3$  or  $\text{Fe}(\text{OH})_2$ ). Coagulants adsorb pollutants and cause sludge formation, while  $\text{H}_2$  gas floats pollutants to the surface of the wastewater.

Due to the advantages of electrochemical treatment methods and depending on the suspended solids content of wastewater, the EC method has been used in treating paper industry wastewater in this study. While examining the effect of current in the electrocoagulation process, the concentrations of Fe ions remaining in the solution after the process was determined spectrophotometrically.

## **MATERIAL AND METHODS**

### **Electrocoagulation Process**

In electrocoagulation experiments, Fe/Fe plate (10 cm × 5 cm) electrode pairs were used as anode and cathode. Before using the electrodes, to clean and activate the surface, it was first soaked in 1 M HCl solution for 5 minutes, sanded, then washed and dried in an oven.

Electrocoagulation experiments were carried out in 300 mL wastewater, without pH adjustment, at the wastewater's pH (pH=6.50) value and at room temperature.

To examine the effect of current, electrocoagulation experiments were carried out at four different current values (50, 100, 200, and 300 mA), and the samples during 1 h were used in the analysis after centrifugation. The energy consumption due to the applied current was determined by Eq. 1.

$$\text{Energy Consumption (kWh/m}^3\text{)} = (\text{V} \times \text{I} \times \text{t}) / \text{V}_{\text{solution}}$$

(1)

### Analyzes

The mineralization efficiency during the electrocoagulation of the paper wastewater was followed by Total Organic Carbon (TOC) measurement at the beginning and at different times (5-60 min). The mineralization efficiency was determined using Eq. 2.

$$TOC \text{ Removal } \% = \left( \frac{TOC_0 - TOC_t}{TOC_0} \right) \times 100 \quad (2)$$

At the end of the electrocoagulation experiments, the amounts of  $Fe^{+2}$  and  $Fe^{+3}$  transferred from the anode electrode to the wastewater were determined spectrophotometrically with UV-vis (Shimadzu) spectrophotometer. For  $Fe^{2+}$  ion analysis, 2 mL of standard Fe(II) solution (or sample), 5 mL of acetic acid (1M), 2 mL of sodium fluoride (0.1 M), 2 mL of phenanthroline (1.5 g/L) solutions were added, respectively, and completed to 25 mL with ultra-pure water. It was held for 10 min, and the absorbance value was determined at 510 nm.

In the case of the determination of  $Fe^{3+}$  ions concentration, 5 mL of salicylic acid and 5 mL of standard Fe(III) solution or sample were added to a test tube. It was analyzed at 525 nm.

## RESULTS AND DISCUSSION

### Physicochemical Properties of Wastewater

The physicochemical properties of the water taken from the paper production factory in Mersin province are given in Table 1. Since the conductivity of the wastewater was sufficient, no supporting electrolyte was used in the EC process. TOC content was measured after the filtration process.

**Table 1.** physicochemical properties of paper wastewater

Properties	Value
pH	6.50
Conductivity	600 mS/cm
Suspended solids	0.84%
Ash	0.58%
Total Organic Carbon (soluble)	3300 mg/L

### Electrocoagulation of Wastewater

The treatment of paper industry wastewater was investigated using the electrocoagulation method, one of the electrochemical treatment methods. The electrocoagulation process was carried out without pH adjustment using Fe/Fe electrode pair, and the effect of applied current on mineralization efficiency was investigated. The amount of current applied is accepted as one

of the critical parameters affecting the treatment efficiency in all electrochemical processes and is considered in experimental studies [5].

The wastewater mineralization efficiencies obtained after the EC process applied at 4 different current values in the 50-300 mA current range are given in Figures 1a-d. In the electrocoagulation process at 50 mA constant current, 40.93% TOC removal was achieved in the first 30 min, while ~72% mineralization was achieved after 45 and 60 min (Fig. 1a). As a result of increasing the current to 100 mA, 70.68% TOC mineralization was reached after the first 5 min and 88.95% mineralization was reached after 60 min, increasing depending on time (Fig. 1b). However, because of increasing the current to 200 and 300 mA, a significant decrease in mineralization efficiency occurred. After 60 min of EC treatment at constant currents of 200 and 300 mA, 68.00% and 35.88% mineralization were achieved, respectively (Fig. 1c-d).

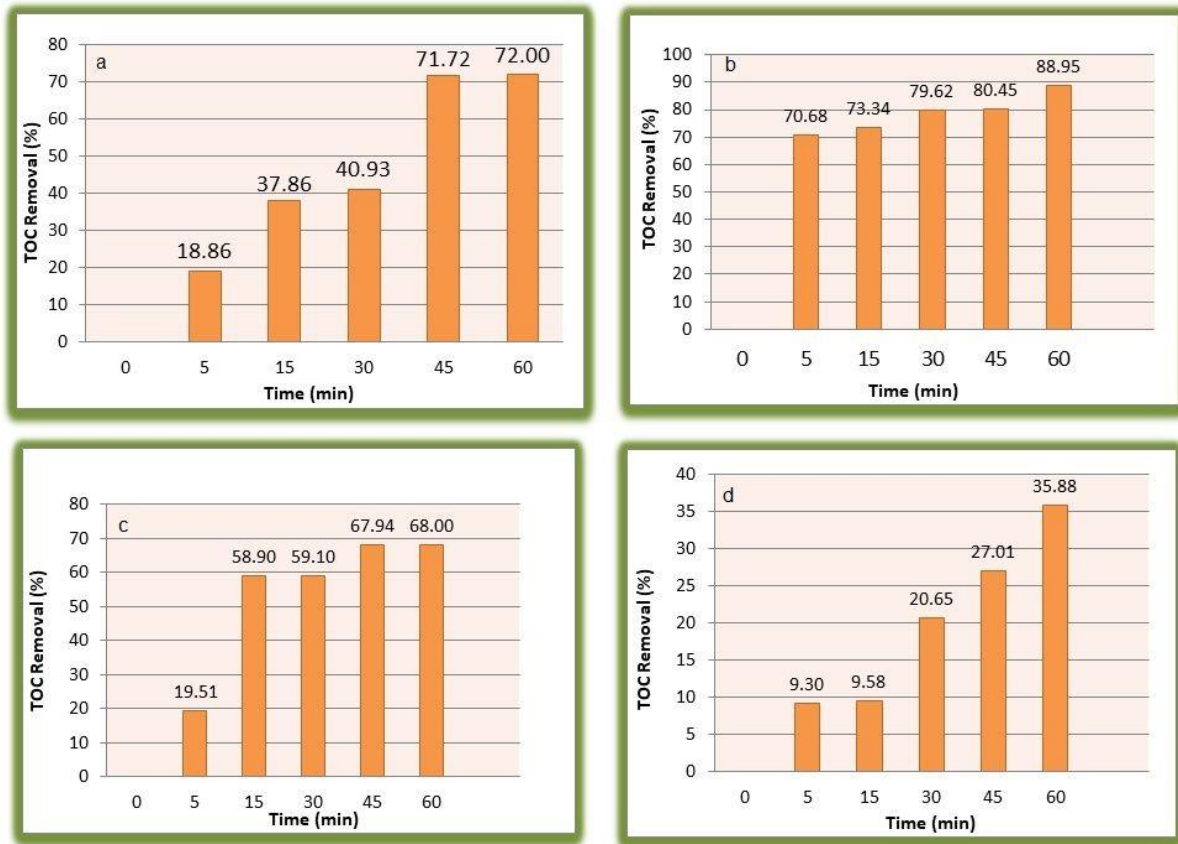
While 72.00% TOC removal is achieved in 1 h at 50 mA constant current, this value increases to 88.95% at 100 mA current under the same conditions because higher amounts of  $Fe^{n+}$  ions pass into the solution medium (Eq. (3)) and the amount of  $Fe(OH)_3$  and  $Fe(OH)_2$  metal hydroxide flocs increases in bulk solution (Eqs. (4-5)). Since the organic pollutants in the wastewater have a larger surface area to be adsorbed, a significant increase in TOC removal has been achieved. This situation can be explained by Faraday's 1st Law, which explains electrochemical processes and states that the amount of substance released from the electrodes and the amount of electricity passing through the solution change in direct proportion [5].

Anode:



In the solution (with dissolved oxygen):





**Figure. 1.** Removal efficiency at (a) 50 mA, (b) 100 mA, (c) 200 mA, and (d) 300 mA (pH=6.50 V=300 mL).

When Figures 1c and d are examined, the %TOC removal efficiencies decreased with the current increase. The increase of the current causes more Fe(II) and Fe(III) formation, and the solution pH value rises rapidly. Previous studies have shown that the highest organic pollutant removal occurs in the pH 6-7 range. A decrease in organic pollutant removal efficiency was observed depending on the increase in pH (Eq. (6)).

The high amount of current reduces the removal efficiency by the rapidly produced gas bubbles as well as the increase in the temperature of the system due to damaging/dispersing the formed flocs [5]. At the same time, the increase in current will increase the energy consumption, thus increasing the cost [12].

Cathode:



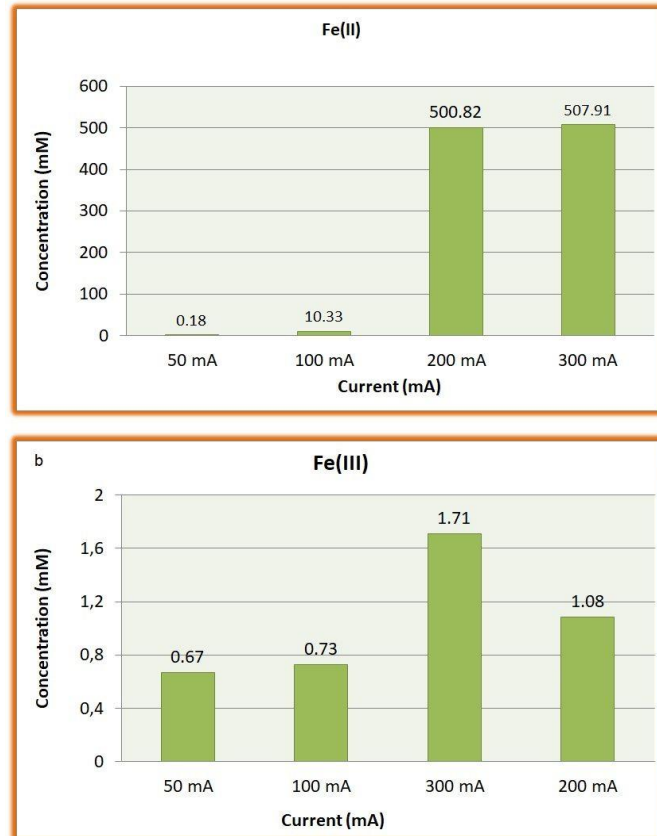
In Table 2, energy consumption values against TOC removals obtained in 1 h at different currents were given.

**Table 2.** Effect of current on TOC removal and energy consumption

Results	Current (mA)			
	50	100	200	300
TOC Removal (%) at 1 h	72.00	88.95	68.00	35.88
Energy Consumption (kWh/m <sup>3</sup> )	16	42	112	288

As a result of the 1 h electrocoagulation process, depending on the applied current, Total Organic Carbon removal TOC efficiencies of 72.00%, 88.95%, 68.00%, and 35.88% were obtained, respectively, at 50, 100, 200 and 300 mA currents. When the results were examined, it was determined that the best TOC removal (removal efficiency was determined) with 88.95% at 100 mA constant current. When the energy consumption values calculated at the same current values are examined, it is seen that while 42 kWh/m<sup>3</sup> is obtained at 100 mA, the energy consumption at 200 and 300 mA increases by 2 and 4 times, respectively.

Figure 2 shows the distribution of free Fe ions in the solution depending on the current. It is seen that while the iron ions that pass into the solution at 50 and 100 mA precipitate by forming flocs, low concentrations of free Fe ions are present in the bulk solution. However, at high currents, high concentrations of free Fe ions, which support the degradation of the flocks, are measured.



**Figure 2.** Effect of current on free (a) Fe(II) and (b) Fe(III) ions concentration in the solution (pH=6.50 V=300 mL).

## CONCLUSION

The importance of water for humanity and all living things is essential. For this reason, it is crucial to treat wastewater and make it reusable. Depending on the quality of the wastewater after treatment, irrigation and in-process use are possible.

In this study, the oxidation of paper wastewater was carried out by the electrocoagulation method, which is one of the electrochemical methods. With the EC method, 89% TOC removal was achieved by applying 100 mA current in as little as 1 h, without adding chemicals and without changing the pH value of the wastewater. The energy consumption in these conditions was determined as 42 kWh/m<sup>3</sup>.

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**YUNUS EMRE'NİN RİSALETÜ'N NUSHİYYE ESERİNDE YER ALAN  
DEĞERLERİN 2018 SOSYAL BİLGİLER DERSİ ÖĞRETİM PROGRAMINDA YER  
ALAN DEĞERLERLE KARŞILAŞTIRILMASI**

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**ÖZET**

Değerler toplumsal yapının oluşması, gelişmesi ve sürdürülmesinde oldukça önemlidir. Oluşturulan bu toplumsal yapının sağlıklı olması ve gelecek nesillere aktarılması ise değerler eğitimi yoluyla sağlanmaktadır. Günümüz dünyasında devletlerin en önemli kültürlenme aracı okullardır. Bu yönüyle okullar gelecek nesillere kültür aktarımını doğru şekilde sağlama görevini de üstlenmektedirler. Okullarda verilen sosyal bilgiler dersi ile öğrencilerin geçmiş ve gelecek ilişkisini sağlıklı bir şekilde kurması, kültürünü, tarihini, bulunduğu coğrafyanın özelliklerini, üyesi olduğu milletin değerlerini ve vatandaş olarak sorumluluklarını bilen bireylerin yetiştirilmesi hedeflenmektedir. Bu durum sosyal bilgiler dersini değerlerin aktarımı bakımından da önemli bir yere koymaktadır. Sosyal bilgiler dersi içeriği yönüyle toplumsal hayatı yansıtmaktadır. Sosyal Bilgiler Dersi Öğretim Programı incelendiğinde içeriğinde yer alan değerlerin Türk tarihinde yazılan yazılı eserler içerisinde ele alınan değerler ile benzerlik gösterdiği görülmektedir. Bu eserlerden biri ise Yunus Emre'nin Risaletü'n Nushiyye eseridir. Bu araştırmanın amacı 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan değerler ile Yunus Emre'nin Risaletü'n Nushiyye eserinde yer alan ortak değerleri belirlemektir.

**Anahtar Kelimeler:** Sosyal Bilgiler, Değerler Eğitimi, Yunus Emre, Risaletü'n Nushiyye

**INCLUDED IN YUNUS EMRE'S RISALETU NÜSHIYYE VALUES INCLUDED IN THE SOCIAL STUDIES TEACHING PROGRAM COMPARISON WITH VALUES****ABSTRACT**

Values are very important in the formation, development and maintenance of the social structure. The health of this social structure and its transfer to future generations is ensured through values education. In today's world, schools are the most important acculturation tool of states. In this respect, schools also undertake the task of ensuring the transfer of culture to future generations. With the social studies course given in schools, it is aimed that students establish a healthy relationship between the past and the future, and raise individuals who know their culture, history, characteristics of the geography, the values of the nation they are members of, and their responsibilities as citizens. This situation puts the social studies course in an important place in terms of the transfer of values. Social studies course reflects social life in terms of its content. When the Social Studies Curriculum is examined, it is seen that the values in its content are similar to the values discussed in the written works written in Turkish history. One of these works is Yunus Emre's Risaletü'n Nushiyye. The aim of this research is to determine the values in the 2018 Social Studies Curriculum and the common values in Yunus Emre's Risaletü'n Nushiyye.

## **GİRİŞ**

Toplumsal yapının sağlıklı, düzenli ve faydalı bir şekilde meydana getirilmesi ve bu yapının devam ettirilmesinde değerler önem arz etmektedir. Oluşturulan sağlıklı ve düzenli bir toplumsal yapının sürdürülebilir olması toplumu oluşturan bireylerin ortak değerler etrafında bir araya gelmesi ile mümkün olmaktadır. Bu değerleri benimseyen toplumlar ortak değerler etrafında bir araya gelemeyen toplumlara kıyasla tarih sahnesinde kalıcı olmuşlardır (Kan, 2010, s. 138). Buradan hareketle bakıldığında değerler gerek içinde yaşanan topluma uyum sağlamada gerekse toplumsal devamlılığın sağlanmasında önemli bir denetim mekanizması rolü üstlenmektedirler (Göz, 2014). Öte yandan sahip olduğu değerleri içselleştiremeyen ve de gelecek nesillere aktaramayan toplumlarda gerek bireysel gerekse toplumsal çalkantılar yaşanacak ve toplumsal devamlılık sekteye uğrayacaktır (Hökelekli, 2010, s. 6-7). Değerlerin varlığını devam ettirmesi ve gelecek kuşaklara aktarılması ise şüphesiz etkili bir değerler eğitimi ile olacaktır.

Değerler eğitimi gelişmiş ve gelişmekte olan ülkelerin pek çoğunda hala tartışılmaktadır. Değerler eğitimi, idealist anlayışa göre öğrencinin değerli davranış ve insan modellerini örnek alması amacıyla eğitilmesini içermektedir (Yel & Aladağ, 2009, s. 120). Değerler eğitimi, bir toplum tarafından önemli görülen, geçmişten günümüze getirilen standartların gelecek nesillere aktarılmasıdır.

Toplumsal hayat içinde arzu edilen toplum yapısının inşa edilmesi için değerler ve bu bağlamda değerler eğitimi önem arz etmektedir. Nitekim değerler eğitimi sayesinde bireyler kendi ahlaki kodlarını geliştirirken; diğer insanların ahlaki kodları hakkında da bilgi sahibi olabilmektedirler. Değerler eğitimi bunun yanında bireylerin kendi deneyimleri üzerinde düşüncelerini ve bu deneyimleri anlamlandırmalarını sağlamaktadır. Öte yandan toplumsal hayata uyum sağlamak adına bireyler dürüstlük, doğruluk, adalet, saygı, sevgi gibi değerlere ihtiyaç duymaktadırlar. Bu değerlerin bireyler tarafından içselleştirilmesi de etkili bir değer eğitimi sayesinde oluşmaktadır (Çelikkaya & Filoğlu, 2014, s. 1542). Bireylerin değerlerle donanmaları ve bu bağlamda değer eğitimi ile tanışmaları ailede başlayan bir süreçtir. Ancak sitemli bir değer eğitimin verilmesinde eğitim-öğretim faaliyetlerinin etkisi yadsınamaz bir gerçektir. Çünkü değer eğitiminin planlı bir şekilde gerçekleştirilmesi gerekmektedir (Doğanay, 2009, s. 227). Özellikle günümüz dünyasında ailede informal şekilde verilmeye çalışılan değer eğitimi yetersiz kalmaktadır. Bu nedenle de değer eğitimine önem veren her ülkede değerler gerek örtük gerekse planlı öğretim uygulamalarıyla eğitim öğretim süreçlerine ve bu bağlamda

öğretim programlarına dâhil edilmektedir. Nitekim değerler milletleri bir arada tutmaları, toplumda beraberliği sağlamaları sebebiyle günümüzde eğitim programlarında önemli bir yere sahiptir. Bu noktada sosyal bilgiler dersi ise ayrı bir önem taşımaktadır. Buradan hareketle bakıldığında demokrasi bilincini aşılması, milli, ahlaki ve evrensel değerleri gelecek nesillere aktarması, düzenli, temiz bir toplum oluşturulması ve kültürel devamlılığın sağlanması gibi misyonlar üstlenmesi sosyal bilgiler dersinin değerler eğitimi noktasındaki önemini ortaya koymaktadır. Öte yandan sosyal bilgiler dersi ortaya çıktığı günden bu yana “iyi-etkin vatandaş” yetiştirme gayretinde olmuştur. Etkin vatandaş yetiştirmek içinse değerlere ihtiyaç duyulmaktadır. (Kalin, 2017, s. 30). Nitekim etkin bir vatandaşın sorumluluklarını bilen, toplumsal sorunlara karşı duyarlı, adaletten ayrılmayan, toplumsal hayattaki ilişkileri saygı ve sevgi çerçevesinde yürüten, evrensel barışı savunurken; bağımsızlığından ve vatanseverliğinden de ödün vermeyen bir yapıda olması gerekmektedir.

Türkiye’de sosyal bilgiler dersi bağlamında değerler eğitimi sosyal bilgiler dersinin okutulmaya başlandığı 1968 yılından itibaren örtük bir şekilde verilmeye başlanmıştır. Bu anlamda sosyal bilgiler dersi öğretim programları kapsamında da ilk kez 1968 İlkokul Sosyal Bilgiler Dersi Öğretim Programı’nda örtük bir şekilde değerler eğitimine yer verildiği görülmektedir. Ancak planlı ve sistemli bir şekilde değerler eğitimine ilk kez 2005 Sosyal Bilgiler Dersi Öğretim Programı’nda (SBDÖP) rastlanılmaktadır. Uzun yıllar uygulamada kalan bu öğretim programı 2017 yılında yenilenmiş ve 2018 yılında revize edilerek basılı hale getirilmiştir. Değerler eğitimi açısından 2005 ve 2018 Sosyal Bilgiler Dersi Öğretim Programları karşılaştırıldığında 2005 programında yer bulan değerlerin büyük bir kısmının 2018 programında da yerini koruduğu görülmektedir. Bununla birlikte 2005 SBDÖP’nda yer verilen misafirperverlik, hoşgörü, sağlıklı olmaya önem verme ve temizlik değerleri 2018 SBDÖP’nda yer bulmazken; 2018 programına ise iki yeni değer eklenmiştir. Bunlar; eşitlik ve tasarruf değerleridir. 2018 programında yer alan değerler aşağıdaki tabloda gösterilmiştir.

**Tablo 1.** 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda Yer Alan Değerler

Adalet	Estetik
Aile Birliğine Önem Verme	Eşitlik
Bağımsızlık	Özgürlük
Barış	Saygı
Bilimsellik	Sevgi
Çalışkanlık	Sorumluluk
Dayanışma	Tasarruf
Duyarlılık	Vatanseverlik
Dürüstlük	Yardımseverlik

(MEB, 2018, s. 9)

Değerler eğitimi açısından ele alındığında sosyal bilgiler dersi bağlamında kullanılabilecek unsurlardan birini de edebiyat ve bu bağlamda edebi eserler oluşturmaktadır. Nitekim sosyal bilgiler dersinde edebiyatın kullanılması eleştirel düşünen, inanç, değerleri inceleyip bunlarla ilgili olumlu tutumlar geliştirebilen ve oluşturduğu tutumları hayatında uygulayabilen etkin bireylerin yetişmesinde önem taşımaktadır (Tokcan, 2016). Unutulmamalıdır ki edebi eserler toplumların bilgi depolarıdır (Şanlı, 2011, s. 152). Yunus Emre'nin Risaletü'n Nushiyye eseri de Türk-İslam kültürü ve medeniyetinin bir yansımasıdır. Bu sebeple değerler eğitimi noktasında önemli bir yere sahiptir. Anadolu coğrafyasında Yunus Emre (1240-1320) tarafından kaleme alınan Risaletü'n Nushiyye isimli eser yaklaşık 600 beyitten oluşmaktadır (Demir, 2016, 2031). Bu araştırmada 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan değerler ile Yunus Emre'nin Risaletü'n Nushiyye eserinde yer alan ortak değerlerin tespit edilmesi amaçlanmıştır.

## YÖNTEM

### Araştırma Deseni

Bu araştırma nitel araştırma yöntemlerinden doküman inceleme tekniği ile desenlenmiştir. Nitel araştırmalarda araştırmacılar, bilgiyi doğrudan ana kaynaktan almakta ve çalışma ortamı, katılımcılar ve dokümanlarla ilişki içinde uzun zaman harcayarak çalışmalarını yürütmektedirler (Büyüköztürk ve vd. : 254). Doküman incelemesi ise bir belgenin sistematik şekilde derinlemesine ele alınmasıdır (Sönmez & Alacapınar,2017). Aynı zamanda araştırılmak istenen olgu ve olaylar ile ilgili yazılı belgelerin analizi doküman inceleme ile yapılmaktadır. Nitel araştırma yöntemlerinde doküman inceleme tek başına veri toplama tekniği olarak kullanılabileceği gibi diğer veri toplama teknikleriyle de birlikte kullanılabilir (Yıldırım ve Şimşek, 2018).

### **Veri toplama aracı ve Verilerin Analizi**

Araştırmada veriler Yunus Emre'nin Risaletü'n Nushiyye adlı eserinden elde edilmiştir. İlgili eser Ziya Avşar tarafından yayıma hazırlanan ve Eskişehir 2013 Türk Dünyası Kültür Başkenti Ajansı tarafından bastırılmıştır. Elde edilen veriler betimsel analiz yaklaşımı ile analiz edilmiştir. Betimsel analizde, elde edilen veriler daha önceden belirlenen temalara göre özetlenir ve yorumlanır (Yıldırım ve Şimşek, 2018). Öte yandan betimsel analizde araştırmaya konu olan veriden yapılan doğrudan alıntılara sıklıkla yer verilebilmektedir. Bu çalışmada da betimsel analiz sonucunda ulaşılan sonuçlar betimsel bir biçimde sunulmuş ve Yunus Emre'nin Risaletü'n Nushiyye eseri 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer verilen değerlerle ilişkili olduğu düşünülen kısımlardan doğrudan alıntılar yapılmıştır.

### **BULGULAR**

2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan on sekiz değer yedi tanesine Yunus Emre'nin Risaletü'n Nushiyye eserinde rastlanmıştır. Eser ile programda benzerlik gösteren değerler: adalet, dürüstlük, eşitlik, özgürlük, saygı, sevgi, sorumluluk değerleridir.

#### ***Adalet Değerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Genel tanımıyla "hak ve hukuka uygunluk" (TDK, 2022) olarak tanımlayabileceğimiz adalet kavramı bir değer olarak birçok ülkede olduğu gibi Türkiye'de de öğretim programları bağlamında öğrencilere kazandırılmak istenen değerler arasında yer almaktadır. Bu bağlamda ilgili değer; 2005 Sosyal Bilgiler Dersi Öğretim Programı'nda "Adil Olma" şeklinde yer almakla birlikte 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda "Adalet" olarak verilmiştir. Öte yandan adalet değeri öğretim programları bağlamında kazandırılması hedeflenen değerler arasında öncelikli öneme sahip olan ve diğer disiplinlerle ortak olarak kazandırılması hedeflenen "kök değerler" arasında yer almaktadır. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan adalet değerinin ilgili eserde iki kez yer aldığı görülmektedir. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan adalet değeriyle ilgili örneklere yer verilmiştir;

- "Cennet, Padişah'ın kerem ışığından, cehennem de adalet ışığındandır." (Avşar, 2013, s. 25).
- "Akıl, adaletli aziz kişidir,  
Bunalana medet onun işidir." (Avşar, 2013, s. 53).

Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan adalet değeriyle ilgili örnekler incelendiğinde ilk örnekte padişahın adil olmasının, adaletli davranmasının önemi belirtilmiş olup ikinci alıntıda adaletin sıkıntı yaşayanların medet umduğu bir kurum olduğu belirtilmiştir.

### ***Dürüstlük Değerlerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Doğruluk aslında temelde “doğru olma durumu” olarak ifade edilebilir. Dürüstlük insani erdemlerin başında gelen özelliklerden biri olmakla birlikte bireylerin edinmeleri gereken değerler arasında da yer almaktadır. Buradan hareketle bakıldığında dürüstlük değeri hem 2005 hem de 2018 Sosyal Bilgiler Dersi Öğretim Programlarında yer bulan değerler arasında yer almaktadır. Aynı zamanda “kök değer” olarak tanımlanan ve ilkokuldan ortaöğretime her ders disiplini bünyesinde kazandırılması amaçlanan değerler arasında yer almaktadır. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan dürüstlük değerinin ilgili eserde doğrudan 4 beyitte yer bulduğu görülmektedir. Öte yandan dürüstlüğün eserin genelinde doğrulukla birlikte ele alındığı görülmektedir. Bu durum bir değer olarak dürüstlüğün doğrulukla birlikte sağlanacağı anlamını doğurmaktadır. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan dürüstlük değeriyle ilgili örneklere yer verilmiştir;

- “Dürüstler cümleden derinde yüzer,  
Özü doğru olanlar Arş'ta gezer.” (Avşar, 2013, s, 136).
- “Öğüdü cümle doğruluktan alır,  
Dürüstlük dirliği ebedî kalır.” (Avşar, 2013, s, 137).
- “İki âlem bir oddur bir nazarda,  
Dürüste birdir bugün de yarın da.” (Avşar, 2013, s, 137).
- “Dürüstlük kaftanın o dem giyesin,  
Cümle ahaliye doğru diyesin.” (Avşar, 2013, s, 138).

Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan dürüstlük değeriyle ilgili örnekler incelendiğinde ilk örnekte aslı doğru olanların, dürüstlükten taviz vermeyenlerin diğer insanlardan farklı oldukları vurgulanmıştır. İkinci beyit incelendiğinde dürüstlüğün ebedi olarak kalıcılığına vurgu yapılırken; üçüncü beyitte dürüst olanın zamana göre etkilenmeyeceği dün neyse bugün de aynı olacağı vurgusu yapılmıştır. Eserde dürüstlük değeri üzerinde yoğun bir şekilde durulduğu görülmektedir. Evrensel bir değer olan dürüstlüğün önemi Yunus Emre'nin diğer eserlerinde olduğu gibi bu eserinde de önemli bir yere sahiptir.

### ***Eşitlik Değerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Eşitlik evrensel değerler arasında yer almakla birlikte Türk kültürü açısından ele alındığında milli değerlerimizle de doğrudan örtüştüğü görülmektedir. Toplumsal uyum ve barışın tesisinde de etkisi yadsınamaz bir değer olarak bizi karşılamaktadır. Sosyal bilgiler dersi bağlamında ele alındığıdaysa gerek iyi gerekse etkin vatandaşlığın içselleştirilmesine katkı sunan değerler arasında yer almaktadır. Bu anlamda eşitlik değeri hem 2005 hem de 2018 Sosyal Bilgiler Dersi Öğretim Programlarında yer bulmuştur. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan eşitlik değerinin ilgili eserde doğrudan aynı isim altında olmasa da anlamsal bakımdan birçok beyitte yer bulduğu görülmektedir. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan eşitlik değeriyle ilgili örneklere yer verilmiştir;

- *“Kimse kınanamaz suçu yüzünden,  
Sorulmaz başkasının suçu senden.*
- *Benim suçum için sana günah yok,  
Senin suçun için bana günah yok.”* (Avşar, 2013, s. 132).
- *“Ne hâcettir sana elin haberi,  
Ki farzdır herkese kendi pazarı.”*
- *“Kimsenin suçu sana zerre ermez,  
Elin yediği sana lezzet vermez.”* (Avşar, 2013, s. 133)

Eserde eşitlik değeri ile üzerinde durulan bölümler yukarıda alıntılanmıştır. Kimsenin suçundan ötürü kınanamayacağı, bir başkasının işlediği bir suçu için bir başkasından hesap sorulamayacağı ve herkesin kendisinden sorumlu olduğu konuları üzerinde durulduğu görülmüştür. Öte yandan eserde kibir üzerine yazılmış birçok beyte rastlanılmaktadır. Kendini üstün görme anlamı açısından kibir, eşitlikle doğrudan ilişkilendirilebilecek bir kavramdır. Aşağıda eserde kibir ile ilgili ifadeler barındıran örneklere yer verilmiştir.

- *Ateşle geldi dört türlü felâket;  
Şehvet, kibir, açgözlülük ve haset.* (Avşar, 2013, s. 21)
- *Varsa kibir haberi, hangi yere,  
İşiten lanet okur o habere.*
- *Sakin olmayasın kibirle yoldaş,  
Kibri nerde görürsen orda savaş.*
- *Kibir ve arzu vefa kılmaz sana,  
Yazık toprağa düştüğün o güne.* (Avşar, 2013, s. 45)



- *Kibir sahibinin nazarı yoktur,  
Bu sebepten gönülde nuru yoktur. (Avşar, 2013, s. 46)*
- *Kibirli kişiler dosta eremez,  
Kibir kendine düşmandır göremez. (Avşar, 2013, s. 48)*
- *Yazık, kibir işini çok uzattın,  
Kendi kendini gönüllerden attın. (Avşar, 2013, s. 49)*
- *Kibir geldi, seni karartıp gitti,  
Ecel atı yörüktür, gelip tuttu. (Avşar, 2013, s. 50)*
- *Arzu ve kibir nice tutar seni?  
Ölüm evreni bir gün yutar seni!*
- *Bu vade ermeden gel bir gözün aç,  
Arzu ve kibir yolundan beri kaç. (Avşar, 2013, s. 51)*
- *Çok hızlı davran ki ütülmeysin,  
Kibir tuzağına tutulmayasın.*
- *Kibrin öğüdünü tutarsan eğer,  
Biçemezsin tevazuya bir değer.*
- *Kibirlinin yeri Siccîn içinde,  
O yüzden olmadı hiç din içinde.*
- *Din yolu tutanın Siccîn nesidir?  
Kin ve kibir ehlinin din nesidir?*
- *Bana inanmazsan hâlin göresin,  
Şu ömrü, kibirle yele veresin! (Avşar, 2013, s. 52)*
- *Sözü bitmeden tevazu göründü,  
Kibir onu görüp yüz geri döndü.*
- *Kılıç çekip gelir, yer alçağından,  
Kibir onu görüp kaçtı dağından.*
- *Dağı ovayı doldurdu bir feryat,  
Kimine Cennet kimine Arasat.*
- *Tevazu kibr'in üstüne at sürdü,  
Kibir baktı, bir eri bin er gördü.*
- *Âsî kibir, hiç bırakmadı işi,  
Dağ başını tutup geçirdi kışı. (Avşar, 2013, s. 54)*

- *Halk içinde yüzünü yere bırak,*

*Bu durum kibir ehline çok uzak. (Avşar, 2013, s. 59)*

Yukarıda verilen beyitler incelendiğinde Yunus Emre'nin kibir üzerine geniş yer verdiği görülmektedir. Nitekim Risaletü'n Nushiyye'de doğrudan "Kibir Destanı" adıyla bir bölüm yer almaktadır. Eşitlik değerini benimseyememiş veya farklı bir anlatımla eşit olmaya tahammülü olmayanların temel özellikleri arasında yer alan kibirlilik Yunus Emre tarafından tüm yönleriyle ilgili eserde işlenmiş; buradan hareketle de eşitliğe vurgu yapılmıştır.

#### ***Özgürlük Değerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Özgürlük, genel anlamıyla herhangi bir kısıtlamaya, zorlamaya bağlı olmaksızın düşünme veya davranma (TDK, 2022) şeklinde tanımlanmaktadır. Bu yönüyle le alındığında hemen her bireyin fitratı özelliklerinde yer bulan bir kavramdır. Bir değer olarak düşünüldüğünde ise Türk milleti açısından ayrı bir anlam ifade etmektedir. Zira her bir Türk vatandaşı özgürlüğüne özünden bağlı olmuş; bunu tarihi geçmişinde de defaten göstermiştir. Ana gayelerinden biri "vatandaş" yetiştirme gayreti olan sosyal bilgiler dersi açısından da bir değer olarak özgürlük ayrı bir önem taşımaktadır. Nitekim bireyi devlete vatandaş kılma noktasında kazandırılması gereken değerlerden birini özgürlük oluşturmaktadır. Öğretim programları bağlamında bakıldığında bu değer ilk defa 2005 Sosyal Bilgiler Dersi Öğretim Programı'nda yer almış; 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda da yerini korumuştur. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan özgürlük değerinin ilgili eserde doğrudan aynı isim altında olmasa da anlamsal bakımdan bir beyitte yer bulduğu görülmektedir. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan özgürlük değeriyle ilgili örneğe yer verilmiştir;

- *"Sabrın her yerde iyiliktir işi,*

*Dayım azad eder yâd ve bilişi". (Avşar, 2013, s. 83)*

Eserde özgürlük değerine yukarıdaki beyitte rastlanmış olup bu beyitte ise sabredeninin sonunun özgürlük olduğu vurgulanmıştır.

#### ***Saygı Değerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Bir arada yaşamın temel gerekliliklerinden biri olarak bizi karşılayan saygı, çatışmalardan uzak uyumlu bir hayat için de gerek arz etmektedir. Kök değerler arasında da yer bulan bu değer gerek 2005 gerekse 2018 Sosyal Bilgiler Dersi Öğretim Programlarında yer almıştır. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan saygı değerinin ilgili eserde doğrudan aynı isim altında olmasa da

anlamsal bakımdan bir beyitte yer bulduğu görülmektedir. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan saygı değeriyle ilgili örneğe yer verilmiştir;

- *“Benim gibi kişiye hürmet etmez,  
Cevap verir bana, öğüt işitmez.”* (Avşar, 2013)

Risaletü'n Nushiyye'de yer bulan yukarıdaki beyit incelendiğinde Yunus Emre'nin hürmet etmenin yani saygı göstermenin önemini vurguladığı görülmektedir.

### ***Sevgi Değerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Sevgi, insani özelliklerin temel boyutlarından birini oluşturmaktadır. Bu anlamda gerek bireysel yaşamın gerekse toplumsal uyumun sağlanmasında n fazla ihtiyaç duyulan değerlerden birini sevgi oluşturmaktadır. Nitekim sevgi zaten sevilen şeye değer katmak; onu değerli kılmaktır. Bir değer olarak sevgi hem 2005 hem de 2018 Sosyal Bilgiler Dersi Öğretim Programlarında yerini almıştır. Öte yandan “kök değerlerden” birini yine sevgi oluşturmaktadır. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan sevgi değerinin ilgili eserde birçok beyitte yer bulduğu görülmektedir. Nitekim Yunus Emre eserlerinde gerek tabii sevgiyi gerekse ilahi sevgiyi yoğun işlemiştir. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan sevgi değeriyle ilgili örneklere yer verilmiştir;

- *Sever dünyayı dünyadır imanı,  
Susuzdur, kanmaz dünyayla canı.*
- *Her neyi seversen imanın odur,  
Nasıl sevmezsin ki sultanın odur.*
- *Bil ki aşkıdır seni senden alan,  
Neyi seversen o tarafa salan.*
- *Sevdiğinden öteye durağın yok,  
Asıl mânâ budur, boş lakırdı çok.*
- *Bu yolda zıtlaşma olmaz, mânâ var,  
Her neyi seversen, odur sana yâr. (Avşar, 2013, s. 32)*
- *Dünyayı sevme, arta kalır senden,  
Gelip sonunda düşman, alır senden. (Avşar, 2013, s. 93)*
- *Sevmez dünyayı er oğlu erler,  
Baki hayat neyse onu dilerler. (Avşar, 2013, s. 109)*

- *Şekeri sevme ki Mısır'da biter*  
*Kim neyi severse orda yeter*
- *Neyi seversen çok gözlersin onu*  
*Görünmedi sana şeker cihanı (Avşar, 2013, s. 124)*
- *“Gözü görmez kişi sevgiden uzak,*  
*Dost nerde sen nerde, aç gözünü bak!” (Avşar, 2013, s. 127)*
- *“Yârini görmezsen o sevgi değil,*  
*Kabul etmezse göz neylesin gönül.*
- *Her sevgi tadını önce göz alır,*  
*O yüzden hasreti gönülde kalır.*
- *Gözü görmez kişinin sevgisi yok,*  
*Şu gözlü kişilerse sevgiyle tok” (Avşar, 2013, s. 128)*
- *“Gözü yok kişinin sevmek nesidir*  
*Gönlü kul eyleyen göz fitnesidir.” (Avşar, 2013, s. 129)*
- *Âşıktır doğruluğa doğru canlar,*  
*Doğruluğu bulur dostu sevenler, (Avşar, 2013, s. 136)*

Sevmenin ve sevginin öneminden bahsedildiği bu beyitlerde bireyin sevgiye önem vermesi gerektiğinin ve bunu yaşamına yansıtmasının önemi vurgulanmaktadır. Öte yandan Yunus Emre maddi çoğu zaman maddi sevginin ötesinde manevi sevgiye vurgu yaparak ilahi aşkı dile getirmiştir.

#### ***Sorumluluk Değerinin Yunus Emre'nin Risaletü'n Nushiyye Eserindeki Yansıması***

Sorumluluk hem kişinin kendine karşı hem de toplumsal hayat içinde birlikte yaşam sürdüğü diğer bireylere karşı görevleri arasında yer almaktadır. Sosyal bilgiler dersi bağlamında ele alındığında ise gerek 2005 gerekse 2018 Sosyal Bilgiler Dersi Öğretim Programlarında yer bulan değerlerden biri olmuştur. Yunus Emre'nin Risaletü'n Nushiyye isimli eseri incelendiğinde 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer alan sorumluluk değerinin ilgili eserde doğrudan aynı isim altında olmasa da anlamsal bakımdan bir beyitte yer bulduğu görülmektedir. Aşağıda Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde yer bulan sorumluluk değeriyle ilgili örneğe yer verilmiştir;

- *“Yunus, cümle sözün sana vazife,*  
*İş sana düşer, kimse etmez ifa.” (Avşar, 2013, s. 40)*

Risaletü'n Nushiyye'de yer bulan yukarıdaki beyit incelendiğinde bir işi yapmak, o işi yerine getirmek için sorumluluk almanın önemin vurgulandığı görülmektedir.

## SONUÇ

Yunus Emre'nin kâmil insan olma yolunda nasihatlerini barındıran ve bu yönüyle bir nasihatname özelliği taşıyan Risaletü'n Nushiyye, evrensel değerlerin pek çoğunu içeriğinde barındıran Türk-İslam edebiyatının önemli eserlerindedir. Bu yönüyle 2018 Sosyal Bilgiler Dersi Öğretim Programı'nda yer bulan değerlerin birçoğuna eserde rastlanılmaktadır. Yunus Emre'nin Risaletü'n Nushiyye eseri ile 2018 Sosyal Bilgiler Dersi Öğretim Programında bulunan değerlerin karşılaştırıldığı bu araştırmada 2018 Sosyal Bilgiler Dersi Öğretim Programında yer alan 18 değerden adalet, dürüstlük, eşitlik, özgürlük, saygı, sevgi ve sorumluluk, değerlerinin ortak olduğu tespit edilmiştir. Asıl amacı vatandaş yetiştirmek olan Sosyal Bilgiler dersi içeriğinde Türk milletinin özünde bulunan değerlerin kendine yer bulduğu görülmektedir. Değerlerden uzaklaşılın günümüzde hem Sosyal Bilgiler dersinin değer aktarımında öneminin bir kere daha ortaya konması hem de Türk milletinin önemli mutasavvıflarından olan Yunus Emre'nin Risaletü'n Nushiyye adlı eserindeki adı geçen değerler ele alınmıştır.

Unutulmamalı ki milletleri millet yapan, ortak duygu, düşünce ve ülküler etrafında milleti bir araya getiren en önemli unsurlardan biri değerlerdir. Bu yönüyle ele alındığında Türk-İslam edebiyatında önemli yer edinen birçok eserde olduğu gibi Yunus Emre'nin eserinde de değerler yoğun bir şekilde işlenmiştir. Bu durum günümüz eğitim sistemi bünyesinde okullarda öğretim programları dâhilinde verilmeye çalışılan değerler eğitiminin aslında edebi yazınımızda yaygın bulunduğunu ortaya koymaktadır. Buradan hareketle eğitim-öğretim faaliyetleri kapsamında sözlü ve yazılı edebi ürünlere geniş yer verilen sosyal bilgiler dersi bağlamında Yunus Emre'nin Risaletü'n Nushiyye isimli eserinin değerler eğitimi anlamında kullanılabileceği görülmektedir. Yunus Emre'nin Risaletü'n Nushiyye isimli eserinde tespit edilen bu ortak değerlerin işlendiği kısımların ortaokul düzeyinde sadeleştirilerek günümüz Türkçesi ile ders kitaplarında yer verilmesi öğrencilerin tarihi köklerinde bu değerleri görerek içselleştirmelerine katkı sağlayacaktır.

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## GELENEKLE “UYUMSUZLUK” GÖSTEREN BİR TİYATRO OYUNU DİKKAT KÖPEK VAR

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### ÖZET

XX. yüzyılın ikinci yarısında Avrupa’da ortaya çıkan Absürt tiyatro ile birlikte yüzyıllardır alışıla gelen tiyatro geleneğinde değişimler meydana gelir. I. ve II. Dünya Savaşları, siyasal ve toplumsal değişimlerle şekillenen yeni dünya düzeni, insanların olaylara bakış açısını, ahlaki ve etik değerlerini, estetik beğenilerini, sorunlarını dile getiriş biçimlerini farklılaştırır. Bu değişimler tiyatronun anlatım tarzına, kişilerin diyaloglarına, işlenen temalara, sahneleme tekniklerine kadar birçok alana sirayet eder. Dünyada meydana gelen bu değişimlere Türk tiyatrosu da sessiz kalmaz. 1960’lı yıllardan itibaren ‘Cumhuriyet Dönemi Türk Tiyatrosu’ büyük bir gelişim ve değişim gösterir. 70’li yıllara gelindiğinde ortaya çıkan darbeler, üniversitelerdeki karşıt görüşlü öğrenciler arasında yaşanan çatışmalar, işçi hareketleri, emperyalizm karşıtı gösteriler ülkede yeni bir dönemin başlayacağını ilk işaretleri olur. Üniversitelerden uzaklaştırılan öğretim görevlilerinin yarattığı boşluk; sanatçıların, aydınların susturulması neticesinde yaşanan beyin göçü ve ilticalar; sanat ve kültür yaşamını kuraklaştırır. Ülke içinde köyden kente göçün hızlanması, şehirlerde baş gösteren işsizlik, gecekondulaşma neticesindeki çarpık kentleşme, tarımsal üretimin zayıflaması gibi nedenler ülkedeki kaos ortamını körükler. Özellikle ‘12 Mart Romanları’na yansıyan sosyal, ekonomik, kültürel, siyasal olaylar tiyatrodaki da varlığını hissettirir. Tiyatro yazarlarının bir kısmı ülkede yaşanan sıkıntılı durumları komedi türü ile anlatmaya çalışırken bir kısmı da Absürt tiyatronun özelliklerinden yararlanır. Melih Cevdet Anday’ın “Dikkat Köpek Var” adlı oyunu yalnız, bunalım içinde, varoluş sancılı yaşayan, özgürlüğünü gün geçtikçe kaybeden, toplum ile ölüm arasında sıkışıp kalmış insana, saçmanın deliliğe yaklaştığı dünyada seyircinin/okuyucuyunun algılama gücünü zorlamasıyla farklı bir deneyim yaratır. Bu çalışmada oyunun Absürt tiyatroya özgü nitelikleri ve Türk tiyatrosundaki yeri ve önemi tespit edilir. Anday’ın şair kimliğinin gerisinde kalan tiyatro eserleri böylece araştırmacıların dikkatine sunulur. Çalışmadaki amaca yönelik olarak oyunun sahip olduğu nitelikler metin odaklı bir okumayla anlamlandırılmaya çalışılır. İlk olarak oyunun sahip olduğu dramaturjik felsefi temeller açıklanır ve açılır. Sonra “Dikkat Köpek Var” adlı eser anlamsal ve biçimsel olarak çözümlenir ve oyunun Absürt tiyatro ile olan benzerlikleri ve farklılıkları tespit edilir.

**Anahtar Kelimeler:** Absürt tiyatro, varoluşçuluk, Melih Cevdet Anday

## **A THEATER GAME THAT SHOWS “INCOMPATIBILITY” WITH TRADITION DİKKAT KÖPEK VAR**

### **ABSTRACT**

With the Absurd theater that emerged in Europe in the second half of the 20th century, changes occur in the theater tradition that has been used for centuries. The new world order, shaped with the 1st and 2nd World Wars, political and social changes, differentiates people's perspectives on events, their moral and ethical values, aesthetic tastes and the way they express their problems. These changes affect many areas such as the narrative style of the theater, the dialogues of people in the plays, the themes and staging techniques. Turkish theater does not remain silent to these changes taking place in the world. Since the 1960s, the “Turkish Theatre in Republican Period” has undergone a great development and change. The coups that broke out in the 70s, the conflicts between the students with opposite views at the universities, the workers movements, and the anti-imperialist demonstrations are the first signs of a new era in the country. The gap created by the lectures fired from universities, the brain drain and asylums caused by the silenced of artists and intellectuals impoverish art and cultural life. Reasons such as the acceleration of migration from village to city in the country, unemployment in cities, unplanned urbanization as a result of slums, and weakening of agricultural production trigger chaos in the country. Especially the social, economic, cultural and political events reflected in the “12 March Novels” make their presence felt in the theatre. While some of the playwrights try to explain the troubled situations in the country with comedy genre, some of them benefit from the characteristics of the Absurd theatre. Melih Cevdet Anday's play “Dikkat Köpek Var” creates a different experience for people who are lonely, depressed, experiencing existential pains, losing their freedom day by day, stuck between society and death, in a world where nonsense is approaching insanity, forcing the perception power of the audience/reader. In this study, it is tried to determine the incompatible characteristics of the play and its place and importance in Turkish theater. The theater works of Anday that lag behind in his poetic identity are thus presented to the attention of researchers. For the purpose of the study, the qualities of the game are tried to be interpreted with a text-oriented reading. First, the dramaturgical philosophical foundations of the play are explained in details. Then, the play titled of “Dikkat Köpek Var” is analyzed semantically and formally. Anday's play similarities and differences with the Absurd theater are determined.

**Key Words:** Absurd theater, existentialism, Melih Cevdet Anday



## 1. GİRİŞ

Absürt kelimesi saçma, zırva<sup>1</sup>, uyumsuz, aykırı gibi anlamlara gelir. Modern tiyatro için red cephesi, avangard tiyatro ve anti - oyun olarak da kullanılan bir terimdir. Absürt sözcüğü farklı kullanımlarla karşımıza çıkmakla beraber felsefe tarihi içinde XX. yüzyılda ortaya çıkan varoluşçuluk akımı ile adından söz ettirmeye ve özellikle tiyatro alanında kendini hissettirmeye başlar. İnsanın varoluşunu, yaşamın anlamsızlığını ve insanlar arasındaki iletişim sorunlarını ele alan, problemlere eleştiri getiren ve yaşama dair sorunlarla insanların yüzleşmesini sağlayan özelliği ile absürdizm kısa zamanda birçok düşünürün, sanatçının dikkatini çeker.

Absürdizm I. ve II. Dünya Savaşı sonrasında ortaya çıkan ruh halinin yansımasıdır. Batı dünyasının determinist mantığı ile çözüme kavuşturulamayan meselerler savaşlarla çözülmek istenir. Özellikle II. Dünya Savaşı'nın doğurduğu açıklık, yokluk, sefalet ve ümitsizlik absürdizmi doğurur. Temelinde varoluşçuluk, nihilizm ve Albert Camus'nun absürt felsefesi vardır. Aydınlanmanın getirdiği kuru akılı putlaştıran ve pozitivist felsefeye karşı çıkan bu görüşler sorunları tespit eder ancak sorunlara dair çözüm sunamaz.

Varoluşçuluğun temel özellikleri absürdizmin çözümlenmesinde ve anlaşılmasında yol göstericidir. Varoluşçuluk “Weil’e göre bunalım, Mounier’ye göre umutsuzluk, Hamelin’e göre bunaltı, Banfi’ye göre kötümserlik, Wahl’a göre başkaldırı, Marcel’a göre özgürlük, Lukacs’a göre idealizm, Benda’ya göre usdışıcılık, Foulquié’ye göre saçmalık felsefesidir” (Bezirci, 1980, s. 7). Varoluşçuluk terimi bütün bu tanımları belli belirsiz karşılamakla beraber “insanda varoluş özden önce gelir” ilkesine dayanır (Johnston, 2019, s. 210). İnsanın kendi özünü kendinin yarattığına inanılır. Dünyaya gelen insanın dünyada kendi doğumu gerçekleştirdiği taktirde varoluşunu gerçekleştirir. Varoluşçulukla ilgili bu tanımlamalar yapılmaya çalışılsa da varoluşçuluğun mantıksal bir yapıda olmaması ve yaşamla beraber kavranabilen bir özelliğe dayanmasından dolayı kesin bir tanımı yapılamaz. Ancak varoluşçuluğun sınırlarını çizen temel ilkeler sıralanabilir: Bireycidir; herhangi bir düşünce okuluna bağlı değildir; gelenekçi felsefeyi küçümser; insanın dünyaya fırlatılmış olduğuna inanılır; önemli olan öznel hakikatlerdir; evrenin özü saçmadır, anlamsızdır, rasyonel değildir; insan kendi yaşamına kendi karar vermelidir.

<sup>1</sup>

Türk Dil Kurumu Sözlüğü ( <https://sozluk.gov.tr/> )

Varoluş felsefesine göre insan köklerinden kopmuş, temelini yitirmiş, geçmişini ve tarihini kaybetmiş, topluma yabancılaşmış, huzursuz ve mutsuz bireydir. Modernizmle birlikte insanın

geçmişle olan bağlantısının zayıflaması ve insanın kendini manasız bir varlık olarak görmesiyle II. Dünya Savaşı sonrasında bir çıkış yolu aranır. Ancak bu dönemde aranan çıkış yolu makinenin egemenliğinin gölgesinde gerçekleşir. Endüstri devrimiyle beraber makinenin egemenliğine girmiş olan insan kendi özünü ve benliğini yitirir. Makinenin bir çarkı haline dönüşen insan kendine, ürettiği nesneye yabancılaşır, nesneye dönüşür. Diğer yandan Marksist düşüncede yabancılaşma, kapitalist sistemde makinenin getirdiği üretim düzeniyle toplum ve mülkiyet düzeni arasındakiler çelişkileri vurgular. İnsan yaşadığı çelişkiler neticesinde Marks'ın bahsettiği dört farklı yabancılaşma aşamasından geçer: “Kişinin kendi üretim faaliyetine yabancılaşması, kendi ürününe yabancılaşması, çalışma arkadaşlarına yabancılaşması, diğer türlere yabancılaşma” (Aydın, 2010, s. 17-32). İnsan üretim, tüketim ve mülkiyet düzeni arasında bir uygarlık kuramaması neticesinde kendini saçma, yabancı, anlamsız hisseder. Bu his durumu insanı yalnızlığa, bunalıma sürükler. Sartre'ın ifadesiyle insan nedensiz, zorunsuz, anlamsız bir varlık haline gelir.

Varoluş felsefenin özünde kişinin kendini tanıması, özünü yaratması, benliğini kazanması, baskıdan kurtulması, zorbalığa karşı başkaldırması vardır. Bireyin kendi kendine gerçekleştireceği bu eylemler neticesinde birey ana gerçeğe dönüşür, bireysellik öncelenir ve toplum hor görülür. Bu özellikleriyle varoluşçu felsefe <sup>2</sup>Absürt tiyatroyu etkiler. Sevdâ Şener'in ifadesiyle varoluşçu tiyatroyla aynı politik ve kültürel atmosferden neşvünema bulan Absürt tiyatro; tarihsel, kültürel, sosyal gerçeklere de odaklanarak kurgulanan tiyatro metinlerinde kendini göstermeye başlar. Bu bağlamda özellikle 1960'li yıllardan sonra Türk tiyatrosu özel tiyatroların da çabasıyla Eugène Ionesco, Edward Albee, Arthur Adamov, Samuel Beckett, John Osborne, Harold Pinter gibi dünya tiyatrosunun öncü yazarlarını Türk

<sup>2</sup> Türkçede “absürt” sözcüğü kelime anlamı ve terim anlam bakımından farklı sözcüklerle karşılanırsa da Absürt tiyatro yerine “Uyumsuz tiyatro” ifadesi de kullanılmaktadır. Çünkü uyumsuz sözcüğünün absürdizmin ifade ettiği geniş anlam alanını kapsadığına inanılır. Zehra İpşiroğlu bu konuda şu değerlendirmeleri yapar: “Batı’da ‘Absürt Tiyatro’ diye tanımlanan bu akımın tam Türkçesini bulmakta zorluk çektim. Sözlükte absürd sözcüğünün karşılığı widersinning, unsinning (usdışı, saçma), ungerimeit ya da dissonant (uyumsuz) olarak veriliyor. Usdışı sözcüğü bize sürrealizm’i (gerçek-üstüçülük) animsatiyor. Surrealizm denince, bilinçaltının uyurgezerlere özgü bir otomatizm içinde ortaya dökülmesi akla geliyor. Absürd tiyatrodaki böyle bir otomatizm söz konusu değil, burada tam tersine eleştiren, sorunları deşen, onların özüne giden, bilinçaltının derinliklerine indiği zaman da onu gün ışığına çıkarmaya çalışan bir akıcılıkla, bilinçli bir tutumla karşılaşıyoruz. Absürd tiyatro yazarları, surrealistler gibi aklın kavrayamadığı, erişemediği, inanılmaz yaşantılar üzerinde değil, günlük yaşam düzeyinde oluşan gerçekler üzerinde duruyorlar. Ayrıca bu yazarlar akla ters düşen, ya da ona aykırı olanları da uğraşmıyorlar, bu nedenle absürd tiyatrosunun anlamsız ya da saçma tiyatro diye tanımlanmasını da doğru bulmuyorum. Burada mantıksal bir çelişki değil, gerçekçilik düzeyinde alışkanlıkların, gelenek ve törelerin dondurduğu kalıplarla yaşam arasındaki tutarsızlık, uyumsuzluk söz konusudur. (İpşiroğlu, 1996, s. 10-11). Ancak biz çalışmamızda Batı terminolojisine bağlı kalarak absürt ifadesini kullanmayı tercih ettik.

seyircisiyle buluşturur. Ayrıca aynı yıllarda Türk toplumunun geçirdiği sosyal ve kültürel dönüşümler, ülke yönetimindeki siyasal krizler, darbeler, işçi ve öğrenci hareketleri, yoksulluk, göç gibi konular

farklı anlatım tarzları ile yerli oyunlarla sahnelenmeye başlanır. Böylece Türk seyircisi Absürt tiyatronun yerli ve yabancı örnekleri ile tanışır.

Melih Cevdet Anday tarafından kaleme alınan “Dikkat Köpek Var” (1972) adlı tiyatro oyunu dilin kullanılışı, oyun kişileri, işlenen temalar, zaman ve mekân bakımından Absürt tiyatronun kendine has özelliklerine göre kurgulanmış bir eserdir. Tek perde ve tek sahneden oluşan oyun törenselliğe, geleneklere karşı çıkan isimsiz bir delikanlının topluma yabancılaşmış diğer oyun kişileriyle mantık ve düzen çerçevesine uymayan duygularla seyirciyi/okuyucuyu sarsar. Oyun kişilerinin eylemsizlikleri, sızlanma ve memnuniyetsizlikleri, oyundaki siyasal ve sosyal göndermeler, çelişkili durumlar; sorgulamaları beraberinde getirirken yasağın çiğnenmesi ile oyun kişileri geçmişin tutsaklığından kurtularak bireysel özgürlüklerine kavuşur.

## **2.ABSÜRT TİYATRONUN FELSEFİ TEMELLERİ**

Kierkegaard tarafından ilk kez kullanılan varoluşçuluk kavramı XIX. yüzyılda Almanya’da Nietzsche, Scheler aracılığı ile filizlenmeye başlar. Fransız Bergson; Blondel ile Hegel’in usçu ve diyalektikçi felsefesine karşı varoluşçuluğu destekler. Sartre ile varoluşçuluk popüler hale gelir. Sartre “Varlık ve Hiçlik” adlı eserindeki çelişkiler nedeniyle eleştiri oklarını üzerine çeker. Varoluşçulukta tüm ayrılıkların bir arada olması, diyalektiği içine alması ve aynı zamanda ona karşı olması, Hegelci görüngübilimden yararlanması varoluşçuluğu bir sentez haline getirirken kendine has özellikleri olan bir felsefi akım olmaktan uzaklaştırır. Sartre’ın yakın arkadaşı Albert Camus varoluşçuluğun önemli isimlerinden bir başkasıdır. Onun başlıca kavramları uyumsuz, saçma ya da absürttür. Farkındalığı son derece yüksek olan insan dünyadaki arayışına cevap bulamadığını görmeye başlar başlamaz saçma kendiliğinden ortaya çıkar ve dünya ile insan arasındaki uyumsuzluk belirginleşir. Bu uyumsuzluk içinde insan kaderini sevmeli ve intihar fikrinden uzaklaşarak Nietzsche’nin üstün insan fikrine denk düşen başkaldıran insana evrilmelidir.

Heidegger kaygı, korku, kuşku üzerindeki düşünceleri Kierkegaard’ın düşünceleriyle benzerlik gösterir. “Varoluş terimini modern anlamda kullanan ilk filozof [olan] Kierkegaard” (Akarsu, 1980, s. 114) insanın yaşamında somut düşünceye yönelmesini ister. İnsanı somut



düşünceye yönlendiren iki aracın korku ve iç – daralması olduğuna inanır. İnsan yaşadığı korku ile varoluşunu gerçekleştirebilir. Tanrı tarafından unutulmuş olabileceğini düşünen insan yaşadığı korkunun yarattığı uyanıklık ile yaşamını sürdürür.

Kierkegaard için varoluş, insanın ve hayatın kendisidir. Varoluş, insanın uğruna yaşaması ve ölmesi gereken bir hakikat aracıdır. İnsanın kendini tanıması ve anlaması için yapması gerekenlere yönelmesidir. Bu yönelişle beraber insan varoluşundan yola çıkarak birey olabilir. Bireyselleşme yolunda insanın izini sürekli takip etmesi gereken üç önemli öge vardır: estetik, etik ve din. Kierkegaard insan varlığını yalnızca akıl ile belirleyen Hegel ve dolayısıyla Kant'a temelde de Descartes'a karşı bir duruş sergiler. Kısacası 'düşünüyorsam öyle ise varım' önermesini "Ben var olduğum (jag Er til) ve düşünen biri olduğum için düşünüyorum ve var oluyorum" önermesine dönüştürür (Cauly, 2006, s. 64). İnsan var olma iradesiyle diğer varlıklardan etik zafer olasılığı içinde var olma iradesiyle ayrılır.

"İnsan tindir. Ama tin nedir? Tin ben'dir. Ama ben nedir? Ben, kendine bağlı olan bir ilişkidir; daha doğrusu ben, ilişki içinde bu ilişkinin içsel yönelimidir; ben, ilişki olmayıp ilişkinin kendine dönüşüdür

İnsan sonsuzluk ile sonlunun, geçici ile kalıcının, özgürlük ile zorunluluğun bir sentezidir, kısacası bir sentezdir. Sentez iki terimin ilişkisidir. Bu görüş açısından ben, hâlâ varolmamıştır"(Kierkegaard, 2014, s. 21).

İnsan bir sentezdir önermesi insanın sadece bir töz olmadığını ve ilişki halinde olan bir varlık olduğunu ileri sürer. İnsan kendini oluşturan bu ilişki dışında bir hiç'e dönüşür. Birçok unsurun oluşturduğu varoluş sürekli olarak içinde bulunduğu ilişkiler bütününden fazlası olmak zorundadır. Çünkü ben, sonsuzun ve sonlunun bileşiminden oluşur.

"Sonluluk, sonsuzluğa sınırlar getirir; aynı şekilde olabilirin alanındaki zorunluluğun alıkoyma rolü vardır. Sonlunun ve sonsuzun sentezi olarak ben, öncelikle ortaya konmuş, var olmuştur; daha sonra gelişmek için imgelem perdesine kendini yansıtır ve ona da olabilirin sonsuzluğunu uyandıran şey budur. Ben, zorunluluk kadar olasılık taşır, çünkü pekâlâ kendisidir ama kendisi haline gelmek zorundadır. Ben, zorunluluktur, çünkü kendisidir ve olabilir, çünkü kendisi haline gelmek zorundadır" (Kierkegaard, 2014, s.45).

Kierkegaard insanı değerlendirirken onu başkalarına nasıl davrandığı üzerinden bir değerlendirmeye tabi tutmaz. Yani insanı ahlak, gelenek, örf gibi normlar üzerinden iyi ya da kötü olarak nitelendirmez. Kierkegaard insanı 'iyi' olarak değerlendirirken etik<sup>3</sup>

<sup>3</sup> Etik: Felsefenin değerle ilgili boyutunu oluşturan bir temel disiplin olarak, doğru ve yanlışın teorisi; olması gerekenle ilkeleri ele alıp tartışan felsefe disiplini. Doğru ve yanlış, iyi ve kötü, adalet benzeri kavramları ele alıp tartışan etik, üç bölümden meydana gelir. bunlardan birincisi ve en önemlisi normatif etikdir. Olması gerekeni ele alan normatif etik, ahlaki değer ve erdemleri tartışırken, iyi bir ahlaki hayatın neden meydana geldiği, ahlaki bir eylem tarzını belirlemenin pratik yollarının neler olduğu üzerinde durur. Etiğin kimi zamanlarda normatif etiğe teşkil edebilen ikinci türü, insanların hangi ahlaki değerlere bağlandıklarını araştıran betimleyici etikdir. Buna mukabil, etiğin daha ziyade 20. Yüzyılda geliştirilmiş olan üçüncü bölümü, ahlak yargılarının anlamı ve gönderimiyle etik önermelerin doğruluk değerinin nasıl belirleneceği üzerinde duran metaetikten meydana gelir. (Cevizci, 2012, s. 165-66).

kavramından yararlanır. Bu değerlendirmeleri yaparken Tevrat'tan aldığı dini hikâyelerden, İbrahim peygamberin kurban hadisesinden, felsefe tarihi içinde yer edinmiş önemli düşünürlerin etik, insan ve varoluş üzerindeki fikirlerinden yararlanır, karşılaştırmalar ve çelişkiler üzerinden düşüncelerini sıralar. Hegel felsefesinin ahlakın tümel özelliğini savunan görüşlerine karşı çıkan Kierkegaard, Nietzsche'nin kitlenin doğruluğu ve ahlakı ortadan kaldırdığı fikrinde birleşir. "Nietzsche gibi, bireyin kişiliğini kitle içinden ortadan kaldırmak isteyen demokrasiden de, sosyalizimden de nefret eder. Kitle bireylerden kuruludur, ama o kitleyi kuran bireyler o anda hiçbir şey değillerdir" (Akarsu, 1980, s. 118).

Kierkegaard, Hegel'in tümel ahlak anlayışına ve insanın ahlaken sorumlu olduğu toplum fikirlerine karşı imanı önceleyen düşüncelerini "Korku ve Titreme" kitabında yer alan İbrahim peygamber kıssası üzerinden somutlaştırır. Hegel'e göre "[d]ini koruyan temel faktör tümeldir ve genel geçer etiğin yayılmasına olanak tanır. Din bu etik sınırların içinde yatar ve öznel bir Tanrı fikrine yer vermez, zira dinsel aktarım gerektirir" (Kierkegaard, 2019, s. 15). Kierkegaard, Hegelci etiğe karşı imanı ortaya atar ve İbrahim'in oğlu İshak'ı<sup>4</sup> 'Tanrı'ya kurban etmeye götüren şey etik midir yoksa iman mıdır?' sorusuna cevap arar. İbrahim peygamberin oğluna çok geç yaşında kavuşmasına rağmen Allah'ın emri ile kurban edeceği Moriya Dağı'na götürmesi ve imanı açısından verdiği sınavdan başarıyla geçmesi Kierkegaard'a göre onu bir 'iman şövalyesi' yapar. "Diğer yandan Hegel, imandan bahsederken İbrahim'in cani sıfatıyla boşlanıp afroz edilmesi gerektiği yerde, imanın babası sıfatıyla şan ve şeref kazanmasına yüksek sesle ve açıkça karşı [çıkır]" (Kierkegaard, 2019, s. 78). Hegel bu görüşü ile İbrahim peygamberi bir caniyeye dönüştürür. Hegel'in İbrahim peygamberi değerlendirilmesinde arketipik dinsel bakış görülür. Özellikle

<sup>4</sup> İshak'ın çocukluğu ve gençliğiyle ilgili olarak Tevrat'ta sadece iki hadise yer alır. İlkine göre İshak sütten kesildikten sonra İbrahim'in verdiği ziyafet esnasında İsmâil kardeşi İshak'a güldüğü için Sâre onun evden uzaklaştırılmasını ister. Tanrı ona, "Sâre'nin sana söylediği her şeyde onun sözünü dinle; çünkü senin zürriyetin İshak'ta çağrılacaktır" dediği için Hz. İbrâhim, İsmâil ile annesi Hâcer'i oradan uzaklaştırır (Tekvîn, 21/8-14; 25/9-11). Tevrat'a göre İsmâil ile İshak tekrar babalarının cenazesinde bir araya gelirler (Tekvîn, 25/9-10). İkinci olay da onun kurban edilmek istenmesiyle ilgilidir. Tevrat'a göre kurban edilmek istenen İshak'tır. Onun bu esnada kaç yaşında olduğu belli değilse de kurban taktimesinde nelerin gerekli olduğunu bildiğine ve yakılan kurban taktimesi için odun taşıyabildiğine göre (Tekvîn, 22/6) delikanlılık çağında bulunmalıdır. Yahudi tarihçi Josephus'un dediğine göre İshak yirmi beş, rabbilerin hesabına göre de otuz yedi yaşına geldiğinde (EJd., II, 482) Allah, İbrâhim'i denemek için sevdiği biricik oğlu İshak'ı Moriya diyarına götürüp bir dağ üzerinde yakılan kurban olarak takdim etmesini emreder (Tekvîn, 22/1-2). İbrâhim bu emir üzerine İshak'la beraber iki uşağını da yanına alarak Moriya diyarına gider. Yolda İshak babasına kurban edilecek kuzuyu sorar. Babası kuzuyu Allah'ın tedarik edeceğini söyler. Belirtilen yere vardıklarında ve İbrâhim İshak'ı kesmeye teşebbüs ettiğinde Rabb'in meleği müdahale eder, imtihanı başardığını bildirerek İshak'ın yerine kurban edilmek üzere bir koç verir. İbrâhim bu imtihanında başarılı olduğu için mübarek kılınır, zürriyetinin çoğaltılacağı müjdelendir (Tekvîn, 22/1-19).

İshak'ın kurban edilme kıssası (Tekvîn, 22/1-19) Elohist metnin anlatım sanatının güzel bir örneğidir. İman ve mutlak itaat bu kıssanın hâkim unsurlarıdır (IDB, II, 729). Yahudi bilginleri, Hz. İbrâhim'in bu emri ifaya hazır oluşunu ve itaatini övgüyle anarlar. Onun Tanrı tarafından istendiği için oğlunun ölümünü kabul etmesi hadisesi, şeriatı çiğnemektense ölmeyi tercih eden pek çok yahudiye örnek teşkil etmiştir. (<https://islamansiklopedisi.org.tr/ishak>).

İbranilerde yer alan ve ilk çocuğun kurban edilişi Hegel'in gözünde İbrahim peygamberi bir caniyeye dönüştürürken Kierkegaard için iman meselesidir.<sup>5</sup>

Nietzsche ateist varoluşçu filozoflar<sup>6</sup> tarafından merkeze alınan ve varoluşçuluğa nihilizm felsefesiyle katkı sunan önemli bir isimdir. Nietzsche nihilizmi yaşamın alçaldığı, insanların tür olarak yetkinsizliğe ve geriye doğru gittiği bir hâl olarak açıklar. “Yaşam, inkar edildiği, değersiz kılındığı ölçüde bir hiçlik kazanır. Değersizleştirme, her zaman bir kurmacayı varsayar: kurmaca aracılığıyla ki, sahteleştirir, değersiz kılarız; kurmaca aracılığıyla ki, bir şeyleri yaşama karşı çıkartırız” (Deleuze, 2001, s. 111). Böyle bir durum içinde ne mevcut değerler işlemekte ne de yerine yenileri gelmektedir. Dünya can sıkıcı bir yere dönüşür ve yaşam hiçliğin yerini alır, yaşama hiçlik değerini veren tüm üstün değerler kurmacaya dönüşür ve insanlar tekil yalnızlıkları içinde kaybolur. Yaşam değersizleştirilirken aynı zamanda değerlerin de değersizleştirildiği görülür. Değerlerin hiçleşmesiyle şeylerin özü de hiçleşeceği için Tanrı'da üstduyarlılığını yitirerek ölür. Kiliseler<sup>7</sup> tekil yalnızlığı içinde kaybolmuş insan için işlevini yitirir. Tanrı insan haline gelirken insan da Tanrı'ya dönüşür. Bu dönüşüm sonrasında sancılarını ve sıkıntılarını modern insanın aşması beklenir. Kendine acıyan bir Tanrı'nın varlığına katlanamayarak

<sup>5</sup> Morfolojik açıdan bakıldığında İbrahim'in oğlunu kurban edişi Eski – Doğu dünyasında sıkça uygulanan ve İbranilerin Peygamberler dönemine kadar sürdürdükleri, ilk çocuğun kurban edilişi pratiğinden başka bir şey değildir. İlk çocuk, çoğunlukla bir tanrının çocuğu olarak görülürdü; hatta, arkaik Doğu'da evlenmemiş kızların tapınakta bir gece geçirmeleri ve tanrı (onun temsilcisi, rahip ya da elçisi, ‘yabancı’) tarafından hamile bırakılmaları adet olmuştu. Bu ilk çocuğun kurban edilmesi tanrıya ait olanın ona geri verilmesi demektir. Böylece genç kan, tanrının tükenmiş enerjisini arttırıyordu (zira doğurganlık tanrıları dünyayı sürdürme ve bolluk sağlama çabasında kendi tözlerini tüketiyorlardı; dolayısıyla onların da periyodik olarak yenilenmeleri gerekiyordu) ve bir anlamda, İshak, Tanrı'nın oğluydu zira Sara doğurganlık çağını geçtikten çok sonra İbrahim ve Sara'ya verilmişti. Ama İshak inançları yoluyla verilmişti onlara; vaat ve inancın çocuğuydu. İbrahim tarafından kurban edilişi, biçim olarak Eski – Sami dünyasında yeni doğmuş bebeklerin kurban edilmesine benzese de içerik bakımından bunlardan farklıdır. Eski Sami dünyasının tümünde böyle bir kurban, dinsel işlevine rağmen, sadece bir anane, anlamı tümüyle kavranabilir bir ayinken İbrahim'in durumunda bir inanç eylemidir. Bu kurbanın neden istendiğini anlamaz, yine de bunu yerine getirir, çünkü Tanrı böyle istemiştir. Görünürde saçma olan bu eylemle İbrahim yeni bir dinsel deneyimi, imanı başlatmaktadır. Diğer hepsi (tüm Doğu dünyası) İbrahim ve izleyicileri tarafından açılacak olan bir kutsallık ekonomisi içinde davranmayı sürdürmüşlerdir. Kierkegaard'ın termonolijisini kullanacak olursak, bu kurban edişler “genel olan” a aitti; yani, sadece kozmostaki kutsal enerjinin dolaşımı (tanrıdan doğaya ve insana, sonra insandan –kurban aracılığıyla- tanrıya, vb.) ile ilgilenen arkaik tanrı tezahürleri üzerine kuruluydular. Bunlar haklılığı kendi içinde yatan eylemlerdi; mantıksal ve tutarlı bir sisteme girmektedirler: tanrı'ya ait olan ona dönmelidir. İbrahim için İshak doğrudan ve maddi bir gebeliğin ürünü değil Tanrı'dan gelen bir armağandı. Tanrı ile İbrahim arasında bir uçurum uzanıyordu; süreklilikte temel bir kopuş vardı. İbrahim'in dinsel eylemi yeni bir dinsel boyutu açmaktadır: tanrı hiç bir rasyonel (yani genel ve öngörülebilir) bir haklılaştırma olmaksızın belleyen, emreden, isteyen ve onu için her şeyin mümkün olduğu kişisel, “tümüyle ayrık” bir varoluş olarak göstermektedir kendini. Bu yeni dinsel boyut Musevi – Hristiyan anlamda “iman”ı mümkün kılmaktadır. (Eliade, 1994, s. 109-110).

<sup>6</sup> Varoluşçu filozoflar Hristiyan varoluşçular ve Ateist varoluşçular olmak üzere ikiye ayrılır: Hristiyan varoluşçular: Kierkegaard, Karl Barth, Karl Jaspers, Max Scheler, Blondel, Henri Bergson, Chestov ve Soloviev Ateist Varoluşçular: Nietzsche, Heidegger, J.P. Sartre, Simone de Beauvoir, Albert Camus (Bezirci, 1980, s. 11-12).

<sup>7</sup> Hristiyanlığın yüzyıllardır hüküm sürdüğü Batı Avrupa'da toplumun yüzde 27,5'i herhangi bir dine inanmıyor. Büyük bir çoğunluğu vaftiz edilen 15 Batı Avrupa ülkesinde yaşayan halkın yaklaşık üçte biri kendini ateist olarak tanımlarken, yüzde 46'sı kiliseye gitmediğini belirtiyor. 2017 yılında yapılan bir araştırma, kiliselerde yaşanan skandallar ile din adamlarının sosyal yaşama ilişkin takındıkları tutumun insanların dinden uzaklaşmalarında etkili olduğunu ortaya koyuyor. (<https://tr.euronews.com>)

Tanrı'nın ölümünü gerçekleştiren insan hâlâ kendine acıyan ötekinin acınası bakışından kurtulamamıştır.

Nietzsche nihilizmi etkin ve edilgen olarak ikiye ayırır. Etkin nihilizmde mükemmelliyetçi nihilist vardır. Mükemmel nihilist düşen şeyleri yaşatmaya, ölü olanları diriltmeye çalışmaz. Onu yıkma faaliyeti aynı zamanda yeniden değerlendirmedir. Yeniden değerlendirme yeni değer yaratmak değil, mevcut değerlere savaş açmaktır. Hristiyanlığın ortaya çıkışı ile antik değerler yeniden ele alınır. Fakat aydınlanma ile bu değerler yaşama hizmet etmez hale gelir. Sürekli gelişen, dönüşen, devingen dünyada yalnızca değişim vardır. Bu değişmeyi de sürdüren yaşamın kendisidir. Değişen yaşam içinde Tanrı da yeniden değerlendirmeye tabi tutulmalıdır. Tanrı bu nedenle ölmüştür. Yeni anlamları, değerleri insan kendi üzerine yüklemelidir. Salt akla ve tek gerçek içinde şekillenen tarih anlayışına yani Hegel diyalektiğine de nihilizm karşı çıkar. Tarihin karşısında boyuneğen insan devlet karşısında da boyunegecek ve böylece her çeşit güç karşısında silikleşecektir. Oysa ki Nietzsche'ye göre insan tepkisel güçlerin temsilcisidir. Tarihi yaşam için kullanan, başkaldıran, tarihin akışının tersine doğru yüzebilen insan üstün insandır. Bu üstün / soylu insanı Nietzsche 'köleleşmiş' insandan yeğ tutar. Köle insan durağanlığın insanıdır ve Hristiyanlık gibi temel bir din yaratmıştır.

Üstün insan yaşama güdülerini önde tutan kişidir. Yaşamdan korkmaz, onla çatışmaz, alışkanlıklarına hapsolmaz. Alışkanlıklarını değiştirerek yenilik yaratmanın peşindedir. Halbuki modern insan sürekliliğin, tek düzenin, standartın peşindedir. Yeniliğin, farklılığın karşısında olan modern hayat içinde bulunduğu sarmalın farkındalığı ile memnuniyetsiz hâlini aşamaz. İnsan etkin bir nihilist olduğunda mevcut durumun işlemeyen yönlerini, boşalmış anlamları ortadan kaldırmaya çabalar. Yaşamı körelten şeyleri düşünür ve edilgen nihilistin tutumunu aşar. Alışkanlıkların canlılığı ortadan kaldırması nedeniyle alışkanlıkların aşılması gerektiğini bilir ve rahatlık hapisanesinden kaçmanın yollarını arar. İçi boş toplum değerlerinden sıyrıldığında insan arınarak kendini gerçekleştirme yolunda büyük bir adım atmış olur. Nietzsche'nin ilerleme ve uygarlık tutkusuna, Aydınlanma düşüncesi'ne, bunların baş sorumlusu olarak nitelendirdiği Fransız Devrimi'ne karşı çıkması da bu nedenledir. Modernitenin hakim sınıfı olan burjuvaizme ve onun ahlakına karşı duruş vardır. Modernitenin ısrarla vurguladığı bireyselliğe farklı boyuttan bakan Nietzsche kitleleşmekten yanadır.



Nietzsche ileri sürdüğü görüşlerle varoluşçuluk arasında bir bağın kurulmasını sağlar. Tıpkı varoluşçular gibi insanı odağa alır. Bilhassa ateist varoluşçular Nietzsche'nin fikirlerinden yararlanır ve onu temel dayanak noktası olarak görür. Üstün insan öğretisiyle, değerlerin yeniden değerlendirilmesi fikirleri ile bir varoluşçu filozof olarak kabul edilir. Tanrı'nın ölmesi ve değerlerin değersizleştirilmesi sonucunda insan kendini yeniden inşa etme girişiminde bulunmalıdır. Kendi varoluşunu sorgulamaya başlayan insan yaşamına yeni bir pencere açarak yaşama tutunmaya çalışmalıdır. İnsan varlığının ne denli güvensiz olduğunu, yaşadığımız dünyada ölüme mahkum oluşumuz, küresel ve toplumsal ölçekte yaşanan savaşlar, kıtlıklar, salgın hastalıklar uzun depresyon dönemlerimizi oluşturur. Varoluşsal bu karmaşa Nietzsche'nin kaos fikrine denk düşer. İnsan karmaşa ve kaos içindeyken bile her şeye egemen olma isteğini sönmümlendiremez. Yaşamı kontrol etme hırsı kendine kendine yabancılaşmasına neden olur. İnsan böylece "özne- nesne dualizminin kurbanı" olur (Geçtan, 2013, s.36). Nietzsche'nin ve varoluşçuluğun aşmak istediği şey de bu dualizmdir.

Antik Çağ'da varlığın temelinde yer alan insan, Orta Çağ'da yerini Tanrı'ya bırakır. Yeni Çağ ile birlikte merkeze alınan akılla insan ve Tanrı ölür. Günümüzde de varlığın merkezine post- human / yapay zekânın yerleşmesi ile insan büyük bir kalabalığın içinde uyumlu, itaatkâr bir varlığa dönüştürülerek tüm kişiliği başkalarınca şekillendirilir. XXI. yüzyıl insanı için yaşamın gereksinimleri ve sahip olunması gereken özellikler sosyal medya tarafından belirlenir hale gelir. Aslında insanların bu talebi de Nietzsche'nin sözünü ettiği bir "güç istenci"<sup>8</sup>ni çağırıştırır. Güç istencinin sonsuz döngüsünde insan bakışını kendine çevirmeli ve kaderini sevmeye çalışmalıdır.

Varoluşçuluk öteki, varoluş ve öz arasındaki ilişkileri yeniden yorumlar. Bu ilişkiler arasındaki yenilenmeyi Husserl ve Heidegger başlatır. Duyumsal algı ile öze ulaşamayacağına inanan Husserl öz ile varoluş arasındaki farkın akıl tarafından ayırt edilebileceğini öne sürer. Bu ayırımı (fenomoloji) görüngübilimsel indirgeme yöntemi ile

<sup>8</sup> Güç istenci, ünlü Alman düşünürü Nietzsche'nin insanın daha yetkin bir duruma ulaşma dürtüsüne, güç elde etme ve iktidar uygulana arzusuna verdiği ad. Hayatın kendisinin güç isteminden ibaret olduğunu, insanlığın güç ve iktidar arzusu tarafından yönlendirildiğini ifade eden Nietzsche, söz konusu iradenin kendini aşma ve yüceltme eylemiyle karakterize olduğunu öne sürer. O, gerçek ifadesini veya tezahürünü öncelikle insanın kendi üzerinde güç elde etme, kendini aşma arzusunda ve sonra da sanat ve felsefede, yani yaratıcı faaliyet ve düşüncede bulur. Güç istemi, bu yüzden başkaları üzerinde bir tahakküm elde etme amacına yönelik bir güç olmaktan ziyade, olumsuz bir güç olmak durumundadır. Fakat Nietzsche, bu noktada kalmaz, bir hipotez olarak güç istemini, sadece beşeri gerçekliği değil, bir bütün olarak dünyayı açıklamak için de kullanır. Evrene devasa bir enerji kaynağı temin eden güç istemi, kendini sürekli olarak yeniden yaratma ve yok eden bir güçtür. Bütün değişimlerin kaynağında bulunan söz konusu güç istemi, dünyaya anlaşılabilir karakterini temin eden şeydir (Cevzici, 2012, s. 199).

yapar. Metafiziği sonlandırarak somuta, yaşantıya döner ve felsefeye yeni bir başlangıç yapmak iddiası ile ortaya çıkar. “Ahlakın ve toplumsal felsefenin geleneksel kavramlarının [Şem’lerinin] yerine geçen, öznelarasılık, birlikte - varlık (Mistein) ya da ötekiyle - birlikte - birvarlık (Miteimamdersein), bu alanda tam anlamıyla fenomenolojinin katkısı temsil eder” (Colette, 2006, s. 78). Fenemoloji her şeyden önce betimlemeye dayanan bir yöntemdir. Gerçekliğin kendisi diye bir şey olamaz. Çünkü gerçeklik her zaman kendine yönelmiş bir bilinç tarafından bilinen bir gerçekliktir. Yani dünya deneyimlerimizin tamamı bilinç tarafından kurulmuştur.

Heidegger varlık felsefesine yönelen düşünürlerden biridir. Varlığı varoluşta arayan filozof varoluştan öz çıkarılmalıdır fikrini öne sürer. “İnsanın özü varoluşundadır” görüşüyle varlık sorununa yeni bir bakış açısı kazandırır (Akarsu, 1979, s.119). İnsan yalnızca varolan değil aynı zamanda varoluşunu sorgulayandır. Bu özelliği ile insan özü ve öteki arasındaki farklılığı kavrayabilir. Ancak ben ve dış dünya birbirinden ayrılmaz çünkü insan varoluşunu bir dünya içinde gerçekleştirir. “İnsan Heidegger’e göre ‘varlığın çobanı’ (güdücüsü) varlıktan bir örnek, bir eşbaskıdır” (Akarsu, 1979, s. 120). Diğer varlıklar arasında kendi varlığının farkında olan ve bunu sorgulayan insan “Dasein”, burada olandır. Varlığa gelirken kimse insana bir şey sormamıştır. Yapılması gereken bundan sonra ölmek değildir; anlamaya çalışmak, hayatın ipini ele almaktır. İnsan yazgısını sevmeli ve onun bilincinde olmalıdır.

Varoluşçu filozoflar arasında isminden en çok söz ettiren Sartre bir filozof olmanın yanı sıra iyi bir eleştirmen, yetenekli bir oyun yazarı ve büyük bir entelektüeldir. Bu özellikleri ile Hippolyte Taine ve Zola’yı kendi kişiliğinde birleştirir. “Bunaltı” adlı eseri Sartre’in çok yönlü yazarlığının ispatı niteliğindedir. Sartre bu eseri ile kendine özgü bir evrenin kapılarını okurlarına açar. Bu evrende saçma ve iğrenç bir bir araya gelir ve varoluş anlamsızdır. “Sartre, başlangıçta, bir uyumsuzluk, bir kopuş, bir çatlak, kendinin hafifçe yokluğu tarafından etkilenen bir ‘kendinde mevcudiyet’ ortaya koyar” (Colette, 20006, s. 55). Bireyin kendi varlığını kendi benliğinden doğurmaya çalışması belli başlı baskılardan, normlardan dayatmalardan kurtulması ile başlar. Varlığın özgürlük çabaları sonucunda birey bunaltı içinde uyumsuz bir bireye evrilir.

“Bunaltı [b]ağlanan ve yalnızca olmak istediği kimseyi değil, bir yasa koyucu olarak bütün insanlığı seçen kişi, o derin ve tümel (küllî) sorumluluk duygusundan kurtulamaz. Doğrusu, birçokları bu sıkıntıyı (bu iç daralmasını, bu bungenluğu, bu boğuncu) yaşamazlar. Ama biz

yine de şunu öne süreceğiz: onlar, bunaltılarını maskeleyerek ondan kaçarlar. Nitekim, çoğu kimseler yaptıklarının yalnızca kendilerini bağladığına, yalnızca kendilerini sorumlu kıldığına inanırlar. Bu yüzden “her koyun kendi bacağından asılır” derler. Kalkıp da onlara, ‘ ya herkes de sizin gibi yapıyorsa, o zaman ne olur?’ diye sorarsanız, omuzlarını silkerek cevap verirler: ‘Herkes de böyle yapmaz ki’

Ne olursa olsun, biz yine de durmadan sormalıyız kendimize: ‘Ya herkes de bizim gibi yaparsa sonu nice olur?’ (Bezirci, 1980, s. 59-60).

Öz varoluştan önce gelir fikrini temel dayanak noktası yapan Sartre “varoluşçuluğun papası” olarak Tanrı’nın var olmadığını ve özün insan olduğunu fikrini savunur (Johnston, 2019, s.206). Kendi içinde varlığı oluşturmak bu varlığı hiçliğe götürmektedir. İnsan ne olması gerektiğine dair kesin bir plan ve bilgiye sahip olmadığından kendinde yarattıkları ne ise onun benzeri olacaklardır kısacası “varlık, ne ise odur” (Sartre, 2011, s. 134). Ancak öznenin kendiyile örtüşmesi kendini de yok eder. Diğer taraftan öznenin kendi olmaması da mümkün değildir. Bu tutarsız ve kaygan zemin kendinde mevcut olma durumudur. “Bilincin ontolojik temeli olarak kendi – için’in varlık yasası, kendine mevcut olma biçiminde kendisi olmaktır” (Sartre, 2011, s. 137). Varlığın kendiyile bire bir özdeş olması gerçekte varlığın yokluğunu gerektirir.

“Varlık kendine mevcutsa, bunun nedeni varlığın tümüyle kendi olmamasıdır. Mevcut olmak, örtüşmede dolaysız bir yozlaşmadır, çünkü ayrılığı varsayar. Ama şimdi de kendimize, ‘özneyi kendi kendisinden ayıran nedir?’ diye sorarsak, bunun hiç olduğunu itiraf etmek zorunda kalırız. Genelde bir ayrılmayı ifade eden şey, uzam içindeki bir mesafedir, bir zaman dilimidir, psikolojik bir çatışma ya da sadece aynı anda, aynı yerdeki iki mevcudiyetin bireyselliğidir, kısacası nitelenmiş bir gerçekliktir” (Sartre, 2011, s. 138).

Özneyi kendisinden ayıran hiçlik varlığın sahip olduğu bilinçtir. Hiçlik varlığa varlıkla beraber gelen ve varlığa özgü bir mutlak gerçektir. Hiçlik varlığa ait olduğundan hiçliği yine var eden varlığın kendisidir. Sartre bu varoluş biçimini “kendinde varlık” olarak tanımlar ve bu varlığın sonsuz olduğunu düşünür. İnsan bilincini de “kendisi için varlık” olarak tanımlar ve onu kendinde varlık ile ilişkilendirir. Bu ilişki içinde kendinde varlık olmadan kendisi için varlığın anlamsız kalacağını öne sürer. Kendisi için varlık özünü yine kendisi oluşturmak zorunda olduğundan bu varlık hiçliğe gider ve kesin gerçeklikten yoksun olması hiçliğin sarmalından çıkamamasına neden olur. Kısacası insan anlamsızlık

içinde kendini sürekli oluşturmaya çalışır ve ulaştığı nokta “yokluk”tur. Dolayısıyla Satre’in varoluş

fikrinde anlamsızlık, saçma ve absürdizm vardır. Hayatı boyunca saçmanın içinden kurtulamayacak insan için ölüm de saçmadır.

Sartre insanın dünyaya geldikten sonra kendi özünü ortaya çıkarması gerektiğine inan Tanrı tanımaz bir varoluşçu filozof olarak yalnız, birçok sorumluluğa sahip, terk edilmiş insana büyük sorumluluklar yükler. İnsan kendi edimleri ve eylemleri ile kendi varoluş değerlerini yaratmalıdır. Varoluş felsefesinin temelinde insana değer veren, saygı duyan ve insana nesne olarak değil özne olarak gören bir bakış açısı vardır. “İnsan var olduktan sonra kendini kavradığı gibidir, varlaşmaya doğru yaptığı bu atılımdan (hamleden) sonra olmak istediği gibidir. Kendini nasıl yapıyorsa öyledir yani” (Bezirci, 1980, s. 57). İnsan yaşamının tüm sorumluluğunu üstüne alarak kendi varoluş değerini yaratır. Ancak insan kendi özünü oluştururken sadece kendinden sorumlu değildir, tüm insanlardan sorumludur. Sartre göre bireysel edimler tüm insanlığı etkiler. Edimlerinden dolayı tüm insanlığa karşı sorumlu olan insan özgür olmak zorundadır. “İnsan-gerçekliği yeterince olmadığı için özgürdür, durmadan kendi-kendisinden koparıldığı ve olmuş olduğu şey olduğu ve olacağı şeyden bir hiçlikle ayrıldığı için özgürdür” (Satre, 2011, s. 559).

Sartre’a göre insan Tanrı’yı reddederek kendi varoluşunu gerçekleştirebilir. Tanrı’nın varlığı demek onun var olmadan önce de varlığını kabul etmek demektir. Bu durumda insan kendi varoluşunu gerçekleştiremez çünkü Tanrı insanın varoluşu önünde engeldir. İnsan kendisinin Tanrı olduğu iddiasına yaslanarak özgürlük yönünden sınırlar çizen ve insanın kendini oluşturma gayretlerine engel olan Tanrı’dan kurtulur. Tanrı’nın yok oluşu ile insan kendinde varlık anlayışı içinde etrafını saran tedirginlik ve korkunun atlatılması için tanrı olma isteğine kapılır. Kendini yaratma çabası içindeki insan eylemleri ile saçmadan kurtulmaya çalıştıkça içinde bulunduğu bulantı, anlamsızlık, uyumsuzluk daha da artacaktır. Kısır döngü içindeki insan Tanrı fikrine de sahip olmadığı için eylemlerinin kendine karşı sorumluluğu ile yapayalnız kalacaktır. Ancak insanın içinde bulunduğu anlamsızlık, uyumsuzluk onu varoluşa götürecektir.

Sartre varoluşçulukla beraber bireyin tarihle, toplumla ve kültürel değerlerle bağıni koparır. Bireyin toplumsal sorumluluktan, siyasal eylemlerden kaçınması gerektiğine inanır. İnsanı ussal değil içgüdüsel bir yaşayışa çağırır. Son tahlilde irrasyoneliteye, metafiziğe ve skolastik düşünceye bağlanır. Toplumsal sorunlara bireysel çözümler arar.

Sartre’ın bu görüşlerine ilk olarak öğrencisi Jean Kanapa karşı çıkar. Kanapa’ya göre varoluşçuluk burjuva felsefesidir. Varoluşçuluk insanın umutsuzluk ve terk edilmişliğini evrenselleştirir,

bütün insanlığa mâl eder. İnsanlığa çıkış yolunu göstermediğinden sömürü düzeninin değişmemesine neden olur. Sartre öğrencisi tarafından ağır bir şekilde eleştirilirken Avrupa’da yayılan ve popüler hale gelen varoluşçuluk bu anlayışın karşısında olan filozoflar tarafından insanlık ve özgürlük düşmanı olarak nitelendirilir.

İnsan doğaya yüzyıllar boyunca verdiği şekil ve biçim özelliklerine göre anlam yükler ve değerlendirme yapar. Bu değerlerin yitirilmesi ile dünya bizim için anlaşılabilir olur ve yaşam ile insan birbirinden uzaklaşır. İnsan çevresine yabancılaşmaya başlar, uyumsuzluğu ile doğanın dışına itilir. Gerçeklerin farkına varan insan us gücüyle dünyayı anlamak ve onu insanileştirmek ister. Ancak insan bunu başaramadığında “evreni sevip acı çekebileceğini benimsemediğinde” tam bir uyumsuzluk içinde kısırdöngüye girer ve umutları yok olur (Geçtan, 2013, s. 35). Dünyaya yabancılaşmaya başlayan insan uyumsuzluklar göstermeye başlar. Freud’a göre toplumsalıktan uzaklaşmak insan doğasına aykırıdır çünkü “insan daha çok insan sürüsünün bir hayvanı, önder tarafından yönetilen sürünün bireyidir” (Freud, 2014, s.77). Camus’ya göre ise uyumsuzluğun başlaması aynı zamanda bir uyanıştır. “Bu uyanışın ardından da sonuç gelir zamanla; intihar ya da iyileşme” (Camus, 2014, s.31). Sürüden ayrılan ve kendi varoluşunu anlamaya çalışan insan bu çabasına ve yakarışına rağmen cevapsız kalan soruları karşısında saçma ile yüz yüze kalır. Saçmanın karşısında insan intiharı ya da ölümü tercih etmemelidir. Yaşam her şeye rağmen yaşamaya değerdir. Yaşam mücadelesine devam etmemenin gerekliliğine örnek olarak Camus, Sisifos mitini gösterir. Sisifos<sup>9</sup> için yaşam her türlü hatayı haklı kılacak kadar değerlidir.

Sisifos bilginin peşinde boşa çaba harcayan insanı sembolize eder. Yaşamla mücadele eden insan, yaşamak için kendine neden arayandır. Geleceğe inanan insanlar içindeki yaşama ümidini canlı tutar. Yaşamın güçlüğüne karşı gelerek hayatı yaşamaya değer bulan insanın mücadelesi böylece anlam kazanır. Aksi söz konusu olduğunda Camus’nun “Uyumsuz ve İntihar” başlıklı denemesinin ana sorunsalı olan şu soru karşımıza çıkar: “Yaşamın yaşanmaya değip değmediği?” Bu soru felsefenin temel sorunu olduğundan düşünürler

<sup>9</sup> Tanrılar Sisifos’u bir kayayı durmamacasına bir dağın tepesine kadar yuvarlayıp çıkarmaya mahkum etmişlerdi; Sisifos kayayı tepeye kadar getirecek, kaya tepeye gelince kendi ağırlığıyla yeniden aşağı düşecekti hep. Yararsız ve umutsuz çabadan daha korkunç bir ceza olmadığını düşünmüşlerdi, o kadar haksız da sayılmazlardı (Camus, 2014, s. 137).

kendi cephesinden cevaplar verir. Bu bağlamda Camus hayatın tüm saçmalığı ve anlamsızlığı karşısında insana yaşama tutunmayı önerir. “Camus’nun mutlu hayal ettiği Sisyphos’u Kierkegaard umutsuzluk meydan - okuma figürü olarak görmüştü” (Colette, 2006, s.111).

Sisifos Camus’ya göre uyumsuz bir bireydir. “Tutkularıyla olduğu kadar sıkıntısıyla da uyumsuzdur. Tanrıları hor görmesi, ölüme kin duyması, yaşam tutkusu, tüm varlığı hiçbir şeyi bitirmemeye yönelttiği bu anlatılmaz işkenceye malolur. Yeryüzünün tutkuları için ödenmesi gereken ücrettir bu” (Camus, 2014, s.138). Günümüzün emekçisi hatta beyaz ya da mavi yakalısı da tüm gününü Sisifos gibi geçirir ve uyumsuzluk içinde birbirine benzer günleri yaşar. Kişisel yazgısını gözlemleyen ve kendi yaşamına yöneldiğinde saçmanın kendi varlığından bağımsız olduğunu anlar. Kendisi yok olduğunda saçma var olmaya devam edecektir. Öyleyse Camus’ya göre saçma varlıktan doğmaz. Dolayısıyla insanın yapabileceği tek şey kayanın her zaman yuvarlanacağına farkına varıp yaşamın değersizliği ve kısır döngüsünü hor görmektir. İnsan yaşam içinde, oyun içinde kalmaya çalışmalıdır. Yaşamdan çıkma isteği olan intihar Camus’ya göre bir başkaldırı değildir. “Çünkü intihar başkaldırının mantıksal sonucu değildir. İçerdiği boyun eğiş dolayısıyla onun tam tersidir. İntihar, sıçrama gibi en son noktasına götürülmüş kabullenmedir.[...] İntihar uyumsuzu kendince çözer” (Camus, 2014, s.68).

### **3. GELENEKLE BAĞLARINI KOPARAN BİR OYUN: “DİKKAT KÖPEK VAR”**

Dikkat Köpek Var adlı oyun Absürt tiyatroya özgü nitelikleri ile Türk tiyatrosunun özgün ürünlerinden biridir. Oyun tek perde ve tek sahneden oluşur. Oyun kişileri Delikanlı, Adam (Baba), Kadın (Anne), Doktor ve Genç Kız’dır. Oyunda zaman ve mekân öğeleri belirsizdir. Anday eserindeki yer alan birçok temaya nazaran “Bu dünya mantıkla yürümüyor” düşüncesini öne çıkararak Delikanlı’nın aykırı ve uyumsuz yaşamına okuyucuların/izleyicilerin bir an için durup bakmasını ister.

Oyunda yer alan kişilerin her birisinin isimsiz oluşu Absürt tiyatronun evrensel niteliğine uygundur. Bu oyunlarda yer alanlar tipik özelliklere sahip, her yerde görülebilecek insan profili yansıtılır. Doktor yasakları, Anne yasakların altında ezilenleri temsil ederken Baba da yasaklara boyun eğen ve düzenin uyumlu insanını simgeler. Oyunda yer alan isimsiz kişiler, zaman ve mekân öğelerinin sahip olduğu özellikler ile sınırları ve kalıpları yıkar. Absürt tiyatrodaki zaman mekân belirsizliği, kişi kullanımından kaçınmak, kişi

betimlemelerine yer vermemek en sık rastlanan özelliklerdendir. Oyun kişileri belli bir zümreyi değil tüm insanlığı temsil eder. Çünkü oyundaki karakterlerin iç yaşantılarına ilişkin herhangi bir ipucu yoktur. Karakterlerin sürekli kafalarında açıkça ifade edemedikleri ya da ifade etmek istemedikleri konular bulunması karakterlerin ortak özelliklerindedir.

Adam: “İyi bildiniz, karım yatalaktı. Nikahımız yatak odasında kıyıldı. Düğünümüz de yatak odasında yapıldı. Çok güzel bir düğün oldu. Maskeli idi davetlilerimiz... İçki içilmedi, yemek yenilmedi, konuşulmadı. Hiç konuşulmadı. Çünkü kimse kimseyi tanııyordu. Kimseye davetiye yollamamıştık. Ama birden öyle bir kalabalık bastırdı ki, cehenneme döndü evin içi. Evet cehenneme döndü. Anlıyor musunuz?” (Anday, 2014, s.106).

Absürt tiyatrodaki grotesk özelliklerden dolayı oyun kişileri abartılmış hareketler sergiler, sürekli kendilerini tekrar eder ve gezevelik ederek, evelme – geveleme düzeyindeki ‘çok sesli’ diyaloglarla anlamsızlığın temelini oluşturan doğal bir dil kullanılır. Oyunlarda kaba güldürü kendini hissettirir. Alaycı etkiyi arttırmak için normal aile bireylerinden uzak, geleneksel mekânlardan ayrı bir yapı kurgulanır. Törenelliğe tepki, klişelere karşı çıkış, mantık ve düzen çerçevesine uymayan duygular vardır.

Delikanlı: “Hayır. Ben işsizim, onun için gündüzleri bol bol dolaşabiliyorum. Elime bir kitap alıp hoşlandığım bir yerde oturuyorum. Bugün de yolum buraya düştü. Çok güzel bir yer doğrusu... Bu yol, bu ağaçlar, bu parmaklı kapı, bahçeniz... Fırsatı kaçırmayayım dedim. (Durur.) İyi etmedim mi?”

Kadın (Sert): Kızım, kendisine sokakta evlenme teklif edilmesinden hiç hoşlanmaz.” (Anday, 2014, s.103).

Oyun kişilerinin isimleri olmadığı gibi fiziki ve psikolojik hiçbir özelliğine değinilmez. Kişiler derinlikli olarak çizilmeyerek kuklalaştırılır. Mekanik hareketlere sahip kişiler ya evden çıkar ya da eve girer. Delikanlı da bir sırada oturarak kitap okur, oturduğu sıranın arkasında bulunan bahçeli evden çıkan Genç Kız, Adam ve Kadın’la konuşur. Oyundaki devinimi sağlayan diyaloglar dışında Delikanlı’nın birkaç eylemi ile dramatik aksiyon hareketlenir. Delikanlı’nın Genç Kız’ı gördükten sonra evlenmeye, iş bulmaya karar vermesi, levhayı ters çevirmesi bunlardan birkaçıdır.

Delikanlı: “Demin bu evden genç bir hanım çıktı, kendisine evlenme teklif ettim, babamla konuşun dedi. Siz o genç hanımın annesi misiniz?”

Kadın: Evet, ne olacak?

Delikanlı: Kızınızla evlenebilir miyim?

Kadın: Kızım, babamla konuşun dediğine göre neden babasına sormadınız?

Delikanlı: Babasına sordum, sizinle konuşmamı söyledi.

Kadın: Bana sormanızı mı söyledi? Çok tuhaf doğrusu.

.....

Delikanlı (Kitabını koltuğunun arasına sıkıştırır): Ben de gideyim, kendime bir iş arayayım. (Durur, göğüs geçirir.) Nerde arayayım? Hiç bilmiyorum. “Dikkat köpek var” diye levha asmasını biliyorlar da, “Dikkat iş var” diye levha asmıyorlar hiçbir yere. (seyircilere doğru gelir.) Bana ‘Ne iş yaparsın?’ diye sorsalar, ne derim ben? Çok canm sıkılıyor buna!” (Anday, 2014, s. 102-109).

Oyun kişilerinin eylemleri ve söylemleri birbirini tutmaz. Kişiler eylemsizdir ya da çok az eylemde bulunur. Kadın’ın, Genç Adam’dan istediği şey oturduğu sırada beklemesidir yani eylemsiz kalmasıdır. Oysaki Delikanlı harekete geçip kendine iş bulmak ister. Delikanlı’nın iş aradığı sırada annesi kızının doktorla evlendiğini söyler. Doktor maskesiyle ve sahip olduğu ev ile aileyi sınırlar ve eve hapseder. Yine ev sahibi Doktor tarafından asılan Dikkat Köpek Var levhası absürt özelliği ile dikkati çeker. Aynı zamanda bu levha tehdit ve baskı unsurudur. Kızla evlenmek isteyen erkekleri evden uzak tutar.

Delikanlı: Ben bu işlerin acemisiyim. Ne yapayım?

Adam: Ben değilim. Yüzlerce kişi geldi buraya, kızımı istemeye. Hepsi ile konuştum. Hepsine söyledim, dinletemedim.

Delikanlı: Bana da söyleyin, hangi yolu tutayım?

Adam: Önce köpeğe alışın, köpeğe! [...] (Anday, 2014, s. 108).

Oyun kişilerinin ortak özelliği topluma yabancılaşmış toplumdaki uzak kimseler olmalarıdır. Oyunda kadın ve adamın evlilik törenindeki gariplikler topluma yabancılaşmış insanların varlığını belirginleştirir. Düğüne gelenlerin maskeli olması, davetlilerin kimler olduğunun bilinmemesi, düğünün yatak odasında yapılması ve düğünün cehenneme dönüşmesi yabancılaşmaya, uyumsuzluğa örnektir.

### **Uzaman ve Zamanın Belirsizliği**

Oyunda zamana ve mekâna dair netlik yoktur. Zamana dair en net ifadelerden biri adam ve kadının 40 yıldır evli olmasıdır. Diğer zamansal ifade Delikanlı’nın kapı önünde geçirdiği yarım saatlik ara zamandır. Kısa sürede birbirlerini tanımaya çalışan oyun kişileri diyalog



halinde konuşma görüntüsü içinde kendi problemlerini genele yayar. Cehenneme benzeyen bir törenle evliliğe adım atan Kadın evliliği boyunca bir gün bile mutlu olamadığından bahseder. Hiçbir kadının evliliğinde mutlu olamayacağına dair bir genelleme yapar ve kızını bu genellenenin dışında tutmak ister.

Ailenin kiracı olarak yaşadığı ve kapısında “Dikkat Köpek Var” levhası asılı olan ev oyunda yer alan tek uzamdır. Bu uzam içinde hapsolmuş aile bireyleri içeriye girilmesi yasak bir eve sahiptir. Bu özelliği ile ev dışarıdan gelen herkese kapalıdır, iletişimsizliğin ana mekânıdır. Ayrıca dışarıdan gelecek belirsiz tehlikelere karşı tedirginlik ve korkuyla bekleyen aile karşılaştıkları tehlikeyle beraber varoluş güvencesini kaybeden insanlığı temsil etmesi bakımından mekânın işlevselliğine katkı sunar. Korkunun gölgesinde yaşanan hayat zamanla çekilmez ve anlamsız olur.

Delikanlı: Ya bu bağıran?

Kadın: Kocam... Evet, kocam. Kızımıza ne zaman bir kısmet çıksa da gelip şu sırada otursa, kocam köpek gibi havlamaya başlar. (Köpek havlarken sıraya oturur ve ağlamaya başlar, konuşurken mendiliyle burnunu siler.)

Delikanlı: Birden her şey aydınlığa kavuşuyor öyle ise. Kocanız bana köpeğe alışın demişti. Demek kendisine alışmamı istiyor.

Kadın: (Ağlayarak): Bir gün bile mutlu olmadım kocamla. Gerçekte hiçbir kadın mutlu olamaz, bunu da bilmiyor değilim. Ama ben çabaladım mutluluğumuz için, hasta oldum. Yatakta yattım, düşünün kırk yıl hep o doktorun yüzüne baktım, gece gündüz. Evet, gece gündüz ya... Siz ne sanıyorsunuz? (Anday, 2014, s. 111)

Dar mekân özelliğine sahip olan yatak odası kadının ev içindeki hücrelidir. Bu hücre içinde kadın bunaltı içindedir ve zoraki bir yaşama mahkum edilir. Kiracı olarak uzun süredir aynı evde yaşayan aile bireylerinin hayatı dış dünyadan soyutlanır. Bu yaşam biçimi Kadın’ın hayatını ‘felce’ uğratar. Cehenneme benzeyen düğünle başlayan evlilik hayatı yıllarca aynı durağanlıkla devam eder. Yaşamdaki sıradanlığın nedeni bahçe kapısındaki levhadır. Çünkü bu levha tehdit unsuru olarak eve girmek isteyenleri korkutur, kurulan düzenin devamını sağlar. Levhanın kaldırılması ya da Delikanlı’nın yaptığı gibi levhanın ters çevrilmesi bir eşiğin geçilmesini, bireylerin özgürleşmesini ve

mutluluğa erişmeyi sağlar. Delikanlı'nın kararlı ve cesur tavrı Doktor'un otoristesini, kurulan düzeni yıkar.

Delikanlı: “ Beni bu levha ile korkutamazsınız.

Doktor: Dinleyin, dinleyin! Bu levhayı gördüğünüz halde gene de kıza âşık olmadınız mı?

Delikanlı: Oldum, evet. Bunu saklamıyorum ki... Ancak siz de şunu unutmayın, köpeğin sesini duymadan âşık oldum.

Doktor: O ses sizin içinizden geliyordu. Bahçede köpek olmadığını pekala biliyorsunuz.

Delikanlı: Beni kandıramazsınız. Hiçbir engelden yılmayacağım. Kızı bekleyeceğim burada

Doktor: Yanlış, çok yanlış. Kızı beklerseniz annesi ölür. Seçin birinden birini. Aşk mı, ölüm mü?

Delikanlı: Maskeni çıkar şeytan!

Doktor: Peki. (Maskesini çıkarır, altından başka bir maske, bir köpek maskesi çıkar.) İşte çıkardım. Dikkat!

Delikanlı: Köpek!

Doktor: Git burdan, düzeni bozma! İçerde hastam var.

Delikanlı: Sen bana karışamazsın.

Doktor: Bu evin sahibi benim.

Delikanlı: Yolun da sahibi değilsin ya...

Doktor: Kız dönmeden git diyorum sana.

Delikanlı: Gitmiyorum.

Doktor: (Havlamaya başlar.): hav hav hav..

Delikanlı: (Geriler): Gitmiyorum.

(Doktor havlaya havlaya behçeden içeriye girer)

Delikanlı: Bugünü kendimden yana çevirmek elimde benim. Nasıl mı? Bakın! (Gider, “Dikkat köpek var!” levhasını tersine çevirir) İşte bu kadar kolay.

(Kıza koşa koşa gelir. Delikanlı'yı görünce bir an durular. Sonra onun boynuna atılır, sarılırlar, böyle sarmaş dolaş sallanırlar kendi çevrelerinde)” (Anday, 2014, s. 114-115).

### **Yasağın Çiğnenmesi ve Kaderin Dönüşümü**

Kişi haklarına, siyasal ve sosyal olaylara yönelik göndermeler de sahip olan oyun bu özellikleri ile toplumsal eleştirileri de dile getirir. Bu eleştiriler Absürt tiyatro'nun özellikleri bağlamında absürt bir şekilde aktarılır. Delikanlının işsiz, parasız ve umutsuz

olması ile övünmesi ve bu özelliği ile ideal damat adayı olduğunu söylemesi, hakkını arayan kiracılara sendikanın sahip çıkmaması, evlilikle ilgili töresel düzenin devam etmesi, Delikanlı'nın baskı unsuru otoriteriye karşı tepki vermesi oyunun yazıldığı 70'li yıllara dair toplumsal problemlere göndermelerdir. Ayrıca oyunda 'kendinizi üstün insan sanıyorsunuz' ifadesi Nietzsche'ye bir gönderme olarak okunabilir.

Oyunda yer alan çelişkili durumlar da oyunun Absürt tiyatro bağlamında değerlendirilmesine katkı sunan diğer özelliklerdir. Kadının kocası tarafından yatalak olarak nitelendirilmesi ancak kadının her gün jimnastik yapması, yemek pişirip ortalığı topladıktan sonra yatağa girip doktoru beklemesi, Kadın'ın kocasının uzun yıllardır görmediğini

söylenmesine rağmen Adam'da öyle bir problemin olmaması, levhada bir köpeğin olduğunu yazmasına rağmen bahçede köpeğin olmaması oyundaki çelişkiler olup oyunun absürt yönlerini destekler. Kadının yatalak olması onun pasif bir direniş içinde olduğunu, Adam'ın yaşadığı düzen içinde hiçbir şeye ses çıkarmaması, yaşananları görmemesi olaylara karşı kör olduğunu imler.

Levhadan kurtulmak demek Doktor'dan, maskeli yüzlerden, sahte insanlardan, baskıdan kurtulmak olacağı için harekete geçip levhayı ters çevirmek bile alışılmış olanı değiştirir. Delikanlı Camus'un insanlara önerdiği harekete geç ve kaderini değiştir inanışına göre hareket ederek hem kendi hem de başkalarının hayat akışını değiştirir. Yaşığı çiğneyerek yalnızlıktan kurtulur. Levhanın ters çevrilmesiyle "kısacık bir an içinde 'geçmiş'in tutsaklığından 'gelecek'in özgürlüğüne geçilir" (Yüksel, 1997, s. 59).

#### **4. SONUÇ VE DEĞERLENDİRME**

Melih Cevdet Anday yazdığı on oyun ile Türk tiyatrosunun gelişimine katkı sunan isimlerden biridir. "Dikkat Köpek Var" adlı oyun ile geleneksel tiyatro anlayışının dışına çıkan ve tiyatromuza farklı bir perspektif kazandıran yazar, sevginin önündeki engeli aşmada insanları cesaretlendirmeye çalışır. Topluma yabancılaşmış, uyumsuz, mutsuz bireyleri eylemsizliklerinden, iletişimsizlikten uzaklaştıklarında mutlu olabileceklerine inandırma gayretindedir. Mekânı ve zamanı belirsizleştirerek okuyucuya/izleyiciye evrensel olanı sunarken isimsiz kişilerle de izleyiciyi oyunla bütünleştirir, insana ait varoluş probleminin sürekliliğine dikkat çeker. İzleyicinin gündelik hayatında yaşadığı varoluşsal sıkıntılarla ve zamanın ruhundan kaynaklı problemlerle yüz yüze gelmesini

sağlayarak oyun içinde izleyecinin çözüm yollarını aramasına olanak tanınması eserin Absürt tiyatrodan ayrılan yönünü ortaya koyar. Yabancılaşan ve iletişimsizlikle başbaşa olan insana varoluşunu hatırlatır ve insana kendi özüne, ben'ine döndüğünde yaşadığı problemlerin üstesinden gelebileceğini hatırlatır. Oyunda kullanılan doğal, akıcı ve göndermelerle dolu dil yazarın birçok türde yetkin eserler vermesinin neticesinde ortaya çıkar. Gerçekçi oyun kişilerinin canlı bir söyleşim düzeni içindeki diyalogları oyunun biçimsel niteliğine katkı sunar. Sahip olduğu bu özelliklerle sahnelenme tekniğine de uygun olan oyun, Türk rejisölerinin ilgisini beklemektedir.

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### **JEOFİZİK YÖNTEMLERDEN BETON ANİZOTOPİSİ**

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### **ÖZET**

Yöne bağlı özelliklerin değişimini gösteren anizotropi kavramı betonun en önemli özelliği olan dayanımının belirlenmesi açısından önemli bir parametredir. Zira betonun dayanımı ölçü alım yönüne bağlı olarak farklılık göstermektedir. Beton dayanımı tahribatlı olarak Tek Eksenli Basınç Dayanım Testi (TEBD) ile belirlenmesinin yanı sıra tahribatsız test teknikleri ile de belirlenebilmektedir. Bu amaçla yapılan çalışmada farklı mukavemet özellikleri gösteren beton tasarımlarına ait hazırlanan küp numuneler üzerinde jeofizik yöntemlerden Sismik Ultrasonik yöntem ve Elektrik Özdirenç yöntemleri uygulanmıştır. Bu amaçla kübik numunelerin karşılıklı iki yüzeyinden Sismik Ultrasonik P dalga ölçümleri yapılmıştır. Ayrıca numunenin her yüzeyde iki diyagonal özdirenç ölçümü

yapılmıştır. Hazırlanan numuneler su ve hava kürüne tabi tutulmuştur. Beton numunelerinin sismik hız ve özdirenç anizotropileri literatürde verilen anizotropi bağıntıları kullanılarak belirlenmiştir. Sonuç olarak, özellikle özdirenç anizotropisi üzerinde kür koşullarının çok etkili olduğu belirlenmiştir.

**Anahtar Kelimeler:** Beton, Anizotropi, Sismik Ultrasonik Yöntem, Özdirenç Yöntemi, Tek Eksenli Basınç Dayanımı Testi

## **THE ANISOTROPY OF CONCRETE FROM GEOPHYSICAL METHODS**

### **ABSTRACT**

The concept of anisotropy, which shows the change of properties depending on the direction, is an important parameter in terms of determining the strength, which is the most important property of concrete. In as much as the strength of concrete differs depending on the direction of measurement. Concrete strength can be determined destructively with the Uniaxial Compressive Strength (UCS) Test, as well as by non-destructive testing techniques. For this purpose, Seismic Ultrasonic method and Electrical Resistivity methods, which are geophysical methods, were applied on cube samples prepared for concrete designs with different strength properties. For this purpose, Seismic Ultrasonic P wave measurements were made from the two opposite surfaces of the cubic samples. In addition, two diagonal resistivity measurements were made on each surface of the sample. The prepared samples were subjected to water and air curing. The seismic velocity and resistivity anisotropies of concrete samples were determined using the anisotropy relations given in the literature. As a result, it was determined that curing conditions were very effective especially on resistivity anisotropy.

**Keywords:** Concrete, Anisotropy, Seismic Ultrasonic Method, Resistivity Method, Uniaxial Compressive Strength Test

## 1. GİRİŞ

Jeofizik yöntemler, betonun fiziksel özelliklerinin belirlenmesinde betona hiçbir zarar vermediği için akademik çalışmalarda etkin bir biçimde kullanılmaktadır (Uyanık, (1999; 2012); Uyanık vd. (2012a; 2012b; 2012c; 2013; 2019); Uyanık ve Tezcan, 2012; Öziçer ve Uyanık, 2017; Sabbağ ve Uyanık, (2016; 2017; 2018a; 2018b; 2018c; 2020); Ekin, (2021a; 2021b); Ekin ve Uyanık, (2021a; 2021b)). Bu yöntemlerle, beton dayanımının belirlenmesi, donatı yerleşiminin veya sayısının tespiti ve ayrıca malzemelerin imalat sırasında veya belirli bir kullanım süresinden sonra içyapısındaki çatlak, kırık veya boşlukların tespiti yapılabilmektedir. Yapı ile ilgili sorunlar yapı analizinin önemini artırmıştır (Sabbağ ve Uyanık, 2017; Ekin, (2021a; 2021b); Ekin ve Uyanık, 2021b). Kompozit bir malzeme olan ve yapay kaya olarak kabul edilen beton, yapısı ve bileşenleri itibariyle heterojen bir yapıya sahiptir. Bu durumda tahribatsız muayene teknikleri ile beton üzerinde alınan ölçümler, yönlere bağlı olarak farklı değerler alabilmektedir. Bu nedenle ultrasonik ve elektriksel yöntemler gibi jeofizik yöntemler kullanılarak betondaki anizotropiyi belirlemek mümkündür (Ekin ve Uyanık, 2021b).

Elektrik özdirenç yöntemi, betondaki kırık ve çatlaklar, hasarın derecesi ve nem hakkında bilgi verebilen tahribatsız bir değerlendirme yöntemidir. Ultrasonik yöntemler ise kompozit malzemelerin anizotropik ve doğrusal olmayan elastik davranışlarından dolayı bu malzemelerin yapısal özelliklerini araştırmak amacıyla kullanılabilir (Bucur ve Rasolofosaon, 1998). Suya doymuş kayaçlardaki P dalga hızı anizotropisi, basınçtaki büyük değişiklikler nedeniyle kuru kayalarda daha zayıftır (Beres vd., 2013).

Kırık yoğunluğuna bağlı olarak suya doymuş numunelerdeki hızların kuru numunelere göre daha büyük olduğu görülmüştür (Prasad ve Nur, 2003; Best vd., 2007). Kırık yoğunluğu arttıkça, suya doymuş ve kuru numuneler arasındaki fark daha büyük olur (Beres vd., 2013). Anizotropi miktarı, kayadaki kırık yoğunluğuna ve kırık içeren kayanın mekanik özelliklerinden dolayı su içeriğindeki farklılıklara ve kırık içerisindeki dolgularla etkilenen ve birbirine bağlı olan kırıkların varlığına bağlıdır (Rüger ve Tsvankin, 1997; Chapman vd., 2003).

Bu çalışmada, anizotropinin beton üzerindeki ölçümlere etkisini ortaya çıkarmak için kullanılan 150 mm<sup>3</sup> boyutundaki küp numuneler düşük, orta ve yüksek dayanım özelliklerine sahip 3 farklı beton olarak tasarlanmış ve hazırlanmıştır. Kür koşulları ultrasonik hızlar, elektrik özdirenç değerleri ve aynı zamanda anizotropi üzerinde çok



etkilidir. Bu nedenle numuneler su ve hava kürüne tabi tutulmuştur. Numunelerin karşılıklı iki tarafından ultrasonik P dalga ölçümleri uygulanmış ve 4 yüzeyinden ikisi birbirine diyagonal (90°) olmak üzere toplam 8 görünür özdirenç değeri elde edilecek şekilde elektrik özdirenç yöntemi uygulanmıştır. Kür koşullarının farklılığına bağlı olarak beton numuneler üzerinde anizotropinin etkileri jeofizik yöntemler ile belirlenmiştir.

## 2. YÖNTEM

### 2.1. Sismik Hızlardan Anizotropi

Sismik hızlardan anizotropi derecesi ( $A_n$ ) aşağıdaki bağıntıdan hesaplanabilmektedir.

$$\% \text{ Anizotropi } (A_n) = \left[ \frac{V_{max} - V_{min}}{V_{ort}} \right] \times 100$$

(1)

Buna göre P dalga hızı anizotropisi aşağıdaki bağıntıdan hesaplanabilir.

$$\% (A_p) = \left[ \frac{V_{Pmax} - V_{Pmin}}{V_{POrt}} \right] \times 100$$

(2)

Burada P dalga hızları için ortalama hız aşağıdaki bağıntıdan hızların maksimum ve minimum değerlerinin ortalamaları alınarak belirlenebilir (Walker ve Wookey, 2012; Chen vd., 2017).

$$V_{POrt} = \frac{V_{Pmax} + V_{Pmin}}{2}$$

(3)

### 2.2. Özdirenç Yönteminde Anizotropi

Anizotropi, ölçüm yönüne göre elektriksel farklılıklar sergilemektedir. Dolayısıyla belirli bir noktada ( $R_{max}$  ve  $R_{min}$ ) birbirine dik olarak yapılan ölçümlerden elde edilen görünür özdirenç değerlerinin oranlanmasıyla Özdirenç Anizotropi derecesi ( $A_R$ ) elde edilmektedir (Lataste vd., 2008). Bu çalışmada, özdirenç anizotropisi ( $A_R$ ) aşağıdaki denklem kullanılarak belirlenmiştir (Udosen ve George, 2018).

$$\% (A_R) = \frac{1}{2} \frac{(R_{max} - R_{min})}{R_{Ort}} \times 100$$

(4)

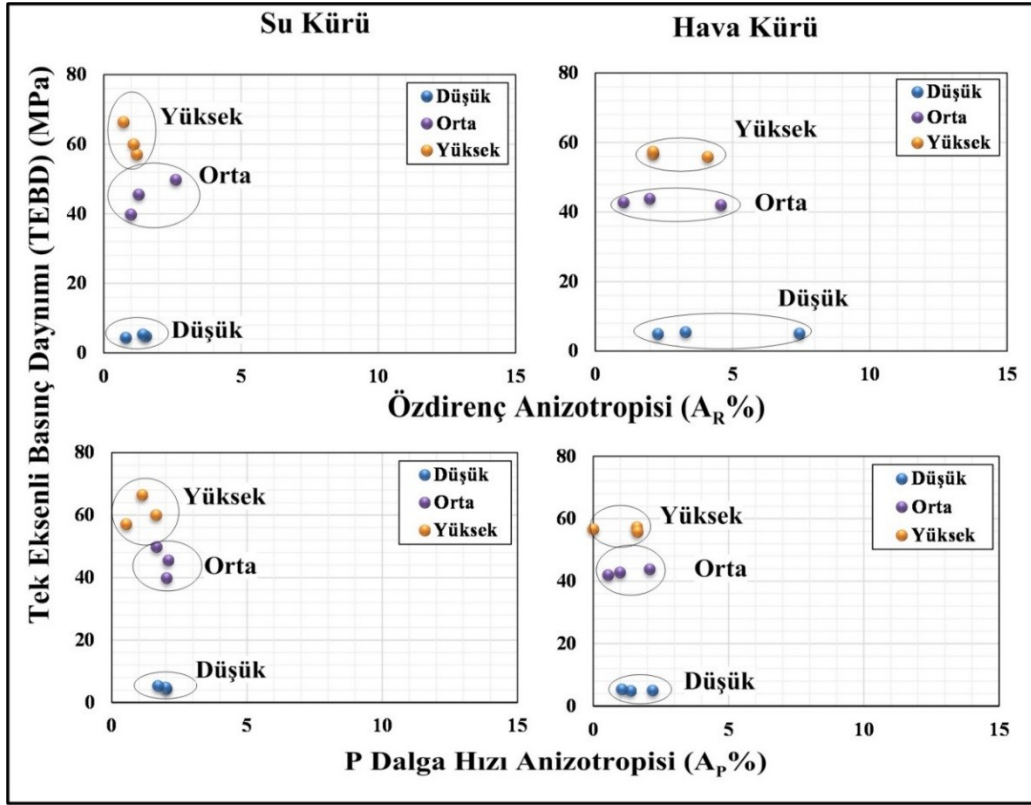
Ortalama özdirenç ( $R_{Ort}$ ), maksimum ( $R_{max}$ ) ve minimum ( $R_{min}$ ) özdirenç değerlerinin ortalamaları alınarak belirlenebilir.

$$R_{Ort} = \frac{R_{max} + R_{min}}{2}$$

(5)

### 3. BULGULAR

Düşük, orta ve yüksek dayanımlı betonların sismik P dalga ve özdirenç anizotropileri sırasıyla Eşitlik 2 ve Eşitlik 4 kullanılarak hesaplanmıştır (Şekil 1).



Şekil 1. Düşük, orta ve yüksek dayanımlı betonların sismik P dalga ve özdirenç anizotropileri

Buna göre özdirenç anizotropisi su küründeki numunelerde %0-3 ve hava kürü numunelerinde %1-8 arasında elde edilmiştir. Benzer şekilde P dalga hızı anizotropisi %0-2.2 aralığında değişmektedir. Su kürü için özdirenç ve P hızı anizotropi sınır değerleri %0.8-2.6 ve %0.5-2.07 ve hava kürü için %1.03-8.18 ve %0.0-2.20 arasında elde edilmiştir.

### 4. SONUÇ VE DEĞERLENDİRME

Betonarme içindeki anizotropi, jeofizik yöntemlerle tahribatsız olarak belirlenebilir. Betonun kür koşulları ve dayanımlarındaki farklılık anizotropi üzerinde çok etkili olmakla birlikte sismik yöntemle belirlenen etki özdirenç ile belirlenenden farklıdır. Betonarme numunelerin farklı yüzeylerinden elde edilen sismik hızlar su ve hava küründe önemli ölçüde değişmezken, özellikle hava kürü numunelerinde aynı numunelerin farklı yönlerinden elde edilen özdirenç değerleri oldukça farklı elde edilmiştir. Bunun nedeni

numunelerdeki gözeneklerin hava ile dolması ve gözeneklerin dağılım yönüne daha duyarlı olması olabilir. Sonuç olarak, jeofizik yöntemler gözeneklerin yönü ve doygunluğu açısından değerli sonuçlar vermektedir.

Özdirençten elde edilen anizotropi değerleri, su kürü numunelerinde sismik hızlardan elde edilen değerlerden daha düşük iken, hava küründeki numuneler için tam tersi bir durumdur. Bu, özdirençin gözeneklerdeki hava dolgusuna karşı daha duyarlı olduğunun bir göstergesidir. Bu nedenle özdirenç yöntemi anizotropiyi belirlemede ultrasonik yöntemle göre daha iyi sonuçlar vermiştir. Hava küründe betonarme dayanımının azalmasıyla özdirenç anizotropisi (%1.03-8.18) artmıştır.

Anizotropi değerinin yüksek olduğu beton numunelerinin tek bir yönde yapılan tek eksenli basınç test sonucunun güvenilirliğini artırmak için çok fazla numune alınmalı ve deney yapılmalıdır. Bu durum fazla maliyet ve hasarlı yapıların oluşmasını sağlamaktadır. Bu yüzden jeofizik yöntemler hem maliyet hem de yapıya zarar vermemesinden dolayı ayrıca beton dayanımı yanı sıra betonun diğer fiziksel özelliklerini de belirlemesi açısından yapı analizlerinde etkin bir biçimde uygulanması önerilmektedir.

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## **ULTRASONİK VERİLERE BAĞLI YAPAY SİNİR AĞLARI (YSA) İLE BETON DAYANIMININ BELİRLENMESİ**

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### **ÖZET**

Bu çalışmada, beton mukavemetlerindeki farklılık, donatı çapı, kür koşulları, zaman, öz direnç ve sismik hız verileri gibi parametreler kullanılarak Yapay Sinir Ağları (YSA) yöntemi ile beton dayanımı tahmin edilmeye çalışılmıştır. Bu amaçla donatısız ve içerisinde bir adet 10, 14 veya 20 mm çapında donatı bulunduran beton numuneleri üzerinde 90 gün boyunca belirli aralıklarla ölçümler yapılmıştır. Numunelerin bir kısmı su kürüne bir kısmı da hava kürüne tabi tutulmuştur. Yapılan çalışmada beton numuneler üzerinde Jeofizik yöntemlerden Elektrik ve Sismik Ultrasonik yöntemler uygulanarak elde edilen verilerden yararlanılmıştır. Ayrıca tahribatlı bir yöntem olan Tek Eksenli Basınç Dayanım (TEBD) Testi sonucunda elde edilen beton basınç dayanım değerleri de değerlendirmede kullanılmıştır. Böylece elde edilen bütün parametreler göz önünde bulundurularak YSA yönteminde çapraz geçerlilik tekniği kullanılarak yapılan değerlendirmeler sonucunda beton dayanımı tahmin edilmeye çalışılmıştır.

**Anahtar Kelimeler:** Beton, Dayanım, Donatı, Yapay Sinir Ağları (YSA), Elektrik Yöntem, Sismik Ultrasonik Yöntem



**DETERMINATION OF CONCRETE STRENGTH WITH ARTIFICIAL NEURAL NETWORKS (ANN) DEPENDENT ON ULTRASONIC DATA**

**ABSTRACT**

In this study, concrete strength was tried to be estimated by Artificial Neural Networks (ANN) method by using parameters such as difference in concrete strength, reinforcement diameter, curing conditions, time, resistivity and seismic velocity data. For this purpose, measurements were made at regular intervals for 90 days on reinforced concrete samples without reinforcement and containing a 10, 14 or 20 mm diameter reinforcement. Some of the samples were water cured and some were air cured. In the study, the data obtained by applying electrical and seismic ultrasonic methods from non-destructive geophysical methods on concrete samples were used. In addition, the concrete compressive strength values obtained as a result of the Uniaxial Compressive Strength (UCS) Test, which is a destructive method, were also used in the evaluation. Considering all the parameters obtained in this way, the concrete strength was tried to be estimated as a result of the evaluations made using the cross validation technique in the ANN method.

**Keywords:** Concrete, Strength, Reinforcement, Artificial Neural Networks (ANN), Electricity Method, Seismic Ultrasonic method

## 1. GİRİŞ

Betonun kalite kontrolünün bir göstergesi olan dayanımının belirlenmesi oldukça önemlidir. Günümüzde tahribatsız test teknikleri sayesinde yapıya veya üzerinde ölçü alınacak betona herhangi bir zarar vermeden dayanımını belirlemek kolay ve hızlı olmaktadır (Uyanık, (1999; 2012); Uyanık vd. (2012a; 2012b; 2012c; 2013; 2019); Öziçer ve Uyanık, 2017; Ekin ve Uyanık, (2021a; 2021b); Uyanık ve Tezcan, 2012; Sabbağ ve Uyanık, (2016; 2017; 2018a; 2018b; 2018c; 2020); Ekin, (2021a; 2021b)). Gelişen bilgisayar teknolojisi sayesinde ise bu durum bir adım daha ileriye taşınarak yapay zeka teknikleri ile daha güvenilir sonuçlar elde edilmesi sağlanmaktadır. Yapay zeka yöntemlerinden Yapay Sinir Ağları (YSA) yöntemi bu anlamda oldukça kullanışlıdır (Acır, 2007; Albayrak vd., 2013; Sabbağ, 2016). YSA yöntemi başta inşaat mühendisliği olmak üzere bir çok mühendislik dalında yaygın bir şekilde kullanılmaktadır (Cladera ve Mari, 2004; Zhao vd., 2005; Chiang ve Yang, 2005; Yüzer vd., 2007).

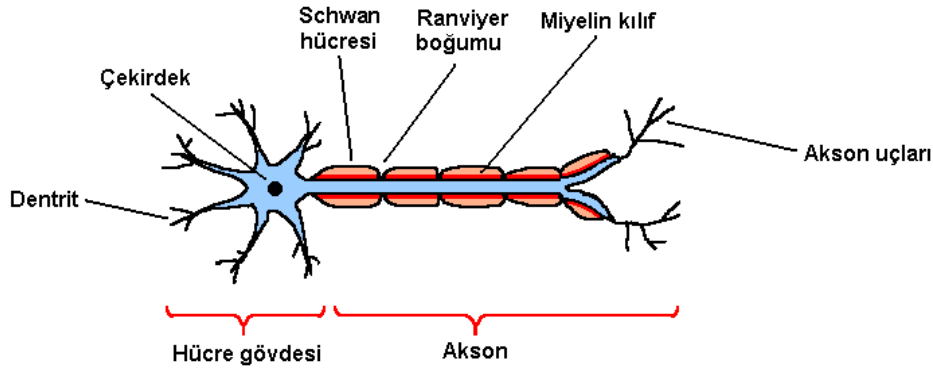
Bu kapsamda yapılan çalışmada, Jeofizik yöntemlerden Sismik ve Elektrik yöntemler kullanılarak hazırlanan donatılı ve donatısız beton numuneler üzerinde ölçümler alınmıştır. Elde edilen Sismik hız ve Özdirenç değerlerinin yanı sıra Tek Eksenli Basınç Dayanım (TEBD) ile belirlenen beton dayanımları, donatı çapı, kür koşulları ve zaman gibi parametreler de kullanılarak Yapay Sinir Ağları (YSA) yöntemi ile beton dayanımı tahmin edilmeye çalışılmıştır. Hazırlanan donatılı numunelerin içerisinde birer adet 10, 14 veya 20 mm çapında donatı bulunmaktadır. Numunelerin bir kısmı su kürüne bir kısmı da hava kürüne tabi tutulmuştur. Tahribatsız ölçümler 90 gün boyunca belirli aralıklarda devam etmiş, 7., 28. ve 90. gün sonlarında TEBD testi ile beton dayanımları belirlenmiştir. YSA yönteminde çapraz geçerlilik tekniği kullanılarak yapılan değerlendirmeler sonucunda beton dayanımı tahmin edilmeye çalışılmıştır.

## 2. YÖNTEM

### 2.1. Yapay Sinir Ağları (YSA)

Yapay Sinir Ağları tekniği insan beyni çalışma prensibini kendine model edinerek öğrenme yolu ile otomatik olarak yeni bilgiler oluşturma amacı ile geliştirilen bilgisayar sistemleridir. Biyolojik bir nöron sinir hücresi, çekirdek, gövde, dentrit ve akson olmak üzere 4 ana kısımdan oluşmaktadır (Şekil 1). Kısa ve dallanmış bir uzantı olan dentrit giriş bilgilerini alırken, uzun ve tek bir uzantı şeklinde olan akson ise çıktı bilgilerini diğer sinir hücrelerine

taşımaktadır. Akson ve dentritin birleşim yeri olan sinaps ise sinir hücrelerinden aldığı sinyalleri değerlendirerek ve eşik değeri üzerinde bir girdi varsa bir sonraki hücreye iletmektedir (Sabbağ, 2016).



Şekil 1. Biyolojik sinir hücresi ve çalışma prensibi (www.biyodoc.com)

Yapay sinir ağlarında yeterli miktarda giriş ve çıkış parametresinin olması gerekmektedir. YSA'da biyolojik sinir ağlarının sinir hücrelerine benzer yapay sinir hücreleri mevcuttur. Biyolojik sinir sistemindeki nöron YSA'daki işlem elemanına, dentrit toplam fonksiyonuna, sinapslar ağırlıklara, akson nöron çıktısına ve hücre yapısı transfer fonksiyonuna karşılık gelmektedir. Yapay sinir hücresi; girdiler ( $X_n$ ), ağırlıklar ( $W_n$ ), toplam fonksiyonu ( $\Sigma$ ), transfer fonksiyonu  $F(\Sigma)$  ve çıktı ( $y$ ) olmak üzere beş ana kısımdan oluşmaktadır (Tsoukalas ve Uhrig, 1997; Kızıllan vd., 2006).

## 2.2. Çapraz Geçerlilik (Cross-Validation) Tekniği

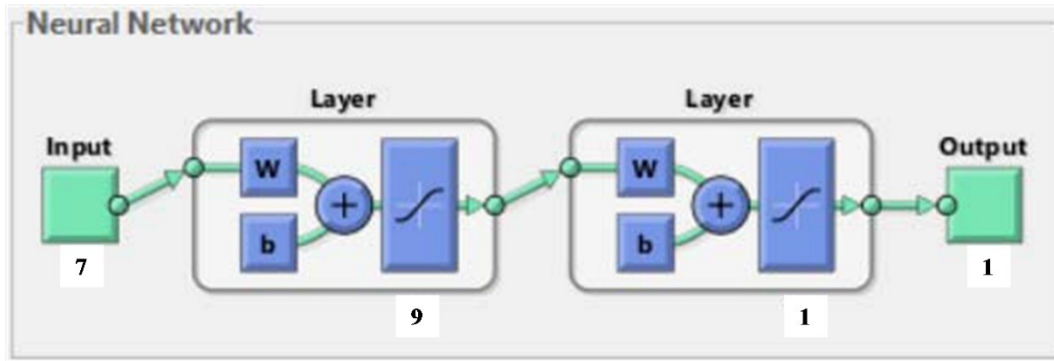
Sınırlı sayıda veri bulunması durumunda çapraz geçerlilik (cross validation) yöntemi kullanılabilir (Lee vd., 2007). Bu yöntemde veriler rasgele eşit 5 parçaya ayrılmıştır. İlk olarak 1. parça üzerinden model tespiti, diğer parçaların bütünü üzerinden test işlemi; daha sonra da sırasıyla diğer parçalar (2., 3., 4. ve 5.) üzerinden model tespiti, kalan parçaların bütünü üzerinden test işlemi yapılarak hata oranlarının ortalaması kullanılmıştır.

## 3. BULGULAR

Yapılan çalışmada, Matlab 2014b Toolbox kullanılarak YSA analizi ile beton dayanımının tahmin edilmesine çalışılmıştır. Buna göre 3 ayrı ağ modeli oluşturularak sonuçlar karşılaştırılarak yorumlanmıştır. Gizli tabaka sayısı 1 adet olarak belirlenmiş, öğrenme algoritması olarak ise Resilient backpropagation (esnek geri yayılım) algoritması

kullanılmıştır. Çapraz geçerlilik (cross validation) tekniğine göre veriler 5 gruba ayrılmıştır. Her defasında bir gruptaki veri seti test için (67 adet) geri kalan 4 gruptaki veriler ise eğitim için (67x4=268) ayrılarak ağ geliştirilmiştir. Dolayısıyla verilerin %80'i eğitim verisi, %20'si ise test verisi olarak ayrılmıştır.

Bu ağın içerisinde bütün giriş parametreleri olarak kür çeşidi, kür süresi, donatı çapı, tasarım çeşidi, basınç (P) dalga hızı, kayma (S) dalga hızı, özdirenç; çıkış parametresi olarak ise beton numunelerinin dayanımı kullanılmıştır. Öğrenme fonksiyonu olarak ileri beslemeli esnek geri yayılım algoritması kullanılmıştır. Nöron sayısı 9, gizli tabaka sayısı 1 olarak alınarak ağ oluşturulmuştur (Katman Sayısı (7-9-1); Öğrenme Algoritması: trainrp, Resilient backpropagation; Lr, Öğrenme Oranı: 0.01; Transfer Fonksiyonu: tansig; İterasyon (Yenileme: 25000)) (Şekil 2).



Şekil 2. Çalışma kapsamında elde edilen yapay sinir ağı modeli

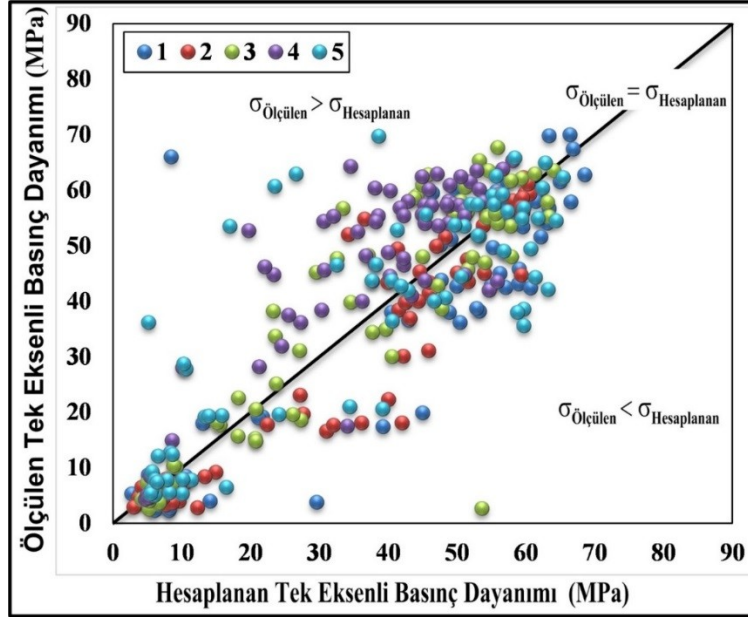
Tablo 1'de YSA'da elde edilen ağdaki 5 modele ait sonucun ilişki katsayıları ( $R^2$ ) ve hata oranlarının (RMSE) ortalamaları alınarak ayrı ayrı sunulmuştur.

**Tablo 1.** YSA sonuçlarına göre elde edilen ağa ait ilişki katsayıları ( $R^2$ ) ve hata oranlarının (RMSE) ortalamaları

YSA	Model No					Ortalama
	1	2	3	4	5	
$R^2$	0.67	0.72	0.78	0.80	0.90	0.77
RMSE	12.78	12.72	9.90	11.22	7.44	10.81MPa

YSA yöntemi ile çapraz geçerlilik tekniği kullanılarak elde edilen betonların hesaplanan tek eksenli basınç dayanımı değerleri ile ölçülen tek eksenli basınç dayanımı değerlerinin karşılaştırılması MPa cinsinden Şekil 3'te sunulmuştur.

Şekil 3'ten de görüldüğü gibi ölçülen ve hesaplanan değerlerin büyük çoğunluğu birbirine oldukça yakın bulunmuştur.



Şekil 3. YSA yöntemi ile çapraz geçerlilik tekniği kullanılarak elde edilen hesaplanan beton dayanımı ile ölçülen beton dayanımının karşılaştırılması

#### 4. SONUÇ VE DEĞERLENDİRME

Yapılan çalışmada YSA yönteminde çapraz geçerlilik tekniği kullanılarak yapılan değerlendirmeler sonucunda beton dayanımı tahmin edilmeye çalışılmıştır. Buna göre 7 adet giriş parametresiyle oluşturulan YSA modeli beton dayanımının tahmin edilmesinde iyi sonuçlar üretmiştir.

YSA ile yapılan veri analizinde giriş parametrelerinin daha çok olması, tasarlanan ağırlık daha iyi öğrenmesini sağlamıştır. Elde edilen bütün parametreler (kür çeşidi, kür süresi, donatı çapı, tasarım çeşidi, P ve S dalga hızları, elektrik özdirenç değerleri ) göz önünde bulundurularak YSA yöntemi ile çapraz geçerlilik tekniği kullanılarak yapılan değerlendirmeler sonucunda elde edilen tahmini beton dayanımı %77 doğrulukla hesaplanmıştır.

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## **SENTETİK BOYA KİRLİLİĞİNİN SUCUL ORTAM VE İNSAN SAĞLIĞI ÜZERİNE ETKİLERİ**

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### **ÖZET**

Sınırlı doğal kaynaklardan biri olan su varlığını korumak son yıllarda gittikçe artan küresel bir talep haline gelmiştir. Endüstriyel kaynaklı boya kirliliği başta insan sağlığı olmak üzere yüzey ve yeraltı su kütleleri üzerindeki olumsuz etkilerinin yanı sıra çeşitli çevresel sorunlara da neden olmaktadır. Bazı sentetik boya grupları bünyesinde cıva, krom, kadmiyum, kurşun ve arsenik gibi ağır metalleri de içerebilmektedir. Bu nedenle çeşitli endüstrilerden kaynaklanan sentetik boya kirliliği, beraberinde ağır metal kirliliğini de meydana getirmektedir. Atıksuların göller, nehirler, akarsular ve göletler gibi sucul ortamlara arıtılmadan deşarj edilmesi canlı organizmalar üzerinde ciddi ekotoksikolojik tehditler oluşturmaktadır. Sucul ortama arıtılmadan deşarj edilen renkli atıksular, ışık penetrasyonunu azaltarak alglerin ve su bitkilerinin performansını olumsuz etkilemektedir. Hem ekonomik hem de ekolojik olarak faydalı bir tür olan ve birincil üreticiler olarak kabul edilen mikroalgler sucul ekosistemlerde önemli bir role sahiptir. Atıksulardaki sentetik boya kontaminasyonu mikroalgal büyümeyi engellemekte ve su ekosistemlerinde enerji ve besinlerin trofik iletimini bozmaktadır. Ayrıca, balıklar ve sucul organizmalar sentetik boyaları biyodegradasyon yoluyla toksik ara ürünlere metabolize edebilmektedir. Bağışıklık sistemleri ve fizyolojik tepkileri üzerindeki hipoksik etkilerinden dolayı çeşitli hastalıklara karşı hassas olan balıkların kontamine olması tüketici üzerinde kramp, ateş ve hipertansiyon gibi çeşitli semptomlara yol açabilmektedir. Kontamine balık tüketimine bağlı olarak insan bağırsak mikroflorası, boyaları insan vücudundaki çeşitli dokular üzerinde olumsuz etkisi olan toksik amin gruplarına dönüştürebilmektedir. Ayrıca arıtılmadan deşarj edilen renkli atıksulara temas durumunda insanlarda alerji, dermatit, cilt tahrişleri, maligniteler ve mutasyonlara yol açabilmesinin yanısıra renk ve koku gibi su kalitesinin bozulması ve dolayısıyla toksik hale getirilmesi dahil olmak üzere çeşitli çevresel sorunlara neden olabilmektedir. Sentetik boya içeren endüstriyel atıksularının başta insan sağlığı olmak üzere çeşitli canlı grupları üzerine olan zararlı etkileri göz önüne alındığında arıtılmamış endüstriyel atıksuların bertarafı, birçok ülkede büyük bir araştırma konusu haline gelmiştir. Bu nedenle boya içeren atıksuların çevre, insan sağlığı ve doğal su kaynakları üzerindeki olumsuz etkilerini önlemek için çevre dostu teknolojiler kullanılarak etkin bir şekilde arıtılması gerekmektedir.

**Anahtar Kelimeler:** Sucul Ekosistem, Boya Kirliliği, Sentetik boyalar, Endüstriyel Atıksu

### **THE EFFECTS OF SYNTHETIC DYE POLLUTION ON THE AQUATIC ENVIRONMENT AND HUMAN HEALTH**

#### **ABSTRACT**

Protecting the presence of water which is one of the limited natural resources has become an increasing global demand in recent years. Industrial dye pollution causes various environmental problems as well as its negative effects on surface and underground water bodies, especially on human health. Some synthetic dye groups may also contain heavy metals such as mercury, chromium, cadmium, lead and arsenic. For this reason, synthetic dye pollution originating from various industries also creates heavy metal pollution. Discharge of wastewater into aquatic environments such as lakes, rivers, streams and ponds without treatment poses serious ecotoxicological threats to living organisms. Colored wastewater discharged into the aquatic environment without treatment affects the performance of algae and aquatic plants negatively by reducing light penetration. Microalgae which is both an economically and ecologically beneficial species and accepted as primary producers has an important role in aquatic ecosystems. Contamination of synthetic dyes in wastewater inhibits microalgal growth and impairs the trophic transport of energy and nutrients in aquatic ecosystems. In addition, fish and aquatic organisms can metabolize synthetic dyes into toxic intermediates through biodegradation. Contamination of fish which is susceptible to various diseases due to its hypoxic effects on the immune systems and physiological responses, can cause various symptoms such as cramps, fever and hypertension on the consumer. Due to the consumption of contaminated fish, the human intestinal microflora can convert dyes into toxic amine groups that have adverse effects on various tissues in the human body. In addition, in case of contact with colored wastewater discharged without treatment, it can cause allergies, dermatitis, skin irritations, malignancies and mutations in humans, as well as various environmental problems, including deterioration of water quality such as color and odor, and thus rendering it toxic. Considering the harmful effects of industrial wastewater, the majority of which are synthetic dyes, on various living groups, especially human health, the disposal of untreated industrial wastewater has become a major research topic in many countries. In order to prevent the negative effects of synthetic dye-containing wastewater on the environment, human health and natural water resources, it should be treated effectively using environmentally friendly technologies.

**Keywords:** Aquatic Ecosystem, Dye Pollution, Synthetic dyes, Wastewater

## **1. GİRİŞ**

Artan insan nüfusu, hızlı sanayileşme, yüksek yaşam standardı ve kentleşmeyle birlikte en çok kullanılan doğal kaynaklardan birisi olan su varlığı, günümüzde sınırsız ve aşırı kullanımı nedeniyle tüm dünyayı su kriziyle karşı karşıya bırakmaktadır. Başta tekstil sanayi olmak üzere çeşitli endüstriyel kuruluşların çeşitli zararlı ve toksik bileşenlere sahip deşarj atıksuları doğal su kütleleri üzerinde güçlü bir tehdit oluşturmaktadır. Bu, suyun kalitesini ve miktarını bozmakta ve suyu daha fazla kullanım için güvensiz hale getirmektedir (Gupta ve ark., 2015). Tekstil atıksuları, alıcı su sisteminin toplam ekolojik dengesinin bozulmasına yol açan organik yük ile birleştiğinde rengi indükleyen boyalar da dahil olmak üzere birçok kirlenici maddenin karmaşık ve oldukça değişken bir karışımı olarak tanımlanabilmektedir (Hassani ve ark., 2008).

Tekstil endüstrilerinde yüksek konsantrasyonlarda organik bileşik ve ağır metal içeren boyalar nedeniyle alınan suyun %93'ü renkli atık su olarak deşarj edilmektedir (Wijannarong ve ark., 2013; Gupta ve ark., 2014). Tekstil endüstrisinde yaygın olarak kullanılan boyaların birçoğu biyolojik olarak parçalanamayan yapısı nedeniyle ciddi bir çevre kirliliği oluşturmaktadır. Atık suyun rengi, suyun oksijenlenme kabiliyetini azaltmakta, sucul ekosistem dengesini ve sucul organizmaların besin iletimini engellemekte ve estetik açıdan istenmeyen görüntüler ortaya çıkarmaktadır (Gupta ve ark., 2015).

## **2. ENDÜSTRİYEL ATIKSU KARAKTERİSTİĞİ**

Endüstriyel atıksularının karakteristiği fabrikaların üretim amacına veya bir prosesten diğerine göre değişmektedir. Bazı karmaşık proseslere sahip fabrikalar daha fazla su tüketebilmektedir. Örneğin günde 60.000 m kumaş üreten ortalama bir fabrikanın günlük yaklaşık 1.5 milyon litre atıksu tahliye etmesi muhtemeldir (COINDS,1999-2000). Kimyasal oksijen ihtiyacı (KOİ), Biyolojik Oksijen İhtiyacı (BOİ), pH, renk ve tuzluluk gibi farklı parametreler, endüstriyel kuru ve ıslak işleme adımlarında kullanılan farklı organik bazlı bileşiklere, kimyasallara ve boyalara bağlı olarak işlem türüne göre değişiklik göstermektedir (Senthilkumar ve ark., 2011). Kompozit tekstil sektörü, elyafların temizlenmesinden başlayarak kumaşların boyanmasına, basılmasına ve terbiyesine kadar tüm proses operasyonlarını bünyesinde barındırmaktadır. Tekstil işleme endüstrisi,

hammadde olarak gri kumaş alan ve bunları işleyerek bitmiş kumaş elde eden kuruluşlardır. Bu nedenle çıkış atıksu karakteristiklerinde farklılıklar görülmektedir. Kompozit, işleme ve yün endüstrileri tarafından üretilen atıksuların karakteristikleri Tablo 1'de verilmiştir.

**Tablo 1.** Bazı endüstrilerin atıksu karakteristiği (COINDS,1999-2000)

PARAMETRE	KOMPOZİT ENDÜSTRİLER	İŞLEME ENDÜSTRİLERİ	YÜN İŞLEME ENDÜSTRİLERİ
pH	5.5-11.0	7.0-8.5	7.0-11.0
SS (mg/l)	300-500	300-500	160-380
BOİ (mg/l)	350-600	230-450	160-350
KOİ (mg/l)	600-1,400	470-900	220-700
Klor (mg/l)	700-1,200	300-900	-
Sülfat (mg/l)	300-700	200-1,000	-
Fenol (mg/l)	0.5-2.0	0.5-2.0	-
Yağ ve Gres (mg/l)	5-15	5-10	-
Sodyum (mg/l)	-	600-870	-

Atıksu bünyesinde pamuk veya yün depolamada kullanılan biyositler (ör., klorlu aromatikler), cilalama ürünleri (ör. sentetik reçineler), yüzey aktif maddeleri (ör. alkil fenol etoksilatlar), polyester elyafların boyanması için kullanılan boya çözücülerini (ör., triklorobenzen ve bütilbenzoat), indirgeyici ajanlar (ör., sodyum sülfür veya sodyum hidrosülfid), metal kompleks boyalardaki (ör., bakır) ağır metaller veya yün boyamada boya fiksasyonu için kullanılan (ör., krom), boya banyosu katkı maddesi olarak kullanılan sülfat tuzları, oksitleyici maddeler (ör., dikromat) ve ağartıcı maddeler (ör., hipoklorit ve hidrojen peroksit) potansiyel tehlikeli bileşikler olarak karşımıza çıkmaktadır (Sandhya ve ark., 2012).

Tekstil işleme atıksularında ortaya çıkan başlıca kirletici grupları ve kirleticilerin kaynaklandığı prosesler Tablo 2'de özetlenmiştir.

**Tablo 2.** Tekstil işleme atıksularında bulunabilen kirletici grupları

KİRLETİCİ GRUBU	SUYLA TAŞINABİLİR KİMYASALLAR	İLGİLİ PROSES
Organik yük	Niştastalar, enzimler, yağlar, gresler, mumlar, yüzey aktif maddeler, asetik asit	Haşıl sökme, ovma, yıkama, boyama
Renk	Boyalar, temizlenmiş safsızlıklar	Boyama, ovma
Nütrientler (N, P)	Amonyum tuzları, üre, fosfat bazı tamponlar ve sekestranlar	Boyama
pH ve tuz etkileri	NaOH, mineral/organik asitler, sodyum klorür, silikat, sülfat, karbonat	Ovma, haşıl sökme, ağartma, merserize, boyama, nötralizasyon
Sülfür	Sülfat, sülfür, hidrosülfid tuzu, sülfürik asit	Boyama
Toksik maddeler	Ağır metaller, indirgeyici maddeler,	Haşıl sökme, ağartma, boyama,

	biyositler, kuaterner amonyum tuzları, oksitleyici maddeler	apre
Ateşe dayanıklı organikler	Yüzey aktif maddeler, boyalar, reçineler, sentetik boyutlar, klorlu organik bileşikler, taşıyıcı organik çözücüler	Ovma, haşıl sökme, ağartma, boyama, yıkama, bitirme

### **3. SENTETİK BOYALARIN SUCUL EKOSİSTEM ÜZERİNE ETKİSİ**

Sentetik boyaların su ekosistemlerindeki varlığı, serbest boyaların toksikliği ve toksik, mutajenik ve kanserojen transformasyon ürünleri nedeniyle ciddi çevre ve sağlık sorunları yaratmaktadır. Sucul bitkilerin ve alglerin fotosentetik mekanizması, boya prosesi atık sularının yüksek renk içeriğinden dolayı ışığın absorpsiyonu ile engellenmektedir (Franciscon ve ark., 2012). Boya içeren atıksuların doğal akarsulara ve nehirlere doğrudan deşarjı, su yaşamı ve besin zinciri ile ilgili ciddi problemler yaratmakta ve nihayetinde çevresel ekosistemin doğasına zarar vermektedir (Bharathi ve ark., 2013). Sentetik boyalar, sucul faunanın besin zinciri boyunca birikmekte ve sucul ortamlarda oksijen sirkülasyonu ve ışık absorpsiyonunu engellemesi nedeniyle sucul floranın (bitkiler, diatomlar ve algler) fotosentetik mekanizmalarını inhibe ederek fizyolojik süreçlerini bozmaktadır (Berradi ve ark., 2019). Azo boyalar suda yaşayan organizmalar için toksisite (ölümcül etki, genotoksisite, mutajenite ve kanserojenite) oluşturmaktadır (Puvaneswari ve ark., 2006). Suda son derece az miktarlarda (bazı boyalar için <1 mg/L) boya bulunması bile göller ve nehirler gibi su kütlelerinin görsel kalitesini ve şeffaflığını kötü bir şekilde etkilemektedir (Chequer ve ark., 2013).

### **4. SENTETİK BOYALARIN İNSAN SAĞLIĞI ÜZERİNE ETKİSİ**

Sentetik boyalar, temas süresine ve boya konsantrasyonuna bağlı olarak maruz kalan organizmalar üzerinde yoğun ve kalıcı etkilere sahip olabilmektedir. İnsanlarda alerjik dermatite ve cilt tahrişine, kansere, mutasyona vb. neden olabilmektedir (Bharathi ve ark., 2013). En toksik sentetik organik boyaların azo grubu boyalar ve bunlar arasında daha baskın olan diazo ve katyonik boyalar olduğu bilinmektedir. Bu boyalar elektron çekme özelliklerine sahip oldukları için insanlar ve hayvanlar üzerinde kanserojenik etki gösterebilmektedir (Berradi ve ark., 2019).

Toksik tartrazinin hiperaktivitesi insanlarda astım, migren, egzama, tiroid kanseri ve diğer davranış sorunlarına yol açabilmektedir (Albroomi ve ark., 2017). Sentetik boya kaynaklı toksik bileşenler sucul ortamda organizmaların bünyesine alınıp besin zinciri vasıtasıyla insanlara ulaşarak hipertansiyon, kramplar, sporadik ateş ve böbrek hasarı gibi çeşitli fizyolojik rahatsızlıklara neden olmaktadır. Bunların çok az bir bölümü ayrıca insanda mesane kanserine, dalak sarkomlarına, hepatokarsinomlara ve kromozomal anormalliklere yol açmaktadır (Puvaneswari ve ark., 2006).

Vücudumuz tarafından sindirilen azo boyalar, bağırsak mikroorganizmalarının azoredüktaz enzimleri etkisiyle aromatik toksik aminlere dönüştürülebilmektedir. Nitro grubu bazı boyalar, etkilenen mikroorganizmalar tarafından üretilen nitroreduktazlar tarafından metabolize edilebilir. Memeli karaciğeri tarafından üretilen enzimler, nitro grubunun nitro-indirgemesinin yanı sıra azo bağının indirgeyici bölünmesini de katalize edebilir. Her iki işlem de DNA'ya zarar vermek için gerekli olan yetenekli bir element olan N-hidroksilaminleri oluşturabilir. Öte yandan, azo boyaların parçalanması da 1,4-fenilendiamin, o-tolidin, aromatik amin ve 3-met-oksi-4-aminoazobenzen gibi güçlü bir hepatokanserojen olarak hareket eden toksik ürünler üretmektedir. Bir başka ticari tekstil azo boyası olan Asidik Mor 7, lipid peroksidasyonunu, kromozomal anormallikleri ve asetil kolinesteraz enziminin inhibisyonunu indüklemeye kabiliyetine sahiptir. Benzer şekilde, Metil Kırmızısı ve mikrobiyal bozunma ürünü olan N,N-dimetilfenilendiamin (DMPD) değişime uğramayan kalıcı bir mutajenik bir boya olarak bilinmektedir. Disperse Blue 291'in insan hepatom hücrelerinde mikronükleus oluşumuna ve DNA parçalanmasına yol açan genotoksik, mutajenik ve sitotoksik etkiye sahip olduğu da bildirilmiştir. Bazı boyalar ayrıca insanlarda mesane kanserine ve hayvanlarda dalak sarkomlarına, hepatokarsinomlara ve nükleer anormalliklere neden olabilmektedir (Singh ve ark., 2007; Verma et al., 2022).

## **5. SONUÇ VE DEĞERLENDİRME**

Sentetik boyaların toksik etkileri derinlemesine çalışılmamıştır. Sıklıkla, renkli suların hoş olmayan estetik etkisine daha fazla dikkat edilir, ancak sucul biyota üzerindeki toksisite tam olarak belgelenmemiştir. Sucul ekosistemlerdeki farklı topluluklarda toksik tepkilerin farklı olması beklendiğinden, tek tür toksisite testlerinin kullanılması sınırlı bilgi sağlayacaktır; sonuç olarak, farklı trofik seviyeleri temsil eden bir dizi tür, şüphesiz, sentetik boyaların hidrobiyontlardaki olumsuz etkisinin daha iyi anlaşılmasını sağlayan kanıtlar sağlayabilir (Hernández-Zamora & Martínez-Jerónimo, 2019).

Tekstil boyalarının atıksulardan uzaklaştırılması, sucul ekosistemin korunması için oldukça önemli bir sorun haline gelmiştir. Boyaların uzaklaştırılması için adsorpsiyon, membran filtrasyonu, iyon değişimi, koagülasyon-flokülasyon ve ileri oksidasyon prosesleri gibi çeşitli fiziksel, biyolojik ve kimyasal yöntemler kullanılmaktadır (Qu ve ark., 2015; Buthiyappan ve ark., 2016).

Tekstil ve boyama endüstrileri birçok ülkenin ekonomisinde önemli bir rol oynamakla birlikte, diğer yandan su kirliliğinin ciddi nedenlerinden biri haline gelmiştir. Trofik zincirin çeşitli seviyelerindeki organizmalar üzerinde olumsuz bir etkisi vardır. Uygun olmayan arıtma sonrası deşarj edilen boya atıksuları çevreye ve canlılara çok zararlıdır. Bu nedenle, büyük hacimli atık sulardan boya ve renklendirici gideriminde çok daha verimli, uygun maliyetli ve çevre dostu alternatif ve sürdürülebilir çözümler bulmaya acil bir ihtiyaç vardır (Verma ve ark., 2022).



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## **ATIKSULARDAN BOYA GİDERİMİNDE KULLANILAN ARITIM YÖNTEMLERİ**

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### **ÖZET**

Atıksulardan renk giderimi çalışmaları sentetik boyaların hem potansiyel toksisitesi hem de çevrede oluşturdukları estetik problemleri nedeniyle son birkaç yılda büyük ilgi görmektedir. Sucul ortamdaki boya kontaminasyonu güneş ışığının suya ulaşmasını engellemekte ve su bitkileri başta olmak üzere fotosentez süreçlerini ve sucul organizmaların besin iletimlerini inhibe etmektedir. Boyaların kompleks aromatik yapılarının onları ısı, ışık, mikrop ve hatta oksitleyici ajanlar varlığında etkisiz hale getirmesi ve boyaların bozunmasını zorlaştırması nedeniyle çevreye verdiği zararlar ciddi boyutlara ulaşabilmektedir. Boyalara temas süresine ve boya konsantrasyonuna bağlı olarak maruz kalan organizmalar ve insanlar üzerinde alerjik dermatit, cilt tahrişi, kanser, mutasyon vb. gibi akut ve/veya kronik etkileri neden olabilmektedir. Renkli atıksular kirlilik yükünün türüne ve miktarına bağlı olarak fiziksel, kimyasal ve biyolojik proseslerin yanısıra çeşitli yöntemlerin bir kombinasyonu ile giderilebilmektedir.

**Anahtar Kelimeler:** Sentetik boya kirliliği, Atıksu arıtım yöntemleri, Sucul ekosistem

## **TREATMENT METHODS USING FOR DYES REMOVAL FROM WASTEWATER**

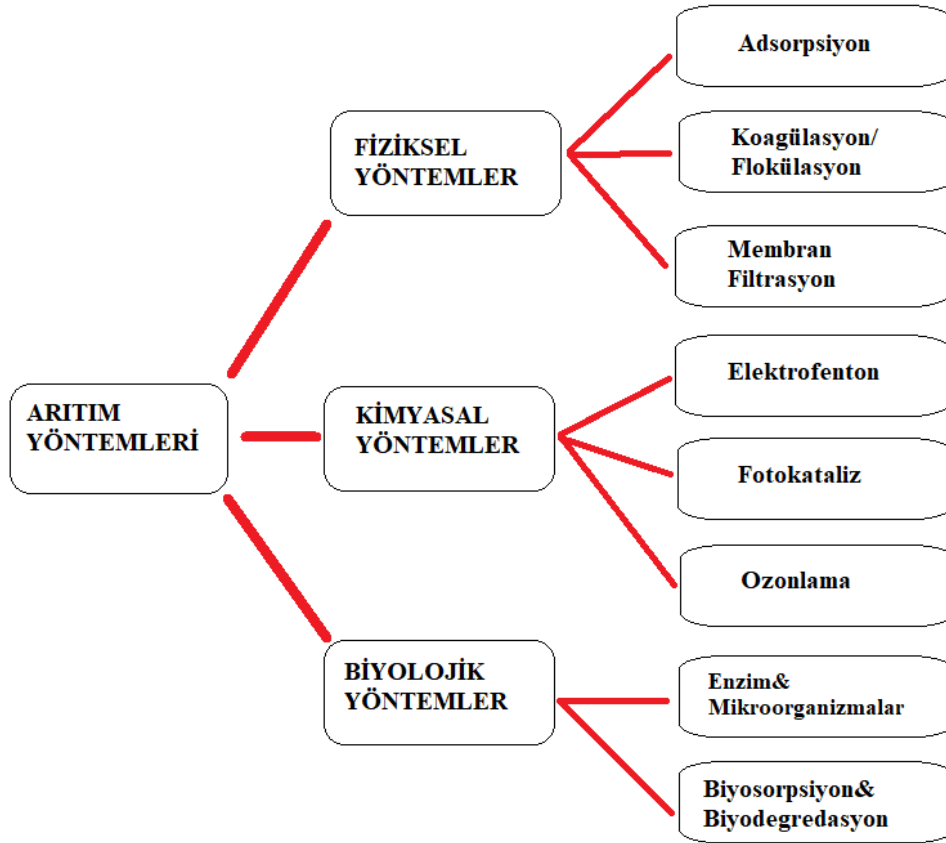
### **ABSTRACT**

Color removal from wastewater has attracted great interest in the last few years due to both the potential toxicity of industrial dyes and the aesthetic problems they cause in the environment. Dye contamination in the aquatic environment prevents sunlight from reaching the water and inhibits photosynthesis processes and nutrient transmission of aquatic organisms, especially aquatic plants. Since the complex aromatic structures of dyes make them ineffective in the presence of heat, light, microbes and even oxidizing agents and make it difficult for dyes to degrade, the damage they cause to the environment can reach serious dimensions. Depending on the contact time and dye concentration, the dyes may cause acute and/or chronic effects such as allergic dermatitis, skin irritation, cancer, mutation, etc. on the organisms and humans exposed. Colored wastewater can be treated with a combination of various methods also physical, chemical and biological processes, depending on the type and amount of pollution load.

**Keywords:** Synthetic dye pollution, Wastewater treatment methods, Aquatic media

## **GİRİŞ**

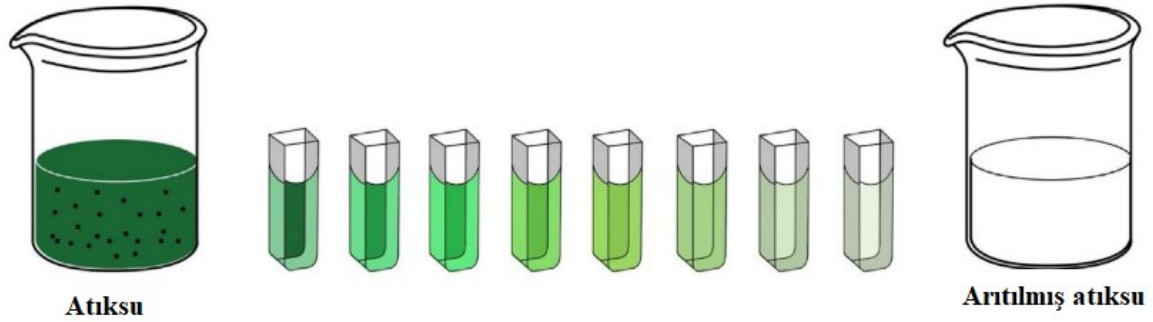
Sentetik boyalar çoğunlukla petrokimyasal bileşiklerden elde edilip sıvı, toz, macun veya granül formlarında ticarileştirilmektedir (Gita ve ark., 2017). Boyalar farklı kumaş sınıflarıyla hızlı ve tutarlı bir renklendirme, çok çeşitli renk pigmentleri ve renk tonları, manipülasyon kolaylığı, çeşitli dış etkenlere karşı kararlılık ve ekonomik enerji tüketimi gibi birçok potansiyele sahiptirler (Hossen ve ark.,2019). Bu nedenle sentetik boyaların büyük bir kısmı, işlem görmemiş veya kısmen işlem görmüş formlarda çevreye bırakıldığında zararlı etkilere neden olmaktadır. Boya atıksuları yüksek biyolojik ve kimyasal oksijen ihtiyacı (BOİ ve KOİ) içermekte ve klorlu bileşikler, ağır metaller, kükürt, nitratlar, naftol, sabunlar, krom bileşikleri, formaldehit, benzidin gibi ayırıcı maddeler, boyalar ve pigmentler gibi organik ve inorganik kirleticiler açısından oldukça zengindir. Suda bulunan boya miktarı, deşaj edilmeden önce elimine edilmeli veya uygun bir konsantrasyona düşürülmelidir. Adsorpsiyon, membran filtrasyon, foto-oksidasyon, koagülasyon/flokülasyon, kimyasal oksidasyon, ileri oksidasyon prosesi (AOP), biyolojik bozunma, biyosorpsiyon gibi tekniklerin atık sudaki boya içeriğini azaltmak için çeşitli diğer proseslerle birlikte konfigüre sistemler gittikçe öne çıkmaktadır (Cai ve ark.,2017). Atıksulardan boya gideriminde kullanılan prosesler Şekil 1’de şematize edilmiştir.



Şekil 1. Arıtım metotlarının şematik diyagramı (Bal ve Thakur, 2021)

## 1. ADSORPSİYON

Adsorbanın yüzeyindeki moleküllerin adsorpsiyonu, katı yüzey ile adsorbe edilen molekül arasındaki etkileşime bağlı olarak fiziksel ve kimyasal sorpsiyon olarak iki aşamada gerçekleşebilmektedir. Fiziksel adsorpsiyonda, tersinir işlemle sonuçlanan elektrostatik etkileşimler ve Van der Waals kuvvetleri yer alırken kimyasal süreçte, güçlü kovalent bağlar, adsorban ve adsorbat arasındaki ana etkileşim modunu göstermekte ve yüzeyden malzemenin iç kısmına difüzyon genellikle tek tabaka ile gerçekleşmektedir (De Gisi ve ark., 2016). Adsorpsiyon prosesinin şematik gösterimi Şekil 2’de gösterilmiştir.



**Şekil 2.** Adsorpsiyonun şematik diyagramı (Pavithra ve ark., 2019)

Her iki süreç de uygun koşullar altında aynı anda gerçekleşmektedir. Boya adsorpsiyon performansı çözelti pH'ından, sıcaklıktan, sorbent dozundan, ilk boya konsantrasyonundan, adsorban yapısından, boyutundan ve yüzey morfolojisinden etkilenebilen bir prosestir (Pavithra ve ark., 2019).

## **2. KOAGÜLASYON/FLOKÜLASYON**

Pıhtılaştırma, atık suların boyanması için kullanılan yaygın bir prosedürdür ve en popüler metotlar arasında göze çarpmaktadır. Koagülasyon prosesinde gerekli pıhtılaştırıcıların (alüminyum (III) veya demir (III) tuzları) masrafları ve önemli ölçüde çamur üretimi, atıksuların rengini gidermek için kimyasal pıhtılaştırma çalışmalarının finansal olarak desteklenmemesine neden olmaktadır. İşletimi basit ve yüksek giriş konsantrasyonlarında iyi performans sergilemekte ve diğer metotlara kıyasla daha ucuz olduğu görülmektedir. Pıhtılaştırıcılar inorganik pıhtılaştırıcılar ve organik pıhtılaştırıcılar olmak üzere özelliklerine göre sınıflandırılmaktadır. Alüminyum sülfat, alüminyum klorür, demir klorür, demir sülfat, kalsiyum oksit ve magnezyum oksit inorganik pıhtılaştırıcılar olarak kullanılmaktadır. Negatif yükün nötralizasyonu, katyonlar tarafından dengelenmekte ve üç değerlikli katyonun, iki değerlikli katyona kıyasla daha güçlü bir yeteneğe sahip olduğu kabul edilmektedir. İnorganik kirleticilerin kullanımı sırasında oluşan yumakların daha küçük ve daha hafif olduğu ve yerleşmesinin daha uzun sürdüğü tespit edilmiştir. Tuzlar atıksuya eklendiği anda iyonlarına ayrıştığı ve ortaya çıkan katyonik türlerin hidratlı formlarda olduğu bulunmuştur (Merzouk ve ark., 2011; Merzouk ve ark., 2013).

### 3. MEMBRAN TEKNOLOJİLERİ

Yüksek verimliliği, gelişmiş oksidasyon prosesine göre düşük maliyeti ve kolay endüstriyel ölçek büyütme gibi avantajlara sahip olması nedeniyle membran teknolojileri atıksulardan renk gideriminde kullanılmaktadır. Nanofiltrasyon membranları, elektrostatik itme içeren ayırma mekanizmaları nedeniyle boyaların uzaklaştırılmasında kullanılır. Son yıllarda nanoteknoloji ve malzeme bilimindeki gelişmelere bağlı olarak membran teknolojisi alanında birçok değişiklik görülmektedir. Membranların üzerinde veya içinde kirlilik birikmesi polimerik membranların seçiciliğini ve geçirgenliğini bozmakta ve bu yöntemin en temel sorunu olarak kabul edilmektedir (An ve ark., 2016; Wang ve ark., 2017).

### 4. FENTON PROSESİ

Biyolojik olarak bozunmaya dirençli olan kompleks organik kirleticilerin H<sub>2</sub>O<sub>2</sub> ayrışmasını hızlandırarak oksidasyonunu arttırmak için bir demir tuzu olan Fenton reaktif kimyasalları uygulanmaktadır. Fenton prosesinin birleşik flokülasyon dezavantajı, reaktif ve boya moleküllerinin kombine bir flokülasyonundan dolayı yan ürün olarak demir çamurunun üretilmesidir (Ayyaru ve Dharmalingam, 2014). Fe bazlı katalizörler, özellikle Fe<sub>3</sub>O<sub>4</sub>, Fenton AOP'lerin (İleri Oksidasyon Prosesleri) bu sorununu çözmekte, iyi tasarlanmış morfolojik, elektriksel ve katalitik özelliklere sahip manyetik özellikleri bu malzemeyi Fenton işleminde bir katalizör olarak uygun hale getirmektedir (Wan ve ark., 2015).

### 5. FOTOKATALİZ

Boya molekülünün mekanizması, farklı ışık kaynaklarına ve gelen fotonların enerjisine göre değişmektedir. Bu işlem, UV fotonu veya düşük enerjili görünür fotonları yarı iletken malzeme ile birleştirmektedir. Hidroksil radikali (HO<sup>•</sup>) üretmek için foto katalizör görevi gören yarı iletken, elektron uyarılmasından sonra elektron-delik çifti oluşturmaktadır. Geleneksel fotokatalitik mekanizması aşağıdaki gibidir:



(1)



(4)



Cr, Pb, As ve Hg vb. gibi metallerin ve metaloidlerin heterojen fotokatalitik işlemleri, pahalı reaktifler veya ekipman gerektirmeyen kirleticilerin sudan uzaklaştırılması için değerli bir seçenek olabilmektedir (Pavithra ve ark., 2019).

## **6. OZONLAMA**

Oksijenden üretilen ozonla gerçekleştirilen ozonlama, birçok araştırmacılar tarafından çalışılmış ve atıksuların rengini gidermenin çok etkili bir yol olduğu bulunmuştur ( Gupta ve Suhas, 2009). Ozon esas olarak atıksuların rengini gidermek için kullanılan bir prosestir. pH'a bağlı olarak, muamele türü yani moleküler ozon (doğrudan reaksiyon) veya hidroksil radikalleri (dolaylı reaksiyon) veya her ikisi de reaksiyon işlemi sırasında aynı anda gerçekleştirilebilir. Buna ek olarak, ozon, organik bileşikleri daha yüksek bir şekilde parçalamasına izin veren yüksek oksidasyon potansiyeline sahiptir (Pavithra ve ark., 2019).

## **7. ENZİM VE MİKROORGANİZMALARLA BOYA GİDERİMİ**

Birçok biyolojik yöntem, yüksek boya konsantrasyonlarında ve geniş bir sıcaklık, pH ve tuzluluk aralığında gerçekleştirilebilen enzim tedavisini içermektedir. Yüksek özgülüğe sahip enzimler, atık sudaki bazı kalıcı boya renkleri etkili bir şekilde ayrıştırabilir. Örnek olarak peroksidaz enzimi hayvanlarda, bitkilerde ve mikroorganizmalarda yaygın olarak bulunur ve bitki peroksidazının boya renkleri renksizleştirdiği araştırmalar sonucu bildirilmiş ve düşük maliyetli bir yöntem olarak çok ilgi görmüştür (Gholami-borujeni ve ark., 2011; Chiong ve ark., 2016). Algler, mayalar, bakteriler ve mantarlar gibi birçok mikroorganizma çeşitli boya giderimi için rapor edilmiş, boya renklerinin atıksudan uzaklaştırılması için saf kültürler veya karışık mikrobiyal kültürler kullanılarak gerçekleştirilmiştir (Varjani ve ark., 2020).

## **8. BİYOSORPSİYON VE BİYODEGREDASYON**

Biyolojik yöntemler, endüstriyel bazlı atıksuların arıtımı için uygulanabilir, ekonomik olarak uygulanabilir ve çevre dostu alternatifler olarak kabul edilmektedir. Bu yöntemler, mikroorganizmaların, bakterilerin, mantarların, mayaların, alglerin ve enzimlerin aerobik, anaerobik veya kombine süreçler yoluyla biyolojik olarak parçalanmasını gerektiren düşük maliyetli süreçlerdir (Yien ve ark., 2019).

Biyosorpsiyon, biyolojik materyallerin ve boya renklerinin biyokütle yüzeyine fiziksel veya kimyasal yollarla etkileşiminin esas alan bir prosestir. Adsorpsiyon, adsorpsiyon, yüzey

kompleksleşmesi, difüzyon, iyon değişimi, şelasyon ve çökelme bu tür etkileşimlere dahildir. Ek olarak, biyolojik materyallerin yüzeyinde ve karboksil, karbonil, hidroksil, amino, fosfat ve sülfon grupları gibi boyaların yapısında boya biyosorpsiyonunda yer alan çeşitli ligandlarla etkileşimler mevcut olabilmektedir (Deniz ve Tezel, 2016; Rybczyn, 2016).

Biyodegradasyon sürecinde, çeşitli mantar veya bakteri biyokütlelerinde bulunan enzimler kirleticileri ayrıştırmaktadır. Doğal boyaların giderilmesini etkileyen ana faktör, mikroorganizmaların uyum yetenekleri ile ilişkilendirilmiştir (Ahmad ve ark., 2019). Örneğin, azo boyaların atıksudan uzaklaştırılması ilk olarak azo boyalardaki N-N bağlarının anaerobik koşullar altında parçalanması, ardından üretilen aromatik ayrıştırılmış aminlerin aerobik ortamda CO<sub>2</sub> ve H<sub>2</sub>O son ürünlerine dönüşmesi gibi bir dizi biyokimyasal bir süreçle tamamlanabilmektedir (Zhu ve ark.,2020).

### **SONUÇ VE DEĞERLENDİRME**

Sadece boya konsantrasyonu ve KOİ'nin azaltılması açısından değil, aynı zamanda pH, BOİ ve toksisitenin düşürülmesi açısından da başarılı bir arıtma gerçekleştirmek için fiziksel, kimyasal ve biyolojik yöntemlerin kombinasyonunun kullanılması gerekmektedir. Tüm bu hedeflere ancak çalışmanın disiplinler arası bir şekilde, bilimsel kanıtların, mühendislik boyutlarının yanı sıra ekonomik ve politik boyutların da dikkate alındığı bir şekilde yürütülmesi halinde ulaşılabilir. Bu tür alternatiflerin uygulanması, ancak çevre korumaya yönelik atık arıtma stratejilerinin uygulanmasına değer veren ve eşlik eden kamu politikalarının desteği ile gerçekleşmesi mümkün olabilir (Ceretta ve ark., 2021).

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**THERMOGRAVIMETRIC ANALYSIS IN NITROGEN AMBIENT OF  
COPPER/TITANIA SELECTIVE CATALYTIC REDUCTION CATALYST  
POISONED WITH CALCIUM**

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**ABSTRACT**

The selective catalytic reduction (SCR) system is an exhaust emission control system used to reduce nitrogen oxide (NO<sub>x</sub>) emissions in diesel engines with the help of catalysts and reductants. In this study, copper (II) chloride (CuCl<sub>2</sub>), titanium dioxide (TiO<sub>2</sub>), and calcium hydroxide (Ca (OH)<sub>2</sub>) nanoparticles were used to produce powder catalysts. While copper was used as an active metal particle, titanium dioxide was preferred as a wash coat material. Calcium is known as a critical poison that causes the deactivation of the SCR catalyst. The purpose of this study is effects of calcium (Ca) addition and calcination temperature on thermogravimetric analysis (TGA) of copper-based catalyst. TGA analysis of the catalyst samples were conducted by heating at a rate of 20 °C/min from 25 °C to 1100 °C temperature at nitrogen ambient, before and after calcination process. In view of thermogravimetric analysis, the weight loss of samples was determined. The analysis results show that the addition of Ca nanoparticles to the catalyst raises the weight loss approximately two times.

**Keywords:** Thermogravimetric analysis, Selective catalytic reduction, Catalyst, Nanoparticles

## 1. INTRODUCTION

Nitrous oxide ( $\text{NO}_x$ ) emissions are an emission resulting from the combustion of fuel in diesel engines. These emissions are among the disadvantages of diesel vehicles as they are not an environmentally friendly product due to their harmful properties. Diesel engines can get rid of this disadvantage, thanks to selective catalytic reduction (SCR) technology, which is an effective and efficient system. The SCR system has a structure consisting of catalyst and reductant. By using ammonia ( $\text{NH}_3$ ) which is the most familiar reductant that takes an active role in this structure, it transforms  $\text{NO}_x$  emissions into  $\text{H}_2\text{O}$  and  $\text{N}_2$  with the help of a catalyst and renders them harmless.  $\text{V}_2\text{O}_5\text{-WO}_3/\text{TiO}_2$  catalyst is commercially used in this system. However, fly-ash emitted from combustion comprises various poisonous substances, such as  $\text{SO}_2$ , alkali metals and alkaline-earth metals. They are in tendency to reduce gradually the effectiveness of  $\text{NO}_x$  removal and restrict the operating life-time of the SCR catalyst (Li et al., 2017; Nicosia, Czekaj, and Kröcher, 2008). It is generally accepted that lubricating oil and its additives, engine corrosion and wear, metals mainly cause fly ash in diesel fuel (Tornehed and Olofsson, 2011; Wang et al., 2019; Sappok and Wong, 2007). Among these sources, lubricating oil is considered the primary source and makes up the majority of the ash (Bagi, Bowker, and Andrew, 2016; Van Kooten et al., 2000). The chemical composition of ash stemmed from lubricating oil principally consists of Mg, Ca, S, and P (Liati et al., 2012; Nemoto et al., 2004). The calcium forms deposits in the combustion systems and thus, it is known as a fly ash that causes the deactivation of the SCR catalyst (Xiang Li et al., 2017; Shu-ming Liu et al., 2017, Albert et al., 2019). Many researchers have conducted studies by using thermogravimetric analysis (TGA) analysis method to investigate the thermal stability and decomposition, weight loss of the catalyst produced with different nanoparticles (Du et al., 2021; X. Liu et al., 2020; Putluru et al., 2015; Shi et al., 2021). Pang et al. synthesized a series of Ce doping Copper/zeolite and Copper/zeolite catalysts utilizing impregnation of wetness process. They performed the TGA to define the passivate factors composed on face of the sulfated Copper cerium-2/zeolite and Copper/zeolite catalysts. The weight losses of the both sulfated catalysts were observed over three temperature regions. They thought that above  $500\text{ }^\circ\text{C}$ , which is the final temperature region, may be the result of the separation of Copper (II)sulfate composed on the face of catalyst. In addition, they reported that for the sulfated CuCe-2/ZSM-5 catalyst, the loss of weight in the final temperature region were surplus lesser than that of the sulfated Copper/Zeolite catalyst,

due to forming of more  $\text{CuSO}_4$  on the face of Copper/Zeolite catalyst. As a result of TGA, they asserted that in the presence of  $\text{SO}_2$ , the formation of Copper(II)sulfate on the face of Ce doping Cu/ZSM-5 catalysts could be hindered (Pang et al., 2014). Thermogravimetric analysis (TGA) comes to the fore in determining thermal reaction characterization with its precision in temperature control and mass measurement, and ease of use. TGA analysis helps to determine weight losses over a wide temperature range in an  $\text{O}_2$  or  $\text{N}_2$  atmosphere and also to observe both the pyrolysis and combustion profiles of the analyzed material. Its greatest advantages include reduced sample sizes and relative speed. With the result of thermogravimetric analysis, a data is obtained about how the weight of a sample changes with temperature. TGA analysis results allow for use in the analysis of reaction kinetics and in proposing reaction mechanisms (Fang et al., 2019; Shen et al, 2021; Toniolo et al., 2008; Xiang et al., 2018). Zhang et al. (Zhang et al., 2020) investigated the thermal characteristics of the materials by applying TGA analysis to Cu-BTC (benzene-1,3,5-tricarboxylate) and Ce-Cu-BTC materials. At temperatures above 300 °C, weight losses were found to be approximately 41% for Cu-BTC and 28% for Ce-Cu-BTC. They noted that when the temperature exceeded 400 °C, the organic materials were completely thermally separated in three stages. In the thermal gravimetric analysis study examining the thermal behavior of NiMn-MOF (Metal-organic frameworks)-74 particulate matter (Shi et al., 2021), it was determined that there was mass loss in four regions in the samples in the temperature range of 50 to 600 °C in the TGA graphs. It was observed that the increase of Mn content in the samples provided a higher decomposition temperature. Rami et al. (Rami et al., 2020) investigated the thermal characteristics of these materials by forming nanoparticles with  $\text{Fe}_2\text{O}_3$ , CuO, ZnO and  $\text{Co}_2\text{O}_3$  materials. Thermal analysis results revealed that  $\text{Fe}_2\text{O}_3$  lost weight between 127 °C and 227 °C, while other materials decomposed at higher temperatures. In their study using  $\text{Fe}_2\text{O}_3$  material, Liao et al. (Liao et al., 2001) found that a high rate of weight loss was experienced in particulate material between 50 °C and 200 °C.

In this study, Ca-Cu/ $\text{TiO}_2$  and Cu/ $\text{TiO}_2$  catalysts were used. The effect of Ca poisoned Cu/ $\text{TiO}_2$  catalyst on its thermal stability and decomposition temperatures was studied through TGA analysis for situations of before and after calcination process.

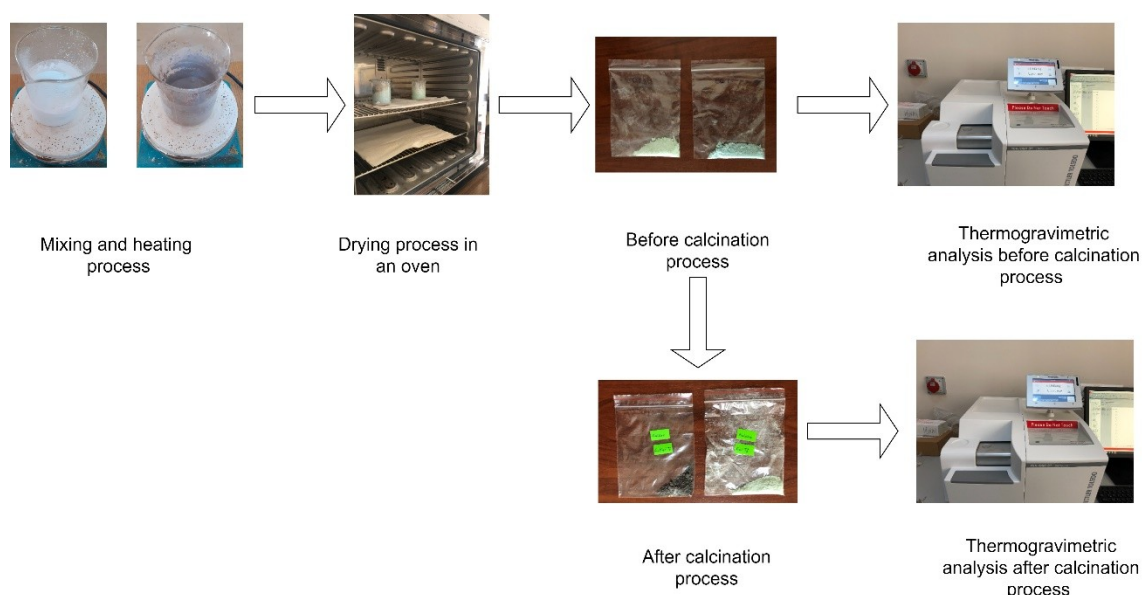
## **2. MATERIAL AND METHODS**

Among of nanoparticles used in catalyst production includes copper (II) chloride ( $\text{CuCl}_2$ ), titanium dioxide ( $\text{TiO}_2$ ) and calcium hydroxide ( $\text{Ca}(\text{OH})_2$ ). It was also used in the amounts given in the Table 1. The necessary amounts of materials were mixed in 150 mL distilled water by heating with a magnetic stirrer to prepare the solution. Excess water of the solution was evaporated during mixing. Then, a mud-like slurry was formed in the beaker. Last, it was dried in an oven at 130 °C for 12 h (Figure 1).

**Table 1.** Amounts of material in catalyst preparation

Catalysts	Materials		
	$\text{CuCl}_2$	$\text{Ca}(\text{OH})_2$	$\text{TiO}_2$
$\text{Cu/TiO}_2$	0.01 mol	-	0.1 mol
$\text{Ca-Cu/TiO}_2$	0.01 mol	0.01 mol	0.1 mol

After these procedures, TGA analysis was performed for both samples. TGA analysis conditions of the samples were carried out heating from 25 °C to 1100 °C at a rate of 20 °C/min in nitrogen ambient. According to the results of TGA analysis, catalyst samples were calcined at 400 °C for 2 hours. And then TGA analyzes were performed again under the same conditions.



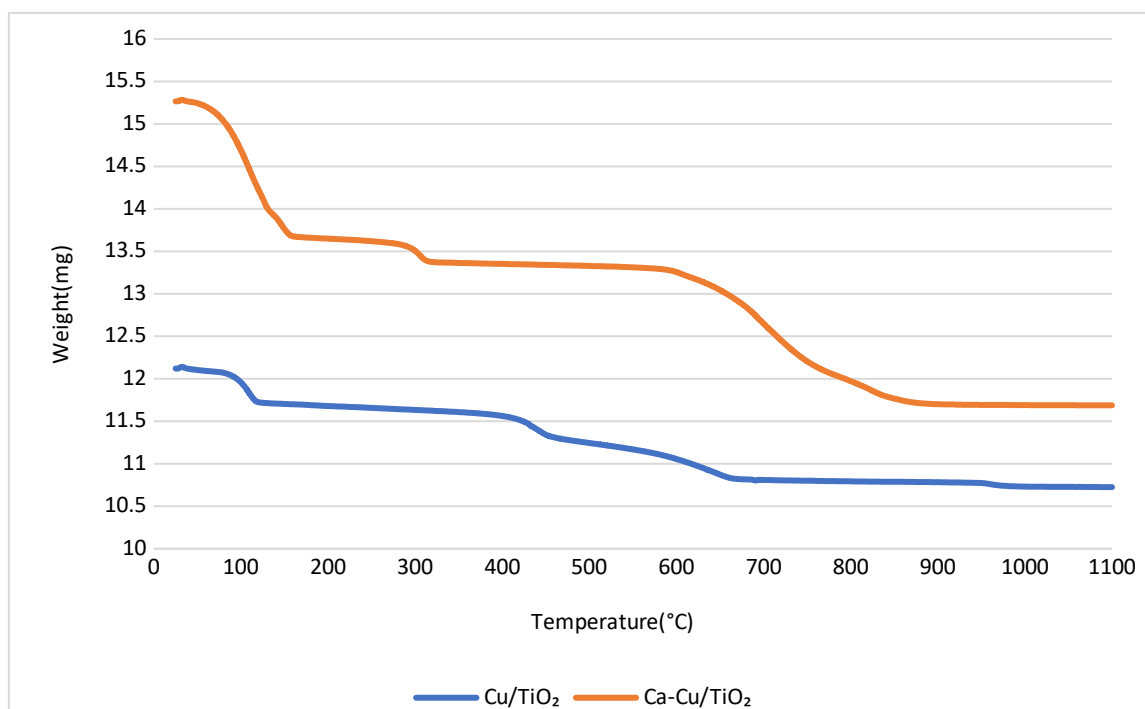
**Figure 1.** Preparing and analysis of the catalyst samples

### 3. RESULTS AND DISCUSSION

TGA analysis results of  $\text{Cu/TiO}_2$  and  $\text{Ca-Cu/TiO}_2$  specimen before calcination are indicated in Figure 2. Initial weight drop was detected in both samples at approximately



110 °C. While the Ca-Cu/TiO<sub>2</sub> sample exhibited a thermally stable behavior up to a temperature of about 600 °C, a deterioration was noticed in the Cu/TiO<sub>2</sub> sample at a temperature of around 440 °C. After 600 °C, the Cu/TiO<sub>2</sub> specimen indicated weight loss at 610 °C and 960°C temperatures, while the Ca-Cu/TiO<sub>2</sub> specimen indicated a weight loss of around 700 °C and 830 °C.



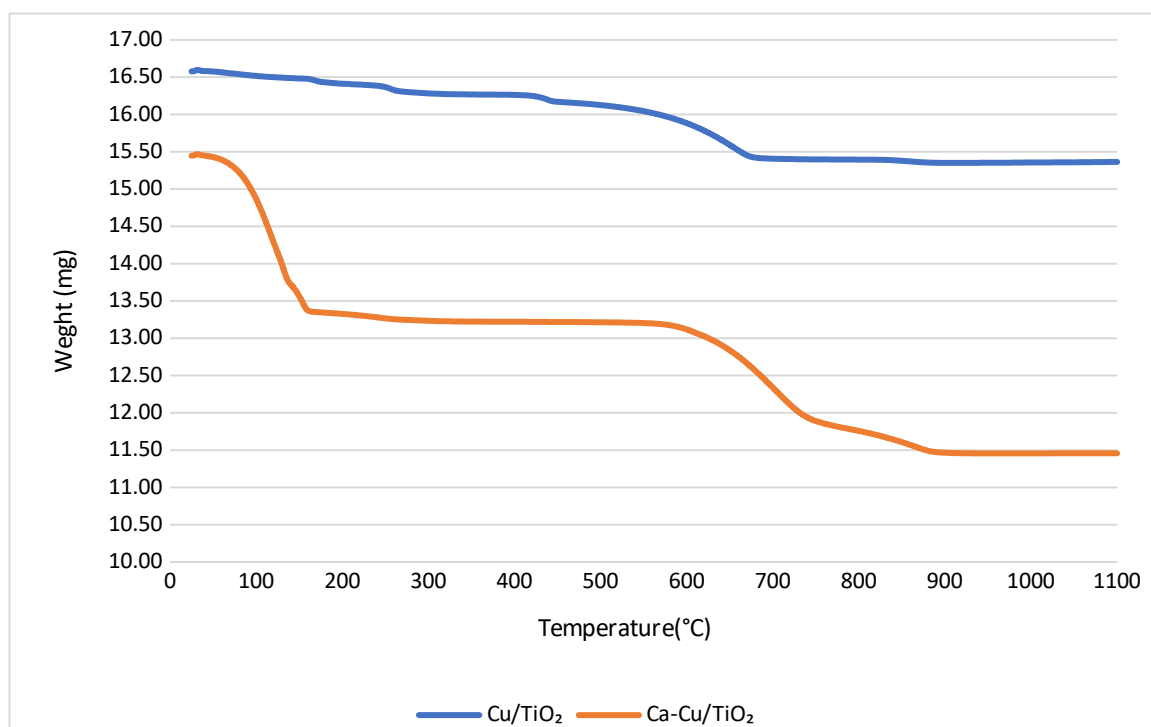
**Figure 2.** Before the calcination process TGA graph of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> specimens

Table 2 indicates the initial and final weights and decomposition temperatures of the samples before the calcination process. While the weight loss was 11.55% in Cu/TiO<sub>2</sub> samples, this loss rate was 23.46% in Ca-Cu/TiO<sub>2</sub> samples. The addition of Ca to Cu/TiO<sub>2</sub> samples increased the weight loss approximately 2 times. However, the final decomposition temperature reached 962 °C without the addition of Ca, and the amount of sample remaining after combustion is higher.

**Table 2.** Initial weight, final weight and onset temperatures of samples before calcination process

Samples	Initial weight(mg)	Final weight(mg)	Onset temperatures(°C)
Cu/TiO <sub>2</sub>	12.12	10.72	110/430/615/962
Ca-Cu/TiO <sub>2</sub>	15.26	11.68	105/152/304/698/829

The TGA graph of the samples after the calcination process is shown in figure 3. As before the calcination process, a weight decrease is observed due to the removal of H<sub>2</sub>O in the samples between 100-150 °C temperatures. Weight reduction was detected in Cu/TiO<sub>2</sub> samples up to approximately 850 °C. In the Ca-added Cu/TiO<sub>2</sub> samples, on the other hand, thermal stability was achieved up to about 700 °C, and a weight decrease was detected in the sample near 690 °C and 850 °C. It is seen that thermal stabilization is achieved after 850 °C in both samples. When compared with the temperature data in figure 2 before calcination, the point that it was seen that there was no weight loss in Cu/TiO<sub>2</sub> samples and where the thermal stabilized temperature started was determined at 860 °C before 960 °C. In Ca-Cu/TiO<sub>2</sub> samples, nevertheless, it was determined that the temperature at which thermal stabilization started increased by 25 °C from 830 °C to 855 °C after the calcination process.



**Figure 3.** After the calcination process TGA graph of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> specimens

The initial and final weights and decomposition temperatures of the samples after the calcination process are given in Table 3. While there was a 7.42% weight reduction in Cu/TiO<sub>2</sub> samples, a 25.82% weight loss was detected in Ca-Cu/TiO<sub>2</sub> samples. The addition of Ca after the calcination process increased the weight loss approximately 3.48 times. Parallel to the change in thermal stabilization temperatures, while the weight loss rate in

Cu/TiO<sub>2</sub> samples decreased, the weight loss amount increased in Ca-Cu/TiO<sub>2</sub> samples. After the calcination process, the maximum decomposition temperatures of both samples were almost the same.

**Table 3.** Initial weight, final weight and onset temperatures of samples after calcination process

Samples	Initial weight(mg)	Final weight(mg)	Onset temperatures(°C)
Cu/TiO <sub>2</sub>	16.58	15.35	135/259/439/632/853
Ca-Cu/TiO <sub>2</sub>	15.45	11.46	110/158/691/852

#### 4.CONCLUSION

In this study, the thermal performance of copper-based catalysts used in exhaust emission systems was investigated. The effect of the calcination process on this thermal performance comparison is also given in the study results. In the thermal tests of Cu/TiO<sub>2</sub> and Ca-Cu/TiO<sub>2</sub> samples up to 1100 °C, it was determined that the addition of Ca increased the weight loss both before and after the calcination process. While the calcination process has a negative effect by decreasing the final thermal stability temperature in the Cu/TiO<sub>2</sub> sample, it has a positive effect on this sample by increasing the final thermal stability temperature in the Ca-Cu/TiO<sub>2</sub> sample.

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## FARKLI ÇEKİRDEK YÜKSEKLİKLERİNE SAHİP S-ŞEKİLLİ ÇEKİRDEKLİ SANDVIÇ KOMPOZİTLERİN ÜÇ NOKTA EĞİLME DAVRANIŞLARI

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### ÖZET

Sandviç kompozitler, havacılık, uzay, ulaşım, inşaat, elektronik, gıda endüstrisi gibi hafiflik, yüksek mukavemet, şekil koruma, yapısal ve darbe dayanımının gerekli olduğu modern mühendislik ve malzeme uygulamalarında geniş bir kullanım alanına sahiptirler. Sandviç kompozit yapıların mekanik davranışı ve performansı, ihtiva ettiği malzeme özelliklerine ve ilgili sandviç kompozit bileşenlerin geometrisine bağlıdır. Tasarlanan sandviç kompozit malzemenin içeriği üst ve alt levha olarak paslanmaz çelik-316, çekirdek malzemesi alüminyum 1050A-0 ve bağlayıcı eleman olarak DP-460 epoksi yapıştırıcı kullanılmaktadır. Bu çalışmada kullanılan özgün çekirdek tasarımına sahip s-şekilli çekirdek kompozit sandviçlerin R10mm yarıçapında değişken et kalınlıkları ve çekirdek yükseklikleri ile oluşturulan varyasyonları ANSYS mechanical analiz programı, üç nokta eğme testi analizi kullanılarak analiz edilmiştir. Üç farklı çekirdek yüksekliği  $h=50\text{mm}$ ,  $60\text{mm}$ ,  $70\text{mm}$  ve üç farklı çekirdek et kalınlığı  $t=0.6\text{mm}$ ,  $0.7\text{mm}$ ,  $0.8\text{mm}$  ile oluşturulan varyasyonlarda hasar yükleri incelendiğinde, S-şekilli çekirdeğin et kalınlığı arttıkça kompozit panelin yük taşıma kapasitesi artmıştır. Sandviç kompozitlerin üç nokta eğme testi analizi sonucu yapıştırıcı eleman olan DP-460 üzerinde hasar oluşturmadığı görülmektedir. Bununla beraber s-şekilli çekirdek yüksekliğindeki artışla beraber sandviç kompozitin yük taşıma kapasitesinin azaldığı sonucuna varılmıştır. Çekirdek et kalınlıkları arttıkça hasar yüklerinin ve eğilme rijitliklerin arttığı görülmektedir bu durum levhalarda oluşan çökmeyi giderek azaltmaktadır. Çekirdeklerde yükseklik artışı ile oluşturulan sandviç kompozit varyasyonların analizinde çökme miktarını artırdığı görülmektedir.

**Anahtar kelimeler:** Sandviç kompozitler, s-şekilli çekirdek, üç nokta eğme, sonlu elemanlar analizi, mekanik davranışlar

**THREE-POINT BENDING BEHAVIORS OF S-SHAPED CORE SANDWICH COMPOSITES WITH DIFFERENT CORE HEIGHTS****ABSTRACT**

Sandwich composites have a wide range of uses in modern engineering and material applications. Lightness, high strength, shape preservation, and structural and impact resistance are required, such as aviation, space, transportation, construction, electronics, and the food industry. The mechanical behavior and performance of sandwich composite structures depend on their material properties and the geometry of the respective sandwich composite components. The content of the designed sandwich composite material is stainless steel-316 as the upper and lower plates, aluminum 1050A-0 as the core material, and DP-460 epoxy adhesive as the binding element. Variations of s-shaped core composite sandwiches with a unique core design used in this study, with varying wall thicknesses and core heights at a radius of R10mm, were analyzed using ANSYS mechanical analysis program, three-point bending test analysis. When the damage loads were examined in the variations created with three different core heights  $h=50\text{mm}$ ,  $60\text{mm}$ ,  $70\text{mm}$  and three different core wall thicknesses  $t=0.6\text{mm}$ ,  $0.7\text{mm}$ ,  $0.8\text{mm}$ , the load carrying capacity of the composite panel increased as the wall thickness of the S-shaped core increased. As a result of the three-point bending test analysis of the sandwich composites, it is seen that there is no damage to the adhesive element DP-460. However, it was concluded that the load-carrying capacity of the sandwich composite decreased with the increase in the s-shaped core height. As the core wall thickness increases, the damage loads and bending stiffness increase, gradually reducing the plates' deflection. In the analysis of composite sandwich variations formed by the increase in height in the cores, it is seen that the number of deflections increases.

**Keywords:** Sandwich composites, s-shaped cores, three-point bending, finite element analysis, mechanical behaviors



## **1. GİRİŞ**

Kompozit malzemeler modern mühendislik uygulamalarında, havacılık, uzay, taşımacılık, konstrüksiyon, elektronik, yemek endüstrisi gibi hafiflik yüksek dayanım ve şekil koruma, yapısal ve darbe dayanımı, yüksek bükülme sertliği, mukavemet ve enerji emme kapasitesi, dinamik darbe olaylarında daha iyi direnç, düşük yoğunluk, yüksek aşınma ve korozyon direnci, karmaşık şekiller elde etmek için esneklik gerektiren uygulamalarda geleneksel malzemelerin yerine tercih edilmektedir.[1-7] Sandviç kompozitler zemin panelleri, iç duvarlar, yiyecek işleme mutfakları ve yolcu saklama rafları gibi uçak iç mekanlarında tercih edilmektedir.[8] Çekirdek yapısında malzeme ve geometrik düzen, sıkıştırma özelliklerini (eğilme ve burkulma direnci), kesme sertliğini ve enerji soğurma yeteneğini artırmak mümkündür.[6-9] Özellikle sandviç kompozit paneller, yüksek enerji sönümlenebilirliği, hafiflik ve yüksek eğilme mukavemetleri nedeniyle yaygın bir şekilde kullanılmaktadır. Bu bileşenlerin (sandviç panellerin) çoğu, çeşitli yüzey malzemeleriyle bal peteği ve köpük çekirdek malzemelerinin bir araya gelmesiyle oluşmaktadır. [9-11] Bilhassa, açık hücreli çekirdek malzemeye sahip sandviç kompozit paneller, kompozit malzemeye, yüksek rijitlik ve özgül mukavemet gibi çok fonksiyonlu yararlar sağlamaktadır.[12-13] Çekirdek yapı geometrisi balpeteği profilinde olabileceği gibi zincir, piramit oluklu, x tipi, kagome tipi, hibrit ve özgün tasarımlarda da kendini gösterebilmektedir. [14-17]

Bu çalışmada özgün çekirdek tasarımına sahip balpeteği kompozit levhanın mekanik davranışları incelenmiştir. S formulu 1050-O serisi alüminyum çekirdek yapısına sahip alt üst levha 316 paslanmaz çelik olan sandviç kompozit levhanın farklı varyasyonlarının ANSYS paket programı kullanılarak sonlu elemanlar metodu ile üç nokta eğilme analizi yapılmış ve analiz sonuçları karşılaştırılarak eğilmeye karşı en iyi dayanım ve rijitlik özelliği gösteren levhaların belirlenmesi amaçlanmıştır.

## **2. MATERYAL VE METOT**

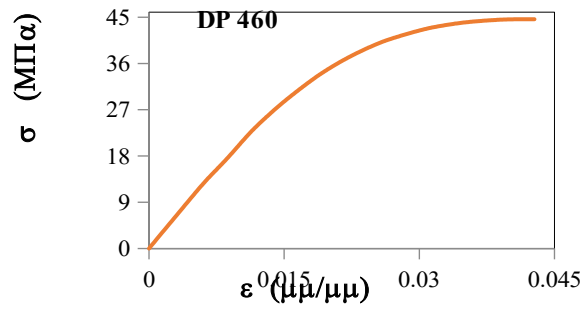
Bu çalışmada yüzey tabakası olarak 1mm kalınlığında, 170x100 mm ebatlarında paslanmaz çelik-316, çekirdek malzemesi olarak da alüminyum 1050A-0 alaşımı kullanılmıştır. Alt-üst levha ile çekirdek arası bağlayıcı eleman olarak DP-460 epoksi yapıştırıcı kullanılmıştır. Alüminyum 1050A-0 ve paslanmaz çelik-316 ait fiziksel ve mekanik özellikler tablo-1’de ifade edilmiştir.



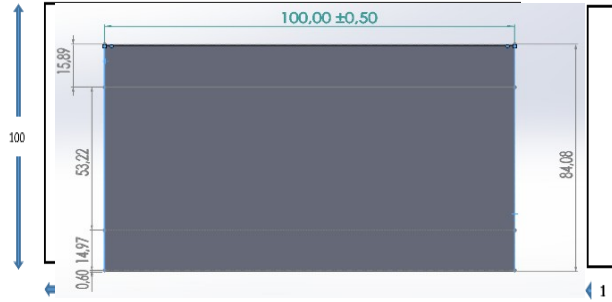
	Aluminum 1050A ,O	316-Stainless Steel
Density	2710kg/m <sup>3</sup>	7800kg/m <sup>3</sup>
Tensile Yield Strenght	34,94 MPa	200 MPa
Tensile Ultimate Strenght	80 MPa	515 MPa
Modulus of Elasticity	69 GPa	200 GPa
Elongation (%)	40	40
Shear Modules	50 MPa	82 GPa
Poisson Ratio	0,33	0,275

**Tablo-1.** Alüminyum 1050A-0 ve Paslanmaz çelik-316 alaşımlarına ait mekanik özellikler

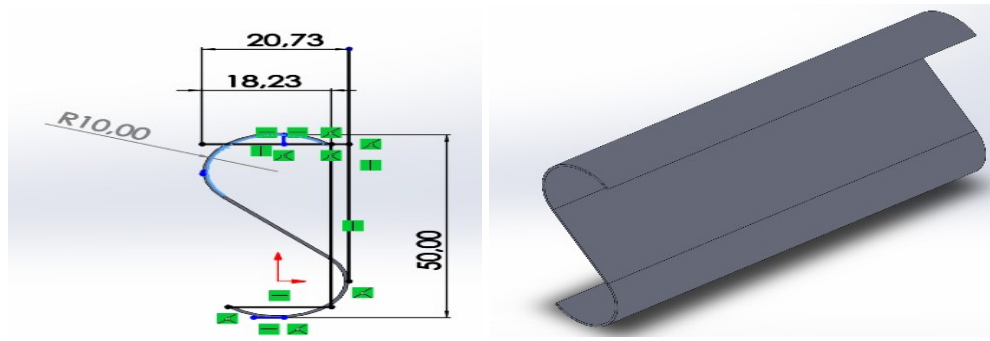
**Şekil -1.** DP-460 epoksi yapıştırıcıya ait gerilme - şekil değiştirme grafiği



Yapıştırıcı olarak DP-460 epoksi yapıştırıcı kullanılmış olup DP-460 yapıştırıcıya ait gerilme – şekil değiştirme grafiği şekil-1 ‘de verilmiştir. 1mm kalınlığında 170x100mm paslanmaz çelik-316 malzemeden oluşturulan alt ve üst levhaya ait ölçüler şekil-2’de verilmiştir.



**Şekil-2.** Alt ve Üst levha sac ölçüleri[18]



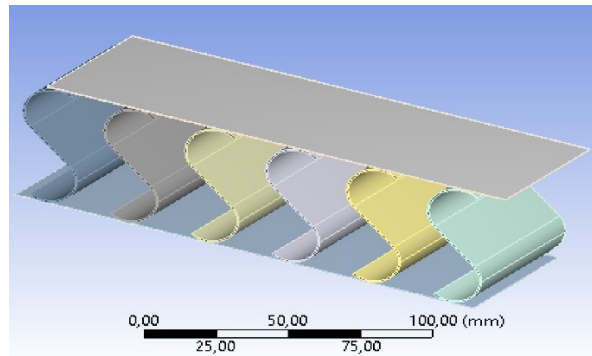
Şekil-3 R10mm için seçilen S çekirdek ölçü ve bükümden öncesi ve sonrası sac ölçüleri[18]

**Tablo-2** S Çekirdekli Bal Peteği Alüminyum Kompozit Levha Varyasyonlarına Ait boyutlar

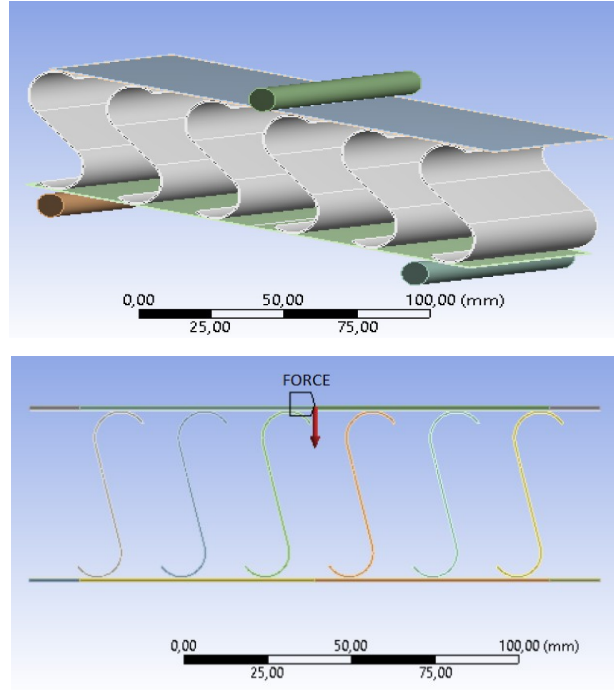
Üst ve Alt Levha Ölçüleri (mm)	Çekirdek Yüksekliği (mm)	Çekirdek Et Kalınlığı (mm)	Çekirdekler Arası Mesafe (mm)
		0,6	
	50	0,7	
		0,8	
		0,6	
100x170x1	60	0,7	25
		0,8	
		0,6	
	70	0,7	
		0,8	

Farklı büküm geometrik varyasyonları ile üretilecek olan çekirdek yapısına ait S çekirdek R10mm için ölçü ve bükümden öncesi ve sonrası sac ölçüleri şekil-3 de verilmiştir.

S çekirdekli sandviç alüminyum kompozit levha varyasyonlarına ait boyutlar tablo-2’de gösterilmiştir. Bu çalışmada üç farklı eğrilik yarıçapı ve üç farklı çekirdek malzeme et kalınlık değerleri için analiz yapılmıştır.



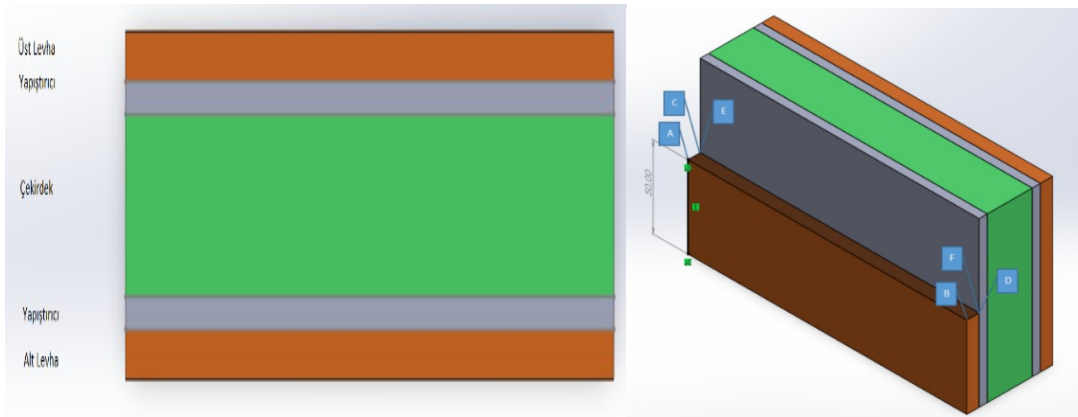
Şekil-4 S-Çekirdekli Bal Peteği Alüminyum Kompozit Levha[19]



Şekil-5 Üç Nokta Eğme Testi Ansys Deneysel Düzenek ile Kuvvet-Adım Diyagramı[19]

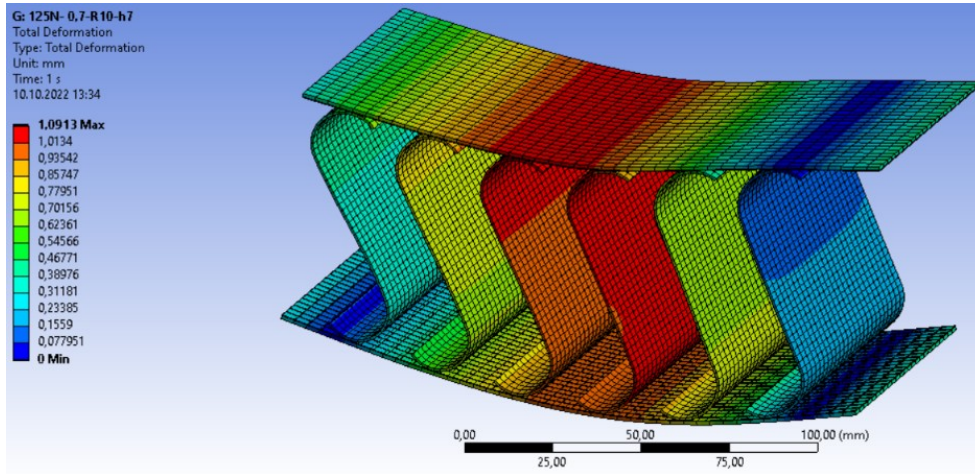
S-Çekirdekli Bal Peteği Alüminyum Kompozit Levha şekil-4 teki gibi alt-üst levha ve çekirdek malzeme arası DP-460 bağlayıcı yapıştırıcı kullanılarak oluşturulmuştur. Oluşturulan Sandviç kompozit levha üç nokta eğilme testi analizine tabi tutulmuştur. Analizler ANSYS Workbench 2021 R1 paket programı kullanılarak yapılmıştır. Üç nokta eğilme analizinde yük kademeli verilmiş olup her kademede 50N artırılabilecek şekilde 10 kademede toplamda 500N yük uygulanmıştır. Üç nokta eğme analizi ile ilgili boyutlar ve sınır şartları şekil 5'te verilmiştir.

Üç nokta eğme analizi sonucunda farklı eğrilik ve kalınlıklara sahip alüminyum çekirdekli kompozit levhalar için elde edilen yük-sehim grafikleri şekil 6'da görülen üst levha üst orta hattının boyunca [AB hattı] incelenmiştir, üst levhanın altı orta hattının boyunca [CD hattı], üst yapıştırıcının üstü orta hattı boyunca [EF hattı] aşağıda gösterilmiştir.

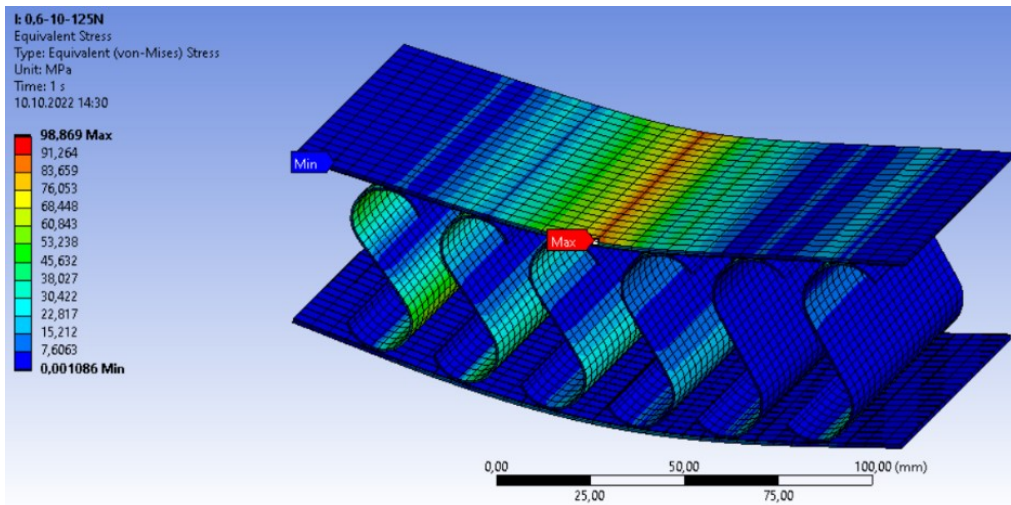


Şekil-6 Sandviç kompozite ait A-B, C-D ve E-F Hatları[19]

### 3. SONUÇ VE TARTIŞMA



(a)



(b)

Şekil-7 a)0,7 mm et kalınlığı, R10 mm yarıçaplı, h:70mm yüksekliğe sahip S çekirdekli sandviç kompozit levha ait toplam deformasyon, b) 0,6 mm et kalınlığı R10 mm yarıçaplı, h:60mm yüksekliğinde alüminyum çekirdekli sandviç kompozite ait von-Mises gerilmesi 0,7 mm et kalınlığı, R10 mm yarıçaplı, h:70mm yüksekliğe sahip S çekirdekli sandviç kompozit levhanın çökmesi Şekil 7a' da ve 0,6 mm et kalınlığı R10 mm yarıçaplı, h:60mm yüksekliğinde alüminyum çekirdekli sandviç kompozit levhanın von Mises eşdeğer gerilmesi Şekil 7b' de görülmektedir. Şekil 7a' da çökme görüntüsü incelendiğinde beklendiği gibi en büyük çökme sandviç kompozitin orta kısmında oluşmuştur. Alttaki paslanmaz çelik örtü incelendiğinde çökme çok az meydana gelmiş ve mesnetlerde yine beklendiği gibi çökme sıfır çıkmıştır. S şekilli çekirdek malzemelerde de orta hatta yaklaştıkça renkler yeşilden kırmızıya yaklaşmakta, bu da orta hattaki çekirdek malzemelerin de kenar malzemelerle göre daha fazla çöktüğünü göstermektedir. Üç nokta eğilme testi yüklemesinde en büyük eğilme momenti, kuvvetin uygulandığı ve sandviç kompozitin ortasında oluşmaktadır. Bundan dolayı Şekil 7b' de bu hat kırmızı görülmektedir. Hem üst örtüde hem de sandviç kompozitin geri kalan kısmında eşdeğer ( $\sigma_{eqv}$ ) gerilmeler giderek azalmaktadır.Şekil 7b' de von-Mises eşdeğer gerilmeler incelendiğinde, en büyük eşdeğer gerilmelerin sandviç kompozitin ortasında olduğu ve bu da beklentilerle uyumlu olduğu görülmektedir.

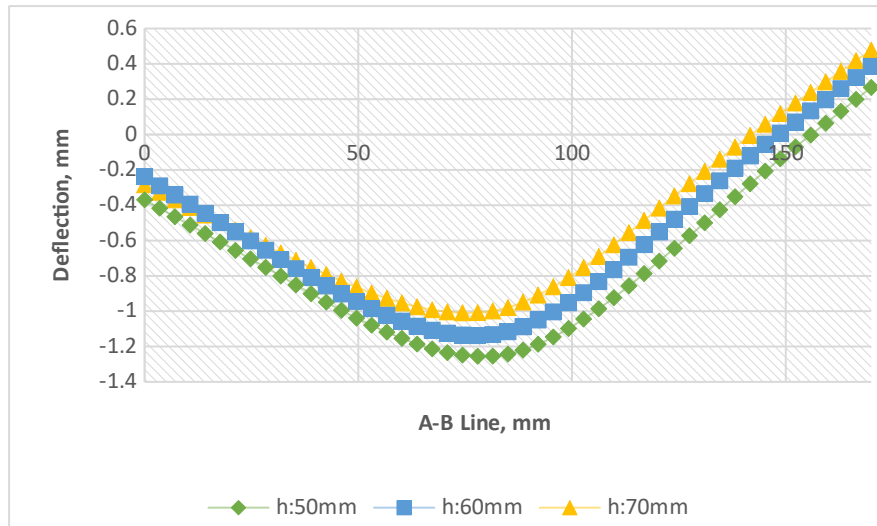
**Tablo-3.** R10mm yarıçaplı 0.6 , 0.7 ve 0.8 mm et kalınlıklı, h=50mm , 60mm ve 70 mm çekirdek yükseklikli sandviç kompozit panelin hasar yükleri

		Hasar Yüğü (N)		
		0,6 mm	0,7 mm	0,8 mm
h	50 mm	135	155	187
	60 mm	195	220	185
	70 mm	145	226	125

Üç nokta eğme analizi sonucunda 50, 60 ve 70 mm çekirdek yüksekliği ve 0.6, 0.7 ve 0.8 mm çekirdek kalınlıklarına sahip alüminyum çekirdekli kompozit levhalar için elde edilen hasar yükler Tablo 3'de verilmiştir. Tablodaki hasar yükleri incelendiğinde 50mm çekirdek yüksekliği için çekirdek kalınlıkları arttıkça hasar yüklerinin arttığı görülmektedir. Bunun nedeni çekirdek kalınlıkları arttıkça eğilme rijitlikleri artmakta bu da hasar yüklerini artırmaktadır. 60 ve 70 mm çekirdek yüksekliğinde en yüksek değerlere 0,7mm et

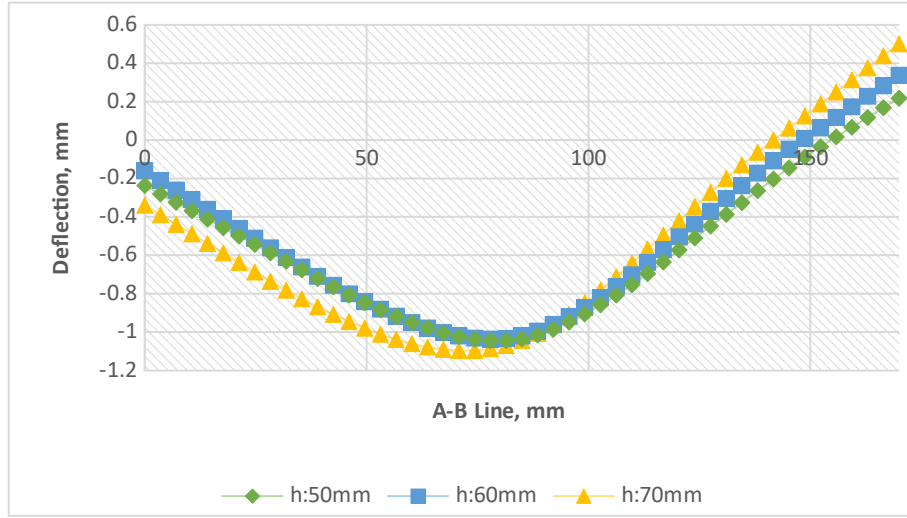
kalınlığında ulaşılmıştır.Çekirdek et kalınlığının artması yükseklik artışıyla oluşan hasar yükü taşıma kaybına çözüm olamamıştır. Bu durum ( $1/\rho=M/EI$ ) ifadesinde sabit eğrilik yarıçapında atalet momentinin azalmasıyla ( $M/EI$ ) ifadesinin sabit olabilmesi için daha düşük eğilme momenti ile ve dolayısıyla daha düşük hasar yükü ile hasar deformasyonlarına ve hasar gerilmelerine ulaşılmaktadır. Gerek çökme değerleri gerek ondan sonraki gerilme grafikleri  $F=125$  N eğilme yükünde elde edilmiş olup bu bütün varyasyonlarda sandviç kompozitin taşıyabildiği en düşük hasar yüküdür.

Şekil 8’ de verilen sandviç kompozit varyasyonların A-B hattı boyunca çökmeleri incelendiğinde çökmelerin A noktası civarında sıfırın çok az üstünde oluştuğu görülmektedir. Bu noktada üst levha A noktasında saat ibresi ters yönde bir miktar eğim göstermektedir. Levhanın ortalarına doğru gidildikçe çökme giderek artmış ve orta noktada maksimum olmuştur. B noktasına yaklaştıkça çökme önce sıfırlanmış daha sonra levhanın B noktası civarında pozitif olmuştur. Bunun nedeni eğilmen levhaların uçlarında meydana gelen eğimdir. B noktasında oluşan eğimin A noktasında oluşan eğimden fazla olmasının nedeni S şekilli çekirdeklerin yönlerinin A’dan B’ye doğru olmalarından kaynaklanmaktadır.

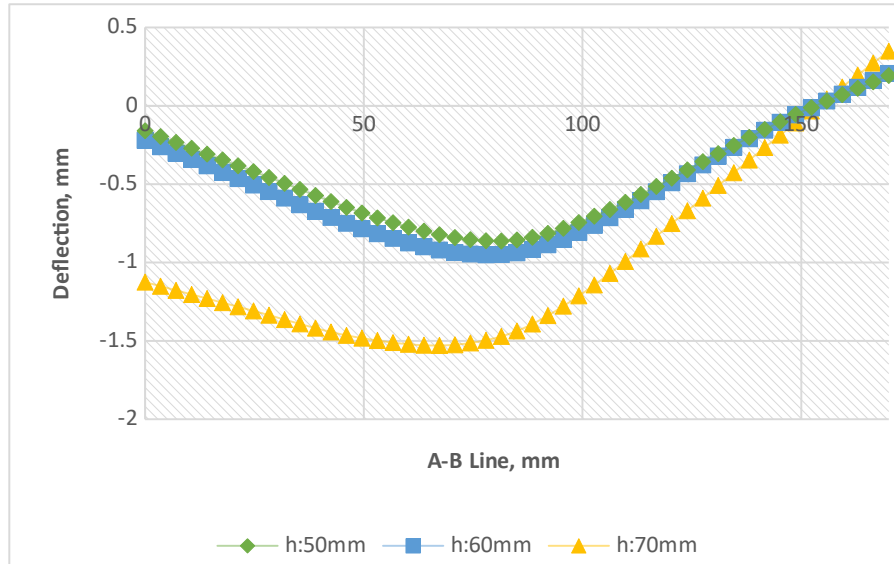


Şekil-8 0,6 mm Çekirdek Et Kalınlığı R10mm Çekirdek Yarıçapında Farklı Çekirdek Yüksekliklerinde Sandviç Panel Kompozitlerin Çökme Eğrileri





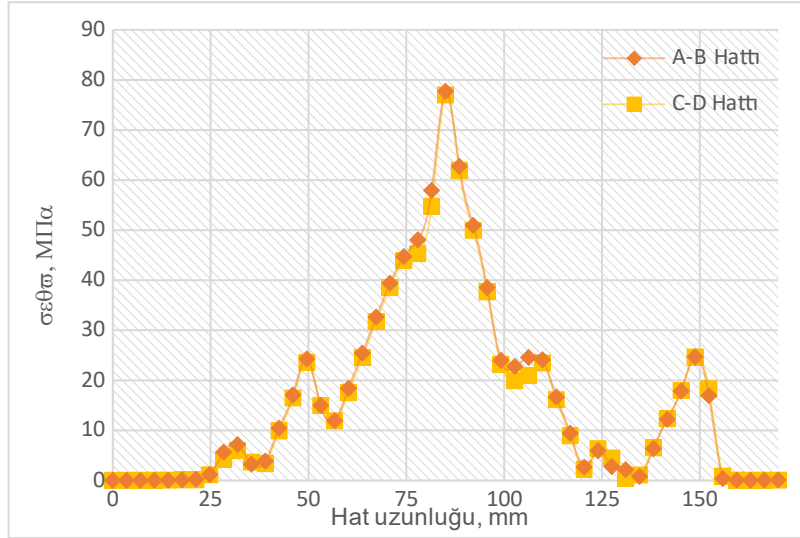
**Şekil-9** 0,7 mm Çekirdek Et Kalınlığı R10mm Çekirdek Yarıçapında Farklı Çekirdek Yüksekliklerinde Sandviç Panel Kompozitlerin Çökme Eğrileri



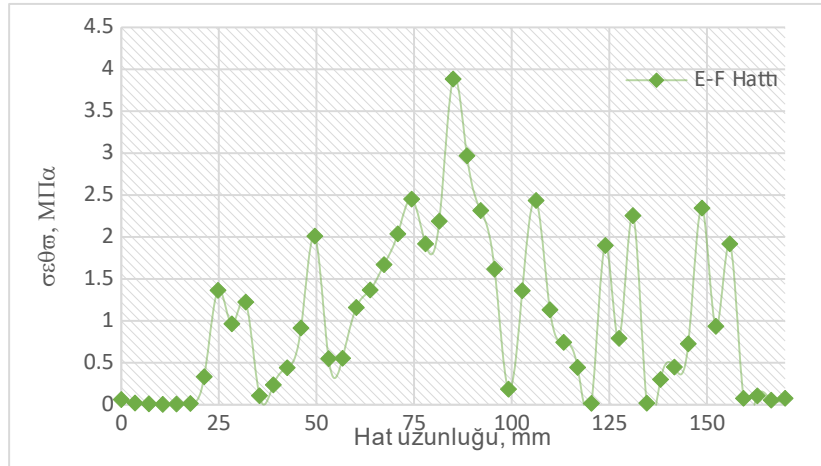
**Şekil-10** 0,8 mm Çekirdek Et Kalınlığı R10mm Çekirdek Yarıçapında Farklı Çekirdek Yüksekliklerinde Sandviç Panel Kompozitlerin Çökme Eğrileri

Çekirdek kalınlıklarının sandviç kompozit levhanın çökme değerleri üzerindeki etkisi açısından grafikler incelendiğinde ince çekirdekli kompozit levhaların daha çok çöktüğü görülmektedir. Yani çekirdek kalınlığı arttıkça levhalarda oluşan çökme giderek azalmaktadır. Bunun nedeni çekirdek malzemelerin kalınlığı arttıkça eğilmeye karşı gösterdiği direnç atalet momentlerin artmasından artar. Bu da daha az eğilmeye ve çökmeye neden olur. Ayrıca h yüksekliği 0,6 mm et kalınlığında arttıkça çökme miktarı artmış, 0,7mm et kalınlıklı çekirdek yapısında yaklaşık olarak birbirine eşittir denilebilir. 0,8 mm çekirdek yapısında çekirdek yüksekliğinin artması çökme miktarını azaltmıştır.

Çekirdek kalınlığının artmasıyla oluşan direnç atalet momentleri çekirdek yükseklik artışıyla daha fazla çökme eğilimi sergilemişlerdir.



(a)



(b)

Şekil-11 0,8mm çekirdek et kalınlığı,R10mm eğrilik yarıçapındaki s şekilli 50 mm hücre yüksekliğindeki sandviç kompozitin farklı hatlardaki  $\sigma_{eqv}$  gerilme eğrileri a) A-B ve C-D hatları boyunca, b) E-F hattı boyunca

0.7 mm çekirdek et kalınlığı, R10 mm eğrilik yarıçapındaki S şekilli 50 mm hücre yüksekliğindeki sandviç kompozitin AB, C-D ve E-F hatları boyunca von-Mises eşdeğer gerilime dağılımları sırasıyla Şekil 11' de verilmiştir.  $\sigma_{eqv}$  gerilme dağılımları incelendiğinde gerilmeler hem A-B hem de C-D hatları için uçlarda sıfır, ortalara doğru

atmaya başlamış ve ortada maksimum çıkmıştır. Bu üç nokta eğilme testlerinde beklenen bir sonuçtur. Çünkü eğilme momentleri uçlarda sıfır ve merkezde maksimumdur.

#### **4.SONUÇ**

Üç nokta eğilme testine maruz farklı çekirdek yükseklikli ve farklı et kalınlıklı S şekilli 10mm hücre yarıçapındaki sandviç kompozitin numerik gerilme analizi bulguları incelendiğinde aşağıdaki sonuçlar elde edilmiştir.

- Hasar yükleri incelendiğinde çekirdek kalınlıkları arttıkça hasar yüklerinin ve eğilme rijitliklerin arttığı görülmektedir bu da levhalarda oluşan çökmeyi giderek azaltmaktadır. Bunun nedeni çekirdek malzemelerin kalınlığı arttıkça eğilmeye karşı gösterdiği direnç atalet momentlerin artması daha az eğilmeye ve çökmeye neden olmasıdır.
- Çekirdek et kalınlığı ve yüksekliğindeki artışlar çökme miktarını artırmaktadır.
- Yapılan analiz sonuçlarında yapıştırıcı üzerinde oluşan gerilemeler hasara sebep olmamaktadır. Bu durum yapıştırıcı seçiminde daha geniş bir spektrum sunmaktadır.

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**FOTOVOLTAİK ENERJİ İLE TARIMSAL İŞLETMELERİN ENERJİ  
GEREKİNİMİNİN KARŞILANABİLİRLİĞİ: VAN İLİNDE UYGULANMASI**

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**ÖZET**

Fosil yakıtlardan üretilen elektriğin çevreye zararı olan sera gazı emisyonu ve diğer olumsuz durumlardan ötürü endişeler neticesinde sağlıklı bir elektrik üretimi için PV (Fotovoltaik) sistemlere talep ve önem günden güne artmakla beraber daha fazla farkındalık görmesine sebep olmuştur. Fotovoltaik ile enerji üretim sistemleri küresel boyutta büyük bir odak noktasına geldi ve enerji tabanlı üretimde, en değerli katkı payına sahip olduğu gözlemlenmektedir. Dünyada yenilenebilir enerji kaynakları ile elektrik üretmek için, güneş enerjisinden faydalanmak için güneş fotovoltaik tabanlı teknolojiler kullanılmaktadır. Ancak üzücüdür ki ülkemiz Güneş kuşağında bulunmasına rağmen sahip olduğu bu enerji potansiyelini katma değere çeviremediği gibi yaygın ve etkin derecede kullanamamaktadır.

Bu çalışmada, ülkemizde güneş enerjisi potansiyeli yönünden avantajlı durumda olan Van ilinde, dünyada uygulama alanı her geçen gün artmakta olan fotovoltaik enerji ile elektrik üreten tarımsal işletmelerden biri olan ceviz işleme tesisinin enerji gereksinimini karşılamak için tüm yönüyle incelenmiştir. Fotovoltaik Güneş Sistemi (FVGS) ile günlük bazda elektrik enerjisi üretimi hesaplanmıştır. Dolayısıyla üretim değerleri aylara göre değişkenlik göstermiştir. Temmuz ayında elektrik üretimi yıl içinde en yüksek değerde enerji ürettiği gözlemlenmiştir. Son olarak FVGS kurulumunun doğru yapılması ile tarımsal işletmelerde kullanılan enerji tüketimlerinin FVGS'leriyle bu enerji gereksiniminin fazlasıyla karşılanabilir olduğu ortaya çıkmaktadır.

**Anahtar Kelimeler:** Güneş Enerjisi, Yenilenebilir Enerji Kaynakları, FVGS, Tarımsal işletmeler, Ceviz İşleme Tesisi

**AVAILABILITY OF ENERGY REQUIREMENTS OF AGRICULTURAL  
ENTERPRISES WITH PHOTOVOLTAIC ENERGY: APPLICATION IN VAN  
PROVINCE**

**ABSTRACT**

As a result of concerns about greenhouse gas emissions and other negative situations that harm the environment of electricity generated from fossil fuels, the demand and importance of PV (photovoltaic) systems for healthy electricity generation has increased from day to day, but has led to greater awareness. Photovoltaic and energy production systems have come into a major focus on the global dimension and are observed to have the most valuable contribution in energy-based production. The world also uses solar photovoltaic-based technologies to make use of solar energy to generate electricity with renewable energy sources. But it is sad that our country, despite its presence in the solar belt, cannot convert this energy potential to added value, as well as use it widely and effectively. In this study, which is advantageous in terms of solar energy potential in our country, in the province of van in the case in the world of application areas and agricultural enterprises, which is one of the growing photovoltaic energy to generate electricity to meet the energy requirements of all aspects of walnut processing plant examined. Electricity production was calculated on a daily basis with the Photovoltaic Solar System (FVGS). Therefore, production values varied over the months. Electricity generation in July was observed to produce the highest value of energy in the year. Finally, with the correct installation of FVGS, it turns out that this energy requirement can be met with Fvgs of energy consumption used in agricultural enterprises.

**KeyWords:** Solar Energy, Renewable Energy Sources, FVGS, agricultural enterprises, Walnut processing plant.

## 1. GİRİŞ

Güneş, insanlığın kullanmış olduğu toplam enerjinin çok daha fazlasını bütün bir yıl boyunca dünyaya göndermektedir. Aynı zamanda yenilenebilir enerji kaynaklarında temel kaynağıdır. Biyokütle, rüzgâr, jeotermal, dalga (gel-git), su (hidrolik) ve güneş enerjisi yenilenebilir enerji grubundadır. Bu enerji grupları arasında uygulama alanı olarak en fazla ve en yaygın olanı güneştir diyebiliriz. Temiz bir kaynak olan güneş enerjisi bir enerji olmakla beraber bol ve tükenmeyen bedava enerji kaynağıdır.

Güneş enerjisinin avantajları yenilenebilir enerji kaynakları arasında oldukça fazladır diyebiliriz. Dikkate şayendir ki havanın açık olması ve güneşli durumunda 15 dk'lık güneş ışması neredeyse tüm dünyanın bir senelik enerji ihtiyacını fazlasıyla karşılamaktadır [1].

Güneş enerjisini direkt elektrik enerjisine dönüştürmek için güneş pillerini kullanmamız gerekir. Güneş panellerinin üzerine güneş ışığının yansmasıyla uçlarında bir elektrik gerilimi oluşur. Bu oluşum güneş pillerinin elektrik enerjisi üretebilen yapılar olduğunu göstermektedir. Güneş pillerinin yapı taşı ışık şiddetidir. Bu yüzden mevsimsel olarak baktığımızda dünyanın farklı yerlerine güneş ışınımın düştüğünden güneş panelleride farklı değerlerde enerji üretir.

Kelime anlamı olarak fotondan elektrik üretmeye fotovoltaik denir. Üretilen elektrik ise fotovoltaik paneller yardımıyla gerçekleşmektedir. Tabii fotovoltaik sistemler güneşten elektrik üretiminde kullanılırlar. Fotovoltaik sistemlerin bileşenleri ise; panel, akü, invertör (evirici) ve şarj kontrol cihazıdır. Genel olarak indirgenmiş çalışma prensibi; şarf regülatörü, fotovoltaik panelden gelen doğru akım enerjisini düzenleyip sabit tutar ve akabinde akü şarjı için stabil şekilde doğru akım elektrik enerjisi oluşturur. İnverterler ise DC elektrik enerjisini AC elektrik enerjisine dönüştürür. Aynı zamanda akü kalitesize göz ardı edilmemesi gerekir. Çünkü şebekeye bağlı olmayan off-grid fotovoltaik güneş panel sistemleri için aküler oldukça önemlidir diyebiliriz. Fotovoltaik güneş sistemlerinin en temel parçaları güneş ve elektriğin üretildiği kısımdır [2,3].

Türkiye'de günlük ortalama güneşlenme süresi toplamda 7,2 saatir ve yıllık ortalama ise metrekarede 2640 saattir [4]. Ülkemizin coğrafi konumu baz alındığında sahip olduğu enerji potansiyeli diğer birçok ülkeye göre daha avantajlı konumda olduğu gözlenmektedir. Aynı zamanda güneş enerji sistemi kırsal bölgelerin elektrik enerjisi kullanmasına da olanak sağlamaktadır.

Yenilenebilir enerji kaynakları olarak sahip olduğu güneşlenme süresinin fazla olma sebebiyle potansiyeli yüksek olan yerlerden biri olan Van'da güneş enerji sistemi ön plana çıkmaktadır. Türkiye geneli bölgeler ve iller göz önüne alındığında oldukça avantajlı bir konumda olan Van



ili, güneşlenme süresi açısından ikinci il ve global radyasyon değerleri açısından üçüncü il durumundadır [5]. Bu gibi avantajları su yüzüne çıkarırsak Van ili fotovoltaik güneş enerjisi sistemlerinde en verimli iller arasındadır.

Bu çalışmada, Van'da kurulacak olan ceviz işleme tesisinin enerji gereksinimi hesaplanıp, enerjiyi temiz ve yenilenebilir enerji olan şebekeden bağımsız sistem olan Off-Grid sistemiyle fotovoltaik güneş enerjisi sisteminin kurulması amaçlanmaktadır. Bu sistem ile tesisin tüm elektrik ihtiyacını karşılanmış olacaktır. Ceviz işleme tesisi incelendiğinde; ceviz soyma, kurutma, kalibre, kırma ve kırık ceviz ayırma makineleri yüksek düzeyde mekanizasyon ve otomasyon sistemleri kullanıldığından elektrik enerjisi tüketim değerleri yüksektir. Bu yüzden elektrik enerjisi maliyeti, işletme için önemli bir enerji girdisi sorunu olarak karşımıza çıkmaktadır.

Yeni yapılan tarımsal üretim projelerinde, ülkemizde tarımsal desteklerin güneş enerjisi sistemlerine de verilmesiyle güneş enerjisinden elektrik elde etmek için FVGS lerin kullanımı da artmaktadır. Bugün ülkemizin farklı coğrafi bölgelerinde yer alan orta büyüklükte ceviz işleme tesislerin aylık elektrik enerjisi faturası ortalama 10.000 TL'dir. Elektrik enerjisi tüketimi ise 10.690 kWh olduğu görülmektedir. Ceviz işleme tesislerindeki yoğun elektrik tüketiminin tamamı veya bir bölümü FVGS lerin kullanımıyla tasarruf edilecektir.

TÜİK 2019 verilerine göre; Türkiye'de %21,55'inin ithalat gideri olarak enerji oluşturmaktadır. Bununla beraber Türkiye'nin yıllık enerji ithalatı ortalama 45 milyar dolardır. Türkiye birincil enerji tüketiminin sektörel dağılımına göre sanayide kullanılan enerji oranı %25,0 en yüksek tüketim oranı olarak karşımıza çıkmaktadır. Aynı zamanda nihai enerji tüketiminin sektörel dağılımında ise %32,5 ile sanayi sektörü en fazla enerji tüketimine sahiptir [6].

Enerjide dışa bağımlılığı azaltıp ithalatın önüne geçebilmek için, ülkemizde yenilenebilir enerji yatırımına hız verilmektedir. Güneş enerjisi santralleri pazarı 2016 yılında fotovoltaik güneş enerjisi doğrudan elektrik enerjisine çevirmede teknolojisine dayalı olarak bir zaman sonra beklenenin üzerinde büyüyerek, yenilenebilir enerji kaynağı olan rüzgâr enerjisinin yıllık kurulumunu geride bırakıp bir önceki yıla göre 51000 MWp yüzde 50 artışla yaklaşık olarak 77000 MWp yıllık kurulumla ulaşmıştır [7]. Fotovoltaik güneş sistemi kurulum maliyetleri gün geçtikçe düşmektedir. Önümüzde ki 20 yıla kadar fotovoltaik güneş enerjisi sistemi yatırım maliyetlerinde yüzde 40 ile 70 oranında, karasal rüzgâr santrali ise yüzde 10 ile 25 oranında azalma beklentisinde bulunmaktadır [8].

Fotovoltaik güneş sistemlerinin tarımsal işletmelerde kurulma maliyeti ve karlılığını hesaplamak kolaydır. FVGS'lerin kurulumları için ülkemizde 1MW ve altındaki güneş sistemi için herhangi

bir lisans alma zorunluluğu bulunmamaktadır [9]. Bundan ötürü mevzuat süreci daha kolay olmaktadır. Fotovoltaik güneş sistemlerinin ekonomik ömrü yatırım analizlerinde 25 yıl olarak kabul edilmektedir ve normal şartlarda 25 yıldan sonra verimi düşse bile tesis 35-40 yıl da kullanılmaktadır [10]. Sistemin kendini amorti etme süresi kullanılan güççe bağlı olarak 3 ile 8 yıl arasında değişmektedir. Ayrıca fotovoltaik güneş sistemlerinin enerji üretimi sırasında sessiz ve kimsiyal kirliliği oluşturmadıkları için çevreye duyarlı teknoloji olarak benimsenmiştir. FVGS lerin olumsuz durumları incelendiğinde, gölgeli alanlarda ve sıcakda verim oldukça düşüktür. Ayrıca geceleri elektrik enerjisi üretimi gerçekleşmez.

## **2. KURAMSAL TEMELLER VE KAYNAK ÖZETLERİ**

### **2.1. Tanımlar**

#### **2.1.1. Güneş enerjisi**

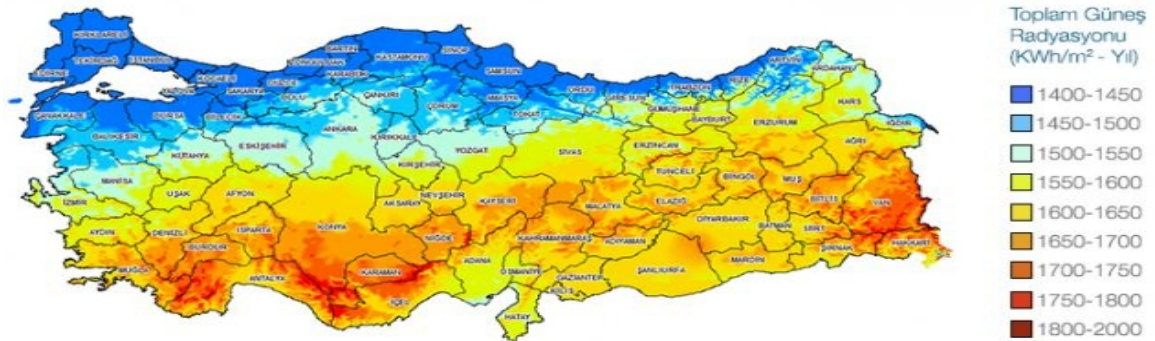
Dünya’da nüfus 4 kat artarken aynı zamanda enerji talebi de 16 kat artmaktadır. Dünya’da yaşayan 7,5 milyar insanın yaşamlarını idame ettirebilmeleri için 13TWh (Terewatt) enerjiye ihtiyaç olduğu bilinmektedir. Tabii bu talep değeri teknolojiye ve nüfus arttırımına paralel olarak hızla artmasına da sebep olmaktadır. Fosil enerji kaynaklarının tükenme durumu ve artan nüfusun enerji tüketiminin hızlı olması, enerji kavramı açısından insanları endişeye sevk etmiştir. Aynı zamanda insanlar alternatif olarak yeni enerji kaynakları arayışına sevk edilmiştir. Alternatif enerji kaynakları arasında; temiz, ekonomik ve çevreye duyarlı olan güneş enerjisi popüler olarak en fazla ilgi gören yenilenebilir enerji kaynağı olduğunu söylemek mümkündür. Fotovoltaik piller ise güneş ışınlarını elektrik enerjisine dönüştürmekte kullanılır. Fotovoltaik kavram olarak, güneş enerjisini elektrik enerjisine dönüştürme olarak tanımlanır. Bu dönüştürmede, kullanılan yarı iletken malzemelerin iş fonksiyonu, mobilite, iletkenlik ve özdirenç gibi karakteristik özelliklerinden faydalanılarak güneş hücresi oluşturulur. Güneş enerjisini kullanılabilir kılmak ve yararlı elektrik enerjisi oluşturmak için güneş pillerinin algıladıkları foton enerjisinden faydalanarak pozitif ve negatif yükler oluşturmaktır. Kısa tanımı ise güneş pildir. Fotovoltaik kelimesini ayırdığımızda “Photo” ışık anlamında, “voltaic” ise elektriksel voltaj anlamına gelir. Elde edilen enerji On-Grid ve Off-Grid olmak üzere ikiye ayrılır. Yani şebekeye bağlı olan ve olmayan demektir. Bizim kullanacağımız sistem Off-Grid “şebekeye bağlı olmayan” sistemdir. Bu sistemle bir tesisin elektrik ihtiyacını şebekeden bağımsız bir şekilde karşılanmasıdır. Güneş enerjisinden elektrik enerjisi elde edilme aşamaları aşağıdaki şekil 2.1’de belirtilmiştir.



Şekil 2.3. Güneş enerjisinden elektrik elde etme aşaması

### 2.1.2. Türkiye’de güneş enerjisi potansiyeli

Coğrafi yapısı sebebiyle sahip olduğu güneş enerjisi potansiyeli açısından birçok ülkeye göre avantaj sahibi olan Türkiye’nin, enerji üretiminde yıllık 100 milyon MW olduğu düşünülürse yaklaşık bir saniyede dünyaya gelen güneş enerjisi, ülkemizin enerji üretiminin 1700 katıdır diyebiliriz. Yani dünyaya saniyede yaklaşık olarak güneş ışını 170 milyon MW enerji olarak gelmektedir [11]. Ülkemizin illere göre yıllık güneş ışını miktarını gösteren güneş enerjisi potansiyel atlası Harita 2.1’de belirtilmiştir [12].



Harita 2.1. Türkiye güneş enerjisi potansiyeli haritası

Türkiye'nin günlük toplam güneşlenme süresi 7,2 saattir ve yıllık bazda ise 2640 saattir. Toplamda ortalama güneş ışını şiddeti ise 1,311 kWh/m<sup>2</sup>-yıl, günlük toplamı incelendiğinde ise 3,6 kWh/m<sup>2</sup> olduğu belirtilmiştir.

**Çizelge 2.1.** Türkiye'nin toplam güneş enerjisi potansiyelinin aylara göre dağılımı [1]

Aylar	Aylık Toplam Güneş Enerjisi		Güneşlenme Süresi (Saat/ay)
	(kcal/cm <sup>2</sup> -ay)	(kWh/m <sup>2</sup> -ay)	
Ocak	4,45	51,75	103,0
Şubat	5,44	63,27	115,0
Mart	8,31	96,65	165,0
Nisan	10,51	122,23	197,0
Mayıs	13,23	153,86	273,0
Haziran	14,51	168,75	325,0
Temmuz	15,08	175,38	365,0
Ağustos	13,62	158,40	343,0
Eylül	10,60	123,28	280,0
Ekim	7,73	89,90	214,0
Kasım	5,23	60,82	157,0
Aralık	4,03	46,87	103,0
<b>Toplam</b>	<b>112,74</b>	<b>1311,0</b>	<b>2640</b>
<b>Ortalama</b>	<b>308,0 cal/cm<sup>2</sup>-gün</b>	<b>3,6 kWh/m<sup>2</sup> -gün</b>	<b>7,2 saat/gün</b>

Çizelge incelendiğinde; ülkemizin güneşlenme süresi ve güneş enerji potansiyeli değerleri aylara göre dağılımı belirtilmiştir. Buna göre ülkemizde en fazla temmuz ayında, en az ise aralık ayında güneş enerjisi üretilir. Ülkemiz yılda 110 gün güneşlenme potansiyeline sahiptir. Bu yüzden gerekli çalışmaların yapılması durumunda ülkemiz birim metre karesinden yılda ortalama olarak 1,100 kWh'lık güneş enerjisi üretebilme potansiyeline sahiptir.

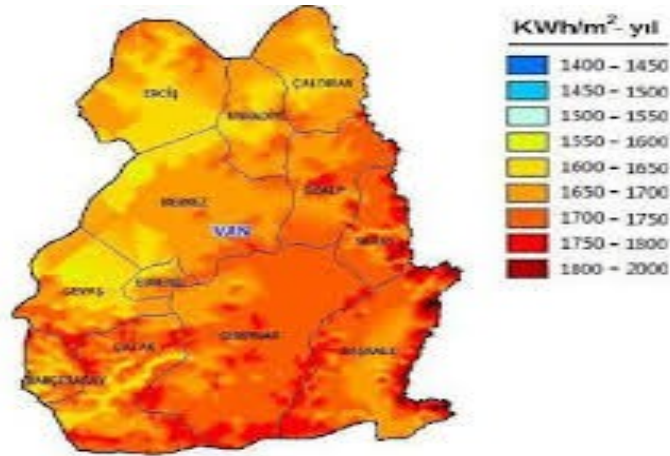
**Çizelge 2.2.** Türkiye'nin yıllık toplam güneş enerjisi potansiyelinin bölgelere göre dağılımı

Bölge	Toplam ortalama güneş enerjisi	Ortalama güneşlenme süresi
	kWh/m <sup>2</sup> -yıl	Saat/yıl
Güneydoğu Anadolu	1,460	2,993
Akdeniz	1,390	2,956
Doğu Anadolu	1,365	2,664
İç Anadolu	1,314	2,628
Ege	1,304	2,738
Marmara	1,168	2,409
Karadeniz	1,120	1,971

Çizelge 2.2 incelendiğinde; ülkemizin yedi güzel bölgesinin yıllık güneş enerji potansiyelinin dağılımı verilmiştir [1]. Ülkemizin en fazla güneş alan bölgesi Güneydoğu Anadolu Bölgesi olup, ikinci sırada Akdeniz Bölgesi ve üçüncü sırada ise Doğu Anadolu Bölgesi gelmektedir.

Bununla beraber Karadeniz Bölgesi ülkemizin en az güneş enerjisi potansiyeline sahiptir. Doğu Anadolu Bölgesinin toplam yıllık ortalama güneş enerjisi 1,365 kWh olarak görülmektedir. Bu verileri dikkate alırsak ülkemizde toplam yıllık alınan enerji  $10^{15}$  kWh olarak gözlemlenmektedir.

### 2.1.3. Van ili güneş enerjisi



Harita 2.2. Van ili güneş enerjisi potansiyeli [13]

Van ilinin eski ismi olan tuşba, zamanında güneş şehri olarak tanınmış ve bazı kaynaklara göre güneş tarlası olarak adlandırılır. Yazın en fazla güneş enerjisi alan Karaman ve Antalya illerimizden sonra üçüncü il olarak yerini almaktadır.[17]

Çizelge 2.3. Van'ın ve Türkiye'nin aylık bazda, günlük ortalama ve yıllık toplamda, güneşlenme süreleri ve güneş enerjisi potansiyeli [13]

Aylar	Van Potansiyeli		Türkiye Potansiyeli	
	Günlük radyasyon (kW/m <sup>2</sup> -gün)	Günlük Güneşlenme Süresi (saat/gün)	Günlük radyasyon (kW/m <sup>2</sup> -gün)	Günlük Güneşlenme Süresi (saat/gün)
Ocak	1,91	5,27	1,79	4,11
Şubat	2,84	6,40	2,50	5,22
Mart	4,14	7,39	3,87	6,27
Nisan	5,13	8,50	4,93	7,46
Mayıs	6,63	10,11	6,14	9,10
Haziran	6,99	11,55	6,57	10,81
Temmuz	7,16	11,65	6,50	11,31
Ağustos	6,05	10,97	5,81	10,70
Eylül	5,25	10,31	4,81	9,23
Ekim	3,64	7,65	3,46	6,87
Kasım	2,31	6,16	2,14	5,15
Aralık	1,73	4,93	1,59	3,75
<b>Toplam</b>	<b>1.635,81 kW/m<sup>2</sup> -</b>	<b>3.068,74 saat/yıl</b>	<b>1.524,18 kW/m<sup>2</sup> -</b>	<b>2.736,89 saat/yıl</b>

	yıl		yıl	
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Çizelge 2.3 incelendiğinde; Van ili ile Türkiye'nin güneşlenme süreleri ve güneş enerjisi durumları karşılaştırılıp, Türkiye'nin ortalama yıllık toplam güneşlenme süresi 2.736,89 saat/yıl iken Van ilinin ise 3.068,74 saat/yıl'dır. Toplam günlük global radyasyon şiddeti ise Türkiye ortalaması 1.524,18 kW/m<sup>2</sup>-yıl iken Van ilinin ise 1.635,81 kW/m<sup>2</sup>-yıl olarak gözlemlenmiştir. Buna göre Van şehri her iki durumda da Türkiye ortalamasının üzerinde bir güneş potansiyeline sahip olduğu görülmektedir.

#### **2.1.4. Güneş enerjisinden elektrik üretiminin avantajları**

Temiz bir enerji ve yakıtı tükenmeyen bir kaynak olan güneşten, elektrik enerjisi üretildiğinde ek olarak herhangi bir yakıtı ihtiyaç olmamaktadır. Fosil yakıt olmadığından karbon monoksit, toz, kükürt, gaz ve duman gibi kirletici durumları olmayan temiz ve çevreci bir yenilenebilir enerji kaynağıdır. Güneş enerjisi panellerinin ömrü yaklaşık 20-25 yıllık olduğundan ve kurulum maliyetlerinin 3-8 yıl içinde amorti ettiğinden dolayı oldukça avantajlı bir enerji kaynağı olarak söyleyebiliriz. Güneş enerji santrallerinin kurulumu tesisin büyüklüğüne göre değişmektedir. Genel olarak 1-9 ay arasında süre almaktadır. Bir diğer avantajı ise GES'lerin bakım maliyetleri ve bakımların yapılması aynı zamanda işletme maliyetleri de oldukça düşüktür. Kasaba, köy gibi yerlerde şebeke hatlarına uzak olan bölgeler için güneş enerjisinin kullanımı en büyük avantajlardan biridir. Bununla beraber; ulaşımın kısıtlı olduğu yerlerde, demiryolu, karayolu, denizyolu, havayolu, tarım makinelerinde ve uydularda bile güneş enerjisi kullanılarak enerji ihtiyacı giderilmiş olmaktadır.

#### **2.1.5. Güneş enerjisinden elektrik üretiminin dezavantajları**

Güneş Enerji sistemlerinin kurulumunda enerji büyüklüğünün panel sayısı ile doğru orantı vardır. Bu yüzden panel kurulumu için alanların geniş olması gerekiyor yani çok büyük arazilere ihtiyaç duyulmaktadır. Güneş enerji sistemlerinde kullanılan fotovoltaik güneş panellerinin fiyatının yüksek olmasıdır. Ancak daha önceden paneller ithal olduğu için fahiş fiyatlarda satılmaktaydı şimdi ise yerli hücre üretimleri sayesinde ülke olarak kendi panelimizi üretmeye başladığımızdan ötürü fiyatlarda hafif esneklik başlamıştır. En büyük dezavantajlarından biri akülerin çabuk bozulmasıdır diyebiliriz. GES'lerin normal şartlarda tarıma elverişsiz topraklarda kurulması istenilir ancak günümüzde kâr gütmek isteyenler maalesef tarıma elverişli topraklarda kurmaya başladılar, enerjide dışa bağımlılıkta indirgeme olurken tarımda ki dışa bağımlılık korkunç bir şekilde büyümektedir. Ayrıca günümüzde güneş paneli teknolojisiyle dünyaya gelen güneş ışınlarının en fazla %20'si elektriğe dönüştürülebilmektedir. Daha fazla verim alınabilmesi için iyileştirme çalışmaları yapılması gerekir.

### **2.1.6. Güneş enerjisinin van iline ekonomik faydaları**

Doğu Anadolu'nun güneş tarlası olan Van'da, güneş enerji sistemi yapımı için yeterli mevcut alanlar vardır. Van'da Güneş enerji sistemi kurulumu için uygun olan toplam 80 milyon m<sup>2</sup> alan vardır. Bu alanın mevcut olarak 40,8 milyon m<sup>2</sup> si kullanılmaktadır [5]. Bu demektir ki Van ilinin GES kapasitesi yönünden hemen hemen yarısı aktif olarak kullanılabilir ve ekonomiye ciddi anlamda katkıda sağlayabilir. DAKA'ya toplam bazda 147,77 MW kapasitesinde 178 lisansız başvuru yapılmış, van da bu miktar lisanslı kurulum için belirlenen kota 77 MW olduğundan yaklaşık iki katıdır. Bundan ötürü GES kurulumu için halkın bilinçlendiği gözlemlenmektedir. Bilinçlenen vatandaş hem kendi enerjisini üreterek maliyetini düşürüyor hem de ekonomiye katkı sağlayarak dışa bağımlılığı azaltmaktadır. Örneğin; Van Akdamar Adası enerji gereksinimini tamamen fotovoltaik paneller sayesinde karşılamaktadır. Akdamar Adasının yıllık enerji ihtiyacı 15.000 kWh iken yenilenebilir enerji ile 25.651 kWh üretmektedir. İhtiyacından fazlasını üretmektedir [14].

### **2.1.7. Güneş pilleri (Fotovoltaik sistemler)**

Kırsal kesimlerde, yerleşim yerlerinden uzak ve elektrik şebekesinin olmadığı yerlerde daha fazla kullanılan güneş pilleri, ekonomik yönden daha uygun olduğu için yaygın bir şekilde kullanılmaya başlandı. Ülkemizde hala kullanılan yangın gözetleme istasyonları, deniz fenerleri, telekom istasyonları ve otoyol aydınlatmasında kullanılan güneş pillerinin kurulu gücü 300 kW civarındadır [1]. Fotovoltaik güneş panelleri ile güneşli veya bulutlu her türlü hava şartlarında bile elektrik enerjisi üretilir. Ancak mekanik ve termik yoğunlaştırıcı sistemlerde açık ve güneşli hava gereklidir. Bundan ötürüdür ki mekanik ve termik dönüşümlü üreteçler sadece Akdeniz, Güneydoğu ve Doğu Bölgelerinde tercih edilmesi gerekir. Doğu Karadeniz hariç yurdun tüm bölgelerinde fotovoltaik sistemler uygun olup kullanılmaktadır [1].

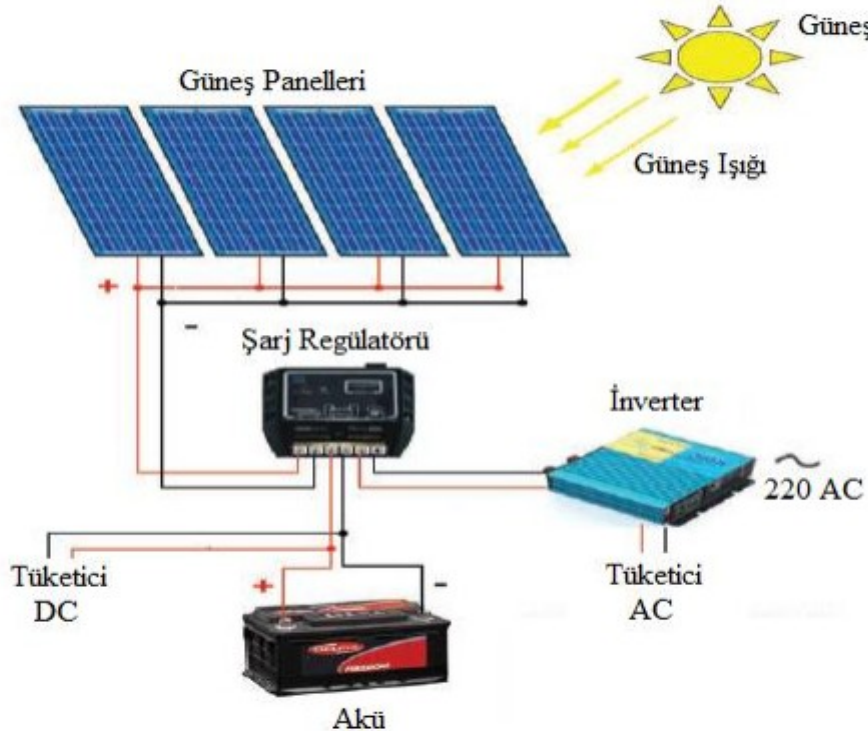
## **3. MATERYAL VE YÖNTEM**

### **3.1. Materyal**

#### **3.1.1. Güneş pili sisteminin kurulması**

Güneş pilinin kurulmasında öncelikli olarak dış etkenlere bağlı olarak üç hususa dikkat edilmesi gerekir. Bunlardan ilki, yıllık bazda en verimsiz aya ait günlük güneş ışınım (Wh/m<sup>2</sup>) değerinin tespit edilmesi, ikincisi ise seçilen en kötü ayın sistem veriminin hesaplanması ve sonuncusu ise güneş enerjisi sisteminin kurulumunun yapılacağı tesisin günlük bazda ortalama yük değerinin (Wh) belirlenmesi gerekir. Bu değişkenleri dikkate alarak GPS kurulumu yapılır ve arıza gibi

olumsuz durumlar olmadığı sürece diğer aylarda da elektrik üretilecektir. Güneş Enerji Sistemini kurarken kullanılan ekipmanlar; Güneş paneli, şarj regülatörü, kablolar, akü ve evirici (inverter) kullanılır. Öncelikle GPS kurulurken ilk aşama, enerji ihtiyacını karşılayacak olan güneş panelini seçmektir. Güneş paneli seçilirken boyut, fiyat ve wattına göre değişmektedir. Bunun için kullanıcı ekonomik durumunu ve enerji ihtiyacını göz önüne getirerek seçmelidir. Güneş Paneli seçildikten sonra enerji durumu dikkate alınarak ihtiyacı olan panel sayısının hesaplanması yapılmalıdır. Daha sonra kullanıcı yine ekonomik durumuna göre akü seçer ve akü sayısını özelliklerine göre tespit eder. Daha sonra şarj regülatörünün kapasitesi bulunur. Şarj regülatörünün amacı ani elektrik boşalmasından ve aküyü aşırı şarjdan korumak için kullanılır. Yani güneş panellerinin ürettiği enerjiden maksimum verim alabilmek için maksimum güç sağlayıcılar da denilebilir. Ceviz işleme tesisinde kullanılan makinelerin birçoğu 220 veya 380 Volt olarak alternatif akımla çalışırlar. Güneş ışığından üretilen elektrik ise 12 Voltluk doğru akımdır. Bu yüzden güneş panel sistemi ile üretilen doğru akımın, alternatif akıma dönüştürülmesi için evirici (inverter) kullanılır. Akü ve evirici ortalama %80-%90 arası bir verimle çalışırlar. Aşağıdaki şekil 3.2’de GPS modelinin dış görünümü gösterilmiştir.



Şekil 3.4. GPS modelinin dış görünümü [15]

### 3.1.2. Sistem bileşenleri

Fotovoltaik sistemleri; akümülatör, invertör, akü şarj regülatörü, kablolar ve elektronik destek devreleri oluşturur. Gece panel verimi düştüğünden ve gün içerisinde güneşin yetersiz olduğu



zamanlarda sistemde genellikle akümülatör bulundurulur [16]. Fotovoltaik sistem gün içerisinde güneşten elde ettiği enerjiyi elektrik enerjisine çevirir ve ürettiğini akülerde stoklar. Daha sonra ihtiyaç halinde gerekli elektrik enerjisi akülerden alınır. Şarj regülatörü ise yükün çektiği ya da güneş pillerinden gelen akımı akımı keser. Ayrıca akülerin aşırı bir şekilde şarj olmasını veya deşarj durumunda akülerin hasar almamasını engeller. Güneş Panelinden elde edilen DC gerilim, AC geriliminin gerekli olduğu durumlarda sisteme evirici eklenerek sinüs dalgasına oluşturulur. Güneş paneli sistemlerine ek olarak çeşitli elektronik devrelerde eklenebilir. Mesela kullanıcı fotovoltaik sistemin maksimum güç noktasında çalışıp çalışmadığını görmek için güç noktası izleyici cihazı ekleyebilir. GPS'ler On-Grid olarak tasarlanırsa, tesisin elektrik gereksinimini panellerden karşılanırken üretilen fazla enerjisi ise şebekeye satılabilir veya panellerden yeterli enerji üretilmezse şebekeden enerji alınabilir. Yani şebekeye bağlı sistemler olarak tanımlanır. Tabii böyle bir sistem tasarlanırsa enerji depolanmasına ihtiyaç yoktur. Ceviz işleme tesisinde ise GPS Off-Grid olarak tasarlanması hedeflenmektedir. Tesisin günlük elektrik tüketimi gerek aylık elektrik faturasından kWh cinsinden hesaplanır gerekse tesisde kullanılan makinelerin tükettiği enerji miktarından hesaplanarak bulunur. Günlük enerji gereksinimi hesaplandıktan sonra fotovoltaik panellerin de saatlik üretim miktarı aynı şekilde hesaplanır. Tüketim miktarını karşılayacak panel sayısı ve gerekli araçların kullanımı temin edilir.

### 3.1.2.1. Fotovoltaik paneller



Şekil 3.5. Fotovoltaik paneller

Sistemin ana elemanı olan ve güneşten gelen ışınları elektrik enerjisine çeviren sistem ekipmanıdır. 70 yıl önce panelin verimi %4 iken gerekli iyileştirme çalışmaları sonrasında verimi günümüzde %15 seviyelerine çıkmıştır. Verimi hesaplanırken  $1 \text{ kW/m}^2$  enerji yaydığı bölgeye göre hesaplanmaktadır [17]. Ülkemizde ise bu değer  $1300 \text{ W/m}^2$  olduğundan verimi daha iyi olduğu görülmektedir. Güneş panellerinin optimum düzeyde bakım ve temizliği yapılırsa yani panel camlarının kirlenmemesine önem verilirse optimum güç verebilecektir. Tabii bunun yanında havanın çok sıcak ve soğuk olması bununla beraber güneş ışınlarının dik açıyla gelmemesi güneş panelinden elde edilen enerjinin verimini düşürecektir. Ülkemizin güneşlenme süresi yazın 11 saat, sonbaharda 7 saat, kışın 5 saat ve ilkbahar 7 saat olarak bilinmektedir. Bu yüzden güneş panellerinden elde edilen enerji mevsimlere göre de değişiklik gösterir.

Dört çeşit panel teknolojisi bulunmaktadır. Bunlar; Monokristal panel, Polikristal panel, İnce film panel ve Esnek panellerdir [17].



Şekil 3.6. Panel çeşitleri

Bizim kuracağımız Fotovoltaik Güneş Sisteminde ise Monokristal panel kullanılacaktır.

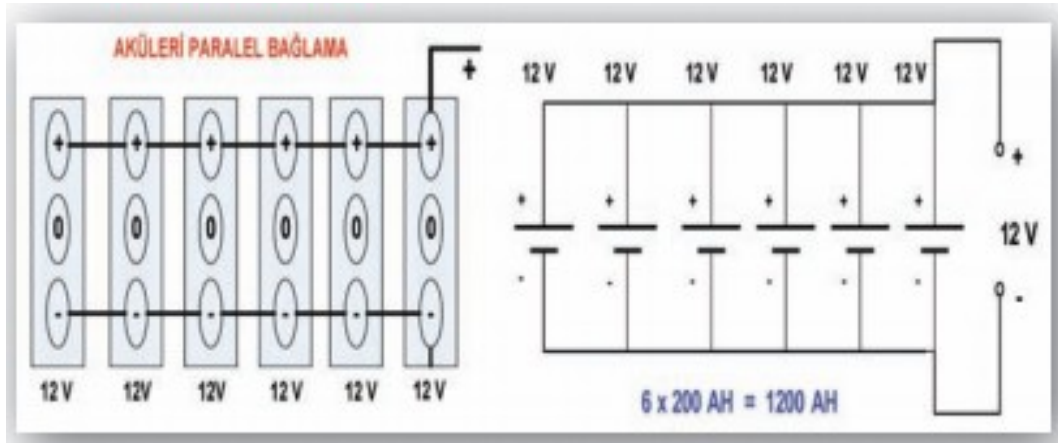
### 3.1.2.2. Akü grubu



Şekil 3.7. Akü grubu

Güneş panel sisteminde akülerin bulunma sebebi, panellerden gerçekleştirilen üretimin elektrik enerjisini depolarlar. Aküler üç tipte görülür. Bunlar; AGM (Absorbed Glass Mat Sealed Lead Acid), Kuru (Flooded Lead Acid) ve GEL (Gelled Electrolyte Sealed Lead Acid). Fotovoltaik sistemler için en çok tercih edilen Kuru tip akülerdir. Akülerin verimleri %90 civarındadır ayrıca akü ömrünü uzun tutmak için kapasite oranı yüzde 50'nin altına düştüğünde şarj edilmelidir. Akü kapasitesi amper-saat olarak ifade edilmektedir. [17]. 12 Voltluk 1200 Amperlik akü  $12V \cdot 1200 \text{ amper-saat} = 14.400 \text{ watt}$  elektrik enerjisi depolar. Depolanan enerjinin yaklaşık %70'den fazlasını kullanmak akü ömrüne zarar vermektedir. Bu yüzden akülerden daha fazla enerji almak için aküler birbirine paralel bağlanır ve akü ömrüde böylece uzun olur. Altı adet 12

voltluk 200 amperlik aküyü paralel olarak birbirine bağlamak mümkündür ancak aküleri birbirine paralel bağlarken dikkat etmemiz gerekir. Hücrelerin Artı (+) kutupları birbirine, eksi (-) kutupları ise birbirine bağlanır. Yani aynı cins plakaların harici bir şekilde birbirine bağlanması gerekir. Altı aküyü birbirine paralel bağladıktan sonra toplam kapasitesi, hücre kapasitesinin hücre adedi ile çarpımı kadar olacaktır. Aşağıdaki şekil 3.6' da görüldüğü gibi altı hücrenin paralel bağlanarak nasıl oluşturulduğu görülmektedir [18].



Şekil 3.8. Akülerin paralel bağlanması

### 3.1.2.3. Akü şarj regülâtörü



Şekil 3.9. Akü şarj regülâtörü

Akülerin deşarj olmasını engellemek için kullanılır. Bununla beraber panelden gelen akımı düzenleyerek aküye iletilmesini sağlayan bileşendir. Akü şarj regülatörü iki çeşittir.

Bunlar; MPPT ve PWM diye adlandırılır. Kısaca özetlenecekse; fotovoltaiik güneş enerjisi sistemleri uzun vadeli bir yatırımdır. Bu yüzden PWM kullanmak yanlış bir durum değildir ancak MPPT regülatörü kullanmak daha verimli olmaktadır diyebiliriz.

Regülatör seçiminde hassas olunması gerek konu, regülatörün gerekli olan maksimum akıma dayanaklılığı ve bataryaların voltajları ile uygun olması gerekir. Sistemlere göre 10A/20A/40A/60A veya 12V/24V/48V gibi regülatör tercih edilmesi gerekir [19]. Regülatörün özelliklerinden biride doğru akımla çalışan cihazlara DC voltaj çıkışı olduğundan direk gerilim verebilirler. Bir diğer özelliği ise regülatörlerin göstergeli olanlarıda mevcuttur. Bu sayede akü ve panel voltajını, akımını ve akülerin şarj durumlarını gösterir. Son olarak GES uygun bir şarj regülatörü seçilirken maksimum akımı mutlaka göz önünde bulundurup tercih edilmesi gerekir. Aşağıdaki çizelgede kullanılan sisteme uygun şarj regülatörü çeşitleri verilmiştir [19].

**Çizelge 3.4.** Şarj regülatörünün panel gücü ve nominal voltaj değerine göre seçimi

Nominal Gerilim Değeri	Panel Gücü	Maksimum Akım
12 V	153 W	9 Amper
	374 W	22 Amper
	544 W	32 Amper
	748 W	44 Amper
	1020 W	60 Amper
24 V	216 W	9 Amper
	748 W	22 Amper
48 V	340 W	5 Amper
	1088 W	16 Amper

#### 3.1.2.4. Evirici (inverter)



**Şekil 3.10.** İnverter (Dönüştürücü)

İnverter, kısacası DC enerjii AC enerjiiye dönüştüren ekipmandır. Aynı zamanda evirici de denilebilir. İnverterlerin gücü seçilirken kullanacağımız cihaz veya makinelerin toplam gücüne göre seçilmelidir. İnverterleri iki grupta inceleyebiliriz.

Birincisi on-grid dediğimiz açık sistemlerdir. Örneğin, enerjinin olmadığı durumlarda depolanmak üzere akü olarak kullanılır. Yani elektriğin olmadığı zaman şebekeden elektrik alabilir. İkincisi ise off-grid dediğimiz kapalı sistemlerdir. Şebekeye bağlı olmadan çalışırlar. Şebeke hattına sahip olmayan köy, dağ, otoyol ve tarla gibi yerlerde güneş veya rüzgârdan faydalanarak elde edilen enerjiiyi dönüştürmek için kullanılır.

### **3.1.2.5. Kablo seçimi**

Doğru akım sistemlerinin hesaplanmasında kullanılan Fotovoltaik sistemlerde kablo seçimi önemli bir husustur. Kablo seçimi önemli görülmediği vakit kablodan ötürü oluşabilecek zararların maliyeti çok yüksek olmaktadır. Örneğin; bir sistemi ele alırsak, sistemin bağlantı parçalarının değeri yaklaşık %5 dir fakat bağlantı ekipmanlarında kalitesiz kablo tercih edildiğinde, sistemde oluşabilecek yangın tehlikesi maddi zarara uğratabilir ve daha önemlisi insan hayatına zararda verebilir. Kablo kesiti hesaplamak için kullanılması gereken formül [20]:

$$A[mm^2] = 0.0175 * 2 * L * P / (fk * U^2)$$

$$A = \text{İletken Kesiti}$$

$$fk [\%] = \text{İletken Kaybı}$$

$$0,0175 = \text{Bakır için spesifik direnç}$$

$$[\text{Ohm} \times mm^2 / m]$$

$$L[m] = \text{Kablo uzunluğu}$$

$$P[W] = \text{Kablo tarafından alınması gereken güç}$$

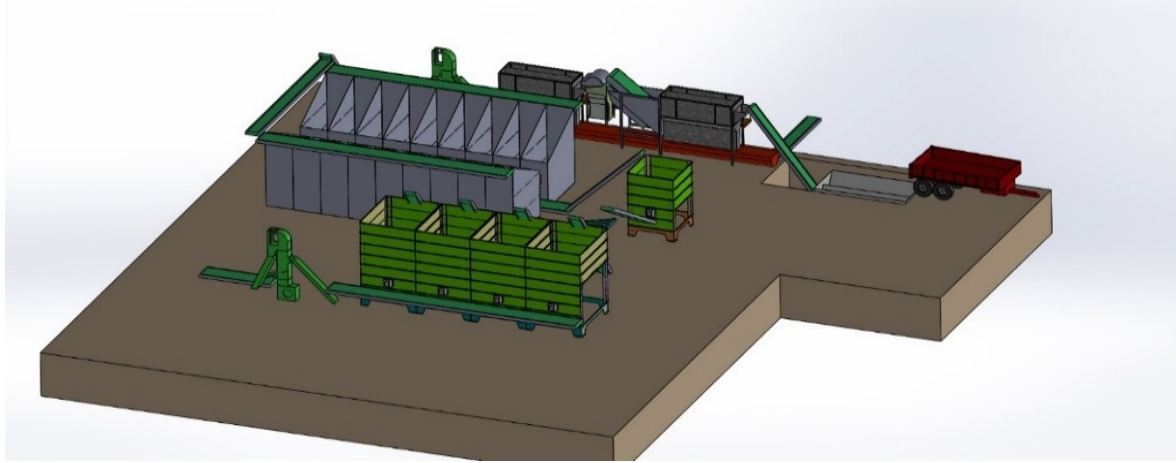
$$U[V] = \text{Sistem Voltajı}$$

Bu formül sayesinde kablo kesiti rahatlıkla bulunabilir. Kolaylık olsun diye formülde kullanılan veriler hesaplanarak bilgisayar ortamında aşağıda görüldüğü gibi bir tablo oluşturulmuştur. Çizelge incelendiğinde, çeşitli amper ve kablo uzunlukları için stardart olan kablo kesitleri verilmiştir [20].

**Çizelge 3.5.** Solar panel sistemlerinde kablo seçimi

Kablo Uzunluğu (m)	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-9
<b>Amper (A)</b>	<b>Kablo Kesiti (mm<sup>2</sup>)</b>							
<b>0-20</b>	2,5	6	6	6	10	10	10	10
<b>21-36</b>	6	6	10	10	20	20	20	35
<b>37-50</b>	6	6	10	10	20	20	20	35
<b>51-65</b>	10	10	20	35	35	35	35	35
<b>66-85</b>	20	20	35	35	35	35	35	35
<b>86-105</b>	20	20	35	35	35	35	35	35
<b>106-125</b>	35	35	35	35	35	35	35	35
<b>126-150</b>	35	35	35	35	35	35	35	35
<b>151-200</b>	35	35	50	50	50	50	50	50

### 3.2. Yöntem



**Şekil 3.11.** Ceviz işleme tesisi görünümü

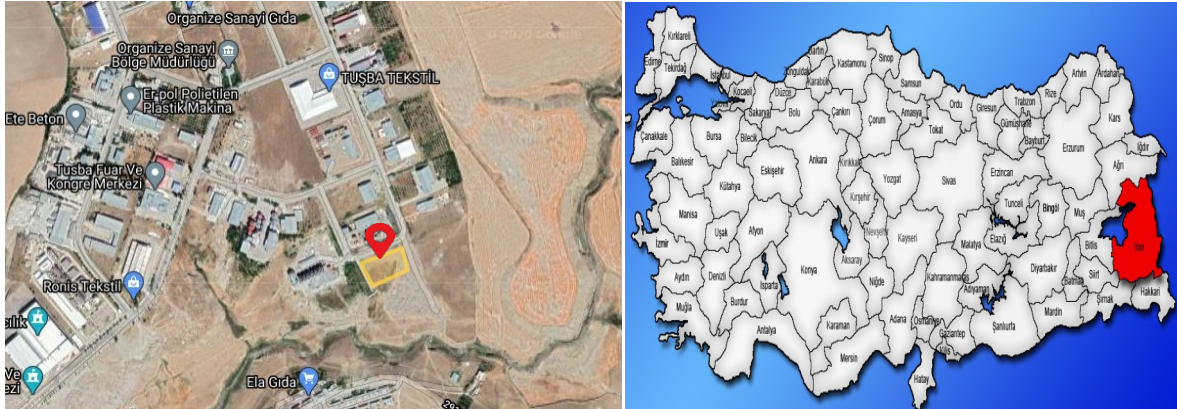
Van'da kurulacak ceviz işleme tesisinin enerji gereksinimi, fotovoltaik güneş enerji sistemiyle tesisin tüm enerji gereksinimi karşılamak için enerji ihtiyacının hesaplanması yapıldı. Tesis içerisinde çalışacak olan makineler günlük 5 saat çalışarak tükettiği enerji ihtiyacına göre analizi yapıldı.

**Çizelge 3.6.** Ceviz işleme tesisinin günlük enerji tüketimi

Cihaz	Enerji Tüketimi (kWh)	Günlük Enerji Tüketimi (kW/9h)
Ceviz Boşaltım Konveyörü	2,2	11
Yıkama Giriş Konveyörü	1,1	5,5
Magnum Yatay Yıkama	2,2	11
Gözle Ayırma Konveyörü	0,75	3,75
Kurutmaya Giriş Konveyörü	1,1	5,5
Kurutma Dağıtım Konveyörü	2,2	11
Kurutma Ön Boşaltma Konveyörü	2,2	11
Bekletme Kasası Açılı Konveyör	1,1	5,5
Çürük Ayırma Makinesi	3	15
Ceviz Kurutma Makinesi	4,08	20,4
Elektrikli Fan (10 adet)	1,8	9
<b>TOPLAM</b>	<b>≈ 22 kWh</b>	<b>≈ 110 kWh</b>

Çizelge incelendiğinde; tesisde yer alan makinelerin enerji tüketim değerleri kilowatt/saat olarak hesaplandı. Günlük enerji tüketimi toplam bazda ortalama 110 kWh olarak hesaplandı.

### 3.2.1. Ceviz işleme tesisinin kurulacak alanı ve konumu



**Harita 3.3.** Tesisin konumu

Ceviz işleme tesisi Van ilinin organize sanayi bölgesinde kurulacaktır. Tesisin toplam alanı 900 m<sup>2</sup> dir. Doğu Anadolu'nun güneş şehri olan Van, güneşlenme süresi olarak da Türkiye ortalamasının oldukça üzerindedir. Güneşlenme süresi doğal olarak yaz aylarında daha fazla görülmektedir.



**Çizelge 3.7. Van ili güneşlenme süresi [13]**

Aylar	Van Potansiyeli	
	Günlük Global radyasyon (kW/m <sup>2</sup> -gün)	Günlük Güneşlenme Süresi (saat/gün)
Ocak	1,91	5,27
Şubat	2,84	6,40
Mart	4,14	7,39
Nisan	5,13	8,50
Mayıs	6,63	10,11
Haziran	6,99	11,55
Temmuz	7,16	11,65
Ağustos	6,05	10,97
Eylül	5,25	10,31
Ekim	3,64	7,65
Kasım	2,31	6,16
Aralık	1,73	4,93
<b>Toplam</b>	<b>1.635,81 kW/m<sup>2</sup> -yıl</b>	<b>3.068,74 saat/yıl</b>

**Çizelge 3.8. FVGS temel verim parametreleri**

Özellik	Veri	Birim
Panel Sayısı	80	Adet
Birim Panel Gücü	400	W
İnvertör verimi	97	%
Kablo kayıpları	6	%
Diğer kayıplar (sıcaklık, gölgeleme, toz vb.)	19	%
Toplam Sistem Verimi	72	%
Toplam Panel Gücü	23	kW
Gerekli aktif panel alanı	300	m <sup>2</sup>

Fotovoltaik güneş sisteminin verim parametreleri incelendiğinde; Kurulan fotovoltaik sistemde toplamda 80 adet Monokristal panel kullanılacaktır. Her bir panelin gücü 400 Watt birimindedir. Fotovoltaik güneş sisteminde invertör, kablo, sıcaklık, gölgeleme, toz vb. gibi kayıpları gözönünde bulundurursak sistemin toplam verimi %72 dir. Bu yüzden 400 W'lık 80 adet panelin gücü 23 kWh olarak bulunur. Tesisin enerji ihtiyacı saatlik 22 kWh olduğu için fotovoltaik sistemin maaliyetlerinde gözönünde bulundurularak tesisin 300 m<sup>2</sup> alanından faydalanılıp fotovoltaik güneş enerji sistemi tesis çatısına kurulacaktır.

#### 4. BULGULAR VE TARTIŞMA

Kurulum yeri için terasa yerleştirilmiş panellerden ortalama elektrik üretimi

**Çizelge 4.9.** Tesisin günlük ortalama elektrik üretimi

Ay	Günlük güneşlenme süresi (saat/gün)	Sistemin günlük ortalama elektrik üretimi (kWh/23kW/gün)
1	5,27	121
2	6,40	147
3	7,39	170
4	8,50	196
5	10,11	233
6	11,55	266
7	11,65	268
8	10,97	252
9	10,31	237
10	7,65	176
11	6,16	142
12	4,93	113

Çizelgeye göre günlük elektrik üretimi değerleri farklılık göstermekle birlikte, en fazla 268 kWh temmuz ayında olması öngörülürken en az ise 113 kWh olarak aralık ayında görülmektedir.

**Çizelge 4.10.** Kurulan sistemin günlük elektrik enerjisi üretimleri ile tesisin enerji ihtiyacının uygunlukları

Aylar	Günlük elektrik üretimi (kWh)	Tesisin günlük ortalama enerji ihtiyacı (kWh)	Yeterlilik Durumu
Ocak	121	110	Yeterli
Şubat	147	110	Yeterli
Mart	170	110	Yeterli
Nisan	196	110	Yeterli
Mayıs	233	110	Yeterli
Haziran	266	110	Yeterli
Temmuz	268	110	Yeterli
Ağustos	252	110	Yeterli
Eylül	237	110	Yeterli
Ekim	176	110	Yeterli
Kasım	142	110	Yeterli
Aralık	113	110	Yeterli

Kurulan sistemin günlük elektrik enerjisi üretimleri ay bazında değerlendirildiğinde tesisin enerji ihtiyacını tüm aylarda karşılandığı görülmektedir. Ancak tesisdeki enerji ihtiyacı günlük 5 saat üzerinden değerlendirildi.

## 5. SONUÇ VE ÖNERİLER

Van ilinin Türkiye'nin fotovoltaik güneş enerjisi bakımından yüksek bir potansiyele sahip olduğu ve şehir güneş tarlası özelliği taşımaktadır. Van ilinin bu potansiyeline dikkat çekmek için çeşitli çalışmalar yapılmaktadır. Ancak yapılan çalışmalara rağmen Van, güneş enerjisi

potansiyeli olarak yüksek olmasına rağmen maalesef yeterli sayıda fotovoltaik güneş enerjisi sistemi bulunmamaktadır. Türkiye’de Van’ın stratejik konumuyla birlikte güneş potansiyelinide göz önünde bulundurursak özel bir konumda olduğu görülmektedir.

Van ilinin global radyasyon değerleri ve güneşlenme sürelerinin Türkiye ortalamasından daha yüksek olduğundan ve tarımsal enerji gereksiniminin ihtiyaçlarından ötürü FVGS’nin tarımda etkin bir şekilde kullanımı mümkün olacaktır. Fotovoltaik güneş sistemi kurulurken, bu sistemden elde edilecek elektrik enerjisinin ihtiyacının önceden bilinmesi önemli bir husustur. Bu hususdan ötürü FVGS’nin kurulacak alanı, güneşlenme süresi, tesisin ortalama elektrik ihtiyacı ve bu ihtiyacın karşılanması için yeterli panel sayısı, panel boyutları ve panel malzemesi belirlenmelidir.

Bu çalışmada, Van ilinde kurulacak olan ceviz işleme tesisinin enerji gereksiniminin, Fotovoltaik güneş sistemiyle giderilmesi için sistem tasarımı yapılmıştır. Amacımız; tarımsal enerji ihtiyaçlarının giderilmesinde, Yenilenebilir enerji kaynaklarına yönelerek hem şehir ekonomisine hem de ülke bazında enerji açığımızı bir nebze de olsa düşürmektir. Ülkemiz güneş enerjisi bakımından Dünya’nın en prestijli ve en zengin bölgeleri arasında yer almasına rağmen FVGS yatırımları oldukça az olarak gözlemlenmektedir. Bu nedenle çalışmamız bölge halkında örnek teşkil edip, mevcut güneş enerjisi potansiyelinide kullanarak yaygınlaştırıp çatı tipi bir FVGS sistem tasarımının nasıl yapılacağı gösterilmek istenmiştir. Böylece fotovoltaik güneş enerjisi sistemiyle ilgilenen kitlelere de faydalı ve örnek bir çalışma olarak hazırlanmıştır.

Sonuç olarak ceviz işleme tesisinin günlük enerji ihtiyacı 110 kWh olarak belirlenmiştir. Tesisin çatı katına kurulan şebekeye bağlı olmayan (Off-Grid) Fotovoltaik güneş sistemi ile sistemin ay bazında günlük enerji üretimi belirlenmiştir. Belirlenen çıkarımlar sonucunda tek vardiya sistemiyle günlük 5 saat çalışan makinelerin toplam enerji ihtiyacı karşılanmıştır.

Tesiste siparislerin yetişmemesi ve yoğunluk gibi durumlardan ötürü ek mesai veya çift vardiya gibi sistemlere geçilirse enerji gereksinimi artar ve üretilen enerji ihtiyaca karşılık vermeyebilir. Bu sebeple önerim, panellerde soğutma sistemi yapılarak panel verimini daha fazla arttırmaya çalışmaktır. Çünkü Panel verimini etkileyen parametreler incelendiğinde, Tablo’ya göre en fazla gölgelenme (%7) ve Sıcaklık (%4,6) parametreleri verimi etkilemektedir. Aşırı ısınma panel verimini önemli ölçüde azaltmaktadır.

Panellerde soğutma sistemi yapılarak verimlilik arttırılabilir.

**Çizelge 4.11. PV verimini etkileyen parametreler**

Parametre	Açıklama	Etki Oranı	Referans
Gölgeleme	Sisteme güç kaynağı yerine yük bağlanmış gibi bir etki oluşturacağından güç tüketimine sebep olmakta ve verim kaybına yol açmaktadır	%7	Rodrigues vd. (2011) Sathyanarayana vd. (2015)
Sıcaklık	Aşırı ısınma panel verimini önemli ölçüde azaltmaktadır	%4,60	Wardowski vd. (1996)
Yansım	Bir foton n tipi ve p tipi malzeme üzerine düştüğünde yasak bant aralığından daha büyük enerjiye sahip olan fotonlar eşit sayıda elektron ve boşluk çifti oluştururlar. Güneşten gelen ışınımın %100'ü kullanılamaz ve bir kısmı geri yansır	%2,50	Navruz (2013)
Tozlanma	Oluşan toz panel üzerine gelen ışınımın azalmasına yol açarak geçirgenliği azaltmakta ve kısa devre akımını etkileyerek verimi azaltmaktadır	%2	Boppana (2015)
Işınım	Enerjinin güneşten tanecik biçiminde yayılmasıdır ve gelen ışınımın %100'ü kullanılamaz, bir kısmı geri yansır	%1,50	Navruz (2013)
Spektrum	Fotovoltaik olayda güneş ışığını soğuracak malzeme yasak enerji aralığı güneş spektrumu ile uyumlu ve elektrik yüklerinin birbirinden ayrılabilmesine izin verebilecek özellikte bir yarı iletken olmalıdır	%1	Grunov vd. (2009)
DC kablo kaybı	Sistemde kullanılan kabloların iç direncinden kaynaklanan kayıplardan kaynaklanır	%5	Deniz (2013)
İnverter	İnverterdeki yarı iletken, manyetik malzeme ve kapasitörlerin iletim ve anahtarlama kayıplarına bağlıdır	%3	Giesler (2010)
AC kablo kaybı	Sistemde kullanılan kabloların iç direncinden kaynaklanan kayıplardır	%1	Deniz (2013)
Uyumsuzluk	Şebekeye bağlı bir sistemde uygun gerilim seviyesine ulaşmak için çok sayıda hücre kullanılır. Bu durum çok sayıda PV hücresinin birbirine seri bağlı olarak aynı DC akımda çalışmasına yol açar	%0,70	Sathyanarayana vd. (2015)

Çizelge incelendiğinde; Fotovoltaik Sistemlerde panel verimliliğini ciddi anlamda etkileyen önemli etkenlerden biri sıcaklık unsurudur. Panelde aşırı ısınma, veriminin olumsuz etkilenmesine sebep olmaktadır. Hücre sıcaklığındaki her 10C artışla üretilen gerilim 0,5 V azalmaktadır [21].



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**AGREGA DANE BOYUTU VE BORAKS KATKISININ BETONUN RADYASYON SOĞURMA ÖZELLİKLERİ ÜZERİNE OLAN ETKİLERİNİN KARŞILAŞTIRILMASI**

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**ÖZET**

Beton bir çok yapı malzemesine göre daha kolay şekil alabilmesi, daha ekonomik olması ve bir çok yapı malzemesine göre daha dayanıklı bir malzeme olması gibi özellikleri sebebiyle günümüzde yapı endüstrisinde sıkça kullanılmaktadır. Betonun kullanım alanına göre çeşitlendirilmektedir. Beton içesine eklenen agregaya boyutu ve çeşitli kimyasallar betonun fiziksel ve kimyasal özelliklerine etki etmektedir. Böylece betonun amacına uygun olarak hazırlanması ve kullanılabilmesi mümkün olmaktadır. Bu çalışmada farklı dane boyutlu agregalar (2 ,4 ve 8 mm) ile 2% boraks katkılanarak hazırlanmış betonların radyasyon geçirgenlik özellikleri 137Cs kaynağı vasıtasıyla 662 keV enerjisinde NaI (Tl) dedektörü vasıtası ile gerçekleştirilmiştir. Hazırlanan bu betonlara ait ineer soğurma katsayısı değerleri ile yarı geçirgenlik değeri, onda bir geçirgenlik değeri ve ortalama serbest yol değerleri deneysel sonuçlar kullanılarak hesaplanmıştır. Elde edilen sonuçlara göre betondaki agregaya dane boyutunun artışı ve boraks katkısının betonda radyasyon soğurma etkinliğinin arttığı gözlemlenmiştir.

**Anahtar kelimeler:** Beton, dane boyutu, boraks, radyasyon soğurma



**COMPARISON OF THE EFFECTS OF AGGREGATE PARTICLE SIZE AND BORAX ADDITIVE ON THE RADIATION ABSORPTION PROPERTIES OF CONCRETE**

**ABSTRACT**

Concrete is easier to shape than many building materials. It is more economical and can be used in many building materials. It is frequently used in the building industry today due to its properties such as being a more durable material than it is diversified according to the usage area of concrete. Aggregate size and various chemicals added to the concrete affect the physical and chemical properties of the concrete. Thus, it is possible to prepare and use the concrete in accordance with its purpose. In this study, the radiation permeability properties of concretes prepared by adding 2% borax with aggregates of different grain sizes (2, 4 and 8 mm) were determined by the NaI (Tl) detector at 662 keV energy by means of a <sup>137</sup>Cs source. The values of the Linear Attenuation Coefficient, Half Value Layer, Tenth Value Layer and Mean Free Path values of these prepared concretes were calculated using the experimental results. According to the results obtained, it was observed that the increase in the aggregate particle size in the concrete and the radiation absorption efficiency of the borax additive in the concrete increased.

**Keywords:** concrete, grain size, borax, radiation absorption

## **1. INTRODUCTION**

Concrete has been used effectively in the construction industry in the last century. In addition to the traditionally used concrete, specially prepared concretes are produced to meet the desired properties and are used in the construction industry. Special concretes vary in terms of materials used, mixing ratios, properties and areas of use (Aydeniz et al., 2012)(KILINÇARSLAN, 2011). There are many types of concrete developed for special purposes for different usage areas. Special purpose concretes are usually obtained by changing the used aggregate and chemical additives or by changing their usage rates (Gan, 1997).

Inorganic materials with different mineral structures such as sand, gravel, crushed stone, which are used with cement and water in the production of concrete, mortar and similar, are called aggregates (Gan, 1997).

Aggregates constitute approximately 3/4 of the prepared cementitious system volume, and in this respect, aggregates are inexpensive materials in the construction of cementitious systems. They reduce the costs of the cement mixture and Aggregates contribute significantly to the technical characteristics of the cementitious system (Gan, 1997).

Aggregates prevent shrinkage in the cement paste. thus, cracks that will occur in concrete during concrete production can be prevented to a great extent. Since aggregates are hard materials, they have a significant effect on the strength of the concrete mixture. It is very important that the aggregate component exhibits a suitable particle size distribution, the air gap in the aggregate will be less in concrete prepared with a well-sized aggregate. therefore, the selection of suitable aggregates will increase the density of the concrete (Aydeniz et al., 2012).

Due to its hardening feature, the substance used in cement making in the construction industry is also used in the waste industry and energy sector. Borax welding powder is widely used in the construction industry (Helmuth, 1987). Powdered borax is white, consists of soft colorless crystals and is readily soluble in water. Some different closely related minerals or chemical compounds in crystalline water content are called borax, but the word usually refers to decahydrate (Krane and Lynch, 1989).

In this study, the effect of different aggregate sizes (2, 4 and 8 mm) in 2% borax added cement on the radiation absorption properties of concrete was investigated. For this purpose, measurements were carried out with the experimental setup prepared with  $^{137}\text{Cs}$  radiation source and NaI(Tl) detector (Kavun et al., 2022). By obtained experimental results, Linear Attenuation Coefficient values and Half Value Layer, Tenth Value Layer and Mean Free Path values were calculated. According to the obtained results, it was observed that the radiation

shielding efficiency of the concrete increased with the increase in the aggregate particle size in the concrete.

## 2. MATERIAL and METHOD

Beer lambert's law is used to determine the amount of radiation interacting with the material as given in Eq. 1 (Eskalen et al., 2020):

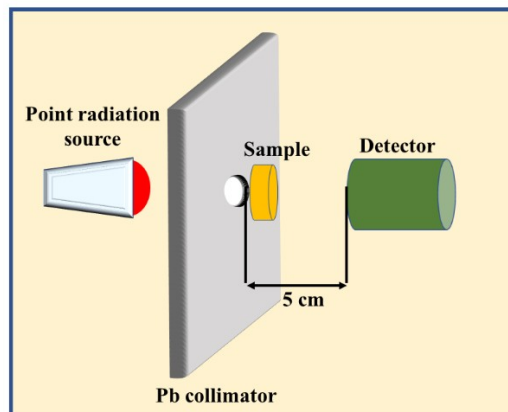
$$\mu = \ln\left(\frac{I_0}{I}\right) / (-x) \text{ (cm}^{-1}\text{)} \quad (1)$$

The value that expresses the material thickness that halves the amount of radiation passing through the material is Half Value Layer (HVL) (Eq.2), and the value that expresses the thickness that decreases to one-tenth is Tenth Value Layer (TVL) (Eq.3). MFP specifies the path taken by the radiation in the material (Kavun et al., 2019).

$$\text{Half Value Layer (HVL)} = \frac{\ln 2}{\mu} \text{ (cm)} \quad (2)$$

$$\text{Tenth Value Layer (TVL)} = \frac{\ln 10}{\mu} \text{ (cm)} \quad (3)$$

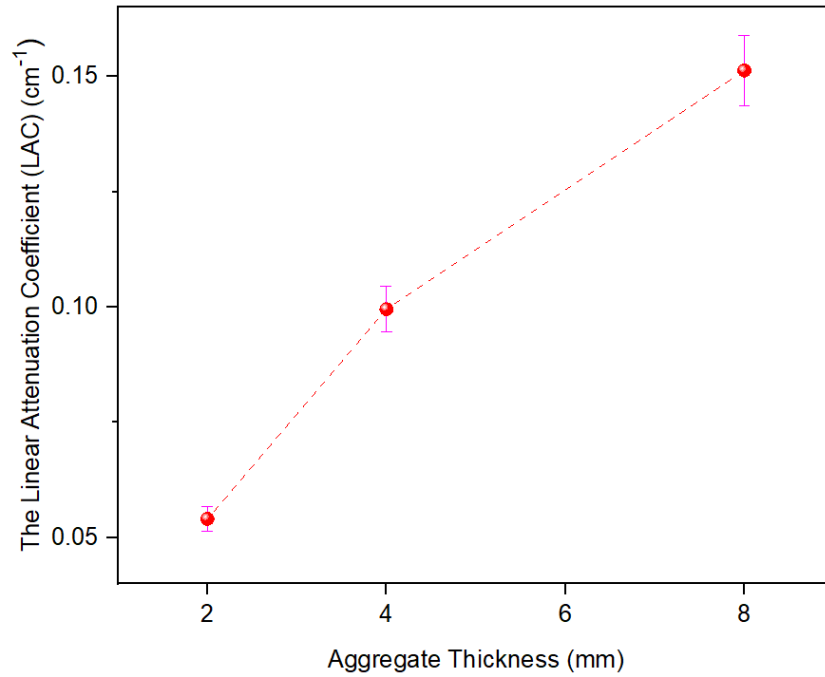
<sup>137</sup>Cs source and NaI(Tl) (ORTEC® 905-4) detector were used in the experiments. This experimental setup is given in Figure 1(Eskalen et al., 2020).



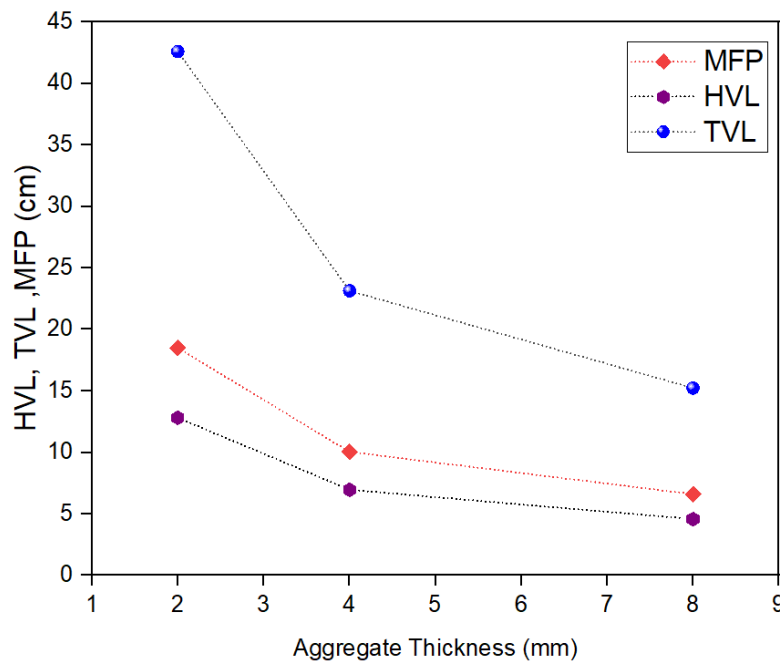
**Figure 1.** Experimental setup (H. Eskalen et al., 2020)(H. Eskalen et al., 2020).

## 3. RESULT and DISCUSSION

In this study, radiation absorption properties of 2, 4 and 8 mm aggregates in 2% borax added concrete were investigated. According to the experimentally obtained values as seen in Figure 2, the linear attenuation coefficient (LAC) value was 0.05 cm<sup>-1</sup> for 2 mm aggregates and 0.15 cm<sup>-1</sup> for 8 mm aggregates.



**Figure 2.** Linear attenuation Coefficient (LAC) values



**Figure 3.** HVL, TVL and MFP values

In this study, HVL, TVL and MFP values were calculated using LAC. Accordingly, while the HVL value is 12.82 cm at 2 mm aggregate size, the TVL value is 42.58 cm and the MFP value is 18.49 cm. In 8 mm aggregate, these values decreased and were measured as 4.58, 15.22 and 6.61 cm, respectively.

#### **4. CONCLUSION**

In this study, the effects of borax additive and aggregate dimensions on radiation absorption were investigated. Accordingly, when the borax additive was kept at 2%, it was determined that the radiation absorption parameters of the concretes prepared with 2 mm, 4 mm and 8 mm aggregates were positively affected by the increase in aggregate size.

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**BETONDAKİ AGREGA DANE BOYUTUNUN RADYASYON SOĞURMAYA  
ETKİSİNİN ARAŞTIRILMASI**

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**ÖZET**

Beton agrega, çimento ve su gibi maddelerin karıştırılmasıyla oluşturulur. Bu yapı malzemelerinin oranlarının değişimi de betonun fiziksel ve kimyasal oluşum sürecini etkilemektedir. Özellikle agrega boyutunun değişimi betonun cinsi ve kullanım özellikleri üzerindeki etkileri büyüktür. Ayrıca betondaki agrega dane boyutunun, betonun radyasyon ile etkileşimine de etki etmektedir. Bu çalışmada farklı dane boyutları ile hazırlanmış betonların radyasyon geçirgenlik özellikleri <sup>137</sup>Cs kaynağı vasıtasıyla 662 keV enerjisinde NaI(Tl) dedektörü vasıtası ile gerçekleştirilmiştir. Deneysel olarak elde edilen lineer soğurma katsayısı değerleri ile yarı geçirgenlik değeri, onda bir geçirgenlik değeri ve ortalama serbest yol değerleri hesaplanmıştır. Elde edilen sonuçlara göre betondaki agrega dane boyutunun artışı ile betonun radyasyon soğurma etkinliğinin arttığı gözlemlenmiştir.

**Anahtar kelimeler:** Beton, dane boyutu, radyasyon soğurma

**INVESTIGATION OF THE EFFECT OF AGGREGATE GRAIN SIZE IN CONCRETE  
ON RADIATION ABSORPTION**

**ABSTRACT**

Concrete is formed by mixing materials such as aggregate, cement and water. The change in the proportions of these building materials also affects the physical and chemical formation process of concrete. In particular, the change in aggregate size has great effects on the type of concrete and its usage characteristics. In addition, the aggregate particle size in the concrete also affects the interaction of the concrete with the radiation. In this study, the radiation permeability properties of concretes prepared with different grain sizes were determined by the NaI(Tl) detector at an energy of 662 keV by means of a  $^{137}\text{Cs}$  point radiation source. Experimentally obtained Linear Attenuation Coefficient values and Half Value Layer, Tenth Value Layer and Mean Free Path values were calculated. According to the obtained results, it was observed that the radiation shielding efficiency of the concrete increased with the increase in the aggregate particle size in the concrete.

**Keywords:** concrete, grain size, radiation absorption



## **5. INTRODUCTION**

Concrete is one of the basic building materials in contemporary societies. Various types of concrete are used in many areas such as roads, buildings, bridges, dams and nuclear power plants (Aydeniz et al., 2012). The basis of the active use of concrete is that it can be easily shaped and durable compared to other building materials (Aydeniz et al., 2012). They are also more economical than other building materials. In addition, concrete can be produced with less energy consumption compared to other building materials. Due to such properties, concrete is widely used in the field of construction (Gan, 1997)(ÖZKAN, 2004).

Concrete, which is a composite material containing cement, fine aggregate, coarse aggregate, water and, if necessary, various chemical and mineral wastes, must be covered with cement paste and all coarse aggregate particles with mortar. Here, concrete gains strength as a result of the reaction of cement, which is the binding material, with water (KILINÇARSLAN, 2011).

There are different building materials in concrete. aggregates have an important place among them. Aggregate is a heap of natural, artificial or both dense mineral material with unbroken and/or broken grains of various sizes, usually up to 100 mm (Aydeniz et al., 2012).

Natural Aggregate is the aggregate that exists in nature by natural means and is broken after being taken from nature. Artificial Aggregate; It is the crushed or unbroken aggregate of industrial products such as blast furnace slag stone, smelting slag or slag sand. Natural Mixed Aggregate; It is a mixed aggregate obtained directly from the aggregate quarry, crusher or industry. Aggregates that have been sieved to separate the particles larger than the maximum particle size are also called natural mixed aggregates (Geçten and Gül, 2019). Ready Mixed Aggregate, on the other hand, is interconnected in place during concrete production in a way to ensure a certain particle distribution of fine and coarse aggregates or these aggregates divided into several grain classes (Aydeniz et al., 2012). Aggregate formed by mixing. Most of the sand and gravel used in mortars and concretes are those extracted from sand beds left by water currents such as rivers, streams, streams, and a variety called river sand or ice masses dragged and piled up (Gurler and Akar Tarim, 2012).

There are some important properties sought in aggregates. These; hard, durable and void-free, do not contain weak grains (sea shell, wood, coal, etc.), resistant to pressure and abrasion, do not contain substances that can damage dust, soil and concrete, do not contain flat and long grains, do not react harmfully with cement (Gan, 1997).

The change in aggregate size has great effects on the type of concrete and its usage characteristics. In addition, the aggregate particle size in the concrete also affects the interaction

of the concrete with the radiation. In this study, the radiation permeability properties of concretes prepared with different grain sizes (2, 4 and 8 mm) were determined by the NaI(Tl) detector at an energy of 662 keV by means of a <sup>137</sup>Cs point radiation source. Experimentally obtained Linear Attenuation Coefficient values and Half Value Layer, Tenth Value Layer and Mean Free Path values were calculated. According to the obtained results, it was observed that the radiation shielding efficiency of the concrete increased with the increase in the aggregate particle size in the concrete.

## 6. MATERIAL and METHOD

The Lambert-Beer's law is used to linear attenuation coefficient (LAC) given in Eq. 1 to obtain radiation absorption quantity (H. Eskalen et al., 2020).

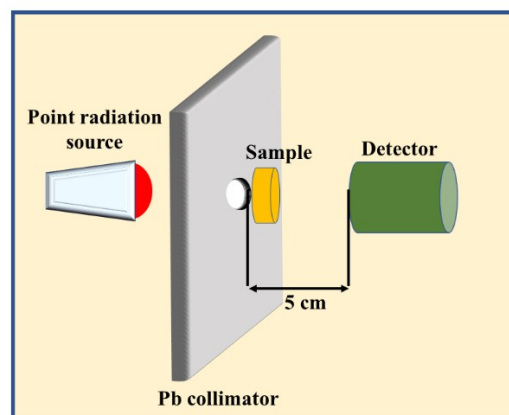
$$\mu = \ln\left(\frac{I_0}{I}\right) / (-x) \text{ (cm}^{-1}\text{)} \quad (1)$$

Half Value Layer (HVL) (Eq.2) is the half-pass value of the radiation coming into the material. The value that expresses the transmittance of one tenth is Tenth Value Layer (TVL). The value that expresses the path taken by the radiation in the concrete is the MFP (Kavun et al., 2022).

$$\text{Half Value Layer (HVL)} = \frac{\ln 2}{\mu} \text{ (cm)} \quad (2)$$

$$\text{Tenth Value Layer (TVL)} = \frac{\ln 10}{\mu} \text{ (cm)} \quad (3)$$

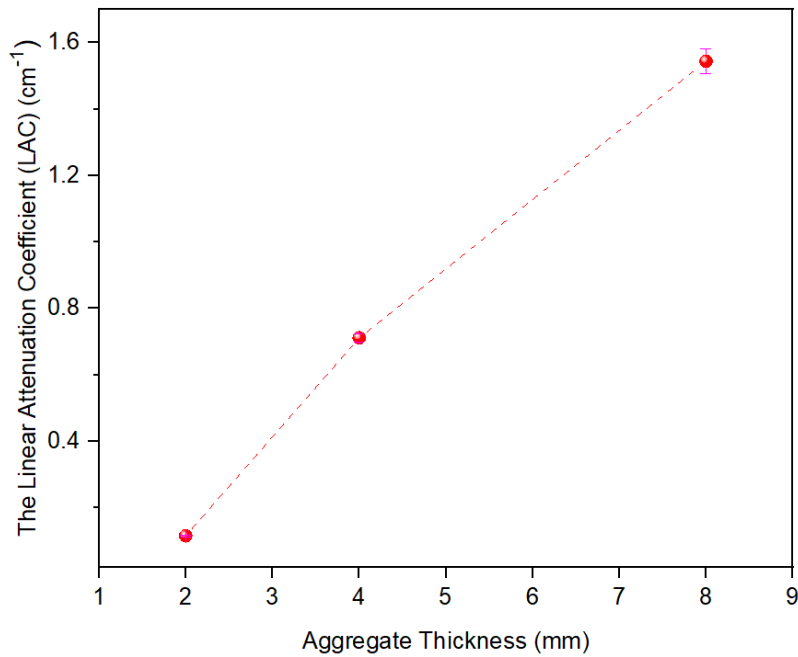
<sup>137</sup>Cs was used as the gamma source and the NaI(Tl) (ORTEC® 905-4) detector have been used for measurements. This experimental setup have been given in Figure 1.



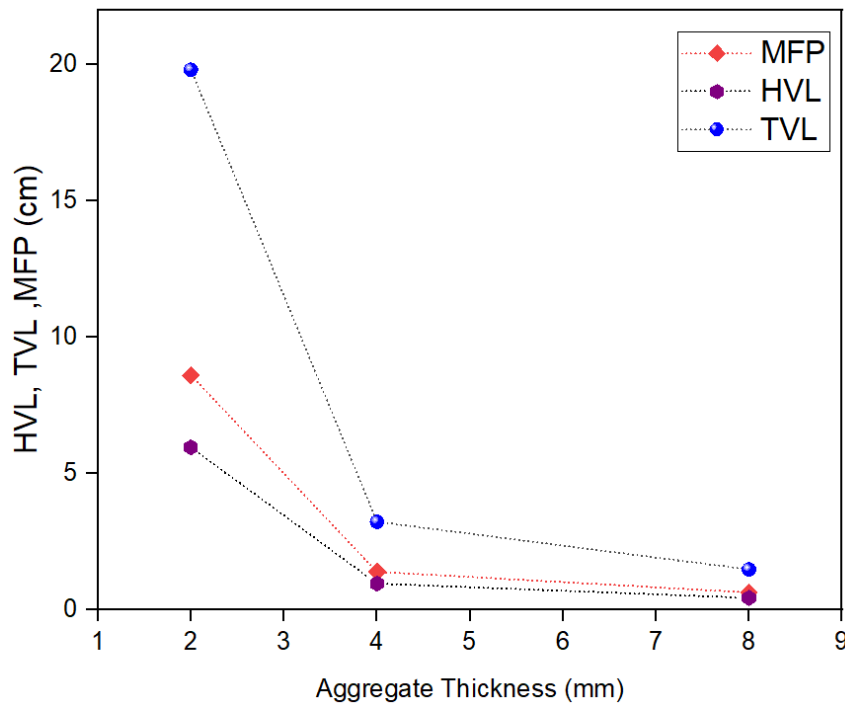
**Figure 1.** Experimental Schema of radiation shielding measurements (H. Eskalen et al., 2020; Kavun et al., 2022)

## 7. RESULT and DISCUSSION

In this study, the effects of different (2,4 and 8 mm) grain size aggregates on radiation absorption were investigated. Accordingly, as seen in Figure 2, the linear attenuation coefficient value (LAC) obtained at 2 mm aggregate size is  $0.1162 \text{ cm}^{-1}$ ,  $0.7118 \text{ cm}^{-1}$  for 4 mm aggregate size and  $1.5443 \text{ cm}^{-1}$  for 8 mm aggregate size.



**Figure 2.** Linear attenuation Coefficient (LAC) values of concrete



**Figure 3.** Half Value Layer, Tenth Value Layer and Mean Free Path Values of concrete

The half value layer value, which expresses the material thickness required for half of the incoming radiation amount to pass, starts from 5.967 cm and ends at 0.449 cm. The Tenth Value Layer value, which expresses the material thickness required to reduce the amount of incoming radiation by one tenth, starts from 19.822 cm and end at 1.491. The mean free path, which is the value that expresses the average free path taken by the radiation in the material, starts from 8.609 cm and decreases to 0.648 cm.

## **8. CONCLUSION**

In this study, radiation absorption amounts of concretes prepared with cements containing aggregates of 2, 4 and 8 mm were measured. According to the LAC values obtained from here, the absorption increases as the grain size increases. accordingly, HVL, TVL and MFP values also decrease. According to the results obtained from here, the effect of particle size on radiation absorption is positive.

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**KAOLİN KİLİ İKAMELİ ÇİMENTO HAMURUNUN YÜKSEK SICAKLIK  
PERFORMANSI**

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**ÖZET**

Kaolin kili, yüksek performanslı betonlar üretmek için potansiyel bir alümina silikat kaynağı olan bir malzemedir. Kaolin kili çimentoya katkı malzemesi olarak kullanılmasıyla klinker üretimi azaltılarak CO<sub>2</sub> emisyonlarıyla ilgili çevresel sorun önlenmesinde yardımcı olabileceği öngörülmektedir. Ayrıca, kaolin kilinin yerel kaynak olması nedeniyle kolay temin edilebilmesi yanı sıra ekonomik olarak daha uygun bir malzeme olarak dikkat çekmektedir. Bu çalışma, %10-15-20-25-30 oranlarında kaolin ikame edilen çimento hamuru numunelerinde yayılma tablası, kılcal su emme ve basınç deneyleri yapılmıştır. Daha sonra numuneler 800 C’de 2 saat boyunca yüksek sıcaklığa maruz bırakılarak basınç dayanımlarındaki değişimler incelenmiştir. Elde edilen sonuçlara göre kaolin ikamelili çimento hamurunun yüksek sıcaklığa maruz kalması sonucunda dayanımda azalma oranına anlamlı bir katkı sağlamadığı görülmüştür. Kaolin kil ikamesi kılcal su emme oranını referans numunesine göre artırdığı ve yayılma çapını azalttığı tespit edilmiştir.

**Anahtar kelimeler:** Çimento hamuru, kaolin, basınç dayanımı, yüksek sıcaklık

**INVESTIGATION OF HIGH TEMPERATURE PERFORMANCE OF KAOLIN CLAY  
SUBSTITUTION TO CEMENT PASTE**

**ABSTRACT**

Kaolin clay is a potential source of alumina silicate for producing high-performance concretes. It is predicted that the use of kaolin clay as an additive to cement can help prevent environmental problems related to CO<sub>2</sub> emissions by reducing clinker production. In addition, due to the fact that kaolin clay is a local source, it attracts attention as a more economically suitable material as well as being easily available. In this study, flow-table, capillary water absorption and compressive tests were carried out on cement paste samples with 10-15-20-25-30% kaolin replacement. Then, the samples were exposed to high temperature at 800 °C for 2 hours and the changes in their compressive strength were examined. According to the results obtained, it was observed that the kaolin substituted cement paste did not contribute significantly to the decrease in strength as a result of exposure to high temperatures. It was determined that the kaolin clay substitution increased the capillary water absorption rate compared to the reference sample and decreased the spreading diameter.

**Keywords:** Cement paste, kaolin clay, compressive strength, high temperature

## **1.GİRİŞ**

Çimento esaslı kompozitlerin kullanımının artması klinker üretimi ile CO<sub>2</sub> salınımında artış meydana gelmektedir. Bu salınım insan kaynaklı CO<sub>2</sub> emisyonunun yaklaşık %5-8'ini meydana getirmekte ve Portland çimentosunun 1 ton üretiminde ortalama 0,8-0,9 ton CO<sub>2</sub> açığa çıkmaktadır. Bu CO<sub>2</sub> salınımı azaltmak, evrensel karbon emisyonunu azaltmaya yardımcı olacaktır (Du, Pang, 2020). Çimento yerine belirli oranlarda puzolanik özellikteki malzemelerin kullanımı CO<sub>2</sub> emisyonunu azaltmak için kullanılan yöntemler arasında yer almaktadır (Poudyal, Adhikari, 2021). Bunlar; uçucu kül ve yüksek fırın cürufu (Topçu, Karakurt, 2007), pirinç kabuğu külü (Özdemir, Koçak 2020) bu malzemelerdendir.

Çimentolu esaslı malzemelerden beklenen dayanımın yanı sıra sürdürülebilir olması istenmektedir. Çimento kompozitlerinin sürdürülebilirlik özelliğini etkileyen etkenlerden biriside yüksek sıcaklıktır. Yüksek sıcaklık, betonun mikro ve makro yapısında ciddi bozulmalar meydana getirmektedir (Ma, Qianmin, et al. 2015). Bu etki kalıcı hasar verebileceği için malzemenin hizmet ömründe de azalmalar meydana getirecektir. Çeşitli sıcaklıklarda çimento hamurunda önemli fiziksel ve kimyasal dönüşümler meydana gelir. 100 °C ve altındaki sıcaklıklarda çimento hamuru içerisinde bulunan serbest su buharlaşır ve 100 °C üzerindeki sıcaklıklarda kimyasal bozulmalar meydana gelir (Khoury, 1992). 600 °C 'ye kadar çimento hamurundaki toplam boşluk hacmi artar. Toplam boşluk hacminin artması çimento hamurunun dayanımını azaltmaktadır (Alonso vd., 2003). Çimento esaslı kompozitlerin yüksek sıcaklığa dayanıklılığı üzerine yapılan çalışmalarda farklı malzemeler yöntemler kullanılmıştır. Bunlar; çelik ve karbon fiber (Lau, Anson, 2006), atık mermer tozu ve cam lif (Gökçer vd., 2013), çelik ve/veya polipropilen lifler (Yermak et al., 2017) betonun yüksek sıcaklıktaki davranışını etkileyen malzemeler arasında yer almaktadır.

Bu çalışmada kaolin kilinin %10-15-20-25-30 oranlarında çimento ikamesi olarak çimento hamuru üretilmiştir. 7 ve 28 gün basınç dayanımları sonrasında, 28 günlük numuneler üzerinde kılcal su emme deneyi ile 800 °C'de 2 saat boyunca yüksek sıcaklığa maruz bırakılmıştır. Yüksek sıcaklık sonrası basınç dayanımları belirlenerek kontrol grubu ile karşılaştırılmıştır.

## **2. MATERYAL VE YÖNTEM**

### **2.1 MATERYAL**

#### **Çimento**



Çalışmada çimento hamuru numuneleri üretmek için TS EN 197-1 uygun olarak. CEM I 42.5 R Portland çimentosu kullanılmıştır. Kullanılan çimentoya ait fiziksel ve kimyasal özellikler Tablo 1 'de verilmiştir.

**Tablo 1.** Deneylerde kullanılan çimentoya ait fiziksel ve kimyasal özellikler

KİMYASAL KOMPOZİSYON	%	FİZİKSEL KARAKTERİSTİKLER	DEĞER
TOPLAM $SiO_2$	19,84	45 MİKRON ELEK ÜSTÜ (%)	5,27
$Al_2O_3$	4,91	ÖZGÜL YÜZEY (BLAİNE) ( $CM^2/G$ )	3625
$Fe_2O_3$	3,52	ÖZGÜL AĞIRLIK ( $G/CM^3$ )	3,12
CAO	61,65	PRİZ SÜRESİ (VİCAT) DAKİKA BAŞLANGIÇ	155
MGO	1,33	PRİZ SÜRESİ (VİCAT) DAKİKA BİTİŞ	230
$SO_3$	2,70	SU İHTİYACI (%)	27,5
KIZDIRMA KAYBI	2,73	HACİM GENLEŞMESİ(MM)	0,55
$Na_2O$	0	BASINÇ DAYANIMI 2. GÜN (MPA)	24,75
$K_2O$	0	BASINÇ DAYANIMI 28. GÜN (MPA)	57,70
CI	0,007		
ÇÖZÜNMEYEN KALINTI	0,95		

## Kaolin

Balıkesir-Sındırgı ilçesinde bulunan kaolin kil yatağından alınıp ticari olarak satışı gerçekleştirilen kaolin kili kullanılmıştır. Kaolinin özgül ağırlığı  $2,63 \text{ gr/cm}^3$  olarak belirlenmiştir. Kullanılan kaolin kilinin fiziksel ve kimyasal özellikleri Tablo 2' de verilmiştir.

**Tablo 2.** Kaolin kilinin fiziksel ve kimyasal özellikleri

Bileşen	Oran (%)
$SiO_2$	69,1
$Al_2O_3$	15,2
$Fe_2O_3$	0,2
CaO	0,1
$Na_2O$	0,03
$K_2O$	11,07
Diğer	4,3

## 2.2 YÖNTEM

### Numunelerin Hazırlanması

Üretilen çimento hamuru kaolin kilinin ağırlıkça farklı oranlarda ikame edilmesiyle hazırlanmıştır. Yapılan ön deneylerde su/çimento oranı 0,35 olarak belirlenmiştir. Şekil 1'de verilen mikser kullanılarak ilk önce çimentoya kuru olarak kaolin kili katılmış ve 60 saniye karıştırılmıştır. Karışım suyu ikiye bölünerek her bir aşama 60 s karıştırmak üzere iki aşamada

eklenmiştir. Karışım suyunun yarısına bağlayıcı maddenin %1 oranında polikarboksilat esaslı süper akışkanlaştırıcı eklenmiştir. Numune kodlamasında kaolin kili “K” ile temsil edilerek katkı oranı yanında belirtilmiştir. Örneğin; K0.10: K; kaolin kili, 0.10; çimentoya ağırlıkça ikame oranını göstermektedir.



**Şekil 1.** Mikser

### **Yayılma Tablası Deneyi**

TS-EN 1015-3 standardına uygun olarak kesik koni kalıp içerisine çimento hamuru eklenir. Kalıp çıkarılıp harç saniyede 1 defa olacak şekilde 15 düşme yapılarak yayılma çapı ölçülür. Kullanılan deney aleti Şekil 2’ de verilmiştir.



**Şekil 2.** Yayılma tablası deneyi

### **Basınç Dayanımı Tayini**

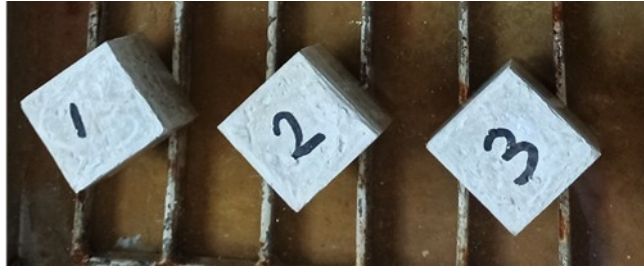
Basınç deneyleri, 50x50x50 mm küp numuneler üzerinde yapılmıştır. Deneyler, sabit yükleme hızında gerçekleştirilmiş ve TS EN 12390-3AC'ye göre 0,4 MPa/s alınmıştır. Kullanılan deney aleti Şekil 3' te verilmiştir.



Şekil 3. Basınç dayanımı deney aleti

#### 2.2.4 Kılcal Su Emme Tayini

Her numune serisine ait 24 saat 70 °C' de etüvde kurulmuş ve 3 adet küp numune alt yüzeylerinden su ile temas ettirilerek kılcal su emme deneyine tabi tutulmuştur. Kılcal yolla emilen su miktarları belirli zaman aralıklarıyla numuneler tartılarak ölçülmüştür.



Şekil 4. Kılcal su emme deneyi

#### 2.2.5 Yüksek Sıcaklık Deneyi

Çimento hamuru 800 °C 'de yüksek sıcaklığa maruz kalması halinde meydana gelen değişimler incelenmiştir. Bu amaçla dijital kontrol panelli, 1200 °C 'ye kadar ısıtma kapasiteli içerisi seramik kaplı yüksek sıcaklık fırını kullanılmıştır.



Şekil 5. Kül fırını

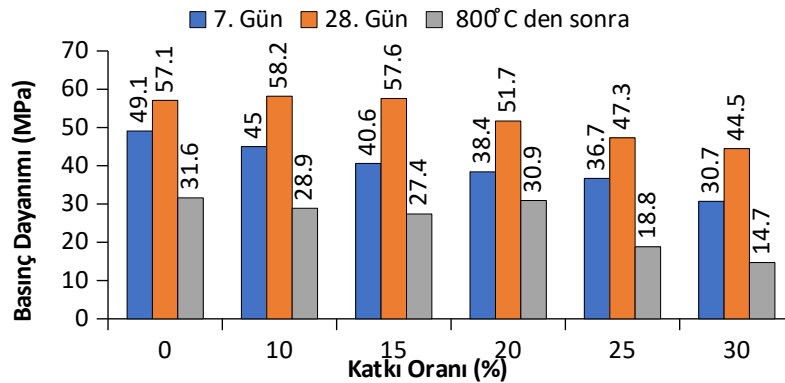
### 3. ARAŞTIRMA BULGULARI

Kontrol ve kaolin katkılı ikameli çimento hamurlarına ait sonuçlar Tablo 3’te verilmiştir.

**Tablo 3.** Kalsine bentonit katkılı çimento hamurlarına ait dayanımlar

NUMUNE	YAYILMA ÇAPI	SU EMME ORANI (%)	BASINÇ DAYANIMI (MPA)					
			7 GÜNLÜK	DEĞİŞİM (%)	28 GÜNLÜK	DEĞİŞİM (%)	800 °C'DEN SONRASI	DEĞİŞİM (%)
<b>Kontrol</b>	21	15	49,1	-	57,1	-	31,6	-45
<b>K0.10</b>	19	19	45	-8	58,2	2	28,9	-50
<b>K0.15</b>	17,5	20	40,6	-17	57,6	0,8	27,4	-52
<b>K0.20</b>	16,5	21	38,4	-22	51,7	-9	30,9	-40
<b>K0.25</b>	15	23	36,7	-25	47,3	-17	18,8	-60
<b>K0.30</b>	13,5	25	30,7	-37	44,5	-22	14,7	-67

Tablo 3’te sonuçları yer alan yayılma çaplarına bakıldığında numunelerdeki kaolin kili miktarı arttıkça yayılma çaplarında azalma meydana getirmiştir. Kil kullanımında su/bağlayıcı oranı sabit kaldığında yayılma özelliğine olumsuz etki yapmıştır (İpek vd., 2003). Kaolin kili miktarı arttıkça yayılma tablası deneyine göre işlenebilirlik azalmaktadır. Artan kaolin ikamesi ile su emme oranında artış meydana gelerek en düşük su emme oranı kontrol grubunda görülmüştür. Bu durum kaolin kilinin su emme özelliğinden kaynaklandığı düşünülmektedir.



Şekil 6. Basınç dayanımı grafiği

Basınç dayanımı sonuçlarına göre artan kaolin kili ikamesi ile 7 günlük basınç dayanımlarında kontrol grubuna göre azalmış, 28. gün basınç dayanımlarında ise düşüş oranı azalarak basınç dayanımı yaklaşık eşit olan %15 kaolin ikameli grupta meydana gelmiştir (Şekil 6). Yüksek sıcaklığa (800 °C) maruz bırakıldıktan sonra kontrol grubunun basınç dayanımında %45’lik azalma gerçekleşirken, %20 kaolin ikameli çimento hamurunda %40 azalma oranı ile basınç dayanımında en düşük azalma meydana gelmiştir.

#### **4.SONUÇLAR**

Ağırlıkça %10-15-20-25-30 oranlarında çimento ikamesi olarak kaolin kilinin taze beton ve sertleşmiş beton deneylerine dayanarak aşağıdaki sonuçlar elde edilmiştir:

- Kaolin kili ikameli numunelerin 7. günde kontrol grubuna göre basınç dayanımlarının azaldığı tespit edilmiştir. Basınç dayanımında azalma oranı kaolin kili ikamesi ile değişkenlik göstermiş, 7. Günde %8 ile %37 arasında azalma meydana gelmektedir. 28. günde basınç dayanımlarında fark azalmakla birlikte K0.15 grubunda katkısız çimento hamuru basınç dayanımı ile yaklaşık aynı değeri almıştır. Bu durum kaolin kilinin puzolanik özellik gösterdiği kanısına varılmıştır.
- Kaolin kili ikameli numuneler üzerinde yüksek sıcaklık deneyi sonrası basınç dayanımında K0.20 grubunda, diğer gruplara göre daha az oranda (%40) düşüş meydana gelmiştir.
- Kaolin kili ikameli numuneler arasında kılcal geçirimsizlik deneyinde 24 saat sonunda en az su emme oranının (%19) K0.05 grubunda hesaplanmıştır. Kaolin kili ikamesinin artması ile su emme oranında artış meydana gelmiştir. Bu durum kaolin kilinin su emme özelliğinden kaynaklandığı düşünülmektedir.

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**INVESTIGATION OF THE WIDEBAND BEHAVIOR OF A 2.4 GHz LOW NOISE MICROWAVE AMPLIFIER**

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**ABSTRACT**

There are various microwave amplifier systems designed and produced for many different frequency bands in the literature. There are also many practical circuits on the market for the 2.4 GHz frequency band, which is the operating frequency of one of the WiFi bands. The 2.4 GHz frequency band finds use in many application areas, including Bluetooth and WiFi, thanks to its license-free use and being suitable for implementation using the standard production technology. In this study, the ZX60-272LN-S+ low noise amplifier (LNA) produced by Mini Circuits is experimentally investigated. The operating frequency range of this amplifier is shown as 2300 MHz - 2700 MHz in its datasheet. On the other hand, both the performance of the utilized microwave integrated circuit and the matching performance of the matching circuits at the input and output ports determine the overall operating frequency range of microwave amplifiers. The performance of the ZX60-272LN-S+ LNA block has been experimentally tested also outside its specified operating frequency of 2300 MHz – 2700 MHz.  $S_{11}$ ,  $S_{21}$ ,  $S_{12}$  and  $S_{22}$  scattering parameters of the ZX60-272LN-S+ LNA circuit were measured for the 10 MHz – 8 GHz range, therefore the performance of this amplifier outside the 2300 MHz – 2700 MHz frequency range is also observed. Considering the obtained scattering parameters, the practical operating frequency range of the ZX60-272LN-S+ LNA circuit is discussed.

**Keywords:** Active microwave circuits, scattering parameters, low noise amplifier.

## **2.4 GHz FREKANS BANDINDA KULLANILAN DÜŞÜK GÜRÜLTÜLÜ BİR KUVVETLENDİRİCİNİN GENİŞ FREKANS BANDI DAVRANIŞININ İNCELENMESİ**

### **ÖZET**

Literatürde çok farklı frekans bandları için tasarlanan ve üretilen mikrodalga kuvvetlendirici sistemleri bulunmaktadır. WiFi bandlarından birinin çalışma frekansı olan 2.4 GHz frekans bandı için de piyasada birçok pratik devre mevcuttur. 2.4 GHz frekans bandı, hem lisans gerektirmeyen kullanımı hem de standart üretim teknolojisiyle üretime müsait olması sayesinde Bluetooth ve WiFi dahil olmak üzere birçok uygulama alanında kullanım imkanı bulmaktadır. Bu çalışmada, Mini Circuits üretimi olan ZX60-272LN-S+ düşük gürültülü kuvvetlendirici (LNA) deneysel olarak incelenmiştir. Bu kuvvetlendiricinin katalog bilgisinde çalışma frekans aralığı 2300 MHz – 2700 MHz olarak yer almaktadır. Mikrodalga kuvvetlendiricilerin çalışma frekanslarında, hem içermiş olduğu mikrodalga entegre devrenin performansı hem de giriş ve çıkışta bulunan uyumlaştırma devrelerinin standart hat empedansı olan  $50 \Omega$ 'a uyumlaştırma performansı belirleyici olmaktadır. Bu çalışmada incelenen ZX60-272LN-S+ LNA bloğunun katalog bilgisinde 2300 MHz – 2700 MHz şeklinde belirtilen çalışma frekansı dışındaki performansı da deneysel olarak incelenmiştir. ZX60-272LN-S+ LNA devresinin  $S_{11}$ ,  $S_{21}$ ,  $S_{12}$  ve  $S_{22}$  saçılma parametreleri 10 MHz – 8 GHz aralığı için ölçülerek bu kuvvetlendiricinin 2300 MHz – 2700 MHz frekans aralığı dışındaki performansı da gözlemlenmiştir. Elde edilen saçılma parametreleri dikkate alınarak ZX60-272LN-S+ LNA devresinin uygulamadaki çalışma frekansı aralığı konusu tartışılmıştır.

**Anahtar Kelimeler:** Aktif mikrodalga devreler, saçılma parametreleri, düşük gürültülü kuvvetlendirici.



## **INTRODUCTION**

Modern telecommunication systems utilize high frequency signals for providing higher bit rates for a better consumer experience. This is achieved by employing wider bandwidth for the carrier signals. In addition, higher frequencies and bandwidths are also required in electronic defence systems for increasing the imaging resolution (pasya et al., 2014; shi et al., 2013; caris et al., 2014). All of these requirements of commercial and military microwave equipments motivate circuit designers to reach the widest bandwidth possible within a technology node.

Microwave amplifiers are indispensable components for microwave systems since the received microwave signals at the receiver side, both for telecommunication and defence systems, have very low power at the order of microwatts (kantur et al., 2014; richter et al., 2009). The amplification stage of microwave circuits generally consist of two stages being the low noise amplifier (lna) section and the power amplifier (pa) section. The power amplifiers are usually employed in the transmitter circuit to increase the transmission power that will be radiated from the antenna. On the other hand, low noise amplifiers are generally used at the receiver part for the amplification of the received signals. Since the received signals have very low power, low noise amplifier provides an appropriate processing by introducing low noise to the already low received power.

The low noise amplifiers are implemented using high electron mobility discrete transistors or monolithic integrated circuits employing high electron mobility semiconductors such as gan (thakur et al., 2020; han et al., 2020). The transistor or integrated circuit choice depends on the requirements of the system, both technically and from the cost point of view. Discrete transistor based designs require impedance matching circuits at the input and output stages while monolithic integrated circuits generally provide the standard 50  $\Omega$  impedance at the input and output ports for the specified operating frequency range. The impedance matching circuits of transistor based low noise amplifier can be implemented using lumped components or microstrip stubs.

There are also different implementation methods for low noise amplifiers. From the practical viewpoint, low noise amplifiers can be implemented on the custom designed printed circuit boards using discrete transistors or monolithic integrated circuits or ready-to-use block level microwave subsystems can be used. Although block level subsystems cost more than the custom designs, they enable a block level design of more complex microwave systems. Apart from the cost factor, the main parameters of these block level subsystems such as the operating frequency range and input power range can also be limiting factors for the microwave system designer. Therefore, it can be stated that there is an obvious trade-off between the ease of use and design flexibility for these block level microwave subsystems.

A widely used low noise amplifier block is considered in this work. The investigated low noise amplifier is produced by mini-circuits and has the part number zx60-272ln-s+ (zx, 2022). According to its datasheet, the operating frequency range is stated as 2300 mhz – 2700 mhz with a 5v single power supply. The scattering parameters namely  $s_{11}$ ,  $s_{21}$ ,  $s_{12}$  and  $s_{22}$  of the zx60-272ln-s+ sample are experimentally measured using a vector network analyzer (vna) as the first step. The actual operating frequency range of this sample is determined from the scattering data. The phase response of the voltage gain is also measured as a function of frequency to interpret the stability of this block. Then, the actual operating frequency limits of the considered lna are discussed.

### 1. THE INVESTIGATED LOW NOISE AMPLIFIER BLOCK: ZX60-272LN-S+

The investigated low noise amplifier block is the Mini-Circuits ZX60-272LN-S+ which is shown in Figure 1.

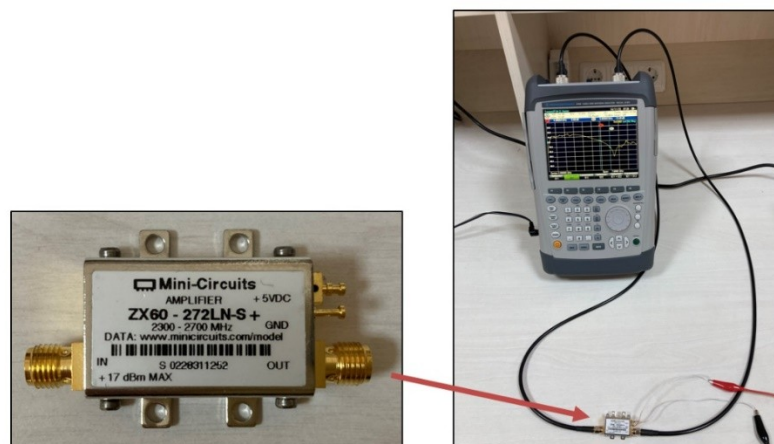


Figure 1. The investigated ZX60-272LN-S+ block and the experimental setup

According to its datasheet, the ZX60-272LN-S+ provides an average gain of  $G=14$  dB between the operating frequency range of 2300 MHz – 2700 MHz, which is obviously frequency dependent. The block operates with a single supply of 5V and consumes 70 mA of quiescent current (ZX, 2022). The input and output voltage standing wave ratio (VSWR) have been specified dependent on the frequency with having the values of 1.31 and 1.69 for the 2300 MHz operating frequency, which correspond to 17.4 dB and 11.9 dB return loss, respectively. It is worth noting that the values of the electronic processing blocks given in datasheets are typical values therefore it is a good practice to test the blocks practically before utilization in more complex systems. Considering this, the microwave parameters of the ZX60-272LN-S+ sample is experimentally extracted. A Rohde & Schwarz ZVH8 vector network analyzer (VNA) device is used to measure the scattering coefficients. The vector network analyzer is calibrated using 2-port high accuracy calibration procedure using the Rohde & Schwarz Z135 female calibration kit. It is worth noting that the ZX60-272LN-S+ block uses standard female subminiature-A (SMA) connectors but the ZVH8 vector network analyzer has type-N output connectors. Therefore, microwave cables having male N-type connector at one end and standard male SMA connectors at the other end are used during measurements and the Z135 calibration kit has standard female connectors. Therefore, at the end of the calibration procedure, the ZVH8 vector network analyzer and the cables constituted a calibrated measurement setup with male SMA connectors ready to be connected to the device under test, ZX60-272LN-S+ amplifier block.

## 2. MEASUREMENT RESULTS

First of all, the gain of the ZX60-272LN-S+ amplifier block is measured. The input port of the ZX60-272LN-S+ is connected to port 1 and the output port of the ZX60-272LN-S+ is connected to port 2 of the ZVH8 vector analyzer. Therefore, the  $s_{21}$  characteristics shows the gain of the ZX60-272LN-S+. The input power is set as -10 dBm, which is a safe value to prevent saturation according to the datasheet. The ZVH8 has been calibrated for its whole measurement range, 10 MHz – 8 GHz therefore, all measurements were performed in this whole frequency range.

The gain-frequency characteristics of the ZX60-272LN-S+ block is measured by the ZVH8 vector network analyzer as shown in Figure 2.



**Figure 2.** Gain-frequency characteristics of the ZX60-272LN-S+ with markers showing the frequency range where ZX60-272LN-S+ provides gain

The gain-frequency characteristics of Figure 2 shows that ZX60-272LN-S+ provides voltage gain in a wide frequency range. The positions of the markers M1 and M2 are set as the points where the gain of the ZX60-272LN-S+ is above 0 dB. The frequency positions of the markers M1 and M2 show that the ZX60-272LN-S+ provides gain between about 200 MHz – 4.68 GHz. It is worth noting that this frequency range is much wider than the specified operating frequency range of 2300 MHz – 2700 MHz. However, it is imperative to investigate the other scattering parameters  $S_{11}$ ,  $S_{12}$  and  $S_{22}$  for a proper evaluation of the operating frequency range, which is reported in the following pages of this study.

The gain level in the specified frequency range of 2300 MHz – 2700 MHz is also of importance therefore the  $S_{21}$ -frequency characteristics is also obtained with markers M1 and M2 set at the 2300 MHz and 2700 MHz frequency points. This plot is shown in Figure 3.



**Figure 3.** Gain-frequency characteristics of the ZX60-272LN-S+ with markers showing the specified operating frequency range

The markers M1 and M2 in Figure 3 show that the gain of the ZX60-272LN-S+ block is 14.45 dB and 13.47 dB at the 2320 MHz and 2720 MHz borders. It is worth noting that the slight deviation from the 2300 MHz and 2700 MHz is caused from the finite number of frequency points of the vector network analyzer. The gain of the ZX60-272LN-S+ block is given as 14.47 dB and 13.36 dB on the datasheet for the border frequencies therefore, the measurement results verify the datasheet with very small deviations.

The phase response of the  $S_{21}$  characteristics is also obtained as shown in Figure 4. The phase response shows an alternating characteristics and the phase shift between the input signal and the output signal is -165.78 degrees for the lower frequency limit and 127.37 degrees for the upper frequency limit. From the stability point of view, it is worth noting that the 180 degrees phase shift occurs at only one frequency therefore the ZX60-272LN-S+ block can provide unconditional stability except this single frequency point.

The input reflection coefficient ( $S_{11}$ ) measurements are performed as the next step. The variation of the input reflection coefficient with the frequency is shown in Figure 5. It is observed from Figure 5 that the input reflection coefficient has acceptable values (<-10 dB) in

the frequency range of 1.8 GHz – 3.08 GHz. Outside of this range, the input reflection coefficient is greater than -10 dB meaning that the amplifier block reflects most of the incoming

waves, which is not an acceptable situation for 2-port circuits.



**Figure 4.** The phase variation of the S<sub>21</sub> characteristics of the ZX60-272LN-S+ with markers showing the specified operating frequency range

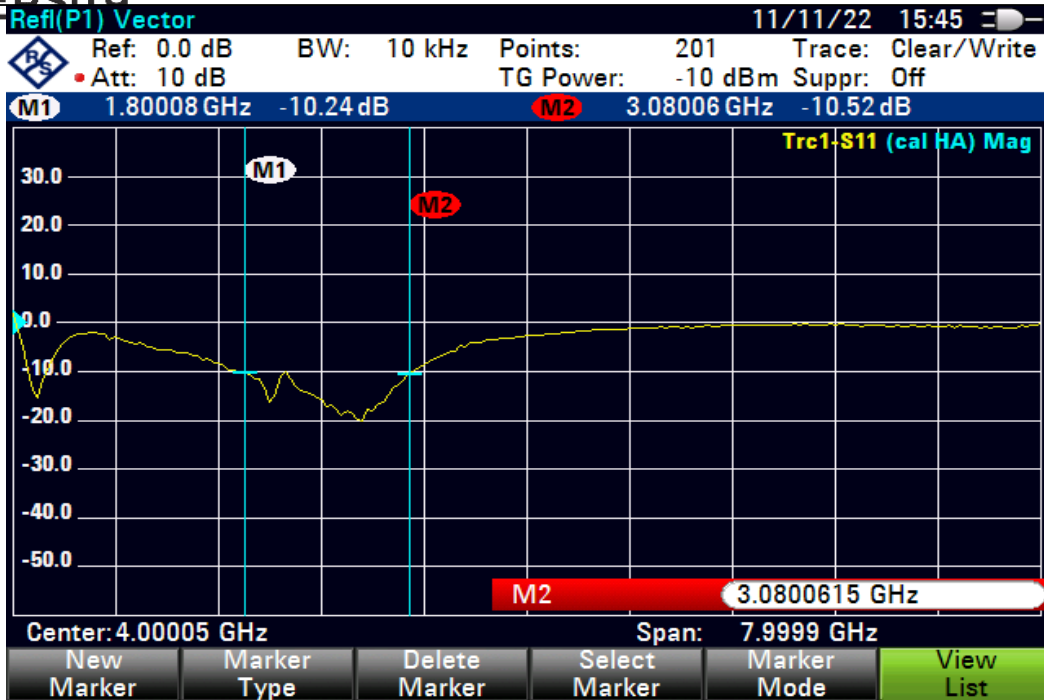


Figure 5. The input reflection coefficient (S<sub>11</sub>) of the ZX60-272LN-S+ with markers showing the range where S<sub>11</sub> < -10 Db



Figure 6. The reverse gain (S<sub>12</sub>) of the ZX60-272LN-S+

The reverse gain, S<sub>12</sub>, vs. frequency is measured as plotted in Figure 6 as the next step. The reverse gain should ideally be zero in order not to have a signal leak from the output port to the input port. The characteristics shown in Figure 6 implies that the reverse gain is less than

-15 dB in the whole frequency range, 10 MHz – 8 GHz, therefore, there does not seem to have any problem with the output-to-input signal leak with the ZX60-272LN-S+ block. In addition, the reverse leak is less than -20 dB for the specified operating range of 2300 MHz – 2700 MHz.

As the next step, the output reflection coefficient,  $S_{22}$ , is measured and plotted as given in Figure 7. The output reflection coefficient has the values less than -10 dB in the specified frequency range of 2300 MHz – 2700MHz, as indicated by the markers M1 and M2 of Figure 7. Other frequency ranges where the output reflection coefficient is less than -10 dB are also shown in another plot as given in Figure 8. It is observed from Figure 8 that the amplifier block provides  $S_{22} < -10$  dB for the frequency range of 1.32 GHz – 3.68 GHz. There is also a narrower high frequency range where  $S_{22} < -10$  dB is maintained and it is determined as 4.68 GHz – 5.60 GHz. Outside of the 1.32 GHz – 3.68 GHz and 4.68 GHz – 5.60 GHz ranges, the output reflection coefficient is not in the acceptable range ( $< -10$  dB).

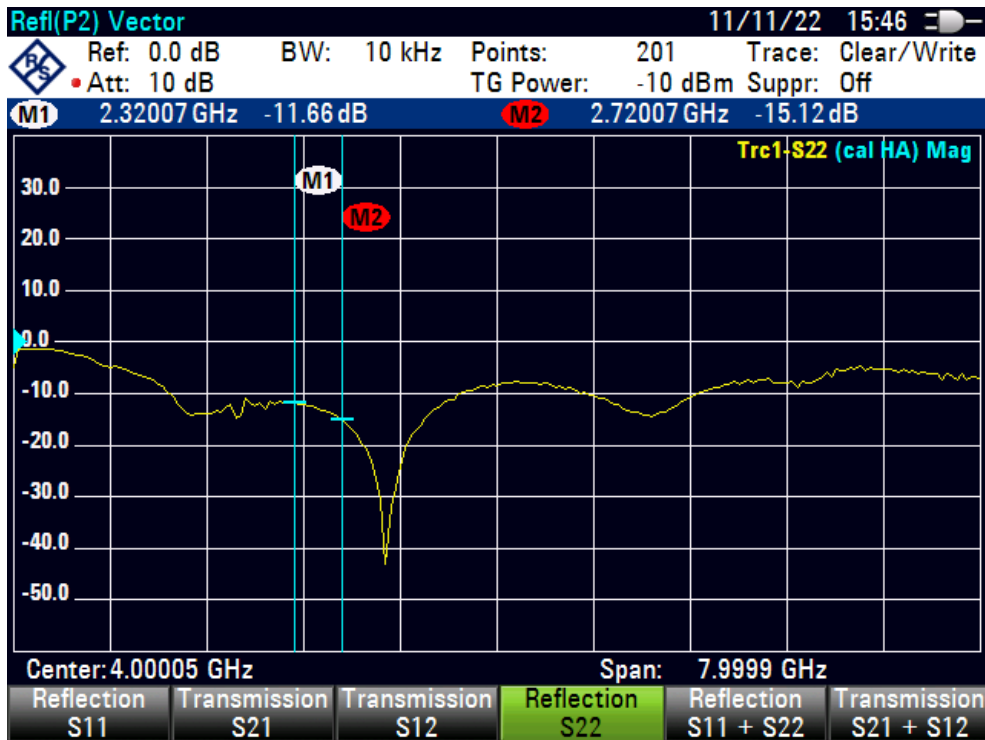


Figure 7. The output reflection coefficient ( $S_{22}$ ) of the ZX60-272LN-S+ showing the specified frequency range



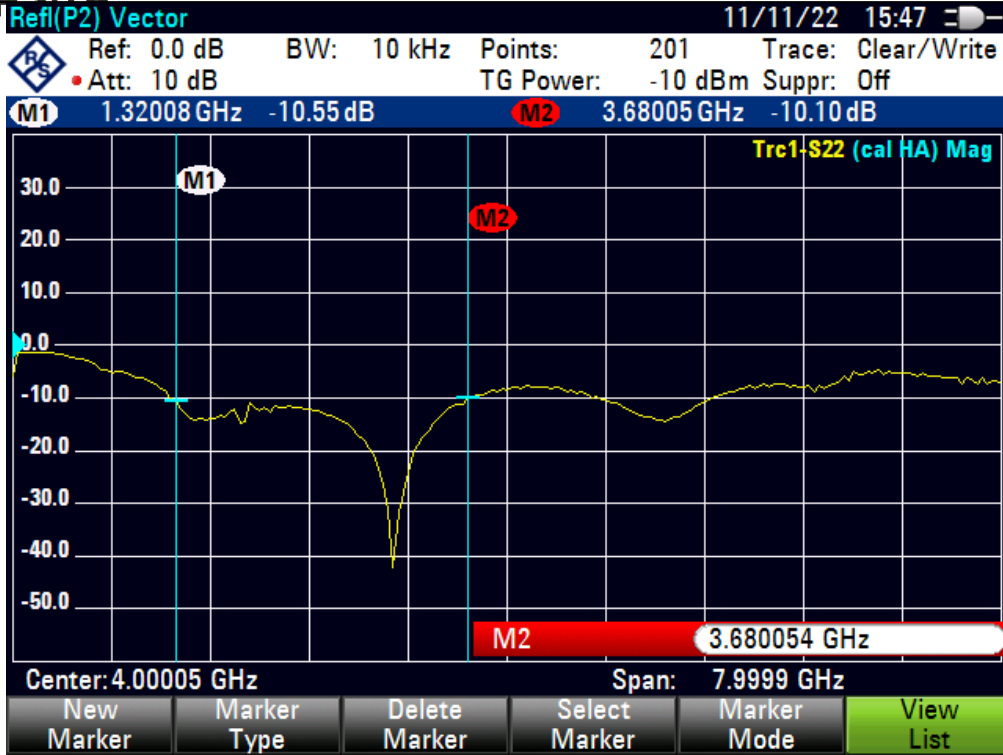


Figure 8. The output reflection coefficient ( $S_{22}$ ) of the ZX60-272LN-S+ showing the frequency range where  $S_{22} < -10$  dB

The summary of the obtained scattering parameters and their acceptable frequency ranges are shown in Table 1. It is worth noting that the limit values of the scattering parameters of Table 1 are the generally accepted values rather than solid rules. The operating frequency range of the ZX60-272LN-S+ amplifier can be determined as the intersection of the acceptable frequency ranges shown in Table 1. The intersection of these ranges, which is the general operating frequency range of the ZX60-272LN-S+ amplifier, is 1.8 GHz – 3.08 GHz, therefore it can be stated that the scattering coefficients of the ZX60-272LN-S+ amplifier maintain acceptable levels in this frequency range while the amplifier provides gain.

**Table 1.** The acceptable frequency ranges for the four scattering coefficients

Scattering coefficient	Acceptable frequency range
$S_{11}$ (< -10 dB) (Input reflection coefficient)	1.8 GHz – 3.08 GHz
$S_{21}$ (> 0 dB) (Inverse leak gain)	200 MHz – 4.68 GHz
$S_{12}$ (< -15 dB) (Gain)	10 MHz – 8 GHz
$S_{22}$ (< -10 dB) (Output reflection coefficient)	1.32 GHz – 3.68 GHz and 4.68 GHz – 5.60 GHz

### 3. CONCLUSIONS

In this study, the ZX60-272LN-S+ low noise amplifier block from Mini-Circuits is investigated. The ZX60-272LN-S+ is a block level low noise amplifier powered by 5V single supply with a 70mA supply current. The operating frequency range of the ZX60-272LN-S+ is stated as 2300 MHz – 2700 MHz on its datasheet. The all four scattering coefficients of the ZX60-272LN-S+ block is experimentally measured using a vector network analyzer in the 10 MHz – 8 GHz range. It is exposed that the ZX60-272LN-S+ block provides nonzero gain in the frequency range of 200 MHz – 4.68 GHz. In addition, the reverse leak is below -15 dB in the 10 MHz – 8 GHz range. From the reflection point of view, the input and output reflection coefficients are below -10 dB limit for the ranges of 1.8 GHz – 3.08 GHz and 1.32 GHz – 3.68 GHz, respectively. Taking the intersection of the acceptable frequency ranges of the four scattering parameters, it is concluded that the investigated ZX60-272LN-S+ low noise amplifier block can be utilized in the 1.8 GHz – 3.08 GHz with positive gain, as expected from an amplifier.

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**NAR KABUĞU UNU ile ZENGİNLEŞTİRİLMİŞ TARHANA ÇORBASI ÜRETİMİ ve KARAKTERİZASYONU**

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**ÖZET**

Bu çalışmada geleneksel yöntemler ile üretilen tarhana çorbasını antioksidan açıdan zenginleştirmek ve çorbadaki un miktarını azaltmak için nar kabukları öğütülüp işlem görmeden tarhana üretiminde %5 ve %10 oranlarda un yerine ilave edilmiştir. Tarhana üretimi hamur eldesi, fermantasyon, kurutma ve öğütme olmak üzere 4 aşamada gerçekleştirilmiştir. Elde edilen çorbalarda nar kabuğu unlarının tarhana çorbasının fizikokimyasal, antioksidan ve duyuşal parametreleri üzerindeki etkisi araştırılmıştır. Fizikokimyasal analizleri kapsamında kül, rutubet, pH, su aktivitesi, renk, titrasyon asitliği, toplam karotenoid, toplam diyet lif, protein, tuz ve viskozite analizleri gerçekleştirilmiştir. %10 nar kabuklu tarhana örneğinde toplam karotenoid içeriğinin ve diyet lif içeriğini arttırdığı tespit edilmiştir. Çorba örneklerinde yapılan FRAP, kuprak, demir şelatlama ve ABTS radikalini giderme aktivitesi, nar kabuğu ununun tarhana örneklerini antioksidan açıdan zenginleştirdiğini göstermektedir. Nar kabuğu unu ilave edilen tarhanaların genel tüketici beğenisi analiz edildiğinde kontrol tarhanasına göre daha az beğenildiği tespit edilmiştir.

**Anahtar kelimeler:** Çorba, Karotenoid, Nar Kabuğu, Tarhana

Bu çalışma Siirt Üniversitesi, Bilimsel Araştırma Proje Koordinatörlüğü Tarafından 2019-SİÜFEB-003 nolu proje ile desteklenmiştir.

**PRODUCTION AND CHARACTERIZATION OF TARHANA SOUP ENRICHED  
WITH POMEGRANATE PEEL FLOUR**

**ABSTRACT**

In this study, in order to enrich the tarhana soup produced with traditional methods in terms of antioxidants and to reduce the amount of flour in the soup, the pomegranate peels were ground and added instead of flour at the rates of 5% and 10% in the production of tarhana without processing. Tarhana production was carried out in 4 stages: dough making, fermentation, drying and grinding. The effect of pomegranate peel flours in the soups obtained on the physicochemical, antioxidant and sensory parameters of tarhana soup was investigated. Ash, humidity, pH, water activity, color, titration acidity, total carotenoid, total dietary fiber, protein, salt and viscosity analyzes were carried out within the scope of physicochemical analyses. It was determined that total carotenoid content and dietary fiber content increased in 10% pomegranate peel tarhana sample. FRAP, cuprak, iron chelating and ABTS radical scavenging activity in soup samples showed that pomegranate peel flour enriched tarhana samples in terms of antioxidants. When the general consumer taste of tarhana with pomegranate peel flour was analyzed, it was determined that it was less liked than the control tarhana.

**Keywords:** Soup, Carotenoid, Pomegranate Peel, Tarhana

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## 1. GİRİŞ

Hazır gıda ve paket ürünlerin kullanımına yönelik talebin giderek artması yüksek kalorili diyetlerin hayatımıza girmesine yol açmıştır. Ancak günümüzdeki birçok hastalığın temelinde sağlıksız beslenmenin yatığı artık bir sır değildir. Bu nedenle artık bilim camiasında insanların dengeli ve düzenli beslenmeye özendirilmesinin yanı sıra besinlerden alınan biyoaktif bileşenleri kullanarak yeni fonksiyonel gıdaların üretilmesi hedeflenmektedir. Böylece bağışıklık sisteminin güçlendirilmesi amaçlanmıştır (Özel, 2015).

Literatürleri incelediğimizde nar kabuğunun son yıllarda birçok fonksiyonel ürüne ilave edildiğini görüyoruz. Orjini İran olan Nar tropik ve subtropik iklimlerde yetiştirilen oldukça eski yenilebilir meyvelerden biridir. Nar latince *Punica granatum* olarak adlandırılır (Schubert ve ark., 1999; Ara ve Raofie, 2016). Ekşilik, Zivzik, Hicaznar, Fellahyemez, Gökmar, Erdemli, Silifke aşısı ülkemizde yetiştirilen nar çeşitleridir (Kurt ve Şahin, 2013). Nar Kabuğu meyvesinin büyük bir kısmını (%30-40) oluşturmaktadır (Kulkarni ve Aradyha, 2005, Topkaya, 2017). Narın kimyasal bileşimi bölgesel farklılığa, iklim koşullarına, bitkisel çeşidine ve depolama şartlarına göre farklılaşmaktadır (Akbarpour ve ark., 2009). Yapılan çalışmalarda nar kabuğunun fenolik bileşik ve besinsel lif açısından önemli bir kaynak olabileceği belirtilmiştir. Nar kabuğunun fenolik bileşik içeriğinin meyvesine oranla 10 kat fazla olduğu saptanmıştır. Bu biyolojik aktiviteleri nedeniyle nar kabuğu birçok çalışmada fonksiyonel ürün olarak kullanılmıştır (El-Said ve ark., 2014; Okumuş ve ark., 2015). Nar kabuğu; probiyotik yoğurt, inek sütü ve soya karışımı ile hazırlanan yoğurt, kek ve dondurma üretiminde fonksiyonel gıda olarak değerlendirilmiştir (Erdoğan, 2013; Topkaya, 2017; Elaltunkara, 2018; Ersöz, 2019). Ancak yapmış olduğumuz literatür çalışmalarında nar kabuklu tarhana ile ilgili bir çalışmaya rastlanmamıştır.

Tarhana Türk diyetinde yaygın olarak yer alan fermente Türk çorbasıdır. Yöreden yöreye değişen çeşitleri mevcut olup genellikle içeriğinde buğday unu, sebzeler (nane, domates, soğan, vb.), maya, baharatlar ve tuz bulundurur (Özdemir ve ark., 2007, Ertaş ve ark., 2009, Çağ Lar ve ark., 2012; Herken ve Aydın, 2015). Tarhana organik asit, serbest aminoasit, mineral, B vitamini içeriğiyle önemli besleyici özelliklere sahiptir. Tarhana yapımı hamur oluşturma, fermantasyon, kurutma ve öğütme olmak üzere temelde 4 üretim aşamasından oluşmaktadır. Tarhana hamuru buğday unu ile yoğurdun farklı oranlarda karıştırılmasıyla elde edilmektedir. Hamur karışımına sebzeler, baharatlar ve ekmek mayası eklenerek 5-10 dakika

yoğrulması sağlanır. Kıvama gelen hamur 1-7 gün 30-35°C’de fermantasyona bırakılır. Tarhanada

fermantasyon yoğurt bakterileri (*Lactobacillus bulgaricus-Streptococcus thermophilus*) ile ekmek mayası (*Saccharomyces cerevisia*) tarafından gerçekleştirilir. Tarhanalar fermantasyon sürecinin sonunda kurutmaya alınır. Kurutma işleminden sonra tarhanalar öğütülerek uygun kuru şartlarda 1 veya 2 yıl saklanabilmektedir. Tarhana düşük pH (3,8-4,2) ve düşük nem (%6-9) içeriği sayesinde uzun süre depolanabilmektedir (Özdemir ve ark., 2007; Herken ve Aydın, 2015). Üretim tipi ve içerisine ilave edilen baklagil, sebze ve diğer gıdalar dikkate alındığında ülkemizde yaklaşık 50 çeşit tarhananın varlığından söz edilmektedir. Tarhana üretimi sırasındaki fermantasyon, hammaddeye göre tarhanaya farklı tat, koku, tekstür ve aroma vermektedir (Coşkun, 2014). Oldukça besleyici olan tarhanayı hayatımıza giren ilk hazır çorba olarak kabul etsek çok da yanlış bir ifade kullanmış olmayız. Tarhana besin değeri, depolama süresi ve kolay hazırlanışı sayesinde birçok araştırmannın konusu olmuştur (Hançer, 2010; Çağ Lar ve ark., 2012; Çevik, 2016; Erol, 2016). Ancak nar kabuklu tarhananın literatürde olmayışı bizi bu çalışmayı yapmaya itmiştir. Bu çalışmada nar kabuklu tarhana üretilerek kalite parametreleri analiz edilmek istenmiştir.

## 2. MATERYAL ve METOT

### 2.1. Materyal

Zivzik nar çeşidi ve tarhana yapımında kullanılan malzemeler Siirt ilinden temin edildi. Nar kabuk unu eldesi için nar meyvesi kabuk kısmından ayıklandı. Nar kabukları temizlendikten sonra kuruması için oda sıcaklığında bekletildi. Kuruyan kabuklar öğütülerek un haline getirildi. Çalışmada kullanılan tüm kimyasallar Sigma Aldrich ya da Emsure ACS, Reag. Ph Eur’dan temin edildi.

### 2.2. Metot

#### 2.2.1. Tarhana Üretim Aşamaları

Tarhana yapımında incelenen literatür sonucunda çeşitli modifikasyonlar yapılarak formülasyonlar oluşturulmuştur (Yalçın ve ark. 2008; Ertaş ve ark. 2009; Demir 2014; Herken ve Aydın 2015 ve Temiz ve Tarakçı 2017). Nar kabuğu unu içermeyen kontrol grubu tarhanası, %5 nar kabuk unlu tarhana (NKT) ve %10 NKT üretilip prosese ait içerikler Tablo 1.’de verilmiştir. İlk olarak tarhana hamuru oluşturulup 10 dakika boyunca yoğuruldu. Daha sonra hamur 30°C’de 3 gün fermente edildi. Fermantasyon tamamlandıktan sonra tarhana

hamuru 2 gün 55°C’de etüvde kurutuldu. Kuruyan tarhanalar öğütücü yardımıyla öğütülerek 0.5 mesh elek ile elendi. Analizlere kadar cam kavanozlarda ağzı kapalı bir şekilde -80°C’de saklandı.

**Tablo 1.** Tarhana Formülasyonları

Hammadde	Kontrol	Nar Kabuklu Tarhana	
		%5	%10
	%0	%5	%10
<b>Buğday Unu</b>	41	36	31
<b>Nar kabuk unu</b>	0	5	10
<b>Yoğurt</b>	25	25	25
<b>Soğan</b>	10	10	10
<b>Domates</b>	5	5	5
<b>Domates salçası</b>	2.1	2.1	2.1
<b>Kırmızı toz biber</b>	0.9	0.9	0.9
<b>Yaş maya</b>	1	1	1
<b>Dereotu</b>	0.5	0.5	0.5
<b>Nane</b>	0.5	0.5	0.5
<b>Tuz</b>	2	2	2
<b>Su</b>	12	12	12
<b>Toplam</b>	100	100	100

### 2.2.2. Tarhanaların Fizikokimyasal Analizleri

Protein Analizi Siirt Üniversitesi, Bilim ve Teknoloji Uygulama ve Araştırma Merkezi’nde hizmet alımı yapılarak gerçekleştirilmiştir. Örneklerimizdeki protein miktarı dumas yöntemi ile Thermo/Flash2000 cihazı ile tespit edilmiştir (Anonim, 2019). Tarhanaların kül analizi için 3 g örnek tartılıp sabit tartıma getirilen krozelere alınmıştır. Krozeler kül fırınında 550°C’de örneklerin rengi gri beyaz oluncaya kadar bırakılmıştır. Krozeler tartılarak %kül olarak sonuçlar verilmiştir (Kişi, 2015). Rutubet analizi için tarhana örneklerinden 3 g tartılıp petri kapların alınmıştır. Etüvde 105°C’de sabit tartıma getirilen örneklerin ağırlıkları kaydedilerek sonuçlar %rutubet olarak verilmiştir (Yörükoğlu, 2012). Titrasyon asitliği analizi TS 2282’deki yöntem baz alınarak yapılmıştır (Gül, 2010; Anonim, 2004). pH analizi dijital pH metre (Bante İnstument-PHS-3BWMicroprocessor) yardımıyla 3 tekrarlı ölçülerek değerler kaydedilmiştir (Gül, 2010). su aktivite değerleri su aktivitesi cihazı (Novasina Lab Touch-A6-CH8853Lachen-1404022) kullanılarak belirlenmiştir (Lang ve Steinberg, 1980). Tarhana örneklerin tuz analizleri mohr yöntemine göre yapılmıştır (Anonim, 2011). Renk değerlerini belirlemek için pencolor art cihazı (color measurement) kullanılmıştır. Viskozite analizi DV-II pro Brookfield viskozimetre cihazı ile tespit edilmiştir (Anıl ve ark., 2016). Toplam karotenoid miktarını belirlemek için aseton ve petrol eteri kullanılarak ekstraksiyon işlemi gerçekleştirilmiştir. Daha sonra ekstrelerin spektrofotometrik olarak absorbansları



ölçülmüştür (Özel, 2015). Örneklerin toplam diyet lif miktarı Sigma-aldrich-TDF-100A besinsel lif kiti kullanılarak kitin bilgi formundaki yöntem uygulanmıştır (Van Soest ve McQueen, 1973; Trowel, 1974; Trowel ve ark., 1976; AOAC, 1990). Tüm analizler üç tekrarlı olarak yapılmıştır.

### 2.2.3. Antioksidan analizler

Fe<sup>3+</sup> iyonu indirgeyici antioksidan güç (FRAP analizi) Ferrik iyonlarını (Fe<sup>3+</sup>) ferröz iyonlarına (Fe<sup>2+</sup>) indirgeme kapasitesi yöntemine göre belirlenmiştir (Benzie ve Strain 1996). Kuprak analizi (Cu<sup>2+</sup> iyonu indirgeyici antioksidan kapasite); Cu<sup>2+</sup> indirgeme aktivitesi Apak ve ark., (2006)'nın metoduna göre yapılmıştır. Demir şelatlama aktivite analizi Dinis ve ark. (1994) yöntemi ile yapılmıştır. ABTS (Radikal katyon yakalama aktivitesi) radikalini giderme aktivitesi Re ve arkadaşlarının yaptığı çalışmaya göre belirlenmiştir (Re ve ark., 1999).

### 2.2.4. Duyusal Analiz

Duyusal analiz gerçekleştirilmeden önce 05.11.2018 tarihli 03-1 protokol nolu girişimsel olmayan etik kurul raporu alınmıştır. "Katılımcı Bilgilendirilmiş Onam Formu" imzalatılarak duyusal analiz yapılmıştır. Renk, Koku/Aroma, Yabancı tat/koku, Kıvam, Genel Beğeni parametreleri rubrik sisteme göre (1-çok kötü 2-kötü 3-orta 4-iyi 5-çok iyi) puanlandırılarak analiz edilmiştir.

## 3. BULGULAR VE TARTIŞMA

Fizikokimyasal analiz sonuçları Tablo 2'de antioksidan analiz sonuçları Tablo 3'de ve duyusal analiz sonuçları Tablo 4'de bir araya getirilmiştir.

**Tablo 2.** Fizikokimyasal analiz sonuçları

Analizler	Kontrol	%5 NKT	%10 NKT
Protein içeriği	14,30 ± 0,455	10,89 ± 0,252	10,34 ± 0,416
%Kül	5,196	5,125	5,98
%Rutubet	5,44± 0,53	3,5 ± 1,01	5,14± 2,49
%Asitlik Derecesi	20,75± 2,47	21,83± 1,89	44,33± 1,60
pH	4,75± 0,0	4,48± 0,006	4,18± 0,015
Su aktivitesi	0,219± 0,005	0,305± 0,001	0,334± 0,0006
Renk	L*	61,41±10,22	33,38±0,68
	a*	-6,15±0,74	-2,83±0,06
	b*	40,11±5,69	20,44±0,342
Toplam Karotenoid İçeriği (µg/g)	31,70 ± 0,004	171,22 ± 0,02	223,54 ± 0,006
Toplam Diyet Lif İçeriği (%)	14,49	21,58	24,77
%Tuz	4,86 ±0,07	5,27 ±0,7	5,1 ±2,96

Vizkozite (100 rpm dönüş hızında Cp)	926,667±40,414 (52°C)	863,333±5,77 (65°C)	175±5 (85°C)
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Fizikokimyasal analiz sonuçları incelendiğinde protein içeriğinin üretim aşamasında unun çıkarılmasına bağlı olarak azaldığı, kül miktarının önemli ölçüde değişmediği, rutubet değerinin %5 NKT azalırken %10 NKT’de kontrol ile benzer sonuçlar verdiği, Asitlik değerinin %10’luk NKT’de arttığı tespit edilmiştir. Ayrıca su aktivitesi ve tuz değerinin arttığı, pH’ın ise azaldığı tespit edilmiştir. Toplam karotenoid içeriği ( $\mu\text{g/g}$ ) ve toplam diyet lif içeriği (%) nin ise konsantrasyon bağlı olarak arttığını söyleyebiliriz. Vizkozitenin ise sıcaklığa bağlı olarak değiştiği bu nedenle sabit sıcaklıkta deneyin yapılmasının faydalı olacağı bu şartlar altında kıyaslanmanın doğru olmayacağı söylenebilir.

L\* değeri gıdaların parlaklığı ile ilgili bilgi verir. Kontrole kıyasla tarhana örneklerinin matlaştığı söylenebilir. a\* değeri kırmızı-yeşil renkleri temsil etmektedir. a\* değeri pozitif yönde arttıkça gıda matriksinin kırmızılığında artış, negatif yönde arttığında ise yeşilliğinde artış olduğu bilinmektedir. Örneklerimizin koyu sarı renkte olduğu anlaşılmaktadır. b\* değeri ise sarı mavi koordinatını temsil etmektedir. Pozitif değerler sarılığı, negatif değerler maviliği bildirmektedir. Bütün örnekler pozitif değerlerde olup hepsinin sarı rengin değişen koyuluğuna sahip oldukları belirlenmiştir.

**Tablo 3. Antioksidan analiz sonuçları**

<b>Tarhana Örnekleri</b>	<b>ABTS 30 <math>\mu\text{g}/\mu\text{L}</math> inhibisyon (%)</b>	<b>FRAP (9 <math>\mu\text{g}/\mu\text{L}</math>)</b>	<b>Kuprak 43,9 <math>\mu\text{g}/\mu\text{L}</math></b>	<b>Demir Şelatlama 16,67 <math>\mu\text{g}/\mu\text{L}</math> %</b>
<b>Kontrol</b>	%21,98 $\pm$ 11,76	%20,68 $\pm$ 0,009	0,1270 $\pm$ 0,015	%28,35
<b>%5 NKT</b>	%44,19 $\pm$ 10,18	%30,48 $\pm$ 0,008	0,1701 $\pm$ 0,06	%35,98
<b>%10 NKT</b>	%49,61 $\pm$ 8,35	%58,57 $\pm$ 0,06	0,2582 $\pm$ 0,02	%34,45

Nar kabuğu unu ilavesinin tarhananın antioksidan özellikleri üzerindeki etkisini tespit etmek için dört farklı deney yapılmıştır (Tablo 3). ABTS radikalinin % inhibisyon değerine baktığımızda konsantrasyona bağlı bir artış olmakla beraber lineer bir etki tespit edilmemiştir. Ancak kontrole kıyasla neredeyse 2,5 katı oranında bir inhibisyon etkisi görüldüğü tespit edilmiştir. FRAP ve kuprak analizlerinde konsantrasyona bağlı olarak lineer bir etki gözlemlendiği ve kontrole kıyasla antioksidan özelliklerin belirgin şekilde arttığını söyleyebiliriz. Demir şelatlama aktivitesinde konsantrasyona bağlı bir artış olmakla beraber lineer bir etki tespit edilmemiştir.

**Tablo 4.** Duyusal analiz sonuçları

Özellik	Kontrol T	%5 NKT	%10 NKT
Renk	2,33±1,28	2,792±1,44	3,083±1,31
Koku	3,17±1,29	3,083±1,24	3,083±1,38
Yabancı Tat/koku	3±1,42	2,71±1,23	2,542±1,21
Aroma	3,5±1,09	2,5±1,28	2,71±1,30
Genel beğeni	3,375±1,12	2,625±1,13	2,83±1,16

Tarhana çorbalarının duyusal analizleri 24 panelist tarafından gerçekleştirilmiştir. Panelistler Tablo 4’de tarhana çorbalarının duyusal özelliklerine ait skorlar verilmiştir. Renk özelliğinde en iyi skoru %10 NKT alırken, koku, yabancı tat/koku ve aroma parametrelerinde her iki tarhana örneğinde önemli bir fark tespit edilmemiştir. Genel beğenide her iki tarhana yakın beğeni almasına rağmen %10 NKT daha çok beğenilmiştir.

#### 4. SONUÇ VE ÖNERİLER

Bütün sonuçlar değerlendirildiğinde nar kabuğu unu tarhananın besinsel özelliklerini etkilemiştir. Nar kabuğu ununun toplam diyet lifi ve antioksidan aktivite özelliklerini önemli açıdan arttırdığı görülmüştür. Duyusal anlamda nar kabuğu ilavesinin yüksek oranlarda olması beğeniye olumsuz etkilese de düşük oranlarda eklenmesiyle nar kabuğunun hem besinsel lif hem de antioksidan aktivitesinden yararlanılabileceği böylelikle endüstriyel anlamda nar kabuğunun değerlendirilebileceği düşünülmektedir.

#### TEŞEKKÜR

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**IQF UYGULANMIŞ GIDALARIN DEPOLAMA SÜRECİNDE SEKONDER METABOLİT İÇERİKLERİNDEKİ DEĞİŞİM; KİRAZ, ŞEFTALİ, BİBER**

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**ÖZET**

İnsanlık tarihi boyunca gıdaları uzun süreli muhafaza etmek için çeşitli yöntemler kullanmıştır. Teknoloji ile birlikte bu yöntemler de gelişmiş ve çeşitlilik kazanmıştır. Bozulmaya neden olan biyokimyasal reaksiyonlar ile mikrobiyolojik faaliyetler yüksek su aktivitesi değerlerinde daha kolay gerçekleşmektedir. Meyve ve sebzeler bünyelerinde %75-95 oranında su içermektedir. Dondurarak muhafaza ile bu tür reaksiyonlar minimum değere getirilmektedir. Teknolojik ve ekonomik nedenler dikkate alındığında, meyve ve sebzelerin muhafazası için dondurarak muhafaza yöntemi diğer birçok yöntemle göre avantajlı görünmektedir. Dondurma işlemi sonunda meyve ve sebzelerin sıcaklığı, donmuş ürünlerin depolama sıcaklığına (-18°C) indirilmektedir. Gıda hammaddelerinin yeni bir ürün üretim ve depolama sürecinde sahip oldukları besin öğelerinin korunması hatta zenginleştirilmesi özellikle sekonder metabolitleri oluşturan doğal antioksidan maddelerin kaybının önlenmesi ve korunması istenmektedir. Üniversite-Sanayi işbirliği kapsamında yerel bir firmadan sağlanan hammaddelerle araştırma gerçekleştirilmiştir. Araştırmada fabrikada hem ön işleme hem de IQF uygulaması yapılan hammaddelerden; kiraz, şeftali, biber numuneleri temin edilmiştir. Daha sonraki 6 aylık depolama süreci boyunca meydana gelen kalite değişim ve kayıpları sekonder metabolitler bakımından belirlenmiştir. Çalışmada hiçbir ön işlem uygulanmamış her bir meyve ve sebze numunesi öncelikle kontrol numunesi olarak seçilmiştir ve daha sonrada dondurulmuş meyve sebze numunelerinden her ay numuneler alınıp, ham fenolik ekstraktları hazırlanarak liyofilize edilmiştir. Son olarak bu ekstraktların Folin - Ciocalteu metoduyla toplam fenolik madde içerikleri ve DPPH antiradikal süpürücü aktivite tayin metoduyla antioksidan aktiviteleri belirlenmiştir. Depolama sürecinde bütün numunelerin %inhibisyon değerinin azaldığı tespit edilmiştir. Bunda ön işlem ve gıdanın olgunluk düzeyinin etkisi olduğu belirlenmiştir.

**Anahtar kelimeler:** IQF, Depolama, Toplam Fenol içeriği, DPPH, Sekonder Metabolit

**CHANGES IN THE CONTENTS OF THE SECONDARY METABOLITE DURING THE STORAGE OF IQF APPLIED FOODS; CHERRY, PEACH, PEPPER****ABSTRACT**

Throughout human history, various methods have been used to preserve food for a long time. Along with technology, these methods have also developed and gained diversity. In foods with high water activity values, spoilage occurs more easily with biochemical reactions and microbiological activities. Fruits and vegetables totally contain 75-95% water as a whole. The freeze-preservation method tries to minimize the risk of such spoilage in foods. According to technological and economic reasons, the freeze-preservation method for preserving fruits and vegetables seems advantageous compared to many other methods. At the end of the IQF freezing process, the temperature of the food is adjusted to the storage temperature of the deep-frozen products (-18°C). The aim of this research is to protect and enrich the nutritional elements of food raw materials, especially natural antioxidant substances that make up secondary metabolites, in the production and storage periods. In this study, the raw materials that were both pretreatment and IQF applied; cherry, peach, and pepper samples were supplied from the local factory within the scope of University-Industry cooperation. During the next 6 months of the storage period, the quality changes of food samples were determined in terms of secondary metabolites. In the study, samples of each fruit and vegetable without any pretreatment were known as a control sample, and other proceed samples were selected from frozen fruits and vegetables every month, and crude phenolic extracts were prepared and lyophilized. Finally, the total phenolic content of these extracts was determined by the Folin-Ciocalteu method, and the antioxidant activities were determined by the DPPH antiradical scavenging activity estimation method. The inhibition % of all samples decreased in the storage process. It has been shown that the pre-treatment and the maturity level of the food have an effect.

**Keywords:** IQF, Storage, Total Phenol Content, DPPH, Secondary Metabolite

## 1. GİRİŞ

Gıdaların ve ürünlerinin kalitesi dört özellikten etkilenmektedir: renk/görünüm, tat, doku ve besin değeri. Tüketiciler, gıdaları yemeye karar vermeden önce rengini ve görünüşünü değerlendirmekte, ardından tadı gıdayı tekrar tüketip tüketmeyeceğine karar vermesine yardımcı olmaktadır (Barrett et al., 2010). Taze gıdalar, işleme sırasında orijinal kalitesinden kısmen veya tamamen kaybedebilmektedir. Bu nedenle tüketiciler, yüksek kaliteli ürünler için daha fazla ödemeye isteklidir ve bu da dondurulmuş gıda endüstrisini, taze ve minimum düzeyde işlenmiş ürünlerle rekabet edebilmek için sürekli olarak geliştirmeye teşvik etmektedir (FAO, 2020).

Araştırmalar günlük meyve ve sebze tüketiminin sağlık açısından kanser ve kardiyovasküler hastalıklar gibi dejeneratif bozuklukların yoğunluk ve ölüm oranını azaltmakla pozitif olarak ilişkili olduğunu göstermektedir (Wang et al., 2018). Meyve ve sebzelerin temel mikro besinlere ve fenolik bileşikler dahil diğer biyoaktif bileşiklere kaynak olduğu yapılan çalışmalarla ortaya konmuştur. Bu biyoaktif maddeler, epidemiyolojik çalışmalarda gösterildiği gibi, bitkilerde yaygın olarak küçük miktarlarda bulunan ve insan sağlığında kemo-koruyucu rollere sahip olan “besin dışı” bileşiklerdir (Boeing et al., 2012). Gıda Muhafaza teknikleri, işlenmiş gıdaların kalite ve güvenliğinin sağlanmasında önemli rol oynamaktadır. Bu teknikler arasında dondurma, gıdaların uzun süreli muhafazası ve saklanması için kullanılan temel işlemlerden biri olarak kabul edilmektedir. Dondurma işlemi ile gıdayı muhafaza etme özelliklerine ek olarak, ürünlerin taze gıdalara erişimi olmayan uzak pazarlara taşınmasına ve mevsim dışında da ürünlerinin yıl boyunca tüketicilere sunulmasına olanak tanımaktadır. Donma sıcaklıkları, taze gıdaların yaklaşık %85-90'ını oluşturan suyu kristalleştirmekte böylece su aktivitesini ( $a_w$ ), biyokimyasal değişiklikleri ve mikrobiyal büyümeyi azaltmaktadır. Düşük sıcaklıkların ( $-18^{\circ}\text{C}$  civarında) bazı reaksiyonları hızlandırabileceği öne sürülse de, donma normalde çoğu değişikliğin meydana geldiği hızı azaltmaktadır (Bonat Celli et al., 2016; Paciulli et al., 2015).

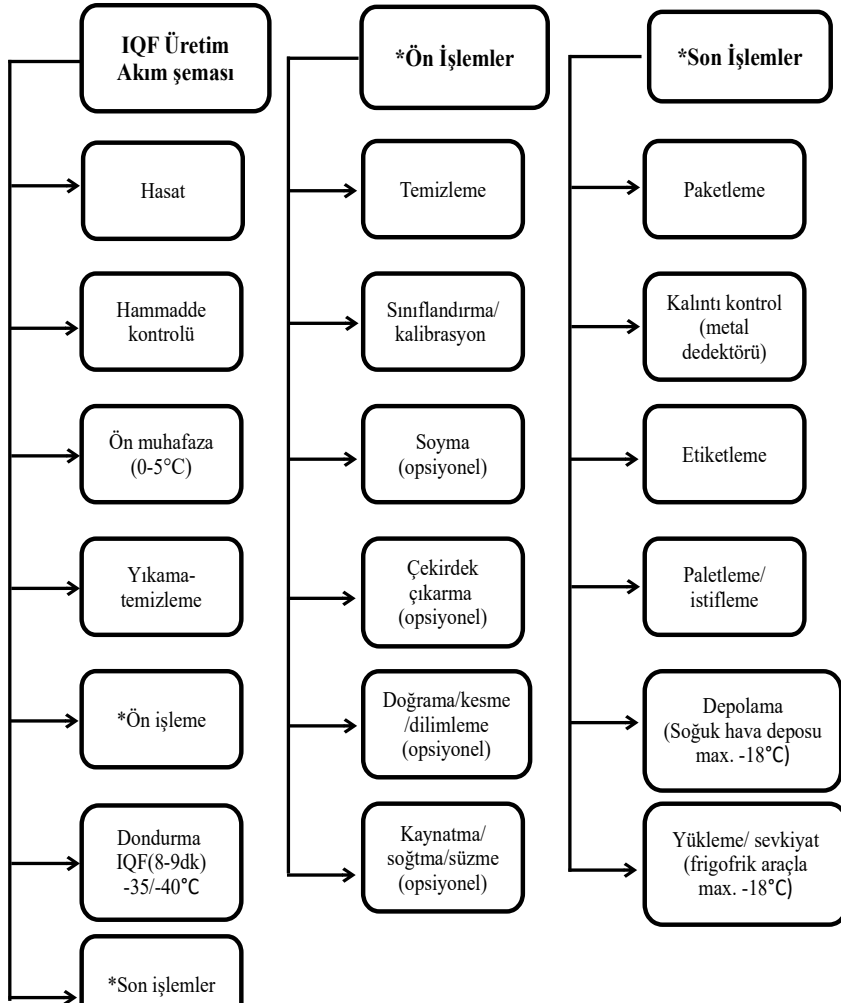
Bu çalışmada yurtdışına ihraç edilen ve endüstriyel ölçekte IQF sistemiyle dondurulmuş kiraz, şeftali, kırmızıbiber, flambe biber ürünlerinin gene endüstriyel ölçekte 6 ay boyunca  $-18$  derecede depoda muhafazası süresince sekonder metabolit niceliklerindeki değişim, fenolik ve antioksidan madde kayıpları düzenli olarak alınan numunelerle belirlenmiştir.

## 2. MATERYAL VE YÖNTEM

Hızlı Dondurulmuş Gıda Maddeleri Tebliği'nde verilen tanıma göre Hızlı dondurulmuş gıda maddeleri: Ürün tipine bağlı olarak mümkün olduğunca çabuk maksimum kristalizasyonun

sağlanması ile hızlı dondurma işlemi uygulanan, ürünün tüm noktalarında termal stabilizasyonun

-18°C veya daha düşük seviyede sağlandığı, bu durumun sürekli korunduğu ve bu şekilde pazarlandığı gıda maddelerini ifade eder (Anonim, 2014). Araştırma hammaddelerinin sağlandığı Bilecik Mapeks Gıda şirketinin IQF sistemi ile dondurmuş olduğu ürünlerde bu prosedüre göre uyguladığı üretim akım şeması şekil 1’de verilmiştir. Sekonder metabolitlerin soğuk depolama sürecindeki değişimini belirlemek üzere çalışma materyali numuneler iki kısımda oluşturulmuştur. Birinci kısım; hasat ve hammadde kontrolünden hemen sonra her bir ürün grubundan ayrı ayrı taze numuneler alınmış, kontrol grubu oluşturulmuştur; kiraz, şeftali, flambe biber, kırmızıbiber. İkinci kısım, ürüne bağlı her türlü ilgili ön işlemi (yıkama, çekirdek çıkarma, sap ayırma, soyma, dilimleme vb.) tamamlamış IQF sistemi ile dondurulmuş ve -18°C depolanan ürünlerden her ay düzenli alınan numuneler oluşturmuştur. Ayrıca depolama sürecinin sekonder metabolitlere etki profilinin belirlenebilmesi için 6 ay boyunca aynı parti numunesinin takibi gerçekleştirilmiştir.



Şekil 1. Fabrika da uygulanan dondurulmuş meyve ve sebze üretim akım şeması

Birinci kısımda alınan hammaddelerin kompozisyon ve olgunluk durumlarının belirlenmesi için A.O.A.C (2002) uygun olarak °Briks, pH, titrasyon, kül, nem, yağ miktarı ve reaktif indeks tayin ve analizleri yapılmıştır. (AOAC, 2002).

### 2.3. Ham fenolik ekstresinin hazırlanması

Antioksidan aktivite ve toplam fenolik madde tayini için kullanılacak fenolik ekstrelerin elde edilmesi için Vega Galvez ve ark. 2009 yılında yaptığı araştırma esas alınarak modifiye edilmiştir. Fenolik ekstraksiyon için uygulamalar Şekil 2’de grafiksel olarak sunulmuştur (Vega-Gálvez et al., 2009).

### 2.2. Toplam fenol miktar tayini

Ekstreler içindeki toplam fenol miktarı tayini Folin-Ciocaltaeu yönteminin Vega Galvez vd.’nin 2012’de yapmış olduğu çalışmanın modifikasyonu ile yapılmıştır (Vega-Gálvez et al., 2012). Standart olarak kullanılan gallik asit ve çalışılan bütün örnekler, %70’lik sulu metanol içinde hazırlanmıştır. Numuneler Folin Ciocaltaeu reaktifi (%10’luk, h/h, suda) ve sodyum karbonat çözeltisi (%20’lik, a/h, suda) ile karıştırılmış, oda sıcaklığında karanlıkta 15 dakika

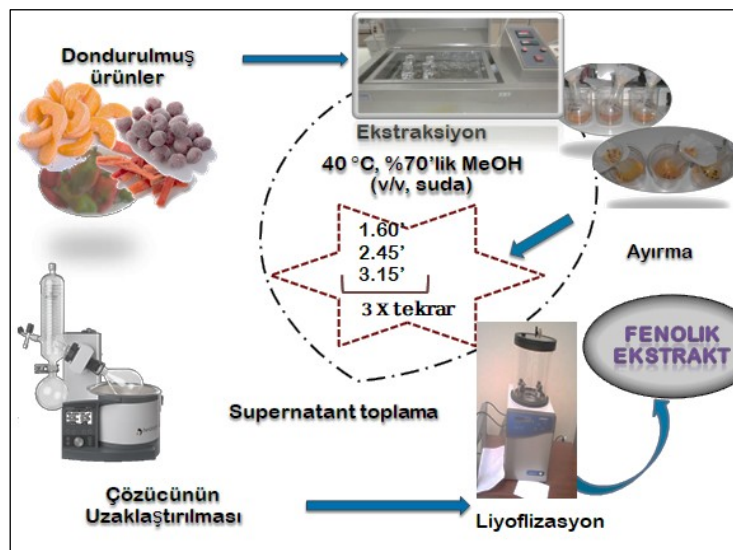
bekletilmiştir. UVvis Spektrofotometrede (Jenway Marka 7315 Model) 725 nm’de absorbans değerleri okunmuştur. Kalibrasyon eğrisi üzerinden toplam fenol miktarları hesaplanmıştır (Şekil 3a).

### 2.3 DPPH üzerinden serbest radikal süpürücü etki tayini

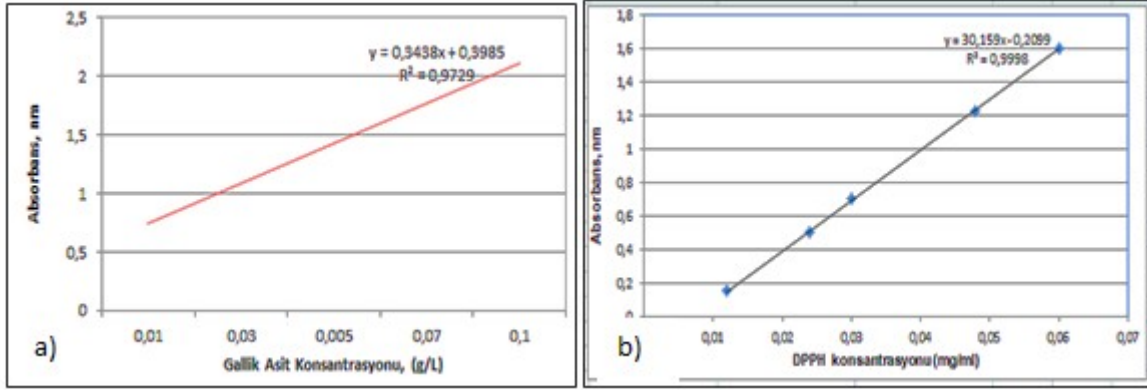
Ekstrelerin serbest radikal süpürücü etkileri 20 dakika içerisinde DPPH’nın (1,1-difenil-2-pikrilhidrazil) %50’sini süpürdüğü konsantrasyon olarak (EC50) hesaplanır (Galvez, 2012). % 70’lik sulu metanol içerisinde hazırlanmış örnek çözeltileri DPPH (0,15 mM) çözeltisi ilave edilerek vortekste karıştırılıp ve oda sıcaklığında karanlıkta 20 dakika bekletilmiştir. Numunelerin 517 nm’de absorbans değerleri okunmuştur. DPPH standardı kullanılarak hazırlanan kalibrasyon eğrisinden elde edilen kalibrasyon denklemi ile reaksiyon ortamındaki DPPH konsantrasyonu (mg/ml) hesaplanmıştır (Şekil. 3b.). 20 dakika sonucunda ortamda kalan DPPH miktarı ise aşağıdaki formül kullanılarak hesaplanmıştır.

$$\% \text{ DPPH}_{\text{kalan}} = (\text{DPPH})_{t=20} / (\text{DPPH})_{t=0} \times 100$$

Sonuçlar DPPH’nın %50’sinin süpürüldüğü (inhibe edildiği) konsantrasyon (EC50 $\mu\text{g/ml}$ ) cinsinden verilmiştir.



Şekil 2. Fenolik ekstraksiyon uygulaması grafiksel tasarımı



Şekil 3. Absorbans Kalibrasyon Eğrileri a) Gallik Asit, b) DPPH

### 3. BULGULAR VE TARTIŞMA

Bu çalışmada hammadde olarak kullandığımız kiraz, şeftali, flambe biber, kırmızıbiberin genel kimyasal özelliklerini değerlendirmek üzere nem, kül, hamyağ, pH ve briks tayinleri yapılmıştır (Tablo1.).

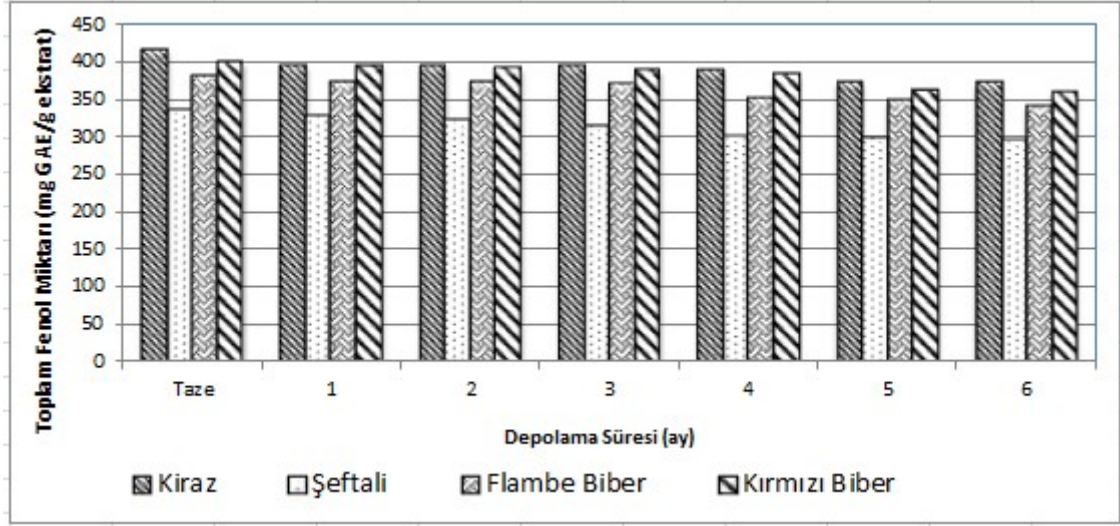
Tablo 1. Hammaddelerin kimyasal özellikleri

NUMUNE ADI	% NEM	%KÜL	*BRIKS	%Yağ	Titrasyon asitliği % (sitrik asit cinsinden)	Olgunluk İndeksi (Şeker/Asit Oranı)	pH
KIRAZ	75,43±3,53	1,16±0,17	22,87±0,34	0,54±0,024	0,12±0,06	14.50	4,85
ŞEFTALİ	90,32±0,16	0,65±0,06	13,00±2,00	0,78±0,46	0,90±0,0	85.48	3,68
FLAMBE BİBER	89,00±1,09	0,50±0,0	7,25±0,25	1,46±0,09	0,16±0,08	56.61	5,1
KIRMIZIBİBER	87,01±1,75	0,32±0,04	6,7±0,20	1,30±0,26	0,13±0,07	41.85	5,11

Çalışmada en yüksek % yağ ve nem oranı ve olgunluk derecesi şeftalide ve flambe biberde tespit edilmiştir. Briks derecesi ve pH asitlik değerleri tüketilmeye ve işlenmeye uygun olgunluk seviyesinin göstergesidir. Aşırı olgunluk, meyvenin işlenebilirlik kalitesini olumsuz etkileyecektir. Bir gıda maddesinin nem miktarının saptanması gıdanın depolama stabilitesinin değerlendirilmesi açısından önemlidir (Dhatt ve Mahajan, 2007; Çurkan et al., 2011; Demiray & Tülek, 2010).

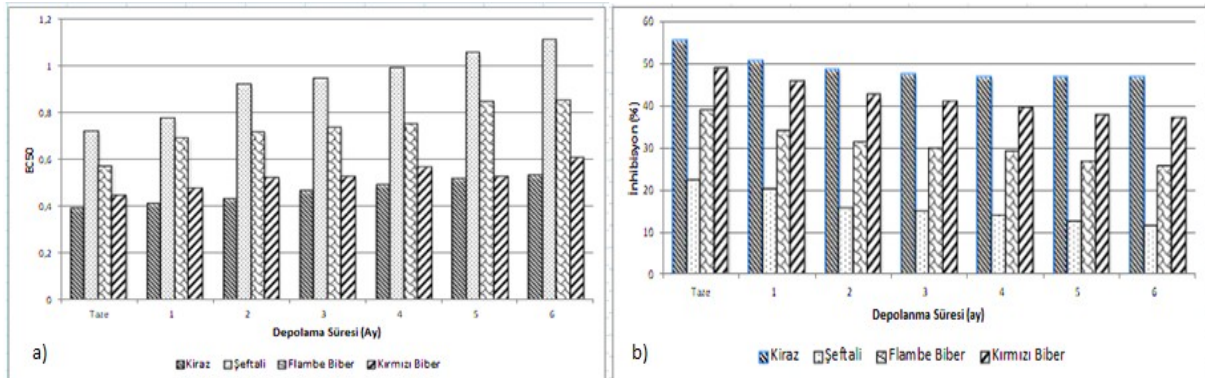
Dondurulmuş hammaddelerin toplam fenol miktarının belirlenmesi amacıyla yapılan çalışmalarda 6 aylık depolama süresinin hammaddelerde değişik oranlarda kayıplara yol açtığı, taze hammaddelerin içerdiği toplam fenol miktarı ile karşılaştırılarak hesaplanmıştır. TP değerleri 6 ay boyunca düşüş göstermiştir. Şekil 4’de sunulan grafiğe göre en fazla TP değerine sahip numunenin kiraz, en düşüğü de şeftali olarak belirlenmiştir. Olgunlaşma, meyvelerin biyoaktif içeriği üzerinde belirgin bir etkiye sahiptir. Bu fizyolojik süreç aynı zamanda hücre duvarı dokusunu ve yapısını değiştirerek taze ürünlerin ticari değerini de etkiler; patojenlere ve

mekanik hasara karşı daha yüksek bir hasat sonrası duyarlılığı ve raf ömründe bir azalmaya neden olduğu da ifade edilmektedir (Murillo et al., 2012; Wu et al., 2010).



Şekil 4. Depolama Süresinin IQF dondurulmuş Ürünlerde Toplam Fenol Miktarına Etkisi

Hammaddelere uygulanan ön işlemler ve IQF dondurma, ürünlerin % inhibisyon güçlerini ve DPPH konsantrasyonunu %50 azaltmak için gereken antioksidan miktarının göstergesi EC50 değerini depolama süresince etkilemiştir (Şekil 5 a ve b).



Şekil 5. Depolama Süresinin IQF dondurulmuş Ürünlerde a) EC50 Değerine ve b) %İnhibisyon Değerine Etkisi

Çalışma da kullanılan numunelerde ilk 3 ay içerisinde daha yüksek %inhibisyon düşüşleri meydana gelirken 3. aydan sonra kayıplarda daha az meydana geldiği tespit edilmiştir.%



inhibisyon en az şeftalide en çok kirazda tespit edilmiştir. Gıdanın sahip olduğu olgunluk derecesi şeftali ve flambe biberde daha fazla antioksidan kapasitede düşmeye ve inhibisyon gücünde azalmaya yol açmıştır. Sağlıklı ve uygun olgunlukta toplanmış kiraz, dondurulmuş depolamada en düşük % inhibisyon kaybı göstermiştir. Bitkisel gıdalarının antioksidan aktivitesi üzerine dondurma işleminin ve dondurulmuş depolamanın etkisi, , bileşim ve yapı vb. içsel faktörlere bağlı olarak değişebilmektedir. Dondurma ve dondurarak depolama sırasında meydana gelen hücre çeperlerinde bozulmalar, antioksidan bileşiklerin salınmasına ve bunların kimyasal, enzimatik oksidasyon reaksiyonları nedeniyle antioksidan kapasitedekayba yol açabilmekte ve bu da kontrol numunesi olan taze ürün numunelerine göre daha düşük bir antioksidan aktivite değerinin belirlenmesine yol açmaktadır (Dawson et al., 2020; Hu et al., 2022; Mokhena et al., 2016; Swallah et al., 2020; Wu et al., 2010).

#### **4. SONUÇ**

Çalışmalar, gıda çeşidinin, hasat öncesi faktörlerin ve olgunluk durumunun, dondurma performansının ürünlerinin fitokimyasal özelliklerine ve kalitesine etkide bulunan faktörler olduğunu göstermektedir. Ancak IQF dondurulmuş ürünlerin tekstürel olarak ve muhafaza sonrasında mikrobiyolojik olarak da analiz edilmesi depolama sürecindeki değişimi daha belirgin ortaya koyacaktır. Aynı parti ürünlerinin farklı dondurma yöntemleriyle işlenmesi hem fitokimyasal özellikler, hemde ekonomik açıdan karşılaştırılması yapılmasını sağlayacaktır ve yöntemin performans değerlendirmesi açısından önemlidir.

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**FACE RECOGNITION SYSTEM USING DEEP LEARNING TECHNIQUES WITH RASPBERRY PI**

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**ABSTRACT**

With the rapid development of reliable facial recognition algorithms over the past decade. It requires the face recognition system to be able to automatically detect a face. This paper aims to take facial recognition to the next level by bringing the power of computer vision and the best deep learning techniques with the increasing demand for face recognition technologies and rapid contactless access. Whereas facial recognition is a category of biometric security. In this paper, some deep learning techniques such as "supervised learning" were tested, and we used artificial neural networks to recognize faces. An image database was used to test models whose images were taken with a high-resolution camera. A data set of people was created. The data set was created only to train this system. We created a dataset containing the names of some people and pictures in different poses and shapes. We used at least 15 images per person for better accuracy. When we saved a person's data and photo in our system to create the dataset, deep learning has been applied to test facial features with dimensions of 128 pixels for each face and uploaded them to the Raspberry Pi. Tests on this dataset in deep learning technologies show that the proposed method achieves good results. This model can help many biometric facial recognition systems to recognize a face more accurately. Giving people access to certain parts of their company or facial can also provide a quick, accurate, and hassle-free solution. Businesses can also take advantage of facial recognition on their attendance systems to prevent time fraud and increase employee security as they enter and leave the office.

**Keywords:** Face recognition, Computer vision, Deep learning, Raspberry Pi

## 1. INTRODUCTION

Face recognition and identifying individuals is a problem of great interest, and there are numerous approaches to solving this problem. Face recognition is a branch problem of visual pattern recognition. We recognize visual patterns all the time, and we get visual information through our eyes. Ant This information is recognized by our brain. For a computer, whatever it's a photo or a video, by a matrix of numerous pixels. The computer must figure out what concept a particular piece of data represents in the data. This is an approximate classification problem in visual model recognition. For face recognition, it is necessary to distinguish who the face belongs to in the part of the data that thinks about the face.

Face recognition in a broad sense includes related technologies for building a face recognition system. It consists of face detection, face position, identity recognition, etc. Face detection algorithm is to figure out the coordinate system of faces in image or video. This is the process of scanning the whole image to determine a face. The output of the face coordinate system can be square. The face position is the coordinate position of the face feature in the face detection coordinate system. The deep learning basically implements some good positioning technologies. So, face recognition includes two steps, the first step is to detect faces, and the second step consists of identifying the images of detected faces with the existing database. There are several ways to detect and recognize faces. Facial recognition works either in an appearance-based form that covers the entire facial features or feature-based that covers geometric features such as eyes, nose, eyebrows, and cheeks for facial recognition [1]. Face recognition technology has made great progress, but there is still room for improvement in practical application. In the future, there may be a special camera for face recognition, which can improve image quality, solve image filtering and image reconstruction problems [2],[3].

From the application of face recognition technology, it is most popular used in attendance access control [4], security [5] and finance, while logistics, retail, smartphone, transportation, education, real estate, network information security [6], etc. And other fields are getting involved. It represents a great progress of artificial intelligence technology, which means that we require more accurate, more flexible and more faster recognition technology.

New deep learning methods have made it possible to be very accurate in identifying people through digital imaging. Face recognition through software systems remains a separate issue. Facial recognition systems enable the identification of a person through digital imaging and the handling of large amounts of digital imaging. Deep Neural Networks experimental application, which allows recognition of faces from digital photography and is a solution based on Raspberry

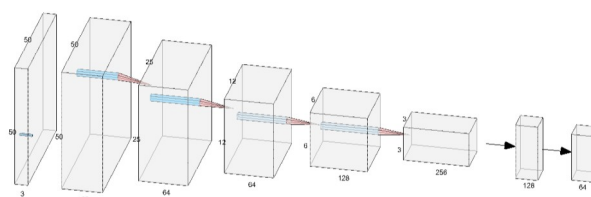
Pi [7]. Recently, deep neural networks and especially convolutional neural networks (CNNs) have shown impressive classification performance in face recognition tasks. By adopting the convolutional neural network (CNN) model, a face recognition system could design and implemented. The system can call the camera to recognize the human face and accurately output the name of the recognized person by uploading the convolutional neural network (CNN) model [8]. It shows that fast and accurate facial recognition can also be achieved on small computers like Raspberry Pi.

## 2. METHODS AND MATERIALS

### 2.1. Deep learning

Deep Learning has proven to be a very powerful tool due to its ability to process large amounts of data. Interest in using hidden layers has outstripped traditional techniques, especially in pattern recognition. One of the most popular deep neural networks is Convolutional Neural Networks (CNN). A deep convolutional neural network (CNN) is an artificial network that consists of one or more convolutional layers followed by one or more fully connected layers, usually given as two separate sets of layers.

CNNs are made up of four layer's types, such as convolutional, pooling, Relu and fully connected (FC) layer. An input image is analyzed in the convolutional layer by a set of filters that produce a feature map. This output is then sent to a layer of pooling, which reduces the map size of the feature. This helps decrease the computation time by condensing the map to the most relevant results. Depending on the network, the convolutional layers and pooling phases are replicated many times, the number of repeats during which the compact function map outputs are sent to a set of FC layers. Such FC layers instead flatten the maps together and compare the probability of each function appearing by the others, before the best classification is calculated. The Rectified Linear Units (Relu) layer is to add non-linearity to a system as the convolution is doing linear operations, it's element wise multiplication and summation.



**Fig.1.** CNN architecture.

Automatically face recognition is an interesting topic but remains a relatively difficult task due to the variation in the face recognition process. For my experiments, we have built CNNs model with various architectures depths with the same filter size, pooling layers, and convolutional layers. CNNs architectures are described in table 1. All of them are used to evaluate the impact of the CNN depth and size filter on face recognition.

**TABLE 1.** Face Recognition Model

Name	Type	Description of output size
Input layer	Input data	50x50x3
Conv1	Convolution + ReLu	32 3x3 filters
Pooling 1	Max pooling +BatchNormalization	2x2
Conv2	Convolution + ReLu	64 3x3 filters
Pooling 2	Max pooling +BatchNormalization	2x2
Conv3	Convolution + ReLu	64 3x3 filters
Pooling 3	Max pooling +BatchNormalization	2x2
Conv4	Convolution + ReLu	128 3x3 filters
Pooling 4	Max pooling +BatchNormalization	2x2
Conv5	Convolution + ReLu	256 3x3 filters
Fc1	Fully Connected + dropout (0.5)	256 units
Fc2	Fully Connected + dropout (0.5)	128 units
Output layer	Softmax	4 classes

The spatial size of the output volume is a function of the input volume  $W$ , the kernel field size  $K$  of the convolutional layer neurons, the stride  $S$ , and the amount of zero padding  $P$  on the border. The number of neurons that "fit" in each volume is then:

$$\frac{W - K + 2P}{S} + 1 \quad (1)$$

The pooling layer usually works independently on each depth or slice of the input and changes its size spatially. We used a max pooling layer with  $2 \times 2$  filters, applied in step 2, which subsamples each depth slice in the input by 2 along both width and height, ignoring 75% of the activations:

$$f_{x,y}(s) = \max_{a,b=0}^1 S^2 x + a \quad 12 Y + b \quad (2)$$

We used the softmax function and the following equation is for softmax function

$$\sigma(z)_i = \frac{e^{\beta_{zi}}}{\sum_{j=1}^k e^{\beta_{zj}}} \text{ for } i = 1, \dots, K. \quad (3)$$

$\sigma$  = softmax

$z$  = input vector

$e^z$  = standard exponential function for input vector



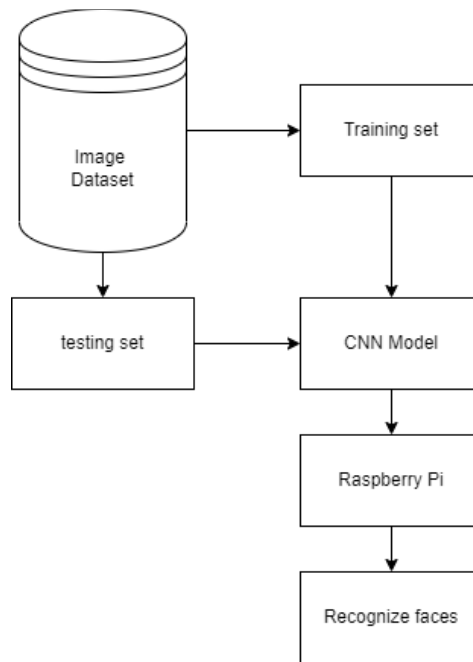
$K$  = number of classes in the multi-class classifier

$e^{z_j}$  = standard exponential function for output vector

## 2.2. Face Recognition System Process

The details of the approach are presented in the following steps:

- a) Select a subset of image samples from an initially labelled dataset and add it to the training set. Create a testing set from the remaining samples.
- b) The training set is then provided to the CNN model for training.
- c) The testing set is then recognized with the above trained network.
- d) The model and algorithm of the system are applied to the raspberry pi
- e) The Raspberry Pi and the camera perform the process of recognizing faces



**Fig.2.** Face recognition system block diagram.

## 2.3. The Dataset

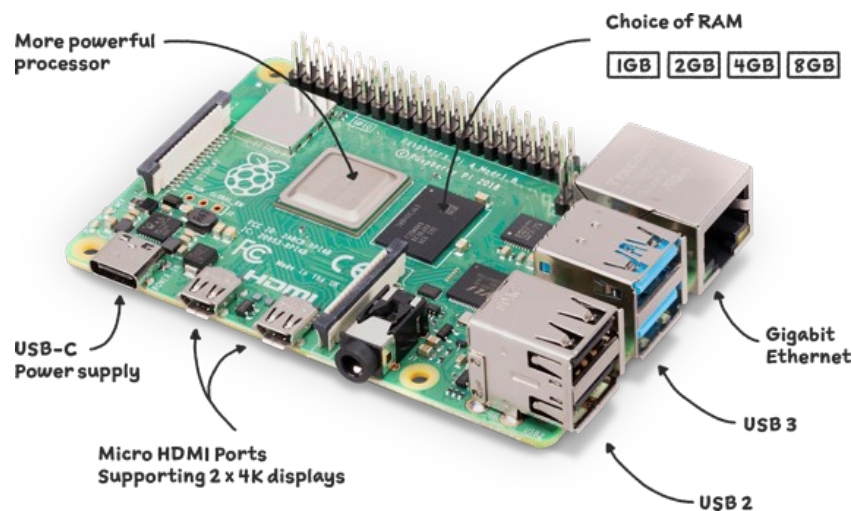
Dataset of people is created before the face recognition process. Dataset was created only to train this system. We utilized the USB camera to generate both test and training sets. We have created a dataset of 4 people which includes their name and images of people in different poses and variations. For 6 individuals with a total of approximately 15 -25 pictures per person. For better accuracy minimum 25 images of each person should be captured.



**Fig.3.** Examples of the training set.

#### 2.4. Raspberry Pi

Raspberry Pi is a tiny, dual-display, desktop computer and robot brains, smart home hub, media center, networked AI core, factory controller, and much more. This is the latest model of raspberry pi, which is released in June 2019, we chose it because it has a credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard or mouse, low cost included. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch, MATLAB and Python.



**Fig.4.** Raspberry Pi [9].

#### 2.5. USB Web Camera

Webcam or Web Camera is a digital camera connected to the computer so that the user can send images directly from anywhere in the world to another place via the Internet. The technology

also provides other different types of web cameras that can be connected to the computer via USB

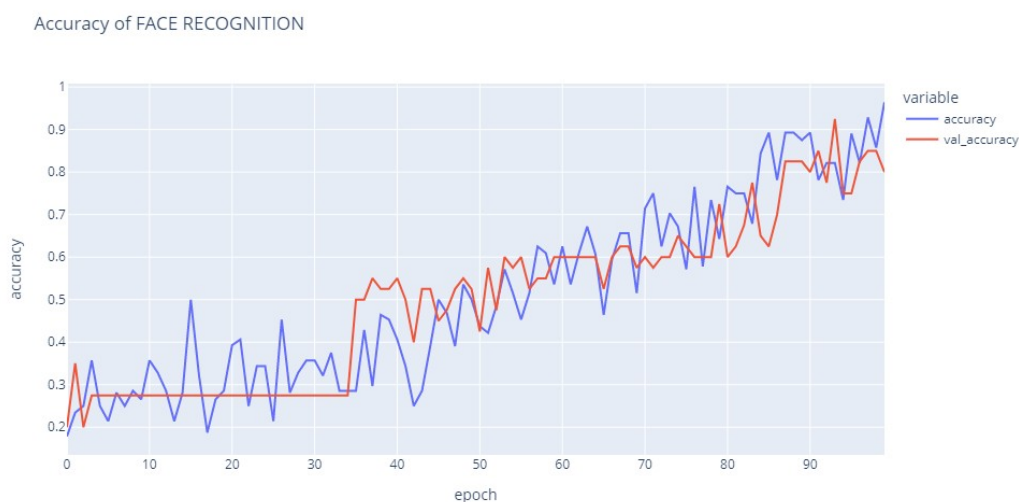
ports or via Wi-Fi. In our system, we used Everest SC-HD03 Webcam which has a high resolution and great quality 1080p, as shown in figure 5 the Everest SC-HD03 Webcam.



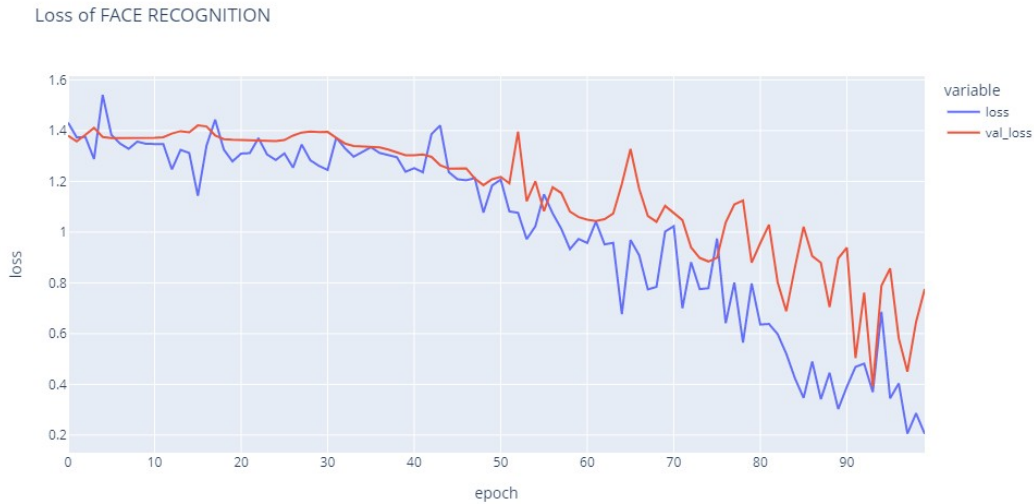
**Fig.5.** Everest SC-HD03 Webcam.

### 3. EXPERIMENTAL WORK AND RESULTS

The CNNs model proposed in table 1 was build using tensorflow which has many advantages to improve efficiency of the model. we Inputted facial images of people for train. The CNNs model were trained for 100 epochs, after every epoch the accuracy was calculated, which is the count of predictions where the predicted value is equal to the true value, it is typically expressed as a percentage. The input is passed through a pile of convolutional and maxpooling layer, the non-linear activation function (ReLU) was used, in output result we applied a softmax function as shown in table 1, Adam optimizer was used as an optimizer for 100 epochs, following our experiments and from the obtained results as shown in Figures 6-7:



**Fig. 6.** Accuracy of face recognition



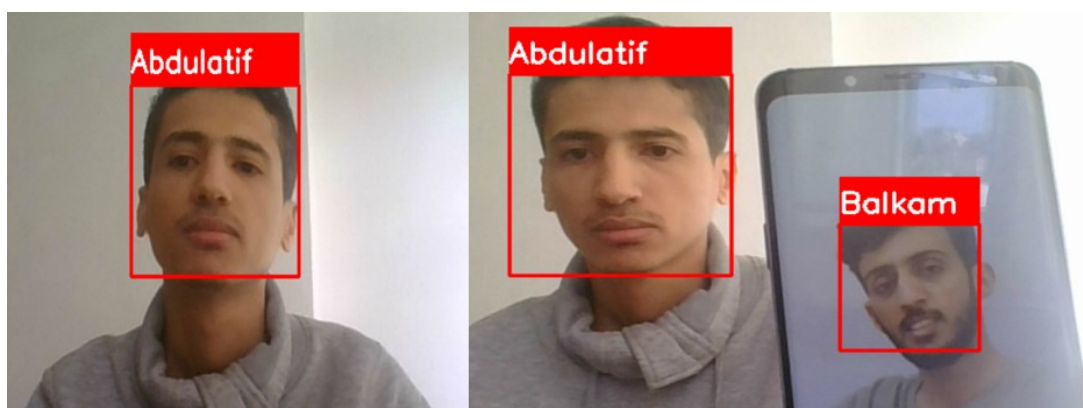
**Fig. 7.** Loss of face recognition

As we have applied the architecture of the model described in table 1 for the face recognition and we have got the good results after training the CNN on dataset for 100 epochs, we obtained the results described in table 2:

**Table 2.** Accuracy And Loss Of Model

	<b>FACE RECOGNITION (after 100 epochs)</b>
<b>Accuracy %</b>	<b>96.43%</b>
<b>Loss %</b>	<b>20.48%</b>

After training the model that we worked on to test the system and the percentage of accuracy is good and the percentage of loss function is in decline. The model is selected on faces to make sure of its effectiveness, as shown in figure 8.



**Fig.8.** Examples of face recognition system results.

#### **4. CONCLUSION**

In conclusion, face recognition results, even considering the much smaller size of contemporary unconstrained image sets labeled for face recognition. Second, the simplicity of our model implies that more elaborate systems using more training data may well be capable of substantially improving results beyond those reported here. Finally, as a perspective of this work can be visualized by creating face recognition system based on CNNs as a feature, another perspective would be the tests our approach on other facial datasets. Our approach leads to significant improvements with respect to both speed and accuracy compared to OpenCV and machine learning methods. Thus, recent deep-learning techniques are also applicable on hardware like raspberry pi with limited resources.

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**MİMARİDE CEPHELERİN GÖRSEL ALGI YÖNTEMİYLE ANALİZİ; GELENEKSEL  
TİLLO ŞEYH NASRETTİN EVİ İLE MODERN EV ÖRNEKLEMİ**

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**ÖZET**

Mekan, sınırları insan tarafından algılanabilen somut bir alan olmanın ötesinde kullanıcıların, içinde ihtiyaçlarını karşılamaya yönelik eylemlerini gerçekleştirdikleri yer, kimlik, aidiyetlik vb. kavramlarla zenginleştirdikleri, çok yönlü anlamlar içeren bir alan olmaktadır. Bu anlamda mekanı oluşturan, tanıtan ve değişimlerini gerçekleştiren kullanıcının kendisi olmaktadır. Endüstrileşme süreciyle birlikte yaşanan ekonomik, siyasal, sosyal, teknolojik vb. değişimler; gelenek, görenek, inanç ve iklim gibi parametrelere uygun olarak tasarlanmış geleneksel evlerden, belli bir kullanıcı için tasarlanmış, kimliksiz, tip ev diyebileceğimiz modern evlere geçiş sürecine neden olmuştur. Bu sayede, ucuz yöntemlerle daha çok sayıda modern evler inşa edilmiştir. Bu evler, farklı yörelerde benzer plan özelliklerine sahip olabileceği gibi cephe biçimlenişinde ise oldukça farklılık gösterebilmektedir. Bulduğu yöreye özgü cephe karakteri taşımayan modern evler; aynı aksta ya da bitişinde yer alan geleneksel evlerin görsel olarak silüetine zarar vermektedir. Çalışma materyali olarak, geleneksel Tillo Şeyh Nasrettin evi ile bitişinde bulunan modern evin ön cepheleri çalışmaya konu edilmiştir. Farklı duyuların aldığı bilgileri yorumlamaya yönelik olan görsel analiz yöntemi çalışmada uygulanmıştır. Bu yöntemde evlerin cephelerine ait çekilen fotoğraflarla birlikte gözlemci yorumlarına ait bilgilerin elde edilmesi hedeflenmiştir. Geleneksel Tillo Şeyh Nasrettin evi ile bitişinde bulunan modern evlerin ön cepheleri gestalt kuramı ilkeleri ile temel tasar ilkelerine uygunluk açısından incelenmiş olup, elde edilen bulgular ve sonuçlar çalışmada yer almaktadır.

**Anahtar Sözcükler:** Tillo, geleneksel ev, modern ev, görsel analiz, gestalt kuramı, temel tasar ilkeleri



**ANALYSIS OF FACADES IN ARCHITECTURE WITH THE METHOD OF VISUAL PERCEPTION; EXAMPLE OF THE TRADITIONAL TILLO SHEIKH NASRETTIN HOUSE AND THE MODERN HOUSE****ABSTRACT**

Beyond being a tangible space whose boundaries can be perceived by humans, the space is the place where the users perform their actions to meet their needs, identity, belonging, etc. It is a field with multidimensional meanings that they enrich with concepts. In this sense, it is the user himself who creates, introduces and changes the space. Economic, political, social, technological etc. experienced with the industrialization process. changes; It has caused a transition process from traditional houses designed in accordance with parameters such as tradition, tradition, belief and climate to modern houses designed for a specific user, without identity, which we can call a type house. In this way, more modern houses were built with cheap methods. While these houses may have similar plan features in different regions, they may differ considerably in their facade formation. Modern houses that do not have the facade characteristic of the region; It visually damages the silhouette of traditional houses located on the same axis or adjacent to it. As the study material, the front facades of the traditional Tillo Şeyh Nasreddin house and the modern house located at the end are the subject of the study. The visual analysis method, which is aimed at interpreting the information received by different senses, was applied in the study. In this method, it is aimed to obtain information about the comments of the observers together with the photographs taken of the facades of the houses. The traditional Tillo Şeyh Nasreddin house and the facades of the modern houses located at the end of it were examined in terms of compliance with the principles of gestalt theory and basic design principles, and the findings and results are included in the study.

**Keywords:** Tillo, traditional house, modern house, visual analysis, gestalt theory, basic design principles

## 1. GİRİŞ

Geleneksel yapılar, belli bir toplum kesimine ait yer koşulları (hava koşulları, doğal afetler, çevre koşulları vb.) ve kültürel özellikleri (din, gelenek, akrabalık, aile vb.) ile şekillenen ortak bir çevrenin yaşam tarzını yansıtan yapı biçimini ifade etmektedir. Bu yapı biçimi içinde, dini ve sivil yapı örnekleri yer almaktadır. İstatistiklere bakıldığında sivil yapılar içerisinde yer alan evler geçmişte olduğu gibi günümüzde de diğer yapı gruplarıyla kıyaslandığında sayıca öne çıkmaktadır. Bu da geleneksel evlerin geçmişteki kullanıcılarının yaşam tarzını büyük ölçüde yansıtması açısından, önemli bilgiler edinmemize yardımcı olmaktadır.

Görüntüsüyle yaşanmışlık hissi vererek içimizi ısıtan geleneksel evler; sosyal, kültürel, maddi, endüstriyel, yapım teknolojisi gibi nedenlerle günlük hayatımızdan uzaklaşmaktadır. Geleneksel evlerin çağın ihtiyaçlarına yanıt veremeyerek yaşantımızdan birer, ikişer yok olması yeni ev ihtiyacı doğmasına neden olmaktadır. İnsanların doğayla mücadele edebilecekleri teknolojik yöntemler geliştirmeleriyle birlikte geleneksel evler yerini modern evlere bırakmaktadır. Modern evler, günümüzde oluşan kültürel yaşama uygun ihtiyaçları karşılayabilecek bir şekilde tasarlanmıştır.

Yaşadığımız çevre içerisinde bulunan fiziksel uyarıcılar (görüntü, doku, koku, ses, ısı vb.) duyu organlarımız aracılığıyla algılanmaktadır. Bu duyumsal algıdan sonra elde edilen bilgiler kişilerin zihninde sahip oldukları karakter, kültür, inanç, hatıra, değer ve geçmiş deneyimlerle birlikte yorumlanmaktadır. Bu duruma Merleau-Ponty, “Bilinçlilik, bedenin arabuluculuğu üzerinden nesneye yönelmektir. Hareket, beden onu anladığında öğrenilir, yani beden hareketi kendi dünyasıyla birleştirdiğinde birisinin bedenini hareket ettirmesi, onun üzerinden nesnelere ulaşmasıdır ya da bir başka deyişle, nesnelere çağrısına cevap vermesidir” şeklinde yaklaşmaktadır (Merleau-Ponty,1962).

Mekani kurmak için kullandığımız aletin kendi bedenimizden başka bir şey olmadığını belirten Poincare’ye göre de: O halde mekanı ölçmek için bir aletimiz olmasaydı mekanı kuramayacaktık; halbuki her şeyi kendisine nispet ettiğimiz ve içgüdü ile kendisini kullandığımız bu alet kendi bedenimizdir. Dış nesnelere kendi bedenimize göre yerleştiriyoruz ve bizim tasarlayabildiğimiz yalnız bu nesnelere mekani ilişkileri, bedenimizle olan ilişkileridir (Poincare, 1986). İnsan bedeni mekânın fiziksel bir parçasıdır. Bu anlamda duyu organlarımız mekânı tanıma ve şekillendirmede ölçme aletlerimiz olarak işlev göstermektedir.

İnsanların yapıları algılaması ilk aşamada görsel duyum aracılığıyla sağlanmaktadır. Bu durum ağırlıklı olarak yapı cepheleri üzerinde yer alan elemanların tasarımı, malzemesi, uyumu vb. aracılığıyla gerçekleşmektedir. Yapılan bu gözlemler öznel algı sonucu gerçekleştiği için bu

bilimsel bilgi oluşumu için dezavantaj oluşturmaktadır. Bu nedenle çalışma kapsamında, Tillo'da bulunan Şeyh Nasrettin evi ile bitişiğindeki modern evin ön cephe karşılaştırılması birtakım ilkelere göre yapılarak nesnel verilerin elde edilmesi hedeflenmektedir. Ayrıca geleneksel ev cephesinin doğru bir şekilde okunması sağlanarak bundan sonraki süreçlerde; geleneksel evlerin korunması, canlandırılması ve sağlıklılaştırılmasına yönelik doğru müdahale yöntemlerinin geliştirilmesi açısından çalışma önemli olmaktadır.

## **2. MİMARİDE BİÇİMSEL ALGI**

İnsanların sahip olduğu duyular arasında görme duyusu insan algısının oluşumunda büyük bir paya sahiptir. Görme işlevi, gözün açık olması halinden ziyade derinliği olan birçok farklı aşamanın gerçekleştiği bir algı ifadesidir. Algılama basit bir şekilde nesnelere rengi, şekli, konumu vb. olabileceği gibi sağduyu yaklaşımı ile nesneye ait gerçek bilgilere sahip olabilecek şekilde de olabilmektedir. Bu da görmekle bakmak arasındaki sınırın ne kadar önemli olduğunu bize göstermektedir. Görme algımız belli bir amaç doğrultusunda hareket ettiğinde algıladığımız her yapının bir görsel ifade ettiği sonucuna gidilmektedir. Bu görseller sahip olduğumuz zevk ölçüsünde değerlendirilerek olumlu veya olumsuz yorumlar yapılabileceği gibi nesnel karşılığı olan bilgilerin elde edilmesinde de yardımcı olmaktadır.

Gestalt kuramına göre, bütün parçaların toplamından farklı bir anlam ifade eder ve birey, bütünü parçalarına bölerek değil, bütünlük içinde algılar. Örnek olarak; bir yapbozun parçaları tek tek farklı şekiller ifade ederken, tamamlanan yapboz ise parçalardan farklı bir bütünü ifade etmektedir. Tasarımlarda görsel algıyı birinci plana alan gestalt kuramı içerisinde belli ilkeler barındırmaktadır.

Yakınlık ilkesi, birbirine yakın nesnelere bir bütün olarak algılar.

Benzerlik ilkesi, birbirine benzer nesnelere algısal olarak gruplaşır.

Tamamlama (Kapatma) ilkesi, tamamlanmayan nesnelere bir bütün olarak algılanır.

Simetri ilkesi, nesnelere bir merkez noktası etrafında simetrik olarak algılanır.

Ortak Kader ilkesi, nesnelere aynı yörünge üzerinde sıralanmış olarak algılanır.

Devamlılık ilkesi, kesişen iki nesne bir bütün olarak algılanır.

İyi Gestalt ilkesi (Pragnanz ilkesi), düzenli ve sıralı nesnelere bir grup olarak algılanır.

Geçmiş Deneyim ilkesi, mekansal yakınlık ya da yakın zamanda algılanan nesnelere bir bütün olarak algılanır (Zengin, 2020).

Temel tasar ilkeleri ise ana hatları itibariyle bütünlük, farklılık, vurgu, denge, alan, zıtlık, ritim, oran-orantı ilkeleri kullanılarak farklı tasarımlar oluşturulmasını sağlamaktadır (Sağsöz, Aydın Öksüz; 2013).

Mimari yapı cephelerinin sağlam bir zeminde değerlendirilerek, sağlıklı sonuçlara ulaşılması için gestalt kuramı ilkeleri ile temel tasar ilkeleri çalışmada yöntem olarak kullanılmaktadır.

Yapılarda biçimi günlük yaşantımızda yorumlarken anlamdırma sürecinde tasarım ilkelerine uygunluk önemli olmaktadır. Mimarlıkta, bazı yapı biçimlerinin belli bir çevreye ait ve birbirinin tekrarı olduğu tespiti de ilkelere uygunluk bakımından sınırın korunmasına yardımcı olmaktadır.

### **3. ALAN ÇALIŞMASI**

#### **3.1. Geleneksel Tillo Evleri (Cas evler)**

##### **Plan Düzeni**

Genel itibariyle iki katlı olmakla birlikte yer yer üç katlı örneklerine de rastlanılan evlerin zemin katlarında servis birimleri (avlu, mutfak, kiler, tuvalet, yazlık oda) yer alırken üst katta ise çoğunlukla misafirlerin kullanımına ayrılan başoda ve diğer odalar yer almaktadır. Plan düzeninde büyüme oda+sofa şeklinde yatay ve düşey yönde gelişim göstermektedir (Görsel 1).



**Görsel 1.** Geleneksel Tillo evi örnekleri

##### **Sabatlar**

Sabatlar evlerin bitişik nizamda inşa edilmeleri sonucunda karşılaşılan ve şekil olarak sivri, basık ve yuvarlak kemerlere sahip mimari elemanlardır. Sabatlar yayaların sokaklar arasındaki geçişini gerçekleştirmek amacıyla tasarlanmış olup, araçların geçişine izin veremeyecek büyüklüğe sahip olmaktadır (Görsel 2).



**Görsel 2.** Geleneksel Tillo evi sabat örnekleri

### **Mekanlar**

Geleneksel Tillo evlerinde açık mekanlar avlu ve damdan oluşmaktadır. Bu mekanlarda evin içinde gerçekleştirilemeyecek günlük işler (çamaşır kurutma, kış hazırlıkları, yiyecek depolama vb.) yapılmaktadır (Görsel 3).

Geleneksel Tillo evlerinde yarı açık mekan olan revak önemli kişilere ait evlerde rastlanılmakla birlikte diğer evlerde yaygın olarak görülmemektedir (Görsel 4).

Geleneksel Tillo evlerinde kapalı mekanlar oda, işlik, ahır, depo, mutfak, hamam(duş) ve heladan oluşmaktadır.

Fonksiyonlarına göre ayrılmayan odalarda geceleri uyuma ile gündüzleri yeme, dinlenme, duş alma, misafir ağırlama gibi birçok eylem gerçekleştirilmektedir. Başoda ise diğer odalara kıyasla daha büyük, manzaraya hakim ve genel itibarıyla misafir kullanımına ayrılmış evin en gösterişli mekanıdır.

Aynı oda içerisinde duvarlarla bölünmüş, dış cephede penceresi olmayan işliklerde misafirler için servis hazırlıkları yapılabilmektedir. Zemin katın avluya bakan kısmında yer alan yazlık odalar tahıl depolama ile hayvan besleme amaçlarıyla kullanılmaktadır (Görsel 5).

Karasal iklim koşulları nedeniyle yiyeceklerin bozulmasının önüne geçmek amacıyla mutfaklar, güneşin daha az alındığı evlerin arka cephelerinde konumlandırılmıştır. Mutfaklarda havalandırma amaçlı küçük pencereler, evlerin tavanlarına yakın bir şekilde yerleştirilmiştir. Seki altında düzenlenmiş mağsellerde, çirtak'ın dip bölümünde "Hamamuke" denilen küçük bir hamam ile merdiven sahanlığının dip bölümünde yıkanma ihtiyacı karşılanmaktadır. Avlu girişlerinin sağ köşelerinde ise helalara yer verilmiştir (Görsel 6), (Şeker İnalcan, 2021).



**Görsel 3.** Geleneksel Tillo evi avlu ve dam örnekleri



**Görsel 4.** Geleneksel Tillo Şeyh Nasrettin evi revak örneği



**Görsel 5.** Geleneksel Tillo evi oda, işlik ve yazlık oda örnekleri



**Görsel 6.** Geleneksel Tillo evi mutfak, duş ve hela örnekleri

### **Cephe Düzeni**

Simetrik cephe düzeninin yaygın bir şekilde kullanıldığı geleneksel Tillo evlerinde kapı ve pencere yerleşimleri cephe düzenini belirleyen elemanlar olmaktadır.

Evlerin giriş cepheleri kullanıcının maddi durumuna göre sade olabileceği gibi gösterişli de olabilmektedir. Gösterişli evlerin cephelerinde yer alan kapılar sütunlu, kemerli ve tezyinat yazı süslemeli olmaktadır.

İki katlı cephe düzeninde alt katlarda yer alan pencereler güvenlik, mahremiyet ile farklı kullanımlara dayalı pencere ihtiyacının olmaması nedenleriyle daha az sayıda ve küçük ölçülerde olmaktadır. Manzara, güneş vb. yararlanmak ile cepheye gösteriş katmak amaçlarıyla üst kat pencereleri daha fazla sayıda, etrafları işlemeli ve büyük ölçülerde olmaktadır.

Pencere boyutları 1/2 boşluk oranına sahip olup , kapı traversleri pencere üst sınırlarıyla aynı hizada olmaktadır. Başoda içerisinde yer alan cumbalar cepheye hareketlilik katmıştır. Saçak sistemleri ise çok ince ya da bulunmamaktadır (Görsel 7).



**Görsel 7.** Geleneksel Tillo evi cephe örnekleri

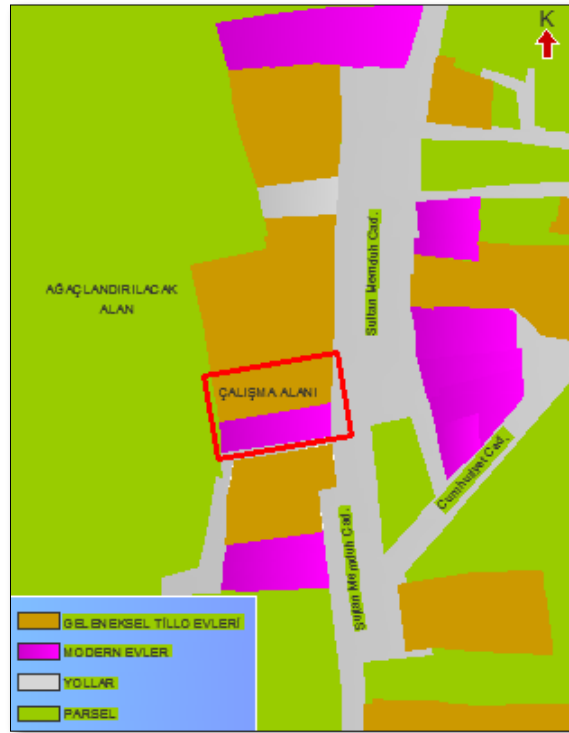
### Yapım Tekniği ve Malzeme

Geleneksel Tillo evlerinde yapım tekniği olarak, yığma taşıyıcı sistem ile iskelet taşıyıcı sistem tercih edilmiştir.

Taş; evlerin taşıyıcı duvarlarında, cas; hem iç hem de dış cephe sıvamalarında, toprak; derz aralarında, ahşap; kapı ve pencere doğramalarında ağırlıklı olarak kullanılmıştır.

### **3.2. Çalışma Alanı**

Çalışma alanı kapsamında Tillo ilçesinde bulunan geleneksel Şeyh Nasrettin evi ile bitişiğindeki modern evin ön cepheleri biçimsel anlamda değerlendirilmiştir. Farklı dönemlerde inşa edilmeleri ile farklı cephe biçimlerine sahip olmaları evlerin tercih edilme nedenleri olmaktadır. Yapıların cephe biçimleri üzerine gerçekleştirilen görsel algı gestalt kuramı ilkeleri ile temel tasarımlarına uygunluk bakımından değerlendirilmiştir (Görsel 8, 9).



Görsel 8. Çalışma alanı





**Görsel 9.** Fakirullah Mahallesi içerisinde incelenen geleneksel Tillo Şeyh Nasrettin evi ile modern ev örnekleme

### **Görsel Analiz Çalışması**

Mimarlık ürünlerinin belli bir işlevi yerine getirme amacı taşımaları gerektiği ile birtakım disiplinlerin tekniklerini içermeleri nedenleriyle sanat olarak görülmeleri mümkün olmamaktadır. Öte yandan bir mimari ürünü ele aldığımızda işlevinden çok görselliği bizi daha çok etkileyebilmektedir. Kolon, kiriş, döşeme, duvar vb. yapıyı meydana getiren elemanlar dışında mimarın yapıya herhangi bir sanatsal değer katıp katmadığı onu anlamlandırabilmemiz için önemlidir.

Geleneksel yapılar var olduğu yöreyi simgeleyen yapı biçimlerini içermektedir. Bu yapı biçimleri tip oluşturarak benzer plan düzenleri ile cephelere sahip olmaktadır. Endüstrileşmeyle birlikte yeni malzeme (beton, çelik, plastik vb.) ile yapım tekniklerin geliştirilmesiyle yapı plan ve cephe biçimlenişinde değişiklikler yaşanmıştır. Bu sayede biçimde özgürleşme yaşanmıştır. Örnek olarak, simetrik cephe düzeni yerini raslantısal biçimlenmiş cephe düzenlerine bırakmıştır. Kullanıcı ihtiyacına öncelik veren yapılaşma anlayışında ‘Biçim işlevi takip eder’ anlayışı ‘işlev biçimi takip eder’ şeklinde değiştirilmiştir. Bu durum yapıların estetik değerlere sahip olmalarına engel olabileceği gibi geleceğe miras bırakılacak yapı örneklerini de azaltmaktadır.

Postmodernizmin öncülerinden Robert Venturi, yapının iç ve dışının birbirinden farklı olarak değerlendirilmesi gerektiği üzerinde durur. Yapının cephesi her ne kadar değişse de yapı içindeki geleneksel dekorasyon aynı şekilde devam edebilmektedir. Bu anlamda değişimin sağlıklı bir şekilde takip edilebilmesi amacıyla yapıların cephe biçimlenişleri daha önemli olabilmektedir (Arslan, 2022).

Endüstri dönemi öncesinde yapı cephelerinin görselliğini artırmak amacıyla plastik sanatlar (resim, mimari, kabartma, hat, tezhip, minyatür vb.) kullanılmaktadır. Günümüzde ise yapılar sadece kullanıcı gereksinimlerini karşılama amacı taşımaktadır. Bu nedenle yapı cephelerini sanatsal anlamda değerlendirmek mümkün görülmemektedir.

















Çalışma alanı kapsamında, örneklem olarak seçilen yapıların farklı mimari dönemlere ait olmaları sonucu, farklı yapı biçimlerine sahip olmaları fikri üzerinde durulmuştur.

Çalışma kapsamında 15 kişiye yapılarla ilgili soru sorulmuştur (Görsel 10).

	Cephe	Avlu	Mekanlar	Konum	<b>Toplam</b>		Cephe	Avlu	Mekanlar	Konum	<b>Toplam</b>
<b>Şeyh Nasrettin evi</b>	8	1	1	5	15	<b>Modern ev</b>	6	3	2	4	15

**Görsel 10.** Evlerin tasarımıyla ilgili en dikkat çekici öge.

İlk aşamada olduğu gibi diğer tasarım öğelerine bakıldığında da cepheler görsel olarak öne çıkmaktadır. Aşağıda örnek olarak seçilen geleneksel ev ile modern ev temel tasar ilkeleri, gestalt ilkelerine göre değerlendirmeye tabi tutulmuştur (Görsel 11, 12).

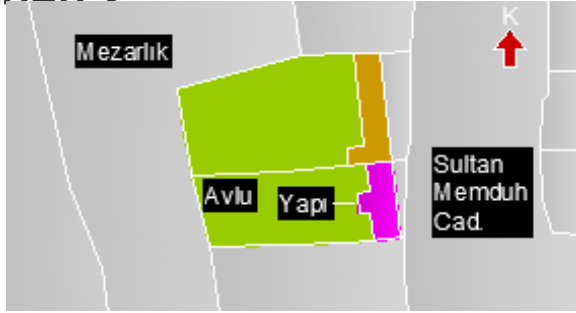
YAPI	TEMEL İLKESİ	TASAR		GESTALT İLKESİ			
		Var	Yok		Var	Yok	
<p>Ada/Parsel No: 130/23-24-64 Adres: Fakirullah Mah. Sultan Memduh Cad. Yapım Yılı:19.yy -20.yy (130 yıl) Tescil Durumu: Tescilli</p> <p><b>GELENEKSEL ŞEYH NASRETTİN EVİ</b></p> <p>Vaziyet planı</p> <p>Giriş cephesi</p>	 <p>Bütünlük</p>	+		 <p>Yakınlık</p>		+	
	 <p>Farklılık</p>		+	 <p>Benzerlik</p>		+	
	 <p>Vurgu</p>	+		 <p>Tamamlama</p>		+	
	 <p>Denge</p>	+		 <p>Simetri</p>	+		
	 <p>Alan</p>	+		 <p>Ortak Kader</p>	+		
	 <p>Zıtlık</p>		+	 <p>Devamlılık</p>		+	
	 <p>Ritim</p>	+		 <p>İyi Gestalt</p>	+		
	 <p>Oran-Orantı</p>	+		 <p>Geçmiş Deneyim</p>		+	
	<b>Toplam</b>		6	2	<b>Toplam</b>	3	5



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Vaziyet planı



Giriş cephesi

MODERN EV

YAPI	TEMEL İLKESİ	TASAR		GESTALT İLKESİ	
		Va	Yo	Va	Yo
	Bütünlük	+		Yakınlık	+
	Farklılık		+	Benzerlik	+
	Vurgu	+		Tamamlama	+
	Denge	+		Simetri	+
	Alan	+		Ortak Kader	+
	Zıtlık		+	Devamlılık	+
	Ritim	+		İyi Gestalt	+
	Oran-Orantı		+	Geçmiş Deneyim	+
	<b>Toplam</b>	<b>5</b>	<b>3</b>	<b>Toplam</b>	<b>7</b>

**Görsel 10., 11.** Modern ev vaziyet planı, giriş cephesi ile temel tasarım ilkesi ve gestalt ilkesine uygunluğu

#### 4. BULGULAR

Alan çalışmasının ilk aşamasında geleneksel ev ile modern evin cephe, avlu, mekan ve konum tasarımlarının görsel olarak değerlendirilmesiyle ilgili 15 kişiye soru sorulmuştur. Kişilerin yorumlarına bakıldığında her iki evin de cephe görselleriyle öne çıktığı tespit edilmiştir. Geleneksel Şeyh Nasrettin evi biçim olarak dikdörtgen formda tasarlanmıştır. Cephe merkezinde, zemin katta eve girişin sağlandığı taç kapı ile üst katta üçüz pencereye sahip başodaya ait cumba bulunmaktadır. Zemin katta simetrik ikiz pencereler ile diğer pencereler bulunmaktadır. Üst katta ise ikiz ve üçüz pencere sistemleri cephede bulunmaktadır. Cephede simetri sadece düşey aksda görülmekle birlikte eve sonradan eklenen birime ait pvc pencere değerlendirmeye alınmamıştır. Geleneksel Şeyh Nasrettin evi; Temel tasarım ilkelerinden bütünlük, vurgu, denge, alan, ritim, oran-orantı ilkelerine uyum göstermekle birlikte farklılık ve zıtlık ilkelerine uyum göstermemektedir. Geleneksel Şeyh Nasrettin evi; Gestalt ilkelerinden simetri, ortak kader ve iyi gestalt (pragnanz) ilkelerine uyum göstermekle birlikte yakınlık,

benzerlik, tamamlama (kapatma), devamlılık ve geçmiş deneyim ilkelerine uyum göstermemektedir. Modern ev biçim olarak dikdörtgen formda

tasarlanmıştır. Cephe merkezinde, zemin katta eve girişin sağlandığı kapı ile üst katlarda yer alan balkonlar cepheye hareketlilik katmaktadır. Zemin katta yer alan kapalı otopark kapısı ile pencere simetri oluşturmamaktadır. Üst katlarda yer alan pencereler ise dişey ve yatay akslarda cephede belli bir simetri oluşturmaktadır.

Modern ev: Temel tasar ilkelerinden bütünlük, vurgu, denge, alan, ritim, oran-orantı ilkelerine uyum göstermekle birlikte farklılık, zıtlık ve oran-orantı ilkelerine uyum göstermemektedir.

Modern ev: Gestalt ilkelerinden simetri ilkesine uyum göstermekle birlikte ortak kader, iyi gestalt (pragnanz), yakınlık, benzerlik, tamamlama (kapatma), devamlılık ve geçmiş deneyim ilkelerine uyum göstermemektedir.

Temel tasar ilkeleri ile Gestalt ilkeleri bağlamında incelenen Şeyh Nasrettin evi ile modern evin ön cephelerinin çoğunlukla; denge, ritim, vurgu, bütünlük ve simetri ilkelerine göre biçimlendiğı görülmektedir. Bu ilkeler, evlerin cephe tasarımıda bütünsel etki ve kompozisyon oluşturarak, düzeni öne çıkaran boyutlar olmaktadır.

## **5. SONUÇ**

Çalışma alanı, Tillo ilçesinin organik yerleşimine göre yüksek bir noktada bulunmaktadır. Örnekleme olarak seçilen, geleneksel Şeyh Nasrettin evi ile bitişindeki modern ev arazi eğimine göre en üst basamakta yer almaktadır. Bu sayede, ilçe sakinleri ve dışardan gelen ziyaretçiler açısından oluşan görüş açıklığı görsel algıyı belirgin bir şekilde arttırmaktadır.

Görsel algı açısından daha estetik ve keyif verici olan geleneksel Şeyh Nasrettin evi yöre mimarisine uyum sağlamaktadır. Bitişik nizamda yer alan modern ev ise bu görsel kompozisyona zarar vermektedir.

Geleneksel Şeyh Nasrettin evi ile modern evin ön cephelerinin bitişik nizamda ve aynı aks üzerinde bulunmaları, modern evlerde tasarlanacak cephe biçimlerinin geleneksel yapılarla uyumlu olması yönünden avantaj sağlamaktadır. Modern evlerin yöreye özgü karakteristik cephe biçimi kazanması ilçenin mimari kimliğini güçlendirecektir. Görsel kaliteyi azaltan birbirinden farklı modern ev cephelerinin daha anlaşılabilir olması, geleneksel evlerin bulunduğu çevreye de değer katacaktır.

Dışarıdan bakıldığında gözlemcilerde görsel bütünlük algısının oluşmasını sağlamak amacıyla, yerleşimler geleneksel konut alanı ve yeni konut alanı olacak bir şekilde tasarlanmalıdır.

Sözelimi, geleneksel evlerin yoğunlukta bulunduğu evlere bitişik veya yakın konumda yer alan modern evlere ait ön cephelerde doğal, doğala yakın veya taklit malzemelerin kullanımı ile

geleneksel ev cepheleri ile benzerlik gerçekleştirilmelidir. Bu tasarım anlayışında geleneksele dönüş sağlanarak geleneksel evlerin tekrardan hayat bulması ile sürdürülebilir olmasına katkıda bulunulacaktır.

Birbirinden bağımsız bir şekilde tasarlanan modern evler ile geleneksel evler arasında bir bütünlük sağlamaya yönelik gerçekleştirilecek bu uygulama, diğer geleneksel yapılara örnek teşkil etmesi bakımından önemli olmaktadır. Geleneğe ve doğaya bağlı olarak, modern evlerde cephe iyileştirmeye yönelik gerçekleştirilecek uygulamaların zenginleştirilmesi kültürel mirasın turizm açısından daha fazla değer görmesine yardımcı olacaktır.

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**MEIXNER-POLLACZEK COEFFICIENT ESTIMATE FOR A CLASS OF BI-STARLIKE FUNCTIONS**

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**ABSTRACT**

Recently, some special polynomials become more and more important role in the field of Geometric Function Theory. These polynomials are considered from very different and various viewpoints to solve the problems in Geometric Function Theory. Especially, orthogonal polynomials appear in many areas of mathematics and have been the subject of interest of many mathematicians. In mathematics, Meixner polynomials (also called discrete Laguerre polynomials) are a family of discrete orthogonal polynomials introduced by Josef Meixner (1934). They are given in terms of binomial coefficients and Pochhammer symbol. In this present paper, we introduce and investigate new subclass of the function class  $\Sigma$  of bi-univalent functions defined in the open unit disc. We define this newly subclass using by Meixner-Pollaczek Polynomials. Taylor-Maclaurin coefficients  $|\alpha_2|$  and  $|\alpha_3|$  were also calculated for this subclass. Furthermore, some miscellaneous properties and known consequences are also indicated.

**Keywords:** Analytic functions, Bi-starlike functions, Meixner-Pollaczek polynomials.



## 1. INTRODUCTION

Let  $\mathcal{A}$  indicate the family of functions analytic in the open unit disk  $D := \{z \in \mathbb{C} : |z| < 1\}$  and normalized by the conditions  $f(0) = f'(0) - 1 = 0$  and having the form

$$f(z) = z + \sum_{n=2}^{\infty} a_n z^n \quad (1)$$

Furthermore, let  $\mathcal{S}$  denote the subclass of functions in  $\mathcal{A}$  which are univalent in  $D$  (see for details [9]). From the Koebe  $1/4$  Theorem (for details, see [5]) every univalent function  $f$  has an inverse  $f^{-1}$  satisfying

$$f^{-1}(f(z)) = z \quad (z \in D)$$

And

$$f(f^{-1}(w)) = w \quad (|w| < r_0(f), r_0(f) \geq \frac{1}{4}).$$

In fact, the inverse function  $f^{-1}$  is given by

$$\begin{aligned} g(w) = f^{-1}(w) &= w - a_2 w^2 - (2a_2^2 - a_3) w^3 - (5a_2^3 - 5a_2 a_3 + a_4) w^4 + \dots \\ &= w + \sum_{k=2}^{\infty} b_k w^k. \end{aligned} \quad (2)$$

A function  $f \in \mathcal{A}$  is said to be bi-univalent in  $D$  if both  $f$  and  $f^{-1}$  are univalent in  $D$ . Let  $\Sigma$  denote the class of all bi-univalent functions in  $D$  given by the Taylor-Maclaurin series expansion given by (1).

For detailed information about the class of  $\Sigma$  was given in the references [1],[2],[3],[16] and [19].

The convolution or Hadamard product of two function  $f, h \in \mathcal{A}$  is denoted by  $f * h$ , and is defined by

$$(f * h)(z) = z + \sum_{n=2}^{\infty} a_n b_n z^n, \quad \text{where } f \text{ is given by (1) and } h(z) = z + \sum_{n=2}^{\infty} b_n z^n.$$

For complex numbers  $\alpha_i (i=1, 2, \dots, p)$  and  $\beta_j (j=1, 2, \dots, q)$  where  $\beta_j \neq 0, -1, -2, \dots; j=1, 2, \dots, q$ , the generalized hypergeometric function  ${}_pF_q(z)$  is defined by

$${}_pF_q(z) = {}_pF_q(z) (\alpha_1, \dots, \alpha_p; \beta_1, \dots, \beta_q; z) = \sum_{n=0}^{\infty} \frac{(\alpha_1)_n \dots (\alpha_p)_n}{(\beta_1)_n \dots (\beta_q)_n} \frac{z^n}{n!} \quad (3)$$

where  $p \leq q + 1$ ,

$$(\lambda)_n = \frac{\Gamma(\lambda+n)}{\Gamma(\lambda)} = \begin{cases} 1 & \text{if } n = 0 \\ \lambda(\lambda+1)(\lambda+2)\dots(\lambda+n-1) & \text{if } n \in N = \{1, 2, \dots\}. \end{cases}$$

The series given by (3) converges precisely for  $|z| < \infty$  if  $p < q + 1$  and for  $z$  in the open unit disc  $D := \{z \in \mathbb{C} : |z| < 1\}$  if  $p = q + 1$ . For the values  $\alpha_i$  and  $\beta_j$ , the family of hypergeometric functions  ${}_pF_q$  is proximately cognate to families of analytic and univalent functions. It is well-known that hypergeometric and univalent functions play important part in many different problems passed in applied mathematics, probability and statistics, operations research, signal theory, moment problems, and other different science (e.g., see Exton [6, 7], Miller and Mocanu [15] and Ronning [20]). We establish a new way for studying the connection between classes of hypergeometric and analytic univalent functions and also find some new bounds coefficients.

## 2. PRELIMINARIES

For  $p = q + 1 = 2$ , the series defined by (3) gives rise to the Gaussian hypergeometric series  ${}_2F_1(a, b; c; z)$ . This reduces to the elementary Gaussian geometric series  $1 + z + z^2 + \dots$  if

- (i)  $a = c$  and  $b = 1$
- (ii)  $a = 1$  and  $b = c$ .

For  $\Re(c) > \Re(b) > 0$ , we obtain,

$${}_2F_1(a, b; c; z) = \frac{\Gamma(c)}{\Gamma(b)\Gamma(c-b)} \int_0^1 \frac{t^{b-1} (1-t)^{c-b-1}}{(1-tz)^a} dt.$$

As a special case, we observe that

$${}_2F_1(1, 1; \alpha; z) = (\alpha - 1) \int_0^1 \frac{t^{\alpha-1} (1-t)^{\alpha-2}}{1-tz} dt,$$

and

$${}_2F_1(\alpha, 1; 1; z) = \frac{1}{(1-z)^\alpha},$$

so that

$${}_2F_1(1, 1; \alpha; z) * {}_2F_1(\alpha, 1; 1; z) = \frac{1}{1-z} = {}_2F_1(1, 1; 1; z).$$

The classical Koebe function is a function holomorphic in  $D := \{z \in \mathbb{C} : |z| < 1\}$  and given as follows:

$$k_2(z) = \frac{z}{(1-z)^2} = \frac{1}{4} \left\{ \left( \frac{1+z}{1-z} \right)^2 - 1 \right\} = z + 2z^2 + 3z^3 + \dots, \quad z \in D.$$

The important function  $k_2(z)$  follows from extremality for the familiar Bieberbach conjecture.

The Koebe function is univalent and starlike in  $D$  and maps the unit disk  $D$  onto the

$$\text{complex plane minus a slit } \left( -\infty, -\frac{1}{4} \right].$$

Certain generalizations of  $k_2(z)$  were appeared in the literature. Robertson [19] proved

$$k_{2(1-\alpha)}(z) = \frac{z}{(1-z)^{2(1-\alpha)}} \quad (0 \leq \alpha < 1)$$

is the extremal function for the functions starlike of order  $\alpha$ . The function

$$k_\alpha(z) = \frac{1}{2\alpha} \left\{ \left( \frac{1+z}{1-z} \right)^\alpha - 1 \right\} \quad (\alpha \in \mathbb{R} \setminus \{0\}, z \in D)$$

was well studied by Pommerenke [17], who investigated a universal invariant family  $U_\alpha$ .

The definition of  $k_\alpha$  was extended for a non-zero complex number  $\alpha$  by Yamashita [25].

From the classical result of Hille [10], we see that  $k_\alpha$  is univalent in  $D$  if and only if  $\alpha \neq 0$  is

the union  $A$  of the closed disks  $\{|z+1|\leq 1\}$  and  $\{|z-1|\leq 1\}$ . Making use of the geometric properties,

Yamashita [25] described how  $k_\alpha$  tends to be univalent in the whole  $D$  as  $\alpha$  tends to each boundary point of  $A$  from outside.

On the other hand, The properties of  $\log k'_c$ , where

$$k_c(z) = \frac{1}{2c} \left\{ \left( \frac{1+z}{1-z} \right)^c - 1 \right\} \quad (c \in \mathbb{C} \setminus \{0\}) \quad \text{and} \quad k_0(z) = \frac{1}{2} \log \left( \frac{1+z}{1-z} \right) \quad (z \in D),$$

(4)

were studied by Campbell and Pflatzgraff [4]. Pommerenke [17] studied the special case of (4), that is,

$$k_{iy}(z) = \frac{1}{2iy} \left\{ \left( \frac{1+z}{1-z} \right)^{iy} - 1 \right\} \quad (y > 0, z \in D),$$

for which

$$k'_{iy}(z) = \frac{1}{(1+z)^{1-iy} (1-z)^{1-iy}}.$$

An obvious and consequential extension of (4) was given by below equation.

$$k_c(\theta, \psi, z) = \frac{1}{(e^{i\psi} - e^{i\theta})^c} \left\{ \left( \frac{1 - ze^{i\theta}}{1 - ze^{i\psi}} \right)^c - 1 \right\} \quad (c \in \mathbb{C} \setminus \{0\}; e^{i\psi} \neq e^{i\theta}; \theta, \psi \in \mathbb{R}; z \in D),$$

and for the case when  $c = 0$ ,

$$k_0(\theta, \psi, z) = \frac{1}{(e^{i\psi} - e^{i\theta})} \log \left( \frac{1 - ze^{i\theta}}{1 - ze^{i\psi}} \right) \quad (e^{i\psi} \neq e^{i\theta}; \theta, \psi \in \mathbb{R}; z \in D).$$

We get

$$k'_c(\theta, \psi, z) = \frac{1}{(1 - ze^{i\theta})^{1-c} (1 - ze^{i\psi})^{1+c}} \quad (c \in \mathbb{C}).$$

Analogy

$$k'_{iy}(\theta, \psi, z) = \frac{1}{(1 - ze^{i\theta})^{1-iy} (1 - ze^{i\psi})^{1+iy}}$$

with the generating function for Meixner-Pollaczek polynomial  $P_n^\lambda(x, \theta)$  [11], [14] we get,

$$G^\lambda(x, \theta, -\theta, z) = \frac{1}{(1 - ze^{i\theta})^{\lambda-iy} (1 - ze^{-i\theta})^{\lambda+iy}} = \sum_{n=0}^{\infty} P_n^\lambda(x, \theta) z^n,$$

where  $\lambda > 0$ ,  $\theta \in (0, \pi)$  and  $x \in \mathbb{R}$ .

**Definition 2.1** For  $\lambda > 0$ ,  $\theta \in (0, \pi)$  and  $x \in \mathbb{R}$ .

$$\begin{aligned} zG^\lambda(x, \theta, -\theta, z) &= \frac{z}{(1 - ze^{i\theta})^{\lambda-iy} (1 - ze^{-i\theta})^{\lambda+iy}} = \sum_{n=0}^{\infty} P_n^\lambda(x, \theta) z^{n+1}, \\ &= \sum_{n=0}^{\infty} \frac{(2\lambda)_n}{n!} e^{inx} {}_2F_1(-n, \lambda + ix, 2\lambda, 1 - e^{-2i\theta}) z^{n+1}, \\ &= \sum_{n=0}^{\infty} F_{n+1} z^{n+1} \\ &= z + \sum_{n=2}^{\infty} F_n z^n, \end{aligned}$$

$$(5) \quad \text{where } F_{n+1} = \frac{(2\lambda)_n}{n!} e^{inx} {}_2F_1(-n, \lambda + ix, 2\lambda, 1 - e^{-2i\theta}) \quad \text{and } z \in D.$$

We give some special cases of different values of  $\lambda$ ,  $x$  and  $\theta$ :

$$(1) \quad L_n^\alpha(x) = \lim_{\phi \rightarrow 0} P_n^{\alpha+1} \left( -\frac{x}{2\phi}, \phi \right), \quad \text{called the Laguerre polynomial.}$$

$$(2) \quad H_n(x) = \lim_{\lambda \rightarrow \infty} n! \lambda^{\frac{-n}{2}} P_n^\lambda \left( \frac{x\sqrt{\lambda} - \lambda \cos \phi}{\sin \phi}, \phi \right), \quad \text{called the Hermite polynomial.}$$

$$(3) \quad U_n(x) = \lim_{\lambda \rightarrow 0} P_n^\lambda \left( \frac{x}{2}, \frac{\phi}{2} \right), \quad \text{called the symmetric Meixner-Pollaczek polynomial.}$$

$$(4) \quad P_n^0(x) = \lim_{\lambda \rightarrow 0} P_n^\lambda(x), \quad \text{shows that these polynomials are orthogonal polynomials in a strip } -1 \leq \Im(z) \leq 1.$$

(5)  $W_n(x) = \lim_{\lambda \rightarrow 0} F_n^{\lambda} \left( \frac{x}{2}, \frac{\pi}{2} \right)$  arises as the Mellin transform of odd Hermite orthogonal functions.

For  $\lambda > 0, \theta \in (0, \pi)$  and  $x \in \mathbb{R}$ , using the Generalized Meixner-Pollaczek polynomial [14],

we introduce convolution operator  $F_{x,\theta}^{\lambda} : A \rightarrow A$ , by

$$F_{x,\theta}^{\lambda} f(z) = \left( z G^{\lambda}(x, \theta, -\theta, z) * f(z) \right) = z + \sum_{n=2}^{\infty} F_n \alpha_n z^n, \quad (6)$$

where

$$F_n = \frac{(2\lambda)_{(n-1)}}{(n-1)!} e^{i(n-1)\theta} {}_2F_1(-(n-1), \lambda + ix, 2\lambda; 1 - e^{-2i\theta}) \quad (z \in U). \quad (7)$$

Let  $\Omega$  be the class of analytic functions  $w$ , normalized by  $w(0) = 0$ , satisfying the condition  $|w(z)| < 1$ . For analytic functions  $f$  and  $g$ , we say that  $f$  is subordinate to  $g$  in  $D$ , denoted by  $f \prec g$ , if there exists a function  $w \in \Omega$  so that  $f(z) = g(w(z))$  in  $D$ . In particular, if  $g$  is univalent in  $D$ , then  $f \prec g \Leftrightarrow f(0) = g(0)$  and  $f(U) \subset g(U)$ .

Recently there has been triggering interest to study bi-univalent function class  $\Sigma$  and obtained non-sharp coefficient estimates on initial coefficients. But the coefficient problem for each of the following Taylor-MacLaurin coefficients  $|\alpha_n|$  ( $n \geq 3$ ) is still an open problem (see [1, 2, 3, 12, 16, 23]). Many researchers (see [8, 9, 13, 22]) have recently introduced and investigated several interesting subclasses of the bi-univalent function class  $\Sigma$  and they have found non-sharp estimates on the first two Taylor-MacLaurin coefficients  $|\alpha_2|$  and  $|\alpha_3|$ . Motivated by the work of [18], [19], [21], and [24], the main aim of current investigation is to introduce Yamakawa family involving Generalised Meixner-Pollaczek polynomial operator of bi-univalent function families  $\Sigma$ . we find estimates on the coefficients  $|\alpha_2|$  and for the functions that belong to these Yamakawa family of functions of the class  $\Sigma$ . We need following Lemma 2.1 and Definition 2.2 to derive our main result. The techniques used are same as Srivastava et al. [22].

**Lemma 2.1** [17] Let  $h \in P$  the family of all functions  $h$  analytic in  $D$  for which  $\operatorname{Re}\{h(z)\} > 0$  and have the form

$$h(z) = 1 + p_1z + p_2z^2 + p_3z^3 + \dots \quad \text{for } z \in D.$$

Then  $|p_n| \leq 2$  for each  $n$ .

**Definition 2.2.(Yamakawa)** [24] A function  $f \in T(n)$  is said to be in the class  $T(n, \alpha)$  if it satisfies the following inequality:

$$\operatorname{Re} \left\{ \frac{f'(z)}{zf'(z)} \right\} > \alpha \quad (z \in D)$$

where  $0 \leq \alpha < 1$ .

### 3. COEFFICIENT BOUNDS FOR THE FUNCTIONS CLASS $T_{\Sigma}^{\lambda, \kappa, \theta}(\alpha)$

**Definition 3.1.** For  $0 < \alpha < 1$ , a function  $f \in \Sigma$  given by the series (1) is said to be in the class  $T_{\Sigma}^{\lambda, \kappa, \theta}(\alpha)$  if the following conditions are satisfied.

$$f \in \Sigma, \quad \left| \arg \frac{F_{\kappa, \theta}^{\lambda} f(z)}{z \left( F_{\kappa, \theta}^{\lambda} f(z) \right)'} \right| \leq \frac{\alpha \omega \tau}{2} \quad (z \in D) \quad (8)$$

$$\text{and} \quad \left| \arg \frac{F_{\kappa, \theta}^{\lambda} g(w)}{z \left( F_{\kappa, \theta}^{\lambda} g(w) \right)'} \right| \leq \frac{\alpha \omega \tau}{2} \quad (w \in D) \quad (9)$$

where  $g$  given by (2) is the analytic continuation of  $f^{-1}$  to  $D$  and  $z, w \in D$ .

**Theorem 3.1.** If the function  $f$  given by (1) be in the class  $T_{\Sigma}^{\lambda, \kappa, \theta}(\alpha)$ , then

$$|a_2| \leq \sqrt{\frac{4\alpha^2 + (\alpha-1)F_2^2}{4\alpha(F_2^2 - F_3^2)}}, \quad (10)$$

and

$$|a_3| \leq \frac{4\alpha^2}{F_2^2} - \frac{\alpha}{F_3}, \quad (11)$$

where  $0 < \alpha < 1$  and  $F_2$  and  $F_3$  are given by (7).

**Proof.** It follows from Definition 3.1 be in the class  $T_{\Sigma}^{\lambda, \kappa, \theta}(\alpha)$



$$\frac{F_{x,\theta}^\lambda f(z)}{z \left( F_{x,\theta}^\lambda f(z) \right)'} = [p(z)]^\alpha \quad (12)$$

and for its inverse map,  $g = f^{-1}$ , we have

$$\frac{F_{x,\theta}^\lambda g(w)}{w \left( F_{x,\theta}^\lambda g(w) \right)'} = [q(w)]^\alpha \quad (13)$$

where  $p(z)$  and  $q(w)$  satisfy the following inequalities:

$$\operatorname{Re}(p(z)) > 0 \quad (z \in D) \quad \text{and} \quad \operatorname{Re}(q(w)) > 0 \quad (w \in D). \quad (14)$$

Furthermore, the functions  $p(z)$  and  $q(w)$  have the form

$$p(z) = 1 + p_1 z + p_2 z^2 + p_3 z^3 + \dots \in P \quad \text{and} \quad q(w) = 1 + q_1 w + q_2 w^2 + q_3 w^3 + \dots \in P. \quad (15)$$

Comparing the corresponding coefficients of (12) and (13) yields

$$-F_2 a_2 = \alpha p_1 \quad (16)$$

$$-2F_3 a_3 + 2F_2^2 a_2^2 = \alpha p_2 + \frac{\alpha(\alpha-1)}{2} p_1^2 \quad (17)$$

$$F_2 a_2 = \alpha q_1 \quad (18)$$

$$2F_2^2 a_2^2 - 2F_3(2a_2^2 - a_3) = \alpha q_2 + \frac{\alpha(\alpha-1)}{2} q_1^2. \quad (19)$$

From equations (16) and (18), we get,

$$p_1 = q_1 \quad (20)$$

$$2F_2^2 q_2^2 = \alpha^2 (p_1^2 + q_1^2). \quad (21)$$

Now by adding equations (17) and (19), we get

$$4(F_2^2 - F_3 a_2^2) = \alpha(p_2 + q_2) + \frac{\alpha(\alpha-1)}{2}(p_1^2 + q_1^2),$$

by using (21), we get

$$a_2^2 = \frac{\alpha(p_2 + q_2) + \frac{\alpha-1}{\alpha} F_2^2}{4(F_2^2 - F_3^2)},$$

Applying Lemma 2.1 for the coefficients  $p_2$  and  $q_2$ , we have inequality given by

$$|a_2| \leq \sqrt{\frac{4\alpha^2 + (\alpha-1)F_2^2}{4\alpha(F_2^2 - F_3^2)}}.$$

This gives the bound on  $|a_2|$  as given in Theorem 3.1.

Next, in order to find the bound on  $|a_3|$ , by subtracting (19) from (17), we get

$$-4(a_3 - a_2^2)F_3 = \alpha(p_2 - q_2) + \frac{\alpha(\alpha-1)}{2}(p_1^2 - q_1^2)$$

From (20) we get  $p_1^2 = q_1^2$  and also using (21) we have

$$-4(\alpha_3 - \alpha_2^2)F_3 = \alpha(p_2 - q_2)$$

$$-4\alpha_3 F_3 + 4F_3 \alpha_2^2 = \alpha(p_2 - q_2)$$

$$-4\alpha_3 F_3 = \alpha(p_2 - q_2) - 4F_3 \frac{\alpha^2(p_1^2 + q_1^2)}{2F_2^2}$$

From equation (21)

$$\alpha_3 = \frac{\alpha(p_2 - q_2) - 4F_3 \frac{\alpha^2(p_1^2 + q_1^2)}{2F_2^2}}{-4F_3}$$

We know that  $p_1^2 = q_1^2$ , and if we equate the denominators, we can obtain

$$\alpha_3 = \frac{2\alpha(p_2 - q_2)F_2^2 - 8\alpha^2 F_3 p_1^2}{-8F_2^2 F_3}$$

Applying Lemma 2.1 for the coefficients  $p_1$ ,  $p_2$  and  $q_2$ , we get

$$|\alpha_3| \leq \frac{4\alpha^2}{F_2^2} - \frac{\alpha}{F_3}$$

This completes the proof of theorem.

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## CAHİT UÇUK'UN ÜÇ ROMANINDA YAPI TEMA

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### ÖZET

Meşrutiyetten bir yıl önce Selanik'te dünyaya gelmiş olan yazarımız Cahit Uçuk, ilk edebi ürünlerini erkeklerin yazı dünyasına hâkim olduğu bir dönemde; Cumhuriyet'in ilk yıllarında yazmıştır. Doksan bir yıllık ömrünün altmış beş yılını edebiyata ayıran yazar edebi metinlerin neredeyse her alanına imzasını atmıştır. Bilhassa Çocuk edebiyatı alanında Çocuk Esirgeme Kurumu ile beraber çalışarak çocuklar için döneminin en dikkat çekici hikâye ve romanlarını yazmıştır. Bu alanda Türk- Amerikan Derneğinden, Türk Çocuk Vakfından ve TÜYAP Kitap Fuarı'ndan ödüller almıştır. Roman sahasında da aynı başarıyı gösteren Cahit Uçuk'un romanları çok okunmuş ve sevilmiştir. Yazı hayatına hikâye ile başlayan Uçuk'un ilk eseri Yarım Ay gazetesinde yayımlanmıştır. Çeşitli gazete ve dergilerde romanları tefrika edilmiştir. Bu gazete ve dergiler: Cumhuriyet ve Tan gazetesi; Yarım Ay, Resimli Ay, Salon, Yıldız, Perşembe, Çocuk ve Çocuk Duygusu dergileridir. Yazdığı romanlarla bir nesil yetiştirmiş ve halkın her kesimi tarafından desteklenmiş olan Cahit Uçuk, o neslin çocuklarına da masallar, hikâyeler, romanlar yazmıştır. Yazarın romanları; Kirazlı Pınar, Dikenli Çit, Kırmızı Balıklar, Sürü Çıngırakları, Değirmen Taşı, Küçük Ev, Güneş Kokusu, Kanlı Dügün, Siyah Dantelli Şemsiye, Hep Yarın, Sabır Taşı, Gecenin Bu Saatinde, Özlem Şarkısı, Bıraktığı Yerden'dir. Bir de Uçan Su isimli bir romanı vardır ki bu romanın tefrikası kitaplaştırılmamıştır. Romanlarında daha çok aşk, kadın, arkadaşlık, köy, musiki gibi konulara değinmiştir. Yapı unsurlarını kusursuz kullanmıştır. Bu makalede çeşitli türlerde eserler yazmış olan Uçuk'un üç romanına yapı-tema incelemesi yapacağız. Bu romanlar; Siyah Dantelli Şemsiye, Dikenli Çit ve Gecenin Bu Saatinde'dir.

**Anahtar Kelimeler:** Cahit Uçuk, Roman, Yapı, Tema.

## BUILDING THEME IN CAHİT UÇUK'S THREE NOVELS

### ABSTRACT

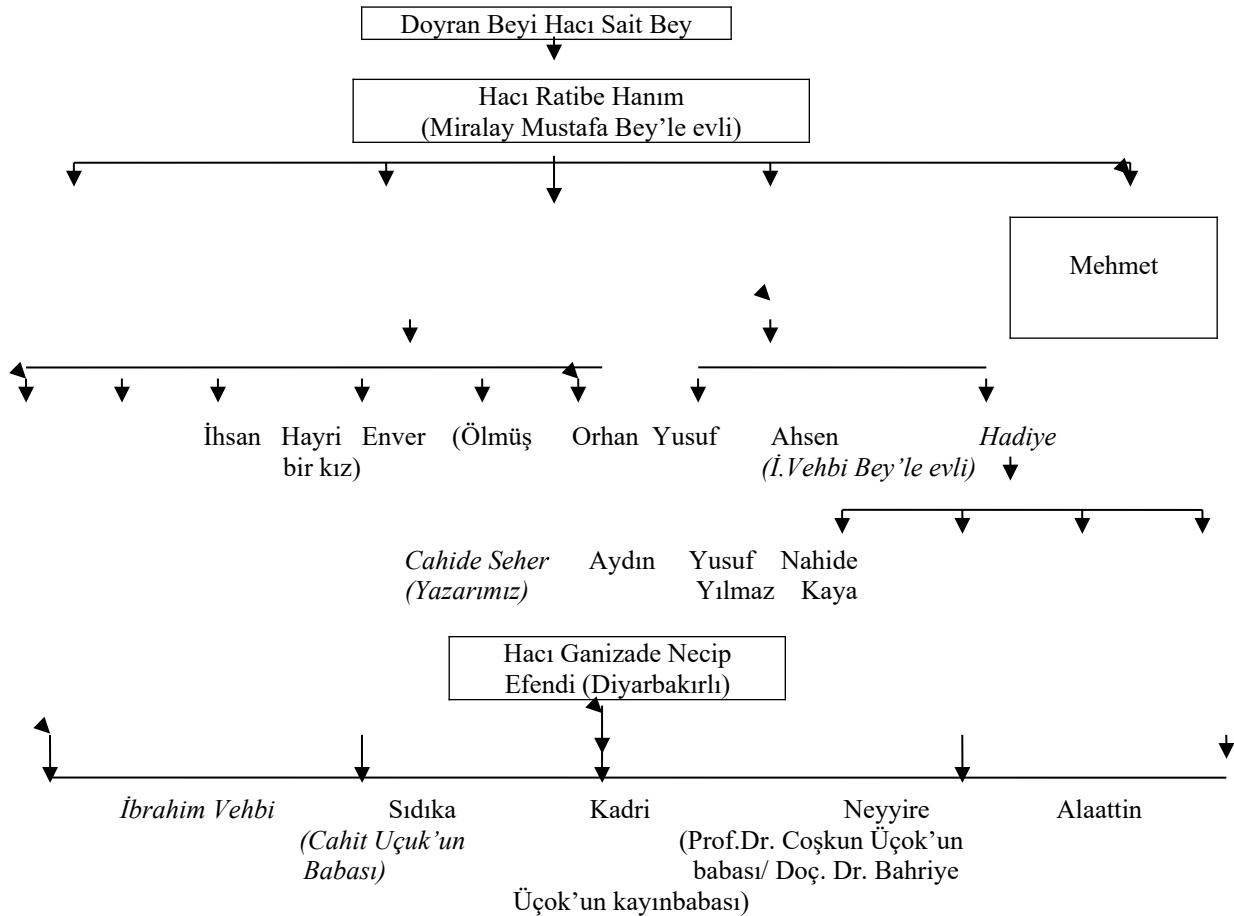
Our writer Cahit Uçuk, who was born in Thessaloniki a year before the Second Constitutional Monarchy, wrote his first literary works at a time when men dominated the world of writing; He wrote in the first years of the Republic. The author, who devoted sixty-five years of his ninety-one-year life to literature, has signed almost every field of literary texts. He wrote the most remarkable stories and novels for children, especially in the field of children's literature, working with the Child Protection Agency. In this field, he received awards from the Turkish-American Association, the Turkish Children's Foundation and the TÜYAP Book Fair. Having the same success in the field of novels, Cahit Uçuk's novels have been read and loved a lot. The first work of Uçuk, who started his writing life with a story, was published in the newspaper Yarım Ay. His novels have been serialized in various newspapers and magazines. These newspapers and magazines are: Cumhuriyet and Tan newspaper; Half Moon, Illustrated Moon, Salon, Yıldız, Persembe, Child and Child Emotion magazines. Cahit Uçuk, who raised a generation with his novels and was supported by all segments of the public, wrote fairy tales, stories and novels for the children of that generation. Author's novels; Cherry Spring, Thorny Fence, Red Fish, Herd Rattles, Millstone, Small House, Sun Scent, Blood Wedding, Black Lace Umbrella, Always Tomorrow, Stone of Patience, At This Time of Night, Longing Song, From Where It Left It. He also has a novel called Flying Water, the serial of this novel has not been published. In his novels, he mostly touched on topics such as love, women, friendship, village and music. He used the building elements perfectly. In this article, we will analyze the three novels of Uçuk, who wrote works in various genres, by structure-theme. These novels; The Black Lace Umbrella, the Prickly Fence, and This Time of Night.

**Keywords:** Cahit Uçuk, Novel, Construction, Theme.

## GİRİŞ

Asıl ismi Cahide Üçok olan yazarımız erkeklerin yazı dünyasında hâkim olduğu bir dönemde yazmaya başladığından dolayı adını Cahit Uçuk diye değiştirmiştir. Biraz da tanınmamak için yaptığı bu değişimde ailesinin Hüseyin Cahit'e duyduğu sevgi de esin kaynağı olmuştur. (Uçuk, 2003: 20) Atatürk ile tanıştırıldığında, bir bayanın erkek ismi taşıması Atatürk'ü de şaşırtmış ve “Neden Cahit?” diye sormuş Atatürk. Cahit Hanım da, “Efendim, siz muallimeyi muallim yaptınız, ‘e’leri kaldırdınız. Ben niçin ismimdeki ‘e’yi kullanayım. Ben de attım.” Demiştir. (Uçuk, 1995: 10)

Selanik'te dünyaya gelen yazar sonraki yıllarda İstanbul, Malatya (Hekimhan), Antalya, Ankara gibi değişik şehirlerde yaşamış ve bu şehirlerin edebiyat camiasında aşına bir yüz olarak bilinmiştir. Anne tarafından Selanikli baba tarafından Diyarbakırlı olan yazar köklü bir soya sahiptir. Bilhassa anne tarafından sanatsever bir muhitin içinde yetişmiştir. Babası Hekimhan, Alanya, Korkuteli gibi ilçelerde kaymakamlık görevinde bulunmuştur. Annesi, musikiye ilgili piyano dersleri almış elişinde becerikli muhitinde tanınan okumayı seven bir kadındır. Anne ve baba tarafından *soyağacı* şöyledir; (Doğan, 1999: 15)



Cumhuriyet'in ilk yıllarında yazı hayatına atılan Cahit Uçuk on beş roman, dokuz hikâye, beş piyes, on çocuk romanı, ondan fazla çocuk hikâye kitabı, ondan fazla masal kitabı, bir destan, bir şiir kitabı ve iki anı kitabının sahibidir. Yazarın gazete ve dergilerde yayınlanmasına rağmen kitaplarına girmeyen hikâyeleri de vardır. (Doğan, 1999: 25) Kendi soyadında bir yayınevi de açmış olan yazar adeta keşfedilmemiş bir yazı makinesidir. Hatta Türk edebiyatında kadın yazarlar arasındaki yazı makinesi de denebilir.

Cahit Uçuk'un dönemindeki en önemli şanslarından birisi de okumayı ve sanatı seven bir anne babaya sahip olmasıdır. Babası resimle annesi musikiyle ilgilenen ve evlerinde büyük bir kütüphane oluşturan kişilerdir. Bu kütüphanede Rus ve Fransız klasiklerinin ve yerli yazarların eserlerinin yeri oldukça geniş yer kaplamıştır. Yedi yaşındayken babasından Abdülhak Hamid Tarhan'ı, Tevfik Fikret'i dinleyen yazar Hamid ile birebir tanışmış hatta Hamid'e şiirini göndererek yorumlamasına da müşerref olmuştur. (Uçuk, 2003: 60) Victor Hugo, Maksim Gorki, Ömer Seyfettin, Reşat Nuri, Faruk Nafiz, Nazım Hikmet, Peyami Safa, Halit Ziya bilhassa Halide Edip gibi isimleri büyük bir tutku ile okur hatta dolabının iç kapağını bu yazarların resimleri süsler. (Uçuk, 1995: 367) Halide Edip'in Sultanahmet Mitinginde de bulunan yazar, annesine mitingle ilgili görüşlerini şöyle belirtir: "Halide Edip Hanım oradakilere enjektörsüz aşı yaptı. Türkleri birleştirme ve coşturma aşısı." (Uçuk, 1995: 295) Edebiyat dünyasına şiirle adım atmış olan Uçuk, ilk şiirini on üç yaşında yazmıştır. Hamid'in de yönlendirmesiyle nesir yazmaya başlamış ve ilk yazısı Yarım Ay dergisinde "Bir Masal Ki Herkes Okumalı!" adıyla yayınlanmıştır. Bab-ı Ali'de artık genç bir kız tanınmaya başlamıştır. İlk altı ay herkes erkek zannetmişse de Halit Fahri Ozansoy'un Oğlu Gavsî Ozansoy'un yaptığı bir röportajla her şey ortaya çıkmıştır. Bab-ı Ali'de bir kadın olarak yaşadığı sıkıntıları Selim İleri ile yaptığı söyleşide şöyle anlatmıştır:

"Yazdıklarım okunuyor ve seviliyordu. Ama bu bir takım çekemezliği durdurmadı. Bir ara bana Adalet Cimcoz taktı; 'Bab-ı Âlimizin sakızlı, eli maşalı George Sand'ı diyor, o kadar şaşırdım, o kadar üzüldüm ki! Ben bir şeyler yapmaya devam ettim. Bu tarz şeylere kayıtsız kalmaya çalıştım. Zaten yazmak benim için bir tutkuydu." (İleri, 1995-1996)

Her yazarın kendine özgü bir çalışma biçimi vardır. Cahit Uçuk da yazmaya başlama aşaması ve gayretiyle farkını ortaya koymuş bir yazardır. Manevi yönü kuvvetli olan yazarımız bunu eserlerine de yansıtmıştır. Bilhassa köylü tiplerini namazında- niyazında tiplerindedir. Ananesi Seher Hanım Bektaşî, annesi Hadiye Hanım ise Nakşibendî tarikatına bağlıdır. Cahit Hanım'ın da şeyhi vardır: Fevzi Baba. Yazıya masasının üzerinde Fevzi Baba'nın bir resmini,

avucuna alıp üzerine okuduğu bir tesbih, bir de küçük Kuran-ı Kerim durmaktaymış. Her yazısının başına Bismillahirrahmanirrahim yazarmış. Öğleden sonra yazmaya başlayıp zamanının çoğunu masada yazarak geçirirmiş. Yazdıklarında tahsise gerek olmadığını direk makineye basıma gittiğini dile getirmiştir yazarın kendisi. (Doğan, 1995: 2)

Yaşadığı dönemde birçok ödüle layık görülmüştür yazar. İlk ödülü Türk İkizleri adlı eseriyle aldığı “Hans Christian Andersen Liyakat Diploması”dır. Türk- Amerikan Derneği’nce bir senenin kadını seçilerek şeref ödülüne layık görülmüştür. 1991 yılında merhum Turgut Özal’ın elinden, çocuk edebiyatına katkılarından dolayı “Türk Çocuk Vakfı Onur Ödülü”nü almıştır. 1995 yılında da on dördüncü TÜYAP Kitap Fuarı’nda 60. yazı yılını kutlamasının anısına şeref ödülüyle onurlandırılmıştır. (Doğan, 1999: 40)

Profesyonel yazı hayatına hikâye ile başlayan yazar nesirde ilk denemesini çocukken annesinin okuduğu romanda küçük değişiklikler yaparak roman yazmayı denemiştir. Yazarın “çok önemsiz şeyler” diye nitelendirdiği bu eser ortada yoktur. İlk romanı Kirazlı Pınar, tefrika şeklinde yayınlanmış ve Uçuk’un dikkatli üzerine çekmesini sağlamıştır. Ahmet Muhip Dıranas eserle ilgili; Kirazlı Pınar ile başladığı bu tarzdaki roman sahasında çalışırsa, Cahit Uçuk edebiyatımız için bir kazanç olur.” demiştir.(Doğan, 1999: 20) İkinci romanı olan ‘Dikenli Çit’ de büyük yankı uyandırmıştır. Bu romanlarla gençler için geçiş dönemi olan -on iki ile on dört yaş arası- ara dönem romancılığında edebiyatımıza büyük katkıda bulunan yazarın romancılığı ile ilgili dönemin önemli gazetecilerinden Vâlâ Nureddin de şunu söylemiştir; “manevi bir körü vazifesini gören mutavassıt bir neşriyat”tır. (Nureddin, 1937: 20) Yaşar Kemal Cahit Uçuk’la karşılaşmasında bu iki meşhur romanı ile ilgili Uçuk’a; “Bacım, bacım; ben seni tanımaz olur muyum? Ben Dikenli Çit’i okudum da yazarlığa heves ettim.” demiştir. (Doğan, 1995: 2)

Yazarın romanları; Kirazlı Pınar, Dikenli Çit, Kırmızı Balıklar, Sürü Çingirakları, Değirmen Taşı, Küçük Ev, Güneş Kokusu, Kanlı Düğün, Siyah Dantelli Şemsiye, Hep Yarın, Sabır Taşı, Gecenin Bu Saatinde, Özlem Şarkısı, Bıraktığı Yerden’dir. Bir de Uçan Su isimli bir romanı vardır ki bu tefrika halinde kaldığı için bulunamamıştır. Romanlarında daha çok aşk, kadın, arkadaşlık, köy, musiki gibi konulara değinmiştir.

Bu makalemizde yazarın üç romanı üzerine eğileceğiz. Bunlar; Siyah Dantelli Şemsiye, Dikenli Çit ve Gecenin Bu Saatinde’dir. Bu romanları yapı unsurları ve temaları bakımından ele alacağız.

## 1. ÜÇ ROMANDA YAPI

Yapı incelemesi bir sistemi meydana getiren, onu oluşturan unsurlar arasındaki ilişki ağının özelliklerini belirlemeyi hedefler. Bu unsurların sistem içinde birim değerini taşıması gerekir. Öyleyse yapı incelemesi sistemi meydana getiren birimlerin belirlenmesiyle başlar. İnsan vücudu bir sistemdir. Dış görünüşüyle bu sistemi oluşturan birimler baş, gövde, kol ve bacaklardır. Bir başka dikkatle bu sistemi iç içe giren sindirim, dolaşım, sinir vb. alt sistemler oluşturur. Her edebî metin de kendi başına bir sistem hüviyeti taşır. Edebî metni yapı bakımından incelemek için metni oluşturan birimlerin belirlenmesi gerekir. (Aktaş, 2015: 140) Metinlerde yapı incelemesini insan vücuduna benzeten Aktaş'ın da aslında metnin en küçük birimine kadar inilmesi gerektiğini vurgulamıştır. Yapı incelemesi yapmak metni mikroskobun altına koymak gibidir. Bu çalışmamızda metni lam ve lamelin arasına koyup ayrıntılarına nüfus edeceğiz.

### 1.1. SİYAH DANTELLİ ŞEMSIYE/ DİKENLİ ÇİT/ GECENİN BU SAATİNDE

#### 1.1.1. Romanın Kimliği

Roman ilk olarak kendilerinin çıkardığı İlhan ve Turhan Selçuk kardeşlerin yönettiği 41.5 adlı mecmuada tefrika edilmiştir. Çıkan anlaşmazlıktan dolayı mecmua kapanınca roman yarım kalmıştır. O sırada yurt dışında olan yazar romanın devamını Zürih'te yazmış ve 17 Haziran 1954'te tamamlamıştır. Eserin basımı 1956 yılında İstanbul'da yapılmıştır. Yüz seksen dokuz sayfadan oluşan kitabın üzerindeki yayınevi bilgisinde İstanbul Matbaacılık tarafından yayına hazırlandığı görülmektedir. Fakat kitapta künye anlamında eksik bilgiler bulunmaktadır.

Kitapta dört tane karakalem çalışması bulunmaktadır. İki Yalçın Çetin ikisi de Suat Yalaz imzalı karakalem çalışmaları eserin muhtevasına ve olayların geçtiği zaman dilimindeki yaşantı tarzlarına uygun çalışmalardır.

Her yazarın tanınmasını sağlayan bir eseri vardır. Dikenli Çit'te Cahit Uçuk için böyle bir eserdir. Hatta Dikenli Çit nesli diye bir de söylem ortaya çıkarmıştır. Unutulmayan bu gençlik romanı 1937 yılında Yarım Ay dergisinde tefrika edilmiştir. Aynı yıl kitap halinde basılmış ve 1967 yılında da beşinci baskısını yapmıştır. (Doğan, 1999: 83)

Yüz doksan sekiz sayfa üç kısımdan oluşan kitap hakkında Vala Nurettin şunları söylemiştir: "Bu son ayların yeni neşriyatları içinde dikkate layık olan eserlerden biri şüphesiz ki Bayan Cahit Uçuk'un 'Dikenli Çit' isimli romanıdır. Bu kitabın yeni bir çığır açtığını söylersek hata etmeyiz. Bahusus Dikenli Çit, Türk edebiyatında bir boşluğu tamamıyor. Küçük çocuklar



İçin 'Tilki Kardeşin Maceraları', 'Güiver'in Seyahatleri' tarzında derece derece kıraat imkânları

vardır; bunlardan kanıksayan bir çocuk, çağı ilerledikçe, münhasıran büyüklere mahsus olması lazım gelen bir edebiyatın içine düşüyor. Arada manevi bir köprü vazifesini gören mutavassıt bir neşriyat yoktur. Hâlbuki mesela; Fransızlarda on iki ile on yedi yaşlar arasındakiler için ne kadar çok romanlar yazılmıştır. Bunlar adeta ayrıca bir kütüphane teşkil ederler. Mevzular daima nezih, nikbin, canlı ve ahlakidir. Araya bir aşk macerası karışmışsa da o da yine saf bir histir. İşte Cahit Uçuk'un bize verdiği numune bunlar biridir. Öyle sanıyorum ki, muharrir, aynı örnekler üzerinde kalemini yürütecek olursa hem gençliğe, hem de edebiyatımıza büyük bir hizmet etmiş olacaktır. Dikenli Çit her sayfasında insana tazelik, gençlik ve adeta bir çiçek kokusu veriyor. Bahar gibi bir kitap!" (Va-Nü, Dikenli Çit, Yarım Ay, No:20, 1937)

İstanbul Matbaası (Servet-i Fünun Matbaacılık) ve Uçuk Yayınları aracılığıyla basılan roman 1966 yılında Siz dergisinde tefrika edildikten iki yıl sonra kitap halinde basılmıştır. Esrin adı başkahramanın annesinin kendisi için kullandığı bir cümleden alınmıştır. Zira başkahraman geç saatte uyumamış olunca ve sığınmak için bir liman aradığında annesinin sesiyle bu cümleyi hafızasından geçirir. Yazar bu cümleyi unutturmayarak aslında başkahramanın masumiyetini de bize göstermiş oluyor.

İçerik olarak kadın merkezli olan bu romanda; yaş olarak oldukça küçük, iyi niyetli, film yıldızı olmak isteyen çok güzel bir kızın başından geçenleri anlatıyor. Yazarın her romanının ana karakteri kadındır (Siyah Dantelli Şemsiye hariç). Gecenin Bu Saatinde adlı romanı da gerek kitap adının farklılığı ile gerek de yazıldığı dönem herkesin dikkatini çekebilecek bir konu seçmesi ile dikkatleri üzerine çekiyor. Tefrika edildikten kısa bir süre sonra kitaplaştırılmış olması da bunun altını çiziyor.

### 1.1.2. Olay Örgüsü

Siyah Dantelli Şemsiye, yazarın diğer romanlarına göre vakası ilginç olan bir eserdir. Yazar bu konuda şunları söylemiştir: "Siyah Dantelli Şemsiye adlı kitabım vardır. Çok güzel bir kitaptır. Kitap o devrin, Osmanlı genç, entelektüel çok kibar bir kuyumcusunun hayatını anlatır. Padişahlar, padişah sofraları, padişahların gizli meclisleri, gizli sohbetler... Mesela, o zaman hünkârın -kendi adını kullanmamış ama- güfteleri var. Eşref Muhip bunları bestelemiş... Gizli davetler oluyor. İhlamur Köşkü'nde, orda burada... Gece âlemleri... O zamanın genç erkeğinin -bugün garsoniyer dediğimiz- 'yuva' dedikleri hanımlarla

buluşukları yerler var... Siyah Dantelli Şemsiye... Esrarengiz bir kadın... Göksu'da, Kâğıthane'de siyah bir araba görünüyor. İçinde siyah dantelli şemsiye olan, yüzünü yarı örten bir hanım... Arabada uçan tül etekler... Bir de Hintli kılığında bir arabacı... İki tane şahane at... Ve bunlar trak trak geziyor... Hanımın

yalnız ayakuçlarını, şemsiye tutan elini görüyorlar ama siyah dantelli şemsiye meşhur oluyor. Romanda bir kadın dört kadın görünüyor. Bu durum, romanın sonuna kadar anlaşılmıyor.” (Doğan, 1995)

Roman üç bölümden oluşmaktadır. Bu üç bölümde kendi içinde alt başlıklara ayrılmış ve olaydaki masalsı hava gerçek bir zemine oturtulmaya çalışılmıştır. Birinci bölüm romana da ismini veren siyah dantelli şemsiyenin ve onu tutan kadının tanıtıldığı uzun bir tasvir pasajıyla başlamıştır. Daha sonra başkişi olan Antikacı Ali Hüsrev'in tanıtımı ile devam etmiştir. Kapalıçarşı'da dükkânı olan nezih bir antikacı (kuyumcu) olan ana kahraman iyi, sevgi dolu, köklü bir ailede yetişmiş iyi eğitim almış (dil, musiki ve din anlamında) birikimli birisidir. Birinci kısım adeta kahramanların tanıtıldığı bölümdür. İkinci kısımda kahramanların üzerindeki efsunlu masalsı hava biraz dağıtılarak birbirlerine yaklaştırılırlar. Üçüncü kısım ise olaylara tam bir gizem havası çöktürülerek düğümlerin çözüldüğü kısımdır.

Yüz seksen dokuz sayfadan oluşan kitap zaman zaman okuyucuyu bir rüya ya da bir masal âlemine götürmektedir. Bir görünüp bir kaybolan, kimliği bir türlü ortaya çıkmayan, ardından koşulan gizemli bir kadın ve tanımadığı bir kıza âşık olup onun peşinden sürüklenen bir erkek... Hıçkırarak ağlayan minyatür bir elma... dört ayrı kadının hikayenin sonunda bir kadında vücut buluş... Masallara özgü bir öykü... Yazar yer yer masal unsurları içeren öyküyü reel hayatın içine oturtmuştur.(Doğan, 1999: 130)

Dikenli Çit romanında vaka yazarın çok sevdiği Antalya ve İstanbul'da geçmiştir. Ayla adlı genç kızın hayal kırıklığı ile sonuçlanan aşk hayatı anlatılıyor:

Arkadaşları arasında sevilen Ayla, babası tarafından zorla kendinden yaşça büyük olan babasının yeğeni mühendis Tevfik ile nişanlandırılmıştır. İhsan'ı seven Ayla kalabalık arkadaş grubuyla İstanbul'a gidip konservatuarda okumak istemektedir. Arkadaşlarının hepsinin konservatuara gidip kendisinin gidememesi Ayla'yı hasta eder ve babası anlayış gösterip nişanı bozar ve Ayla İstanbul'a arkadaşlarının yanına okumak içi gider. Beş gün süren vapur yolculuğunda üniversiteden hocası olacak olan ünlü kompozitör Necip Cevad ile tanışır. Necip Ayla'yı hem müzik anlamında hem dış görünüş olarak beğenir. İstanbul'da arkadaşlarına ve İhsan'a kavuşan Ayla'nın aklı Necip Cevad'ta kalır. İhsan'dan uzaklaşır.

Arkadaşları ile aynı pansiyona yerleşen Ayla Necip Cevad'ın konser daveti ile onu bir daha görür. Ve artık sevgili olarak görüşmeye başlarlar. Necip otuz beş Ayla on dokuz yaşındadır. Birbirlerine 'Ayla nine' ve 'Ustacığım' şeklinde seslenmeleri de bu durum tezadadır. Birlikte İstanbul'un birçok köşesinde buluşarak herkesten uzak aşklarını yaşamışlardır fakat Necip tedirgindir ve Ayla'ya

“Benimle gelersen arkanda bıraktıklarına üzülmez misin?” diye devamlı sormaktadır. Avrupa'ya gitmeyi Ayla'ya teklif eder ve bu Ayla'ya hoş görünür, sevdiği adam için kabul eder. Ayla ile olan randevuları aksatmaya başlayan Necip'in evli olduğu Ayla bir süre sonra öğrenir ve görüşmeyi keser bunu bir mektupla Ustacığınaya söyler. (Aralarındaki mektup trafiği oldukça dikkat çekicidir.) Fakat okuyucu bu durumu ancak kitabın son kısmında Ayla, İhsan'a söyleyince öğrenir. İstanbul'dan Antalya'ya döner ve babasının bahçesine çiftlik şekline getirip orada yaşamaya başlar. Bir yıl geçer yaz gelir ve arkadaşları Ayla'nın yanına Antalya'ya gelirler, İhsan'da tabii ki. Güzel bir yaz geçirirler ve İstanbul'a dönüş vakti gelince İhsan Ayla ile konuşur ve her şeyi öğrenir, okuyucularda her şeyi bu kısımda öğrenir. İhsan'da Ayla'nın yan bahçesini alarak Antalya'da kalır ve bahçelerinin arasında dikenli çit vardır. Ayla son cümleyi söyleyerek kitaba da adını verir adeta: “Aramızdaki dikenli çiti kaldıralım İhsan”. Aslında bu cümlede iki türlü anlam vardır. Hem sevgi anlamında hem de bahçe. Mecaz ve gerçek iç içe geçmiştir. Dikenli çit de Ustacığın ve ona duyduğu geçici sevgidir.

Romanın olay örgüsü hareketli ve basittir. Olay örgüsü işlenirken diyaloglara, mektuplara ve Ayla'nın hatıra defterine başvurulmuştur. Tabiat ve insan tasvirlerini yerlerinde ve bolca kullanmıştır yazar. Olay örgüsün en önemli yerini musiki tutar. Eserde Batı müziği ve Anadolu müziği yan yanadır. Anadolu müziğinin güzelliği ön plana çıkarılmıştır.

Siyah Dantelli Şemsiye romanında film yıldızı olmak için İstanbul Yeşim Çam sokağına giden ve oradan da Beyrut'a uzanan bir yaşam öyküsü anlatılıyor. Düştüğü felaketten kurtulmak isteyen Eda ve onun başına gelenler özellikle mekân merkezli anlatılmıştır. Gerçek ismi Süeda olan başkahraman mutaassıp bir aileye sahip olan ve yaşadığı evi ve ailesini beğenmeyen bir genç kızdır. Gazetede film yıldızı ilanına başvuru yapmak için film şirketine gider, kendini Eda diye tanıtır ve şirket sahibi Fazıl Bey kızı beğenir avans verir. Ailesi ile ilgili her şeyi öğrenir ve tekrar görüşmek istediğini söyleyerek uğurlar. İkinci görüşmelerinde kıza içki içerek onun çıplak fotoğraflarını çeker. Yaşadıklarından dolayı pişmanlık yaşayan Eda'yı fotoğraflarla tehdit ederek Beyrut'a gönderir ve Eda artık Beyrut'ta

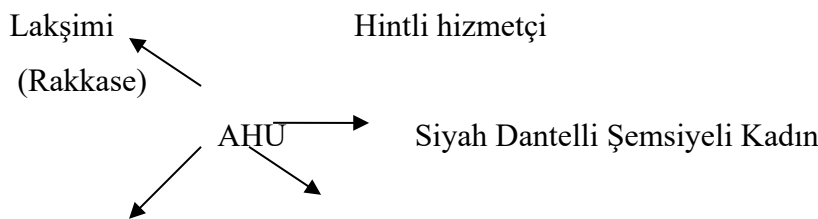
bir umumi evdedir. Eda ile birlikte birçok kız kandırılmıştır. Bunlardan Gülsüm ve Nilgün ile yakınlık kurar. Ablanım diye birisi evi yönetir. Ablanım, Eda'yı güzel bulur ve ona herkesle görüştürmeyeceğine dair söz verir. Bir balo ile kızlar Beyrut'un sosyetik çapkın erkeklerine tanıtılır. Suzan'ı Saburi Bey'e ayırmıştır Ablanım ve Saburi ile macerası o akşam başlar Suzan'ın. Kızla evlenmek isteyen Saburi nikâh işlerini halledip umumi evden aldıracaktı fakat Fazıl Bey ortaya çıkıp Suzan'a sahip olmak ister. Suzan kendini balkondan atar ve bacağı kırılır. Saburi ile gecikmeli de olsa nikâhsız bir

yaşama başlar. Yurt dışına giderler güzel günler geçirir, birçok ülkeyi gezerler. Saburi kalp krizi geçirir bir süre hastanede kalırlar. Beyrut'a dönerken kaza geçirirler Saburi ölür ve başkahraman ablanımın eline tekrardan düşmemek için balkon düşünce tedavisini yapan genç doktoru arar (beni arayabilirsin başın sıkışınca demiştir Doktor Suzan'a). Onun yanında işe başlar ve ablanım ile Fazıl Bey artık kötü bir insan olan madde bağımlısı Gülsüm aracılığı ile Suzan'ı bulurlar. Kaçıracakları gece Suzan kaçır ve Doktor Hayri Maslar'a her şeyi anlatır. Doktorda dayısı olan Saburi'nin kendine emanet ettiği Nazan'ın Eda yani Suzan yani Süeda yani olduğunu anlar ve evlenirler.

Mutlu sonla biten romanda gerilimin yüksek olduğu kısımlar vardır ki bunlar vakanın can alıcı noktalarıdır. Vakaların başlangıcında Eda'nın deniz yolculuğunda kızlardan birinin motordan atlayarak balıklara yem olduğu, Beyrut'taki evde Nilgün'ün ölüm sahnesi, Suzan'ı Fazıl Bey'le boğuştuğu, barmenin telefonla Nazan'ı rahatsız ettiği, Gülsüm, Ablanım ve Fazıl Bey'in Nazan'ı kaçırmaya geldikleri sahnelerde gerilim had safhaya ulaşmıştır. (Doğan, 1999: 162)

### 1.1.3. Şahıs Kadrosu

Romanın şahıs kadrosu oldukça kalabalık hatta bir vücutta dört ayrı kadın başka bir vücutta iki ayrı erkek anlatılmıştır. Efsanevi özellikler içeren bu kahraman durumu ayrıntılı tasvirlerle sanki ayrı ayrı kahramanlar oluşturmak istenmiştir. Özellikle baş kadın kahramanımız aynı zamanda tek vücutta birden fazla kahramanı barındırmaktadır:



Hintli kadın

Romandaki kahramanları sıralı şekilde görelim:

-*Antikacı Ali Hüsrev (Eşref Muhib)*: Başkahraman olan Ali Hüsrev'in besteci kimliği Eşref Muhip'tir. Ahu'nun âşık olduğu kişidir. Ahu'ya şiirler yazıp besteleyen kişidir. İyi yetiştirilmiş, kibar, ince ruhlu birisi olan başkahraman dış görünüş olarak da gösterişlidir. Yalçın Çetin tarafından çizilen kara kalem çalışmalarında hayali olarak yansıtılan kahraman anlatılan

dönemin özelliklerini barındıran nazik bir görüntüye sahiptir. (Uçuk, 1956: 17) Ali Hüsrev ise Lakşimi'ye âşıktır. Adeta başkahraman çift kişiliktir. Lakşimi'yi (rakkaseyi) düşünerek oyun havaları besteleyen, Ahu için şiirler yazıp aşk besteleri yapan çift yönlü bir musikîşinas. Kendinin farkında olan ve kendine hayranlık duyan bir baş kahraman; “Yunan heykellerinin tenasüp ve ahengi ile karşısında duran bu genç adam kendisi miydi?.. Yere kuvvetle basan ayakları biçimli, kalınca kolları kuvvetli, elleri kusursuz. İçine dalga dalga gurura benzer bir sevincin sızdığını, bunun peşinde sıcak bir ürpermenin vücudu sardığını hissediyor.”(Uçuk, 1956: 32)

-*Ahu (Lakşimi –rakkase-)*: Bir vücutta dört ayrı kadından bahsedebiliriz. Bu durum hem masalsı bir hava estirmiştir romanda hem ciddi bir gizemle okuyucuda merak uyandırmıştır. Bu dört kahraman; 1.Ahu 2.Lakşimi (rakkase) 3.Dükkâna gelen Hintli kadın 4. Saraçhane'de Konak'taki Hintli hizmetçi kız'dır. İkinci ana kahraman olan Ahu (Bu ismi esasen Ali Hüsrev kurmuştur fakat sonradan enteresan şekilde kızın esas ismi olmuştur.) bir gizem perdesinin arkasındadır roman boyunca; “Beni anlayan lazım Ali Hüsrev!.. Yoksa mucizenin sihri dağılır.” (Uçuk, 1956: 185) Biz kadın kahramanı hep başkahramanın ağzından dinliyoruz. Net olarak romanın sonunca kendini ifade eden cümleler kurduğunu görüyoruz ve gizem, olay örgüsü böylece çözülüyor.

-*Dikran Efendi*: Ali Hüsrev'in arkadaşıdır, benzer bir işle uğraşırlar ve her sırrını Dikran Efendi'ye anlatır. “...iç kapının açılıp antikacı dostu Dikran Efendi'nin içeri girmesi bir oldu. İnce yüzlü, parlak siyah gözlü, sivri beyaz sakallı, çelebi bir adamdı. Daima siyahlar giyer ve her geldiğinde bir sürü iş haberiyle dedikoduyu beraberinde getirirdi.” (Uçuk, 1956: 11) Yazar kişilerin ismini andıktan hemen sonra içsel ve dışsal tasvir yapmıştır. Önce şekilsel

görünüş sonra içsel olarak başkahramanın hayatının neresinde olduğuna dair ayrıntılı tasvir yapmıştır.

*-Kanuni Niyazi Efendi:* Ali Hüsrev'in sırdaşı, hâldaşı... Birbirlerine derin muhabbet duyuyorlar, musiki ikisinin de ortak paydadır. Niyazi ile besteyi hallederler kazancını Hüsrev Niyazi'ye bırakır. "Niyazi Efendi devrin büyük kanun üstatlarındandı. Aynı zamanda usul tedris ederdi. Ali Hüsrev ondan iki sene kadar usul dersi almıştı ki bu iki yıllık çalışma, sazında kemale varmasına yardım ettiği kadar; iki erkeği müstesna dostlukla bağlamıştı. Ali Hüsrev'e saz âlemlerine giden kapları açan o idi. Geniş bir malumata sahip, birkaç dile vakıf ehli dil bir adamdı. Ve Ali Hüsrev'in mahremi esrarıydı. Bestelediği her yeni şarkı 'Eşref Muhib' namı müstearına bürünüp onun vasıtasıyla musiki âlemine ayılırdı." (Uçuk, 1956: 35)

*-Leyla Hanımefendi:* Kocasını kaybedince tüm varlığını oğluna adanmış bir anne tiplemesidir Leyla Hanım. Ali Hüsrev'i yetiştiren ve onun mutluluğu için çabalayan bir anne. Ali Hüsrev'in dilinden annesinin tasvirini dinliyoruz; "Ali Hüsrev içinden 'annem ne kadar genç ne kadar güzel' diye düşündü. Kendisini çocuk denecek bir yaşta doğurmuştu. Parıl parıl yanan iri siyah gözleri, oğluna baktığı zaman parıltısını şefkat buğusu örterdi. Solgun yüzünde bir eşini oğluna verdiği renkli dudaklı büyükçe fakat son derece güzel bir ağzı vardı. Uzun boylu, narin yapılı hayatının her devresinde şık ve zarif olmayı bilen bir kadındı." (Uçuk, 1956: 27) Annesi dini bütün ailesine bağlı, vefat eden eşine karşı duyduğu sevgiyi hala tüm hayatına yansıtan Müslüman bir Türk kadınıdır. Oğlunun sevdiği kadınlardaki gizemi çözen bir sürü kadının aslında tek bir kadın olduğunu bilen tam bir anne öngörüsünü sahip kahramandır.

*-Padişah (Hünkâr)*

*-Yaver Ağa:* Ali Hüsrev'in babadan kalma arabacısıdır. Ağzı var dili yok, işini yapan sessiz bir adamdır. "Mor camadanlı, kırmızı sırmalı cepkenli Yaver Ağa, yanık yüzünün hiçbir hattı kıpırdamadan, dudaklarının aralığından: -Emrin başüstüne paşam!. dedi. Ve bir heykel donukluğuyla karşılara bakmaya devam etti." (Uçuk, 1956: 13)

*-Ruzudil Kalfa:* Ali Hüsrev'de emeği çok olan dadısıdır. Evin hanımının sağ kolu, evin bütün idaresini elinde tutan yardımcısıdır. Bilhassa üzerinde taşıdığı anahtarlar ve evdeki her gizli şeyi bilip hanımını haberdar etmesi kahramanın öne çıkan belirgin tiplemesidir. "Ağarmış saçları tepesinde hotozu, üzerinde konaktan çıkarken hediye edilmiş elmasları, mevsimine göre ipekli, yünlü elbiseleriyle muhafaza ettiği güzelliğine yakışır bir zarafeti vardı. Sözü

sohbeti yerinde hazır cevap -Leyla Hanım ile Ali Hüsrev hariç- herkese karşı amir tavırlarıyla kendini saydırdığı, tatlı dili, nükteleri, menkıbeleri, hikâyeleri, sırasına göre masallarıyla sevdirmesini bilirdi. Otuz yaşına doğru evlendirilmiş fakat huysuz kocası iki sene sonra ölünce, birçok taliplerine rağmen tekrar konağa dönmüş ve bir daha ayrılmamıştı.” (Uçuk, 1956: 34) Ali Hüsrev dadısını çok sever ve ona muhabbetini belli eder.

*-Aşkınız:* Padişahın sevdiği olan Aşkınız, sarayda çekemeyenlerin oyunuyla saraydan uzaklaştırılır. Ali Hüsrev’in annesine denk gelir ve Ali Hüsrev için eve getirilir. Kız olanları Başkahramana anlatır o da yardımcı olur ve padişahla iletişim kurulur kız saraya döner. Aşkınız aynı zamanda padişahın hamiledir. Yazar Aşkınız’ı şöyle tasvir eder: “Haremin kapısını, Ali Hüsrev’in o güne kadar görmediği körpe bir kız açtı... Ürkek bakışları zümrüt yeşili, başak sarısı saçları çift örgülü saz benizli söğüt dalı narinliğinde nazlı bir şeydi.”

*-Fazıl Baba:* Bektaşî şeyhi olan kahraman Ali Hüsrev’in değişim geçirmesini sağlayan manevi liderdir.

*-Hikmet:* Leyla Hanımefendi’nin (Ali Hüsrev’in annesinin) eski akrabalarından olan kahraman aynı zamanda Leyla Hanımefendi’nin evleneceği kişidir. Yurt dışına gitmesinden dolayı bu evlilik olamamış ve Hintli bir kadınla evlenen Hikmet’in doğan kızı Ahu olmuştur. Kızını, kendisi ölünce Leyla Hanımefendi’ye emanet etmek üzere bir mektup yazmış ve olayların gidişatına esrarengizlik katmıştır.

*-Meydancı Dede:* Dergahın sofasında Ali Hüsrev ile Niyazi Efendiyi karşılayan kişidir. Fazıl Baba’nın yardımcısıdır.

*-İsmail Ali Bey:* Konak sahibidir. Padişahın da davetli olduğu bir eğlence düzenleyen ve musikişinasları aynı zamanda tüm sanatkârları davet eden ev sahibidir. Davete katılan diğer sanatkaralar; *-Lem’i Efendi -Nakkaş Eyran Ağa -Bestekâr Agâh Efendi*’dir.

*-Muhipzade Hüsrev Bey:* Ali Hüsrev’in babası olan kahramanın sadece adı geçmektedir. Padişah tarafından başkahramanın tanınması için anılan bir soy göstergesidir.

*-Leyla Hanımefendi’nin annesi:* Ali Hüsrev’in annesi olan Leyla Hanımefendi’nin iyi yetişmesi için emek vermiş bir anne figürü olarak adı anılmıştır.

*-Aşkınız’ın Cariyesi:* Aşkınız tarafından padişahı kontrol etmek ve kendisine bilgi vermek için görevlendirilen ve Ali Hüsrev tarafından yakalanıp Aşkınız’dan yardım istenen bir kahramandır.

Dikenli Çit Romanının Şahıs kadrosu şöyledir; romanın başkahramanı Ayla'dır. Yazarın neredeyse bütün romanlarında (Siyah Dantelli Şemsiye hariç) başkahramanlar kadınlar ve genç kızlardır. Toplumun her kesiminden kadınları romanlarında konu edinmiştir. Neredeyse hepsi İstanbul'da doğmuş büyümüşlerdir. Fakat Ayla farklıdır. Antalya'da yaşayan Ayla hem okumuş, şehir hayatında yaşayabilen hem köy hayatına alışkın bir kahramandır. Güçlü kişilik yapıları ile dikkat çeken kadın kahramanlar yazarın idealizmini de yansıtır. Zira Cahit Uçuk, soyunun kadınlarına hayrandır. Hayat hikâyesinden öğrendiğimize göre ananesi, annesi ve teyzesi çalışkan, cefakâr, fedakâr ve hırslı yönleriyle yazar üzerinde derin etki bırakmışlardır. Roman kahramanlarının güçlü kişilikleri, yazarın hayran olduğu soyunun kadınlarından da izler taşır.(Doğan, 1999: 190)

Erkek kahramanlarının çoğu şehirde yaşamış, tahsilli, belli bir mesleği olan, bazıları varlıklı kişilerdir. Necip Cevad, İhsan, Tekin, Ayla'nın babası, Tefik buna örnektir. Necip Cevad ünlü bir kompozitördür.

Şahısları tek tek inceleyecek olursak;

-*Ayla*: Romanın başkahramanı olan Ayla, çevresi tarafından çok sevilen musiki ile ilgilenen ailesinin tek çocuğu olan kişi duygu düşünce ve davranışları bakımından çok iyi çizilmiştir. Küçük yaşta istemediği biriyle nişanlanıp ayrılması, sonra kendinden yaşça büyük bir adamla girdiği gönül ilişkisinin içine düşmesi ve çıkmaz durumları aşmaya çalışması sırasındaki Ayla çok iyi tasvir edilmiştir. Necip Cevad'ın Ayla Ninesi...

-*İhsan*: Aylan'ın arkadaşları arasında en başka sevdiği kişidir. Çocukluk aşkı denilecek bir karakter. Ayla için fedakârlıklar yapabilecek şekilde tasvir edilmiştir.

-*Necip Cevad*: Ünlü kompozitör ve Ayla'nın tutkulu aşığı... Yaşça Ayla'dan büyük ve evli olan kahramandır. Çok konuşmayan sadece belli buluşmalarda Ayla'ya hayranlığını belirten, Ayla'yı kaybetmekten korkan, Ayla'nın kalabalık müzisyen arkadaşlarının meşhur hocası Necip Cevad'ı karakter tahlilleri oldukça başarılıdır. Ayla'nın Ustacığı...

-*Ayla'nın babası*: Sadece kendi doğruları olan, sert bir babadır. Ayla hasta olunca iyi yönden değişim göstermiştir. Tip gibi görünse de aslında bir karakterdir.

-*Ayla'nın annesi*: Ayla annesinin babasının yanlışlarına ses çıkarmamasına kızar yani romandaki anne eski kadınlardan sessiz ve eşinin her dediğini onaylayan bir kişidir. Bunu da ben senin gibi güçlü ve cesur değilim diye açıklar kızına.



-*Tevfik*: Ayla'nın kendisinden yaşça büyük mühendis nişanlısıdır. Sevilmeyen, mekanik kafaya sahip kişidir. Arkadaşları Ayla'ya yakıştırmaz, Ayla 'da sevmez. Don Kişot takma adını takarlar.

*Ayla'nın kalabalık arkadaşlar topluluğu*: -Tekin –Sevin –Ali –Ahmet –Selime –İclal –Ayşe ve daha ismi anılmamış kişiler. Kitabın girişinde on kız on erkek olmak üzere yirmi kişiden bahsetmektedir. Hepsinin ayrı bir özelliği vardır. Mesela Tekin şakacı ve çok iyi bir müzisyenmiş.

-*Ayşe*: Bahçıvanın kızı, Ayla'nın İstanbul'dan Antalya'ya dönüşünde ona çiftlikte yardımcı olmuş yarenlik yapmıştır.

-*Dilek*: Ayla'nın konservatuardan arkadaşı ve Necip Cevad'ın yeğenidir. Gerçi bilen tek kişidir ve Ayla'ya yasak aşktan dolayı çok üzülmüştür.

-*Tamara*: Tekin'in okuldan beğendiği Rus kahraman.

-*Bahçıvan Mehmet*: Aylaların evlerine bahçelerine bakar ve çiftliğe yardım eder.

-*Bahçıvanın karısı*: tek bir yerde adı geçer, piknik sonrası sofrayı toplamak için Ayla seslenir.

Gecenin Bu Saatinde romanında kalabalık bir şahıs kadrosu vardır. Eda'nın hayatının çevresinde dönen bu kişiler başkahramanın hayatında önemli değişiklikler yaparlar. Kahramanların hepsi tiptir. Karakter özelliği gösteren kahraman yoktur. Fakat tiplmeleri oldukça başarılı işlemiştir. Eda'nın hayatını birebir etkileyen kişiler; Fazıl Bey, Gülsüm, Nilgün, Abla'nım, Muhammed El-Saburi, Doktor Hayri Maslar'dır.

-*Süeda- Eda- Suzan- Nazan*: Romanın başkahramanıdır. Hayatı değiştikçe ismi de değişir. Bu durum bir gerçeği dile getirmektedir. Eda ve onun gibileri, hayatta insanlara bir kez verilen isimlerine bile sahip çıkamamaktadırlar. Küçük yaşta başına büyük olaylar gelen Eda, her türlü anında annesinin, “Gecenin bu saatinde genç kızlar yataklarında olur.” Sözüünü hatırlar, annesinin sesini kulaklarında duyar. Ama artık çok geçtir. Annesinin bu sözünü dinlediği için bu hallere düşmemiş midir?(Doğan, 1999: 163) Eda pasif bir tip değildir. Olaylar karşısında direnir. Örneğin, bu hayattan kurtulmak için intihar etmek ister. İlk gece Saburi tehlikesinden kendini korur. Gülsüm ve Abla'nım'dan kurtulma çarelerini bulup uygular. Eda, daha ziyade duygu ve düşünceleriyle tanıtılmıştır. Başına gelenlerin sürekli olarak muhasebesini yapar. Örneğin, kaza geçirdikten sonra hastanede düşündükleri, Doktor Hayri'nin evinde, aynada kendisiyle konuşması, onun içinde bulunduğu durumun vahametini göstermesi bakımından önemlidir.

-Muhammed El-Saburi: Zengin, iyi ve kurtarıcı Arap iş adamı tiplemesidir. Kötü yola düşmüş kızı kendi annesi de Türk olduğu için -verilmiş söz gibi- kurtarmıştır. Kıza hayatında göremeyeceği maddi manevi güzellikleri sunar. Yaşça başkahramanın dedesi yaşındadır (17-60) Cahit Uçuk kendi hayatında da yaşça kendinden yaşça büyük olan Mahmud Yesari ile evlenmiştir. Bu durumu kahramanlarına da yansıtmıştır diyebiliriz. Yazar bizlere şöyle tasvir ediyor Saburi'yi: “Yanımda uzun boylu bir adam gördüm. Kalın karakaşları altındaki siyah gözleri üstümdeydi. Yüzü çiçek bozuğu... Arap şivesiyle konuşan sıcak bir sesi vardı bu beyi.” (Uçuk, 1968: 66) yazarın eserde yabancı bir erkeğe yüklediği olumlu tavır dikkat çekicidir.

-Doktor Hayri MASLAR: Başkahramanımız olan Eda'nın diğer bir kurtarıcısıdır. Saburi'nin kuzeni ve İstanbul'dan ananesinin ricası ile Beyrut'a gelmiş ananesinin ve dayısının hatırasına hürmetten orayı terk etmemiştir. Eda'nın ya da Suzan'ın (umumi evde iken başkahramanın adı Suzan) umumi evde balkondan atlaması ile ona yardımcı olan doktordur. Daha sonra Ablanım'dan kaçmak isteyince ona yardımcı olmuştur. Dayısının ölüm döşeginde ona emanet ettiği Eda olduğunu öğrenince de zaten sevdiği başkahraman ile evlenir. Başkahramanın ağzından yazar doktoru şöyle tasvir eder: “Uzun boyu, geniş omuzları, biçimli başıyla ne

güzeldi. Yüzü, gözlerinin ifadesi. Belki güzel kelimesi onu anlatabilmek için yetmezdi.” (Uçuk, 1968: 113)

-Anne- Baba- Kardeş: Romadaki anne tiplemesi fedakâr, ailesine düşkün kızını kötülüklerden korumaya çalışan bir Türk annesidir. İstanbul'un fakir semtlerinde eşine maddi olarak yardımcı olmak için evde nakış-dikişle uğraşan masum bir anne. Kızının hayallerinden ve kendilerini beğenmediğinden haberdar olmayan devamlı kızına nasihat eden fakat kızını elinden yitiren bir annedir.

Babası cüzi bir miktara çalışıp ailesini geçindirmeye çalışan, çocuklarını ve eşini seven minik bir yuva kurmuş olan bir baba tiplemesi yapmıştır yazar.

Küçük kardeşle ilgili çok bir ayrıntı yok sadece var olduğu anılmış ve Eda'nın onu çok sevdiği söylenmiştir.

Anne, baba ve kardeş ile ilgili tasvire yer vermemiş yazar sadece üçünü birden bir cümlede anlatmıştır: “Babamın bir tüccar yanında kâtip olduğunu, aldığı parayla geçinemediğimizi, annemin trikotaj işleri yaptığını öğrenmişti... Bir de küçük kardeşim var. Onu da çok severim. Artist olur para kazanırsam ona ben bakacağım.” (Uçuk, 1968: 8)

Anne ve baba tasviri: “Kumral saçları büsbütün ağarmış, güzel yüzlü bir kadın, pencereden aşağıya bakıyor. Gözlerinde tükenmeyen bir bekleyişle kızından kuşkanadından bir habercik uman bir annedir. Akşamları yorgun yorgun yokuşu çıkan erkek. Elindeki filede sarı kızının sevdiği yiyecekleri taşımaktadır. Her günün sonuna kadar süren bir belkinin umuduyla yaşamakta bu erkek.

-*Ablanım (Emine Hanımefendi)*: Eserin kötü kadını olan tiplemedir. Umumi evde abla olarak orayı idare eden kişidir. Yani kızları pazarlama işini yapan tiplemedir. Yazar tasvirini başkahraman ağzından şöyle yapar: “Uzun boylu güzel bir kadın. Sağ kaş alnına kadar kalkık. Gözlerinde kalın sürmeler çekili. Kırmızı boyalı dudaklarında yarısına kadar yanmış bir sigara ilişik. Belindeki kuşağa bir deste anahtar şıkırdayan bir zincir asılıdır. Arap şivesine çalan bir şive ile konuşuyor.” (Uçuk, 1968: 44)

-*Gülsüm*: Başkahramanın yoldaşı, kaderdaşı olan iki arkadaşından birisidir. Gülsüm tiplemesinde dikkat çeken bir unsur var ki bu unsur karaktere ait bir şeyken tiplemde de kullanmıştır yazar. Eserin başında iyi bir insan olan Gülsüm eserin sonun yaşadıklarında dolayı kötü bir insana döner ve Eda’ya kıskançlıktan dolayı (doktorla gönül ilişkileri oluyor ve doktoru elinden Eda- Suzan aldı diye düşünüyor fakat madde kullandığından doktor ondan uzaklaşıyor.) kötülük yapar. Yazar başkahramanın ağzında Gülsüm’ü şöyle tasvir eder: “Sağ kanepede oturan

bir kız vardı. Saçları omuzlarında, gözleri gece, yüzü soluktur. Büyük ağzı, kırmızı kalın dudaklarıyla güzel bir kız. Konuştuğunu hiç duymadım. Sade türkü söylüyor maniler atıyor.”(Uçuk, 1968: 38) Gülsüm türkü barda şarkı söylemeye başlar, umumi evden kurtulunca fakat orada uyuşturucuya alıştırılır ve artık eski Gülsüm değildir. Oysaki başkahraman o evde Gülsüm’ü çok sever ve kendisine bir dayanak olarak görürdü.

-*Nilgün*: Eda’nın kaderdaşlarından ikincisi olan Nilgün on dört yaşında, bir kunduracıyı sevmiş ve ondan hamile kalmış minik kız. Eda, Nilgün’e karşı abla merhameti gösterir ve onu korumaya çalışır. Umumi evdeki adı Fatoş olan Nilgün balo gecesi kendisini bakire sanan bir adamla odaya çıkar ve odada adam onun bakire olmadığını anlayınca kıza zarar verir. Hamile olan Nilgün ölür ve çocuğu kurtarılır. Yazar başkahramanın ağzından şöyle tasvir eder Nilgün’ü: “İncecik bir yüz. Sudaki yıldız benzeri bir çift göz karanlığın içinde yanıyor.” (Uçuk, 1968: 34)

-*Fazıl Bey*: Romanın kötü adamı olan Fazıl Bey, tam Türk filmlerindeki tiplemedir. Erol Taş ile Tecavüzcü Coşkun karışımı bir tiplemedir. Yazar başkahramanın ağzında şöyle betimleme

yapar: “Dokulmuş saçları, kısık kara gözleri, fırça bıyıklarıyla tuhaf hem iyi, hem kötü bir adam tesiri bırakmıştı üstümde. Bakışları burgu benzeri, baktığı yeri delebilirdi sanki.” (Uçuk, 1968: 7)

#### 1.1.4. Mekân

Siyah Dantelli Şemsiye romanında olayların geçtiği mekânların zamana uygunluk gösterdiği dikkat çekmektedir. Geniş- açık mekân İstanbul’dur. Ev içi mekânlar en ince ayrıntısına kadar tasvir edilmiştir. (Doğan, 1999: 131) Teker teker mekân isimleri verilmiş bu mekanların ayrıntılı resimleri çizilmiştir okuyucunun dimağında. Hata eşya tasvirleri bile oldukça ayrıntılıdır. Mesela Ahu’nun evinde hizmetçinin getirdiği meyve tabağı, Ahu’ya verilmek üzere Dikran Efendi’nin Yaptığı küpeler bile en ince ayrıntısına kadar tasvir edilmiştir; “Üzeri zümrüt kakmalı halkaların altını görünmüyordu. Sanki halka maden ve taştan yapılmamış ta bir taze filiz kıvrılmış ve altına güneş ışıklı yeşil yapraklar sırlanmıştı. O kadar güzel, gönül alıcı, zarifiler ki, ancak ‘Ahu’nun pembe sedef kulaklarına layıktılar.” (Uçuk, 1956: 47)

Eserde kullanılan mekânlar:

*Dar- kapalı mekânlar*; Ali Hüsrev’in antikacı dükkânı, Dikran Efendi’nin dükkânı, Niyazi Efendi’nin dükkânı, Saraçhane’deki konak, Ahu’nun faytonu, Ali Hüsrev’in faytonu, Ali

Hüsrev'in köşkü, Ali Hüsrev'in konağı, Ali Hüsrev'in yuvası, eğlencelerin yapıldığı yalı-köşk- konak, saray, Şeyh Fazıl Efendi'nin evi- divanhanesi- dergâhı. Aynı zamanda kapalı mekânların içlerindeki odalar, hamamlar, soğukluklar, sofalar, haremleler de ayrıntılı şekilde tasvir edilmiştir.

*Geniş- açık mekânlar*; İstanbul, Kâğıthane, Saraçhane mesire yeri, Saraçhane'deki evin bahçesi, sahil, Nuruosmaniye Camii avlusu.

Bilhassa 'yuva' adlı evin tasviri dikkat çekicidir; "Üstleri uçuk pembe ipek kumaş kaplı iki koltuk bir kanepeler vardı... sıralı abanoz kitaplık ve nihayet gümüş semaverin durduğu küçük masa ile eşyası tamamlanan genişçe oda; oraya bir aşk yuvasından ziyade, zevkli bir erkeğin dinlenme odası hissini veriyordu." (Uçuk, 1956: 83)

Ahu'nun konağı yani Saraçhane'deki meşhur Billur Sokak Numarayı Cedit 52... Bu konağın tasviri abartılı şekilde yapılmıştır romanda; "Mermer döşeli bir yol ki iki yanı cennet bahçelerine misaldi." (Uçuk, 1956: 14)

Eşya tasvirlerinde ayrıntı fazladır bilhassa kapı tokmakları ön plana çıkarılmıştır. Kristal, bronz, porselen gibi çok farklı ham maddeden değerli şeylerdir bunlar. O zamanın değerlerini ön plana çıkaran basit ama dikkat çekici bir ayrıntıdır. Yazar mekân ve eşya tasvirlerinde oldukça başarılıdır.

Dikenli Çit romanında olaylar Antalya ve İstanbul'da geçer. Antalya'yı 'cennet' olarak nitelendiren ve buraya olan hayranlığını her fırsatta dile getiren yazar, buradaki zengin doğayı ve güzelliklerini başarılı bir şekilde tasvir etmiştir. Portakallıklar mekân olarak seçilir ve olay portakallıklarda başlatılır. Tasvir o kadar başarılı olmuştur ki okuyucu adeta portakalların arasında yürümüş onlara dokunmuştur. İstanbul'da doğduğu şehir olan Antalya'ya tekrar dönen yazar, kendisine mekân olarak bir çiftlik oluşturur. Ve burada yaşadığı sıkıntıları unutmaya çalışır. Yani Antalya'ya kahramanın hayatında güzellikleri içinde barındıran huzur, mutluluk ve kaçış mekânıdır.

İstanbul'un Ayla'nın hayatındaki konumu Antalya'nın tam tersidir. Yorucu, üzücü yönleri vardır. Ayla başta İstanbul'u ve konservatuarı hayalindeki en değerli şey olarak görse de orada yaşadığı gönül macerası Ayla'yı hırpalamıştır. Kendinden yaşça büyük olan evli hocası ile olan ilişkisi Ayla'nın köklerinden kopmasına sebep olmuş bunu gidermek için tekrar özünün mekânı olan Antalya'ya dönmüştür.

Bu iki şehir de yazarın hayatında birebir olan şehirlerdir. Hatta yazar Ayla'da kendisini göstermiş okuyuculara bile denebilir. “Erkekler Dünyasında Bir Kadın Yazar” adlı anı türündeki eserinde İstanbul ve Antalya'nın hayatındaki yerini oldukça açıklayıcı anlatmıştır. Yazar bu iki şehirde Ayla misali yaşadığı için yaptığı tasvirler gözleme dayanmaktadır. Bunda dolayı tasvirler realisttir ve yazar mekân tasviri konusunda oldukça başarılıdır.

Uçuk'un romanlarında; -Köy ve kasabanın mekân olarak / - Şehrin mekân olduğu olarak seçilmiştir. Dikenli Çit'te ikisi de kullanılmıştır. (Doğan, 1999: 206)

*Açık-geniş mekânlar:* Antalya, İstanbul, Boğaz, Haliç, Kalamış, Portakallık, Çiftlik açık mekân olarak eserde yer verilmiştir. Eserde en çok dikkat çeken açık mekân tasviri Antalya için yapılmıştır. Realist ve romantik bir tasvir olan portakallık tasvirin Antalya'nın içinde yer alır. “... bahçenin ortasından akan derenin kıyısına doğru yürüdüler... Ayla sofrayı suyun kıyısındaki büyük kayısı ağacının gölgesine kuruyordu...”

*Kapalı-dar mekânlar:* Antalya'daki ev, İstanbul'daki öğrenci pansiyonu, Dilek'in evi, lokantalar, otomobiller, gemi, çiftlikteki ev kapalı mekân olarak kullanılmıştır. Vakaların cereyan ettiği mekânlar kapalı mekânlardır. Yazar açık mekânları daha çok önemsemiş ve tasvir konusunda açık mekânlara daha cömert davranmıştır. Tabii ki kapalı mekân tasvirleri de vardır fakat açık mekân tasviri daha çok ön plandadır. Kendi odasının tasvirini yaparken kendi içini anlatıyor gibi bir hissiyat uyandırıyor okuyucuda.

Cahit Uçuk, Gecenin Bu Saatinde romanında evrensel bir konu işlemiştir. Böyle bir evrensel konuyu geniş bir coğrafyaya yaymıştır. Olaylar bir zamanlar İstanbul'daki film endüstrisinin merkezi durumunda olan Yeşil Çam sokağında başlar, Beyrut, Londra, Hamburg ve Paris'te devam ederek tekrar Beyrut'ta noktalanır. Mekân tasvirlerinde yazar gerçekçi olmaya çalışmış, bazen de detaylara fazlaca önem vermiştir. (Doğan, 1999: 162)

*Dar- Kapalı Mekânlar:* Açık adres verilerek kapalı bir mekân söylenmiştir. Yeşil Çam'daki film bürosu; Yeşil Çam Sokağı Fındık Apartmanı 3 Numara. Yine Yeşil Çam'da stüdyo olarak kullanılan ev; “Kapıdan girdik. Kapıcı kulübesinde ihtiyar bir adam uyukluyor. Loş koridorun sonundaki kapıyı itti. Geniş beton bir salon. Tavana yakın pencerelerden tozlu bir ışık uzanmış. Dekorlar, kocaman fotoğraf makinaları, projektörler.”(Uçuk, 1968: 12), kızların fotoğraflarının çekildiği ve hayatlarının karardığı kapalı mekândır. Başkahramanın İstanbul'daki aile evi, saf ve temiz mekândır. Özlediği, koparak hata ettiği kapalı mekândır baba evi; “Küçük evimiz ne kadar sevimli imiş. Her yanı derli toplu. Pencerelerinde hafifçe

solmuş basma perdeler üzerinde kreton örtülü karşılıklı divanlar. Masamızın ortasında annemin begonyası. Ufak bahçemizde

babamın diktiği son goncaları açılmağa çabalayan güller, renk renk kasımpatıları. Yazdan kalma bugünün bütün mutluluğunu duyuyorum içimde.”(Uçuk, 1968: 22) Romanın masum kapalı mekânı baba evi ise kötü kapalı mekânı Beyrut’taki umumi evdir; “Geniş, orman benzeri bir bahçe var çevremizde. Otel mi acaba diye düşündüm. Değil, değil. Burası bir evdi. Evdi ama insana ürküntü veren bir ev.”(Uçuk, 1968: 44) Bu iki iyi ve kötü mekânların ortalaması Doktor Hayri Bey’in muayenehanesidir. Umumi evden (birleşme evi) kurtulmuş yeni bir kapalı mekâna yerleşmiştir hemşire Nazan olarak. Bu mekân da baba evi kadar olmasa da koruyucu bir kapalı mekân olarak işlenmiştir.

Diğer kapalı mekânlar; yurt dışında kaldıkları oteller ve Saburi ile Doktor Hayri Maslar’ın lüks evleri diyebiliriz.

*Açık- Geniş Mekânlar:* Yurt için açık mekânı olarak sadece İstanbul kullanılmıştır. Yurt dışında ana mekân Beyrut’tur. Avrupa’nın birçok şehri de kullanılmıştır; Londra, Paris, Hamburg. Avrupa şehirlerindeki tasvirlerde oldukça gerçekçidir. Yazar, gerçek hayatta gezip gördüğü yerleri anlatmıştır, gerçekçi tasvirlerde bu durumun payı yüksektir. Beyrut, evrensel bir konunun işlendiği evrensel bir mekândır. Binbir Gece Masallarının mekânı olan Beyrut, yazarın romanın da bir masal havası yaratmıştır; “Gözlerimi açtığımda, bir yangının alevleriyle tutuşmuş, pembeleşmiş göğü gördüm. Korkunç bir yangın olmalıydı göğün altında. Ürkek bakıyordum göğe. Sonra bir virajı döndük. Uzaklarda yangın değil, parlayan ışıklarıyla koca bir şehir göründü... Öyle ışıklı ki bu şehir. Sanki bayram için donatılmıştı. Bir kıyı yolundaydık. Belki otuz katlı oteller yolun sağında, solda yol boyunca rıhtım. İri iri kayaları döğen beyaz köpüklü denizin gerileri simsiyah.” (Uçuk, 1968: 43)

#### **1.1.5. Zaman**

Romanda zaman kavramı net olmamakla birlikte olayların akışına ve farklı yapıdaki mekânların tasvirine göre tahmin edilebiliyor. Vakaların cereyanına bakılınca zaman Osmanlı dönemidir. Musiki seven şiirle ilgilenen adı verilmemiş bir padişah döneminde geçiyor olaylar. Sadece bir padişah mahlası telaffuz ediliyor ‘Hakani’. Net olmayan uydurma bir mahlas olduğu bilinmekle beraber köşklerde yapılan musiki eğlencelerine bakılınca acaba Lale Devri’ne ait bir vakadan mı bahsediliyor diye zaman tayini yapılabilir. Erkeklerin sevgililerine ‘yuva’ adlı konakları düzenledikleri bir zaman diliminden bahsediliyor.

Net tarihi vakalara göre tahmin etmekle birlikte mevsim, hafta, gün gibi zaman kavramları kullanılmaktadır. Yaz mevsimi bilhassa kullanılıyor eğlence mevsimi olduğu için, ‘Bu yazın

son mehtabı!’ (Uçuk, 1956: 130) tamlaması bize mevsimsel net bir tarih söylüyor. Yine gece, sabah, akşam, düğün- nişan günü gibi zaman kavramları kullanılıyor.

Kozmik zaman kavramını Dikenli Çit için kullanabiliriz. Bu romanda zaman kavramının insanla ilgisi belirgindir. Mevsim kavramları kullanılmıştır belirgin şekilde. Romandaki kahramanlar baharda gelecekle ilgili planlar yaparlar. Bahar mevsiminde neşeliler. Kış mevsimi okul mevsimidir ve sıkıntılı bir dönemdir. Olaylar zaman kavramlarıyla iç içe geçmiştir. Baharın sonu aşkın da sonu olarak verilmiştir. “Baharın sonu, aşkının sonuna rastladı. Bunda bir hayat sonu acılığı var.” (Uçuk, 1937: 174) Yaz mevsimi ve güzel olaylar hep beraber verilmiştir. İhsan ve Ayla güzel günlere adımlarını yaz mevsiminde atmışlardır. Zaman kavramının net olmadığı romanda mevsimin insan üzerindeki etkisi belirgin şekilde verilmiştir.

Gecenin Bu Saatinde romanında hikâye edilen vakanın belli bir zamanı yoktur. Esasen problem, her zaman Eda gibi artist olma hevesiyle yanıp tutuşan kendi başına buyruk pek çok genç kızın başına gelebilecek türdedir. Yazar net bir zaman kullanmamış olmamakla birlikte zaman kavramını içeren kelimeler kullanmıştır; “Kaç gündür yoldayız bilmiyorum. On gün on gece. Belki aylardır.” (Uçuk, 1968: 38)

Uzun bir zaman geçmiş havası yaratılıyor bazı cümlelerde bu romana masalsi bir hava katıyor; “Yarına yüzyıllar var.” (Uçuk, 1968: 275)

“Ben bir hafta komada kalmışım” (Uçuk, 1968: 195) cümlesi yine bir zaman kavramı içeriyor. Mevsim kavramları kullanılmıştır; “Bahar geliyor bahar! Bahar! Bahar!” (Uçuk, 1968: 222)

Romanda yer yer zamanda geriye dönüşlerde görülmektedir ki bu modern romanın belirgin özelliklerindedir. Yazar bu geriye dönüşleri kahramanın geçmişi hayal etmesiyle yapmıştır.

Betimleme yapılan yerlerde zaman kavramı kullanarak an betimlenmiştir; “Akşam iniyor usuldan. Gökten akıyor gökkuşağı renkleri dünyaya.” (Uçuk, 1968: 260)

#### **1.1.6. Bakış Açısı ve Anlatıcı**

Romanda anlatıcı kadar önemli olan bir diğer kavram da bakış açısıdır. Bakış açısı, vaka zincirlerinin, mekân, zaman, şahıs kadrosu gibi unsurların kim tarafından görüldüğü, idrak edildiği ve kime nakledildiği sorularının cevabıdır. Anlatma esasına bağlı edebi eserlerde mühim bir yeri olan ve diğer unsurları çevresinde toplayan vaka zincirinin şekli, başlangıç ve



bitiş noktası, büyük ölçüde bakış açısına bağlıdır. Eserde şahısların teşekkürü ve tanıtılması, mekânın tasviri gibi konularda da üzerinde durulacak unsurlardan biri bakış açısidir. (Aktaş, 2003: 76-78)

Eserde gözlemci bakış açısı baskın şekilde kendini göstermektedir. Fakat olay örgüsünde kahramanlardan bazılarının da bakış açılarına yer verildiği görülmektedir bu durumda çoğulcu bakış açısını ön plana çıkarmaktadır.

Yazar tıpkı diğer romanlarında olduğu gibi Dikenli Çit'te de çoğulcu bakış açısını kullanmıştır. Vakaların gerçekleştiği yerlerde kahraman bakış açısını kullanarak başkahraman öncelikli olmakla birlikte neredeyse bütün kahramanları konuşturmuştur. Geçmişe dönüş yapıldığı ve vakaların dış bir gözlemlerle aktarılmak zorunda kaldığı yerde bazen gözlemci bazen de hâkim bakış açısını kullanmıştır. Eserin kimin ağzından anlatıldığı vaka kadar önemlidir. Bakış açısı okuyucunun esere ilgisini ve eserin anlaşılabilirliğini de etkiler. Başkişinin hatıra defterinden ve mektuplarından alınan kısımlarda kahraman bakış açısı kullanılmıştır. Ustama mektup kısmındaki bir örnek cümleyle bunu görelim; “Sana gelecekmişim gibi içimde tuhaf titremeler duyarak masamın başına oturdum. Söylemek istediklerimin, duyduklarımın yanında, buraya yazdıklarım çok küçük fakat bunları yazabildiğime de seviniyorum çünkü başka bir şey yapamıyorum...” (Uçuk, 1937: 155)

Yazar olayların gidişatında kendini göstermez. Kahraman anlatıcılığı baskın olarak kullanmıştır. Adeta yazar kahraman gibi hissettirerek kullandığı anlatıcılığı başarılı işlemiştir romana. Dış bir anlatıcı yoktur. Roman masalsi bir hava barındırmasından ve evrensel her dönem geçerli olan bir konuyu işlemiş olmasından dolayı anlatıcının kullandığı dil çok önemlidir. Başkahramanın günlüğünden dinliyormuş gibi hissettiğimiz geri dönüşlerin olduğu kısımlarda kahraman uzaktan bir gözle kendi hayatına baktırılmış ve gözlemci bakış açısının özellikleri kullanılmıştır. Eserin diğer kısımlarında birebir olayları kahramanla birlikte yaşamıştır okuyucu. Bundan dolayı kahraman bakış açısı esere hâkimdir.

## 2. ÜÇ ROMANIN TEMATİK İNCELENMESİ

### 2.1 Ferdi ve Sosyal İçerikli Temalar

Yazar, romanlarında işlediği konuları gerçek hayattan alarak adeta döneminin sorunlarına ayna tutmuştur. Aşk, rüşvet, kadın hakları, kadının erkek ve çocuk için önemi, kadının toplum içindeki yeri, çalışan kadının sorunları, ihanete uğrayan kadınların maddi ve manevi

problemleri, anne- çocuk ilişkisi, köy insanının karşılaştığı sorunlar, köy hayatının güzel yönleri, folkloru- gelenek- görenek ve adetleri, insan- hayvan dostluğu, güzel sanatlar gibi pek çok konuyu romantik ve realist bir bakış açısıyla ele almıştır. (Doğan,1999: 176)

İnceleyeceğimiz Siyah Dantelli Kadın, Dikenli Çit, Gecenin Bu Saatinde romanlarında; aşk, kadın, sevgi, aile, arkadaşlık, güzel sanatlar(musiki), köy gibi temaları işlemiştir.

### 2.1.1. Aşk

Cahit UÇUK'un romanlarında işlenen aşk teması görür görmez duyulan bir aşktan ziyade zaman içinde gelişen olgunlaşan bir aşktır. "Aşk mihrabında dize gelenler, bir daha uzun yollar aşamazlar. Onların bedenlerinde, dış âlemin yükünü çekecek derman kalmaz. Secdeye varanlarsa, gözlerini kamaştırın nuru görmüşlerdir, artık gözlerini açsalar bile her yanda, hep aynı ışığı görürler." (Uçuk, 1956: 121) maddi sevginin evrilerek manevi bir sevgiye dönüşü üç romanının da bir yerlerinde muhakkak görülür.

Dikenli Çit'te İhsan ve Ayla'nın arasındaki aşk çocukluktan başlamıştır. Birbirlerini uzun süredir tanıyan ikilinin zamanla gelişen bir bağları vardır. Yine Gecenin Bu Saatinde adlı romanda da aşk duygusu ilk görüşte değil zamanla kişiler birbirini tanıdıkça oluşmuştur. Bu da yazarın aşk konusunda da realist davrandığını gözlemciliği elden bırakmadığını göstermektedir.

Yazar aşk ve fedakârlık temalarını iç içe işlemiştir. Ele aldığımız romanlardaki kahramanlar bilhassa kadınlar aşk için fedakârlık yapan tiplerdir. Dikenli Çit'te Ayla'nın Necib Cevad için yaptığı fedakârlıklar örnek verilebilir: "...Hiç üzülmez, arkanda bıraktıklarını düşünmez misin? –Evet, ustacığım razıyım, üzülmem, düşünmem." (Uçuk, 1937: 63) Ayla, sevdiği adam için herkesi arkasında bırakabilecek kadar fedakar bir kadın tipleridir.

Siyah Dantelli Şemsiye'de başkışı erkek, Gecenin Bu Saatinde'de ve Dikenli Çit'te başkışı kadındır. Fakat üçünün de aşk hissiyatı aynıdır. Erkek tiplerine de bir kadın narinliği verilmiştir aşk mevzusunda. Fedakâr, derin, güzel seven bir tiplerdir Ali Hüsrev.

Süeda'da (Eda- Suzan- Nazan) ve Ayla'da aşkı ilk olarak kendilerinden yaşça büyük hatta babaları ile eşdeğer yaşta adamlarda bulmuşlardır. Dikenli Çit'teki Necip Cevad otuz beş, Ayla ise 19 yaşındadır. Gecenin Bu Saatinde'deki Muhammed el Saburi altmışlı yaşlarda Süeda 17 yaşındadır. Bu aşk duygularında hem olgunluk hem de babasal bir sevgi vardır. Biraz korunma, sığınma ihtiyacı biraz olgunluğa hayranlık vardır. Dikenli Çit'te Ayla Necib arasında geçen bir konuşmada baba sevgisi hissiyatı görülür; "-Korkma Ayla seni paltomun

İçine alırım... - Ben çok küçükken, geceleri uykum gelince, babamın oturduğu koltuğa gider, onun kucağına yerleşir, röbdöşambırının altına kedi gibi sokulurdum. Babamın kucağında onun sıcaklığını baba kokusunu duyarak uyurdum. Şimdi de senin paltonun içine saklanacağım ustacığım...” (Uçuk, 1937: 68)

### 2.1.2. Kadın

Cahit Uçuk, kendisinin de kadın olması hasebiyle kadın kahramanlara daha çok ağırlık vermiştir. Siyah Dantelli Şemsiye adlı romanda başkahraman erkek olsa da olayların gizeminin baskın olduğu kahraman yine kadın olmuştur. Yani erkek başkahramanın ağzından kadın kahramanı yüceltmıştır yazar. Kadını ve kadın problemlerini hiçbir zaman göz ardı etmeyen yazar bunu romanlarına yansıtmıştır. Kadının erkek ve çocuk için önemi, toplum hayatındaki yeri, ihanete uğraması, sevilmesi, anne- çocuk ilişkisi, çalışma ve köy hayatında karşılaştığı sorunlar üzerinde durmuştur. (Doğan, 1999: 177) Tabi ki kadınlara her zaman olumlu yönden bakmamış gerçekçi davranarak eleştirmiştir de bunu Siyah Dantelli Şemsiye romanından bir pasajla inceleyelim: “Kız, kendisini saraydan götürmesi için ne kadar yalvarmıştı. Fakat Ali Hüsrev, onu almamıştı. Ne yapacaktı biçareyi. Güzel fakat kuş beyinli bir kızdı.” (Uçuk, 1999: 85)

Dikenli Çit adlı romanında ise eski kadınların erkeklere kayıtsız şartsız ezik bağılılığını eleştirmiş yazar. Bu eleştiriyi evladın ağzından annesine karşı yaptırmıştır ki karşıdaki erkek figürü de babadır; “Anne yıllarca babamın bu azabına nasıl katlandın?... Anne senin yerinde ben olsam bu kötü yaşayışa katlanmazdım... Bir yandan haklısın anne fakat bir yandan da eski kadınları korkak ve beceriksiz buluyorum.” (Uçuk, 1937: 30) Kadınları eski kadın ve yeni kadın diye ayırıyor. Bu bir nevi Batılı eğitim almış kadın ve almamış kadın ayrımıdır. Cumhuriyet sonrası hastalıklı bakış açısı yazarın zihniyetine de sinmiştir. Eskiye dair birçok şey kötü kadınlar da bunlardan birisidir.

Gecenin Bu Saatinde adlı roman meşhur olma meraklısı kadın karakterlerin çektiği sıkıntılar ve hayatlarının erkeklerin tek elinde olması kahramanlar üzerinden eleştirilmiştir. Yazarımız kadına ve sorunlarına oldukça duyarlıdır ve hemcinslerini eserlerinin neredeyse çoğunun başkahramanı yapmıştır. Kadın yazarların bir elin parmaklarını geçmediği bir dönemde yazarlık yapan Cahit Uçuk’un kadın temasını bu denli işlemesi şaşılmanması gereken bir durumdur. Realiteyi romanlarına taşımıştır diyebiliriz.

Cahit Uçuk'un kadınları genel olarak onurlu, sevecen, yumuşak huylu, iyi niyetli, bazen ihtiraslı kişilik yapısına sahiptir. Tuttuğu işte başarılı olmak, hayatta kalabilmek için mücadele etmek bu kadınların ortak yönüdür. Kadın fedakârdır. Evi, çocuğu ve eşi için her türlü fedakârlığa katlanır. Güçlü kişilik yapıları ile dikkat çeken bu kadınlar yazarın idealizmini de yansıtır. Zira Cahit Uçuk, soyunun kadınlarına hayrandır. Roman kahramanlarının güçlü kişileri, yazarın hayran olduğu soyunun kadınlarından da izler taşır. (Doğan, 1999: 190)

### 2.1.3. Arkadaşlık

Cahit Uçuk, incelediğimiz üç romanda da arkadaşlığa dair mevzulara yer vermiştir ki özellikle Dikenli Çit'te ana kaburgada arkadaşlık teması vardır. Başkahraman Ayla ve arkadaşlarının hayallerini gerçekleştirme üzerine kurulu olan roman. Ayla'nın arkadaşlarının olduğu ortamda kendisi gibi olduğunu ve mutlu olduğunu görürüz. Ayla'nın arkadaşları adeta ailesidir. Gerçek aşkı da bu arkadaşlarının arasında birinde bulur. Çocukluktan beri arkadaş olan İhsan ile Ayla birbirlerine âşık olurlar. Bu da arkadaşlığın her mevzuda ilk adım olduğunu açıklar niteliktedir. Ayla arkadaşlarından uzaklaşıp doğru olmayan bir yola sapınca acılar çeker ve tekrar onların gölgesine neşesine sığınınca mutlu olur. Yazar bu romanda arkadaşlık temasını kutsal bir mabet gibi kullanmıştır.

Siyah Dantelli Şemsiye romanında Başkahramanın iki arkadaşı vardır ve birisi ruhen rehberidir diğeri iş yeri arkadaşı ve yoldaşdır. Ruhen rehberi olduğu arkadaşı ile sonunda aynı şeyhe de bağlanarak ruhdaş olurlar. Yoldaşı olan arkadaşı da popüler arkadaşlıklardaki gibi sevdiği kızla görüşmesini sağlama durumu olmuştur. Yazar bu romanda da arkadaşlık temasının vazgeçilmez olduğunu vurgulamıştır.

Gecenin Bu Saatinde adlı romanda arkadaşlık teması sahte Perihan adında birisiyle başlar. Başkahraman gerçekte olmayan bu sahte arkadaşı kullanarak evden kaçır. Başta sorunlu başlayan bu arkadaşlık teması romanın sonunda da Gülsüm ile sorunlu biter. Başkahramanın aynı batağa düşmüş iki arkadaşı vardır biri Gülsüm diğeri Nilgün'dür. Nilgün acı bir şekilde ölür ardında sahipsiz bir çocuk bırakarak. Gülsüm de uyuşturucu kullanan ve Eda'ya zarar veren bir tiplere dönüşür. Eda Nilgün'ün çocuğuna sahip çıkarak bir nebze arkadaşlık temasını olumluya çevirmiş olsa da roman boyunca sorunlu bir arkadaşlık gözler önüne serilir. Zira kötü yola düşmüş kızı ya arkadaşı o yola düşür ya da o yolda arkadaş bulur demek istemiştir yazar.

### 2.1.4. Musiki

Cahit Uçuk'un hayatında güzel sanatlar oldukça geniş bir yer tutar. Özellikle musikiye olan eğiliminin temelinde çocukluk yaşantısından izler bulunur. O edebiyata ve sanata meraklı olan bir ailenin çocuğudur. Annesi ud, keman, piyano ve flüt çalar; babası da resim yaparmış. Kızlarına da Amasya'da Ermeni bir kadından yaklaşık bir ay kadar piyano dersleri aldirmişlardır. Sanatla alakadar bir aile ortamında büyüyen Cahit Uçuk'ta sanata karşı meylinin olmasını tabii görmek gerekir. (Doğan, 1999: 182)

Gecenin Bu Saatinde romanı hariç incelediğimiz diğer iki romanında da musiki temel unsurlardandır. Gecenin Bu Saatinde musiki ve şiir yan bir kahraman olan Gülsüm ile

özdeşleştirilmiştir sadece. Yazar aynı zamanda manzum eserlerde yazmakta olduğundan bu romanda birebir kendi yazdığı mani tarzı şiirlere de yer vermiştir.

Dikenli Çit adlı romanda vakanın ana kaburgasını musiki oluşturur. Konservatuar okumak için İstanbul'a gitmek isteyen Ayla ve arkadaşlarının hikâyesi anlatılır. Erkek kahramanlardan birisi de konservatuarda hocadır. Yani roman musiki üzerine kuruludur.

Siyah Dantelli Şemsiye'de bestekâr bir başkahraman görüyoruz ki piyano çalan ve besteleriyle meşhur olan birisidir. En yakın arkadaşı da ud çalan meşhur bir musikişinastır. Romanda padişahı da özellikle musiki yönüyle görürüz ki hep musiki toplantıları yaptırır ve padişahın da başkahraman tarafından bestelenen şiirleri vardır. Sevdiği kadın onun sanatsal yönüne hayran kalarak başkahramana âşık olur.

#### **2.1.5. Aile**

Yazarın kendi hayatında aile kutsal bir yer teşkil eder. Ailesine bağlı olan yazar aile kurabilmek için birkaç deneme yapmıştır. Aile içi ilişkilerinde kendisi de fedakâr olan yazar kahramanlarına da bu fedakârlık temasını sindirmiştir. Fedakâr olan iyi tiplere olmayan kötü tiplere olmuştur.

Dikenli Çit'teki Ayla, babası ile başta sorunlu olsa da sonradan yine ailesine sığınmıştır. Yazarın kendi hayatında yaşadığı kötü olaylardan sonra ailesine sığınmasına benzemektedir bu durum. Gecenin Bu Saatinde romanında artist olmak için ailesinden kaçan ve ailesini beğenmeyen Eda sonradan pişman olmuş ailesine dönmek çok istemiş ve onları özlemle hayal etmiştir. Siyah Dantelli Şemsiye'nin Ali Hüsrev'inin annesi ve dadısıdır ailesi. Babasını ötelere uğurlamış olan kahramanın aile olarak gördüğü kişiler kutsaldır ve acılarını o evde o ailede yaşayarak giderir. Şunu çıkarabiliriz buradan; yazarın kullandığı aile teması sığınılacak limandır.

#### **2.1.6. Sevgi**

Yazarın romanlarında sevgi teması oldukça geniş bir yer tutar. Olaylara ve insanlara rindane bir tavırla yaklaşan yazarın, insanları, hayvanları ve bitkileriyle tüm tabiatı, tüm hayatı sevdiğine ve onlarda derin manalar bulduğuna şahit oluruz. Bunda Hekimhan ve Antalya'da doğanın kucağında geçen çocukluk yıllarının ve şeyhi Feyzi Baba'dan aldığı feyzin de etkisi vardır. Yazarda 'Yaradılanı severim Yaradan'dan ötürü' düsturu vardır.

Hayvanlara ve tabiata karşı sevgisini özellikle Dikenli Çit adlı romanında net şekilde görürüz. (Doğan, 1999: 181)

Gecenin Bu Saatinde ve Dikenli Çit adlı romanlarında aşk ve baba sevgisinin birbirine karıştığını görürüz. Yaşça büyük erkeklere âşık olduklarını sanan başkahramanlar aslında aşkla dolu sandıkları betimlemelerinde karşı tarafa baba sevgisinin hissiyatlarını hissetmektedirler.

## SONUÇ

Cahit Uçuk, birçok edebi türden eserler vermiş bir edebiyatçıdır. Fakat roman yazarın hayatında farklı bir yere sahiptir. Bunun nedenleri arasında, yazarın mizacında uzun soluklu yazma tutkusunun var olmasını gösterebiliriz. Roman yazmaya tefrika olarak başlayan yazar daha sonra romanlarını kitaplaştırmaya başlamıştır. On beş roman yazmış olan Cahit Uçuk'un romanlarından birisi kayıptır. Ferdi ve sosyal konuların baskın olarak el alındığı bu romanlarda kadınlar ön plandadır. Kullandığı kadın kahramanların hepsinde yazarın hayatından esintiler görebilmekteyiz. Bu da bize yazarın eserlerinde realizmin baskın olduğunu gösteriyor. Realizm ve romantizmi romanlarında kullanan yazar tasvirlerini realist bir tavırla yapmıştır. Kullandığı mekânların da çoğu kendi hayatında var olmuş mekânlardır. Zaman kavramı romanlarında net olmamakla birlikte günlük olağan akışa dikkat edilmiştir. Mevsimlerle kahramanların ruh hali eş değer ilerlemiştir. Yaz ve bahar mevsimi mutluluğu kış ise sıkıntı ve kederi anımsatmıştır kahramanlarına ki yazar kendisi de anılarında bu şekilde hissetmektedir.

Cahit Uçuk, roman sahasında edebiyatımıza bir kazanç olmuştur (bilhassa ara dönem gençleri -14/ 18 yaş- için yazdığı romanlarıyla) ve on beş romanı edebiyatımıza kazandırmıştır. Bu çalışmamızda Cahit Uçuk'un üç romanını yapı- tema bakımından inceledik.



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## AL/VOX/P-Sİ/AL (MOS) YAPISININ ELEKTRİKSEL KARAKTERİZASYONU

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### ÖZET

Metal oksit yarıiletken yapılar bir yarıiletken üzerine yalıtkan oksit ve bunun üzerinde de iletken bir tabakanın kaplandığı ve geniş bir kullanım alanı olan yapılardır. Bu çalışmada vanadyum oksit ( $VO_x$ ) filmler sol-jel daldırma yöntemi ile p-Si yüzeylere kaplandıktan sonra buharlaşma yöntemi ile omik ve doğrultucu alüminyum (Al) kontaklar oluşturularak metal oksit yarıiletken tabakası (MOS) elde edilmiştir. Elde edilen MOS tabakalar için elektriksel karakterizasyonu akım-gerilim (I-V) ve kapasite-gerilim (C-V) ölçümleri ile gerçekleştirilmiştir. Al/VO<sub>x</sub>/p-Si/Al (MOS) Yapısının I-V karakteristikleri ile temel elektrik parametreleri tayin edilmiştir. Ayrıca aynı ölçümlerden Cheung metodu kullanılarak yapının seri direnci hakkında sonuçlar elde edilmiştir. C-V ölçümleri de farklı frekanslar altında gerçekleştirilerek yapının kapasite ve iletkenlik değişimleri incelenmiştir. Ölçüm sonuçlarından yola çıkarak teorik hesaplamalarla metal oksitlere dair birçok elektriksel parametre hesaplanmış ve sonuçları tartışılmıştır. Yapılan ölçümler ile elde edilen değerlerden istediğimiz fiziksel parametreleri hesaplayabilmek için  $1/C^2 - V$ ,  $\ln I - V$  ve  $H(I) - I$  grafikleri oluşturulmuştur. Hesaplanan parametrelerin başlıcaları idealite faktörü (n), Seri direnç ( $R_s$ ), potansiyel engel yüksekliği  $\chi_b$ , Fermi enerjisi ( $E_f$ ), alıcı yoğunlukları  $N_a$ , kesme gerilimi ( $V_o$ ), difüzyon potansiyeli ( $V_d$ ), doyma akımı ( $I_o$ ) ve maksimum elektrik alan ( $E_m$ )'dir. Bu parametrelerin hesaplanmasında termiyonik emisyon teorisi, Norde ve Cheung metotlarının kullanılmış ve bu teoremlerin uygulama yöntemleri ve sonuçları irdelenmiştir. Elde ettiğimiz sonuçlar, farklı yöntemler kullanılarak elde edilen sonuçlar arasında küçük sapmaların olduğunu göstermektedir. Bu durum yöntemlerin farklı varsayımlara dayanmasından ve farklı değişkenleri ihmal edip farklı değişkenlere odaklanmasından kaynaklanmaktadır. Elde edilen metal oksit yapılar yüksek seri direnç gerektiren uygulamalara elverişli olacağı düşünülmektedir. Yapılan analizler neticesinde elde edilen yapıda kullanılan VO<sub>x</sub> oksit tabakasının SiO<sub>2</sub>'e alternatif malzemesi yerine aday malzeme olabileceği görülmektedir.

**Anahtar kelimeler:** Metal oksit yarıiletken, Vanadyum oksit, elektriksel özellikler.

**ELECTRICAL CHARACTERIZATION OF AL/VOX/P-SI/AL (MOS) STRUCTURE****ABSTRACT**

Metal oxide semiconductor structures that have a wide usage area are structures on which an insulating oxide and a conductive layer are coated on a semiconductor. In this study, after coating the vanadium oxide (VO<sub>x</sub>) films on p-Si surfaces by the sol-gel dip coating method, a metal oxide semiconductor layer (MOS) was obtained by forming ohmic and rectifying aluminum (Al) contacts via the evaporation process. Electrical characterization for the obtained MOS layers was carried out by current-voltage (I-V) and capacitance-voltage (C-V) measurements. I-V characteristics of Al/VO<sub>x</sub>/p-Si/Al (MOS) Structure and primary electrical parameters were determined. In addition, the series resistance of the structure was obtained by applying the Cheung method to the same measurement results. C-V measurements were performed at different frequencies to examine the capacity and conductivity changes of the structure. Based on the measurement results, many electrical parameters of metal oxides were calculated with theoretical calculations and the results were discussed.  $1/C^2 - V$ ,  $\ln I - V$  and  $H(I) - I$  graphs were generated from the values obtained by measurements in order to calculate the physical parameters. The main calculated parameters are; ideality factor (n), series resistance ( $R_s$ ), potential barrier height  $\phi_b$ , fermi energy ( $E_f$ ), acceptor densities  $N_a$ , cutoff voltage ( $V_o$ ), diffusion potential ( $V_d$ ), saturation current ( $I_o$ ) and maximum electric field ( $E_m$ ). Thermionic emission theory, Norde and Cheung methods were used in the calculation of these parameters, and the application of these methods and results of the theorems were examined.

Our results show that there are small deviations between the results obtained using different methods. This is due to the fact that the methods are based on different assumptions and neglect and focus on different variables. It is thought that the obtained metal oxide structures will be suitable for applications requiring high series resistance. As a result of the analyzes made, it is seen that the VO<sub>x</sub> oxide layer used in the structure obtained may be an alternative candidate material for the SiO<sub>2</sub>.

**Keywords:** Metal oxide semiconductor, Vanadium oxide, electrical properties.

## GİRİŞ

Metal oksitler benzersiz özelliklerinden dolayı birçok alanda ilgi noktası olmuşlardır. Özellikle geçiş metalleri bu özellikleri daha çok sergilemektedirler. Geçiş metallerin atomik boyutta boş d-kabuklarının olması onlara metal fazından yalıtkan faza geçiş yapabilme yeteneği kazandırır ve bu durum onlara farklı özellikler kazandırır [1]. Geçiş metallere olan vanadyumun da bazı oksitleri metal fazdan yalıtkan faza dış etkilerle geçiş yapabilmektedir [2].

MOS yapılar bir metal ile oksit tabakanın birleşiminden oluşurlar. Bu yapılar daha karmaşık yarıiletken aygıtlar üretmek için kullanılırlar [3]. Metal oksitlerin büyük çoğunluğu yarıiletken olarak kabul edilir. Metal oksitler metallere çok daha farklı özelliklere sahiptirler ve batarya, süper kapasitör, sensörler, süper iletkenler, güneş hücreleri gibi birçok uygulamada kullanımları mevcuttur [4].

Bir silikon yüzey üzerine bir metal kaplandığında tam bir kontak oluşmaz ve arada atomik düzeyde bir ara yüz oluşur. Metal - yarıiletken kontaklar hakkındaki bilgimiz Braun'ın 1874'te yaptığı ve bakır ile demir sülfür kontağının beklenmedik doğasını gösteren çalışmaya dayanır [5].

Yarıiletkenlerdeki kusurlar ve yabancı maddeler yasak enerji bandında etkilere neden olur. Benzer etkilere kristal örgü ve simetrisinin önemli ölçüde bozulduğu yarıiletken yüzeyinde de rastlanır. Yüzeydeki değişimden kaynaklı yasak enerji bandındaki bu değişimden yüzey durumları doğar. Yüzeydeki değişime benzer bir durum metal-yarıiletken gibi farklı eklemler oluşturulduğunda da gözlenir ve buna ara yüz durumları denir [6].

Ara yüz durumları iki gruba ayrılabilir. Bu gruplardan ilki metal ile diğeri ise yarı iletken ile etkileşim halindedir. Bu etkileşimler ara yüz durumlarının boşluk ile yarıiletken yasak enerji aralığındaki dağılımını etkiler. Bir MOS yapıda ara yüz bulunması bariyerin transmisyon katsayısını değişmesine, metal ile yarı iletken arasında potansiyel farkı oluşmasına, yarıiletkende difüzyon potansiyelin azalmasına, ara yüzün elektrik yüklenmesine neden olur. Ara yüz durumları ekstra izinli enerji durumları oluştururlar. Her bir ara yüz durumu elektriksel yükte de artışa neden olur. Bu da kapasitansın artması anlamına gelir. Bu sebeple kapasitans uygulana gerilimle ani yükseliş gösterir. Yüksek frekanslarda ara yüz durumları değişen ac sinyale yetişemez [7].

MOS yapılar için parametreleri farklı metotlar ile hesaplanabilmektedir. Bunlardan biri olan Norde metodunda eşitlik 9 ile ifade edilen ve termal emisyon teoreminden gelen Schottky

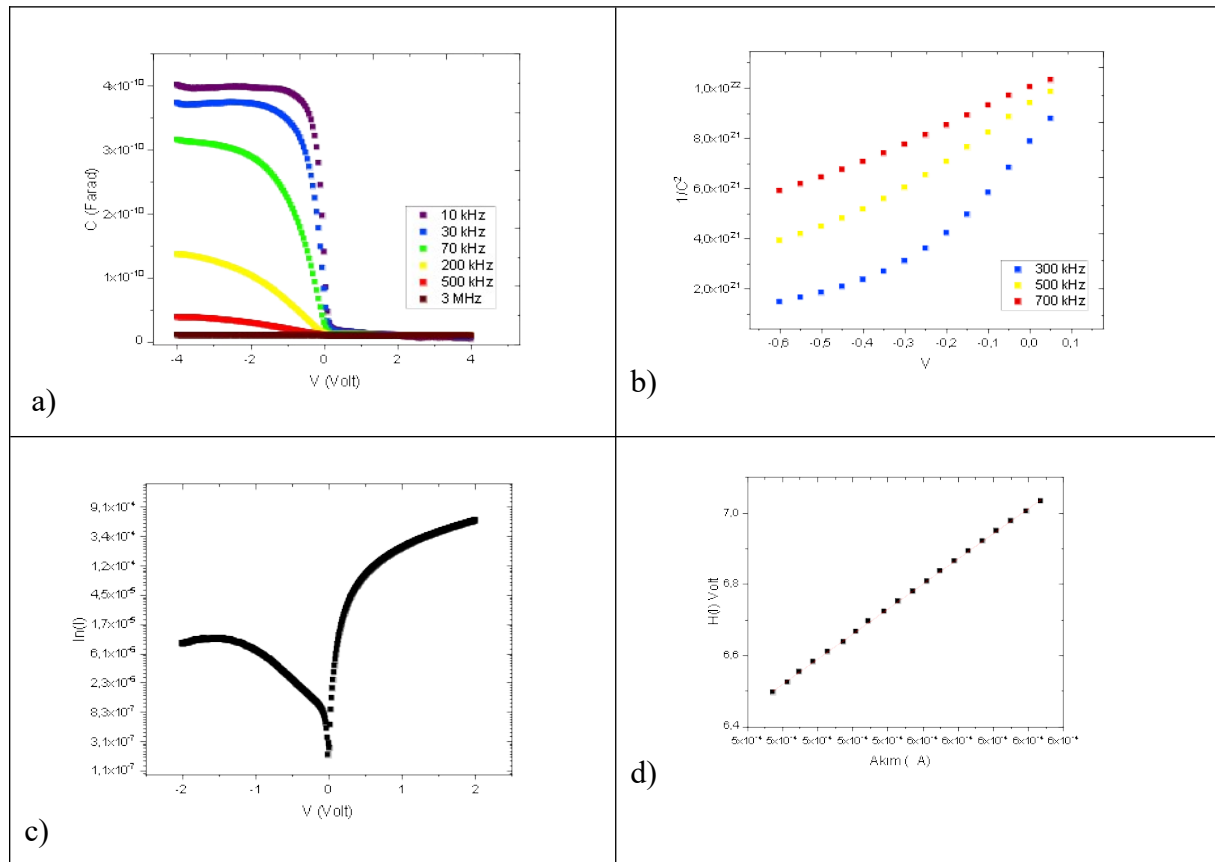
diyot için akım - gerilim denkleminde  $kT/q \ll V \ll IR$  varsayımı kullanır. Bu yöntem ile potansiyel

engel yüksekliği belirlenebileceği gibi alternatif olarak Cheung metodunda ise denklem 1 ile ifade edilen eşitlik kullanılarak potansiyel yüksekliği hesaplanmaktadır [8, 9].

### ARAŞTIRMA VE BULGULAR

Çalışmamızda sol-gel yöntemi ile elde ettiğimiz vanadyum oksit tabakası p-Si tabaka üzerine kaplanmış daha sonra buharlaştırma yöntemi ile omik ve doğrultucu kontaklar oluşturulmuştur. Bu şekilde elde edilen MOS yapıların akım – gerilim, iletkenlik – gerilim ve kapasitans – gerilim ölçümleri prob istasyonu kullanılarak yapılmıştır. Elde edilen sonuçlardan  $1/C^2$  ve  $H(I)$  hesaplamaları yapılmıştır.  $H(I)$  fonksiyonu eşitlik 1 ile ifade edilir ve  $\phi_b$  engel potansiyelini hesaplamamıza imkân sağlar. Bu eşitlikte  $n$  idealite faktörü,  $I$  akım,  $R_s$  seri direnci göstermektedir.

$$H(I) = n\phi_b + IR_s \quad (1)$$



Şekil-1: MOS yapılarla ait a) C-V, b)  $1/C^2 - V$ , c)  $\ln(I) - V$ , d)  $H - I$  grafikleri.

Farklı frekanslarda yapılan ölçümler için elde edilen kapasitans – gerilim grafiği şekil-1a'daki gibidir.  $1/C^2 - V$  grafiğinin geçiş bölgesinin eğiminden alıcı yoğunlukları  $N_a$  değeri  $1,91 \cdot 10^{14} \text{ cm}^{-3}$  olarak elde edilmiştir. Selçuk çalışmasında benzer şekilde alıcı yoğunluklarını  $\text{SiO}_2$  oksit tabakalı MOS yapı için ortalama  $6,24 \cdot 10^{13}$  olarak elde etmiştir [10]. Saloma çalışmasında ise  $1,26 \cdot 10^{14}$  olarak  $N_a$  değerini bulmuştur [11]. Görüldüğü üzere  $\text{SiO}_2$  oksit tabaka kullanılarak elde edilen sonuçlar arasında büyük farklılıklar olabilmektedir ve çalışmamızda vanadyum oksit kullanarak elde ettiğimiz MOS yapılara yakın değerler elde edilebilmektedir. Bu durum oksit tabakanın yarı iletken tabakaya göre oldukça ince bir yapıda elde edilmesi ile ilişkilendirilebilir. Eşitlik 2 kullanılarak Fermi enerjisi 0,28 eV olarak bulunmuştur.  $1/C^2 - V$  grafiğinin eğimi ve eşitlik 3 kullanılarak kesme gerilimi ( $V_o$ ) ve difüzyon potansiyeli ( $V_d$ ) değerleri sırasıyla 0,96 ve 0,99 Volt bulunmuştur. Bu eşitliklerde  $k$  Boltzmann sabitini,  $T$  mutlak sıcaklığı,  $q$  elementer yükü,  $N_v$  p-Si için valans bandındaki durumların yoğunluğunu göstermektedir. Saloma çalışmasında bu değerleri sırasıyla 0,58 ve 0,33 olarak elde etmiştir [11]. Aradaki farklılık oksit tabakanın türünün farklı olmasından kaynaklandığını düşünülmektedir.

$$E_f = \frac{kT}{q} \ln \left( \frac{N_v}{N_A} \right) \quad (2)$$

$$V_d = V_o + \frac{kT}{q} \quad (3)$$

Eşitlik 4 ve eşitlik 5 kullanılarak maksimum elektrik alan ( $E_m$ ) ve Schottky engel alçalması ( $\phi_b$ ) değerleri sırasıyla  $7,63 \cdot 10^3 \text{ V/cm}$  ve  $9,65 \cdot 10^{-3} \text{ eV}$  olarak hesaplanmıştır. Bu eşitliklerde  $\epsilon_s$ ,  $\epsilon_o$  sırasıyla p-Si ve boşluk için dielektrik sabitini göstermektedir. Bu değerler engel yüksekliği hesaplamasında kullanılmıştır.

$$E_m = E(x=0) = \sqrt{\frac{2qN_A V_d}{\epsilon_s \epsilon_o}} \quad (4)$$

$$\Delta \phi_b = \left[ \frac{q E_m}{4\pi \epsilon_s \epsilon_o} \right]^{1/2} \quad (5)$$

Engel yüksekliği ( $\phi_b$ ) değeri eşitlik 6 kullanılarak  $C - V$  değerlerinden 1,27 eV olarak bulunmuştur. Selçuk çalışmasında bu değeri  $\text{SiO}_2$  oksit tabakası için 0,63 ile 1,09 arasında değişen değerlerde bulmuştur [10]. Engel yüksekliğindeki bu farklılık vanadyum oksit filmlerin daha yüksek kesme potansiyeline sahip olması sonucu ile örtüşmektedir.

$$\phi_{b(C-V)} = V_d + E_f - \Delta \phi_b \quad (6)$$



Tüketim tabakası genişliği değeri eşitlik 7 kullanılarak  $2,61.10^{-4}$  cm olarak bulunmuştur. Saloma çalışmasında bu değeri  $1,92.10^{-4}$  olarak bulmuştur [11]. Tüketim tabakasının geniş olması film kalınlığının geniş olması ile ilişkilendirilebileceği gibi difüzyon potansiyelinin daha büyük olmasından da kaynaklandığı düşünülmektedir.

$$W_D = \left( \frac{2 \epsilon_s \epsilon_o V_d}{q N_A} \right)^{1/2} \quad (7)$$

Elde edilen MOS yapıların sıfır beslem kapasitans değeri  $C_o$  ve maksimum kapasitans değeri  $C_{ox}$  sırasıyla  $1,40.10^{-10}$  ve  $4,02.10^{-10}$  Farad bulunmuştur.  $C_{ox}$  maksimum kapasitans değeri filmdeki oksit tabakaya ait olduğu kabul edilir. Eşitlik 8 kullanılarak bu değerlerden oksit tabakanın dielektrik katsayısı  $\epsilon'$  2,86 F/cm olarak bulunmuştur. Bu parametreler maksimum değerinde elde edildiği 10 kHz frekansındaki ölçümlerden elde edilmiştir. Kapasitans eşitliği kullanılarak oksit film tabakasının genişliği ölçülen minimum kapasitans değeri kullanılarak 0,76  $\Omega$  olarak bulunmuştur. Tataroğlu çalışmasında  $SiO_2$  kullanarak elde ettiği benzer yapılar için  $C_{ox}$  değerini frekansa göre 2,66 ile 3 pF arasında değişen değerlerde elde etmiştir [12]. Tataroğlu çalışmasında  $SiO_2$  için dielektrik sabiti değerini 1,69 olarak bulmuştur [13].

$$\epsilon' = \frac{C_{ox}}{C_o} \quad (8)$$

I – V ölçümleri sonuçlarından faydalanılarak logaritmik ölçekteki  $\ln(I)$ -V grafiği şekil-1c'deki gibi elde edilmiştir. MOS yapıya ait  $I_o$  doyma akımı değeri eşitlik 9 ve I – V grafiğinin ön pozitif beslem bölgesinin eğimi kullanılarak  $2,34.10^{-7}$  amper olarak bulunmuştur.

$$\ln I = \ln I_o + \frac{qV}{nkT} \quad (9)$$

MOS yapısına ait sıfır beslem potansiyel engel yüksekliği eşitlik 10 kullanılarak 0,65 eV olarak bulunmuştur. Bu eşitlikte A ve  $A^*$  sırasıyla diyot alanı ve Richardson sabitini göstermektedir.

$$\phi_{bo} = \frac{kT}{q} \ln \left( \frac{A \cdot A^* T^2}{I_o} \right) \quad (10)$$

Bir diyot için ideallikten sapma miktarını gösteren parametre idealite faktörü olarak isimlendirilir [14]. Bu değer eşitlik 9'dan faydalanılarak  $\ln I - V$  grafiğinin eğiminden elde edilir. Elde ettiğimiz MOS yapısına ait idealite faktörü 2,12 olarak bulunmuştur. H(I) fonksiyonunun düşey eksenini kestiği nokta ve  $\phi_{b(CV)}$  değeri kullanılarak idealite faktörü 2,31 olarak bulunmuştur. Farklı oksit tabakalar kullanılarak yapılan literatürdeki çalışmalarda idealite faktörü genellikle 1,5 – 2,5 aralığında bulunurken kimi çalışmalarda değer 4,61'e

kadar yükselmektedir [15]. Elde ettiğimiz idealite faktörü literatürdeki sonuçlar ile uyum içindedir.

Bir metal-oksit kontak için seri direnç değeri kullanılan yarıiletken materyal ve omik kontak ile ilişkilidir [16]. Eşitlik 11'e göre elde edilen grafiğin eğiminden  $R_s$  değeri bulunabilir [17].

Benzer şekilde I – V grafiğinin pozitif bölgedeki eğiminden de  $R_s$  değerini doğrudan elde etmek mümkündür. I – V grafiğinden  $R_s$  değeri 2994,01  $\Omega$  olarak bulunurken  $dV/d(\ln I)$  grafiğinden 2459,81  $\Phi$  olarak bulunmuştur. Saloma, bu değeri elde ettiği  $\text{SiO}_2$  oksit tabakalı MOS yapıları için 1270 ile 3630  $\Phi$  arasından değişen değerlerde elde etmiştir [11]. Elde ettiğimiz değer ideal seri direnç değerlerine göre büyük olmakla birlikte yüksek direnç istenen uygulamalar için uygun olacağı düşünülmektedir.

$$\frac{dV}{d(\ln I)} = I R_s + n \left( \frac{kT}{q} \right) \quad (11)$$

MOS yapılara ait engel yüksekliği Cheung metoduna göre H(I) grafiği ve eşitlik 1 kullanılarak 1,66 eV olarak bulunmuştur.  $\text{SiO}_2$  için yapılan çalışmalarda engel yüksekliği 0,68 ile 0,97 eV arasında değişen değerler bulunmuştur [13, 10].

Seri direnç değerlerinin frekansa bağlı değişimi eşitlik 12 ile hesaplanabilir. Bu eşitlikte  $G_{ma}$ , güçlü birikim bölgesindeki iletkenliği;  $\omega$ , ac sinyalin açısal frekansını;  $C_{ma}$  ise aynı bölgedeki kapasitansı göstermektedir. [18]. Hesaplanan değerler sonucu elde edilen  $R_s$  değerlerinin frekansa bağlı grafiği şekil 2-b'deki gibidir. Grafikte de görüldüğü gibi seri direnç değerleri artan frekansla hızla azalmaktadır.

MOS yapılara ait ara yüz durumları eşitlik 13 ile ifade edilen Card ve Rhoderic metoduyla hesaplanıp eşitlik 14'e ile hesaplanan ara yüz durumlarının enerjisi  $E_{ss}$  ile yarıiletken yüzeyinin en üst valans bant enerjisi  $E_v$  ile farkına karşın grafiği şekil 2-a'daki gibi elde edilmiştir [19]. Grafik incelendiğinde durum yoğunluğunun, enerji farkı ile azaldığı görülmektedir. Tataroğlu çalışmasında benzer bir sonuçla karşılaşmıştır [13].

$$R_s = \frac{G_{ma}}{G_{ma}^2 + (\omega C_{ma})^2} \quad (12)$$

$$N_{ss}(V) = \frac{1}{q} \left[ \frac{\epsilon_i}{\delta} (n(V) - 1) - \frac{\epsilon_s}{W_D} \right] \quad (13)$$

Burada  $\mathcal{M}_i$  ve  $\mathcal{M}_s$  sırasıyla yalıtkan ve iletkenin dielektrik sabitini,  $\underline{\Omega}$  ara yüz yalıtkan tabakanın kalınlığını ve  $W_D$  uzay yük bölgesinin genişliğini ifade etmektedir.

$$E_{SS} - E_v = q(\Phi_b - V) \quad (14)$$



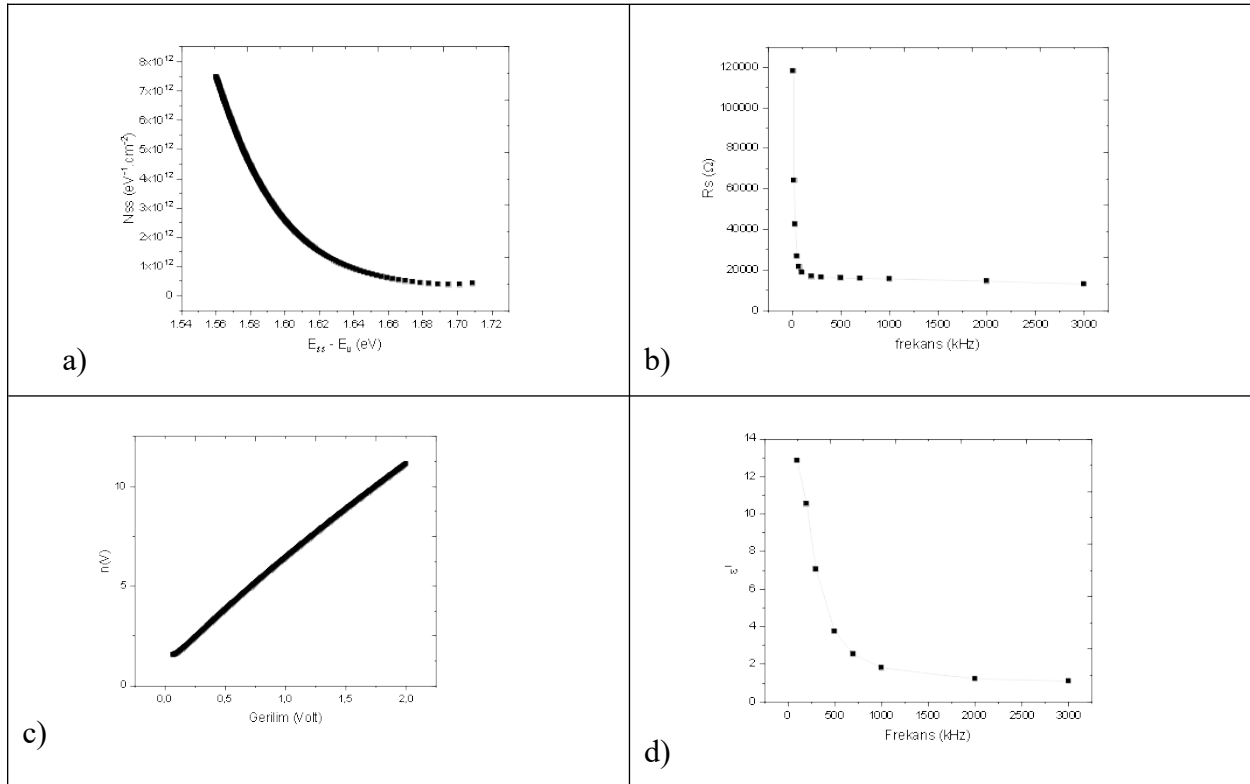
Bu eşitlikte Ess yarıiletkenine ait ara yüz durum enerjisini, E<sub>v</sub> ise valans bandın en yüksek enerjisini ifade etmektedir.

MOS yapılara ait dielektrik sabitleri farklı frekanslar için eşitlik 8 kullanılarak hesaplanmış ve şekil 2-d'deki grafik oluşturulmuştur. Görüldüğü gibi dielektrik değerleri de artan frekans ile benzer bir düşüş göstermektedir. Tataroğlu çalışmasında benzer bir sonuçla karşılaşmıştır [12]. Yazar çalışmasında bu durumu bir dielektrik malzemenin beklenen davranışı olduğunu

belirtmiş ve düşük frekanslarda tüm polarizasyon türlerinin katkı sağladığını, yüksek frekanslarda ise sadece elektronik polarizasyon etkisinin kalmasına bağlamıştır. Ayrıca bu durumun yüksek frekanslarda ara yüzey dipollerinin dış alternatif alanla uyum sağlamada karşılaşacağı zaman sınırı ile ilişkili olduğunu belirtmiştir.

İdealite faktörünün voltaja bağlı değişikliği eşitlik 11 kullanılarak elde edilen eşitlik 15 ile ifade edilebilir [5]. Bu eşitlik ile hesaplanan idealite değerlerinin gerilim ile değişim grafiği şekil 2c'de görülmektedir. Grafikte görüldüğü gibi idealite faktörü artan gerilim değerleri ile eşitlik 15'le uyumlu bir şekilde yükselmektedir.

$$n(V) = \frac{qV}{kt \ln(I/I_0)} \quad (15)$$



Şekil-2: MOS yapılara ait a) Durum yoğunluğu - enerji farkı, b) Seri direnç - frekans, c) İdealite faktörü - gerilim, d) Dielektrik sabiti - frekans grafikleri.



## SONUÇ

Bu çalışmada Al/VO<sub>x</sub>/p-Si/Al (MOS) yapılarının sol-jel yöntemi ile elde edilmesi ve elektriksel özelliklerinin hesaplanma yöntem ve işlemleri gösterilmiştir. Elektriksel özelliklerin belirlenmesi için elde edilen MOS yapılara ait birçok elektriksel parametre hesaplanmıştır. Bu parametrelerden bazıları diğer parametrelerin hesaplanması için gerekli iken bazı parametreler MOS aygıtlar geliştirirken aygıt özelliklerini belirlemede kullanılırlar. Sonuçlara bakıldığından

alıcı yoğunlukları ve tüketim tabaka genişliği değerlerinin literatürde Al/SiO<sub>2</sub>/p-Si üzerine yapılan çalışmalardakine yakın çıktığı görülmektedir. Bu durum bazı parametrelerde yöntem ve oksit tabaka malzemesinin çok büyük etkisinin olmadığını kullanılan metal ve yarıiletken tabaka aynı olduğunda sonuçların yakın çıkacağını gösterir. Difüzyon potansiyeli, engel yüksekliği, sıfır beslem kapasitans değeri ve maksimum kapasitans değeri, dielektrik sabiti, engel yüksekliği parametreleri ise SiO<sub>2</sub> üzerine yapılan çalışmalarda farklı çıkmıştır. Bu parametrelerin kullanılan oksit malzemenin türünden etkilendikleri açıkça görülmektedir.

Elde ettiğimiz MOS yapısına ait kapasitans - voltaj (C – V), Ters kare kapasitans - voltaj (1/C<sup>2</sup> – V), akımın doğal logaritması - voltaj (ln(I) – V), H fonksiyonu - akım (H – I), Durum yoğunluğu - enerji farkı, Seri direnç - frekans, İdealite faktörü - gerilim, Dielektrik sabiti - frekans grafikleri oluşturulmuştur. Grafiklerden elektriksel parametreleri tespit etmede faydalanılmıştır. Grafikler incelendiğinde kapasitansın ve akımın üç bölgeye ayrılacağı görülür. Grafiklerden durum yoğunluğunun enerji farkı ile azaldığı görülür. Seri direnç ve dielektrik sabiti değerlerinin ise artan frekansla hızlı düşüş gösterdikleri anlaşılmaktadır. VO<sub>x</sub> kullanarak elde ettiğimiz MOS yapıların idealite faktörü SiO<sub>2</sub> için yapılan bazı çalışmalarda benzer çıkarken bazı çalışmalarda farklı çıkmıştır. Bu durum idealitenin kullanılan malzemenin çok filmin elde edilme yöntemi ile daha çok ilişkili olduğunu göstermektedir. Aynı durum seri direnç değerleri için de geçerlidir.

Çalışmamızda idealite faktörü, potansiyel engel yüksekliği ve seri direnç değerleri farklı metotlar kullanılarak hesaplanmıştır. Seri direnç değeri I – V ve dv/d(lnI) grafiklerinden iki farklı yöntemle elde edilmiştir. Sonuçlar arasında yaklaşık 500 Ω bir fark görülmektedir. Oran olarak %25'lik bu fark kimi uygulamalarda önemli değişikliklere neden olabilecektir. Ancak yüksek empedanslı bazı uygulamalar için bu değer farkının çok büyük etkisi olmayacaktır ve kolaylıkla tolere edilebilir. İdealite faktörü ise I – V grafiğinden 2,12 olarak bulunurken, H – I

grafiği ve C – V ölçümleri kullanılarak 2,31 olarak bulunmuştur. Sonuçlar arasında çok büyük bir farkın olmadığı söylenebilir. Potansiyel engel yüksekliği değeri ise C – V ölçümlerinden 1,27 olarak hesaplanırken, I – V ölçümlerinden 1,37 olarak bulunmuştur. Bu değerler arasında da çok büyük bir fark olmadığı söylenebilir. Uygulamada hangi değerlerin gerçeğe daha yakın olduğunu tecrübe ile değerlendirmek gerekir.

Sonuç olarak VO<sub>x</sub>/p-Si/Al MOS yapıların kimi özelliklerinin Al/SiO<sub>2</sub>/p-Si MOS yapılarınkine benzerken bazı özelliklerinin farklı olduğu görülmektedir. Bu sonuç elde ettiğimiz MOS yapıların aygıt uygulamalarında potansiyel bir aday olduğu ve bu konuda çalışmaların önünün açık olduğu gösterir.

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## VOX TABANLI İNCE FİLMLERİN YAPISAL, YÜZEYSEL VE OPTİKSEL ÖZELLİKLERİNİN İNCELENMESİ

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### ÖZET

Metal oksitler gösterdikleri karakteristik özelliklerden dolayı en temel metal oksit dirençlerden, en karmaşık mikroşlemcilere kadar birçok farklı elektronik aygıt uygulamalarında geniş kullanım alanına sahip yapılarıdır. Çalışmamızda farklı fazlarda elde edilen VOx ince filmler wet chemical yöntemiyle soda-lime camı ve silikon wafer üzerine kaplanmış; XRD ve EDX ile yapısal, SEM ve AFM ile yüzeysel ve UV-VIS ölçümleri ile de optik özellikleri araştırılmıştır. Film eldesinde kullanılan çözücü ve tavlama sıcaklığı değiştirilerek film özelliklerindeki değişimler incelenmiştir. Elde edilen sonuçlar literatür ile karşılaştırılarak raporlanmıştır. Filmlere ait absorpsiyon katsayısı ölçümleri kullanılarak  $(\alpha h\nu)^2 - h\nu$  grafiği elde edilmiş ve grafikten optik bant genişliği tespit edilmiştir. Yapılan XRD analizleri ile filmlerin kristal yapıları tespit edilmiş ve değişen parametrelerin etkileri belirlenmiştir. SEM ve AFM ile filmlere ait yüzey özellikleri ve pürüzlülük değerleri belirlenmiştir. Elde edilen oksit filmlerin XRD analizlerinden kristal yapısını çözümlendiğinden çok altlık değişiminin etkilediği görülmektedir. Öte yandan tavlama sıcaklığının yapı üzerinde önemli etkileri görülmüştür. Filmlerin UV-VIS absorpsiyon grafikleri incelendiğinde morötesi ani absorpsiyon artışlarının 350 nm dalga boyu civarında olduğu gözlemlenmektedir. Optik geçirgenliğin ise 800 nm dalga boyuna ulaşıldığında %85 civarında sabit kaldığı görülmüştür. Filmlerin bant genişlikleri değişen ortam koşullarına göre 1.89 ile 1.98 eV arasında bulunmuştur. Filmlerin hepsi mor ötesi ve görünür bölgede opaklık gösterirken kızıl ötesi bölgede saydam davranmıştır. Filmlere ait bant genişliğinin tavlama sıcaklığındaki artış ile yükseldiğini görülmektedir. Çalışmada literatürde pek rastlanmayan özellikle  $V_8O_{15}$  yapısına ait fiziksel parametreler elde edilmiştir. Vanadyum oksitlerin birçok fazda elde edilebilmesi bu oksitlerde geniş araştırma imkânları vadetmektedir.

**Anahtar kelimeler:** Vanadyum oksitler, optik özellikler, yapısal ve yüzey özellikler.

**INVESTIGATION OF STRUCTURAL, SURFACE AND OPTICAL PROPERTIES OF VOX-BASED THIN FILMS****ABSTRACT**

Due to their characteristic properties, metal oxides are structures that have a wide range of use in many different electronic device applications, from the most basic metal oxide resistors to the most complex microprocessors. In our study, VOx thin films obtained in different phases were coated on soda-lime glass and silicon wafer by wet chemical method; Its structural properties were investigated with XRD and EDX, surface measurements with SEM and AFM, and optical properties with UV-VIS measurements. The changes in the film properties were investigated by changing the solvent and annealing temperature used in the film production. The results obtained were compared with the literature and reported. By using the absorption coefficient measurements of the films, the  $(\alpha h\nu - h\nu_0)^2$  graph was obtained and the optical bandwidth was determined from the graph. The crystal structures and the effect of parameters on crystal structures were determined from XRD analysis. The surface properties and roughness values of the films were determined by SEM and AFM. From the XRD analyzes of the oxide films obtained, it can be seen that the substrate rather than the solution essentially affects the crystal structure. On the other hand, significant effects of annealing temperature on the structure were observed. Examining the UV-VIS absorption graphs of the films, it is observed that in the ultraviolet region around 350 nm wavelength a sudden increase in absorption occurred. It was observed that the optical transmittance remained stable at around 85% when the wavelength of 800 nm was reached. Bandwidths of the films were found to be between 1.89 and 1.98 eV, depending on the different coating conditions. All of the films were opaque in the ultraviolet and visible regions, while they were transparent in the infrared region. It is seen that the bandwidth of the films increases with the increase in annealing temperature. In the study, physical parameters of the  $V_8O_{15}$  structure, which are not frequently encountered in the literature, were obtained. The fact that vanadium oxides have many different phases promises strong research capability for these oxides.

**Keywords:** Vanadium oxide, optical properties, structural and surface properties



## GİRİŞ

Vanadyum oksit filmler özellikle birçok fazda elde edilebilmesi ve kritik sıcaklıklarda yarıiletken veya yalıtkan fazdan metal fazına geçebilmesinden dolayı uzun zamandır ilgi konusu olmuşlardır [1]. Vanadyum farklı oksidasyon durumlarına sahip d geçiş metalidir. Vanadyum  $V_nO_{2n-1}$  ve  $V_{2n}O_{5n-2}$  oksidasyon durumları gösterebilmektedir.  $V_2O_3$  monoklinik yapı gösterirken,  $V_2O_5$  ortorombik yapı göstermektedir. Vanadyum oksitler kromojenik materyallerdir ve bu sebeple optik özellikleri dış etkilerle değişebilmektedir [2]. Vanadyum oksitler benzersiz optik özelliklerinden dolayı birçok optik uygulamaya adaydırlar. Anahtarlama, modülasyon, optik sınırlandırıcı ve optik rezonatörler için ayarlama bunlardan bazılarıdır [3]. Vanadyum oksitler yüksek termal dirençlerinden dolayı bolometre ve mikro bolometre cihazlarında algılayıcı materyal olarak kullanılmaktadırlar. Vanadyum oksitlerin diğer kullanım alanları ise etanol sensörü, redoks akış bataryası, lityum iyon bataryalarda katot materyali olarak sıralanabilir [4].

İnce filmlere ait optik özellikler genellikle yansıtma, geçirgenlik ve absorpsiyon ölçümlerine dayanır. Bütün bu ölçümler gönderilen ışığın dalga boyundan etkilenir. Absorpsiyon yansımaya ve aynı zamanda geçmeyen ışınları ifade etmektedir. Optik sabitler olan kırılma ve sönmüleme katsayısının yanı sıra film kalınlığı da optik ölçüleri etkileyen önemli bir etmendir [5]. Vanadyum oksit filmler için foton enerjisi, absorpsiyon ve bant genişliği arasında eşitlik-1 yazılabilir.

$$\alpha h\nu = A(h\nu - E_g)^n \quad (1)$$

Doğrudan optik bant genişliği için bu ifadeden yola çıkılarak  $(\alpha h\nu)^2 - h\nu$  grafiği çizilir ve grafiğin  $h\nu$  eksenini kestiği noktadan optik bant genişliği elde edilebilir bu modele Tauc ve Davis–Mott modeli denir [6, 7].

X-ışını kırınımı (XRD) ince film karakterizasyonunda vazgeçilmez bir yöntemdir. XRD ile bir yapıya ait kristal fazı, örgü parametreleri, kristallik derecesi, kristal tanelerinin tercih ettiği yönelim, tanecik boyutu, film kompozisyonu, film kalınlığı gibi birçok parametre elde edilebilir [8].

Taramalı elektron mikroskopu (SEM) ince filmlerin topografyası, yapısal özellikleri, kompozisyonu ve ışık emisyonu gibi birçok özelliği hakkında bilgi sağlayan yararlı bir araçtır. SEM genellikle 100 eV ile 30 000 eV aralığındaki enerjiye sahip elektronların materyal yüzeyinde gezdirilmesi ile oluşan ikincil elektronların şiddeti ile topografya bilgisi elde etmede

kullanılır. SEM teknikleri arasında kristal yapı, yanlış kristal yönelimleri, tane sınırları, gerinim ve yapısal kusurlar gibi farklı bilgiler sağlayan EBSD ve ECCI gibi yöntemler de bulunur [9].

Bu çalışmada wet chemical yöntemiyle farklı parametreler kullanılarak soda-lime camı ve silikon wafer üzerine kaplanmış filmlerin XRD, SEM, EDX , AFM ve UV-VIS ile fiziksel özellikleri incelenmiş ve sonuçlar teknolojide geniş kullanım alanına sahip SiO<sub>2</sub> filmlere ait literatürdeki sonuçlar ile karşılaştırılmıştır.

### ARAŞTIRMA VE BULGULAR

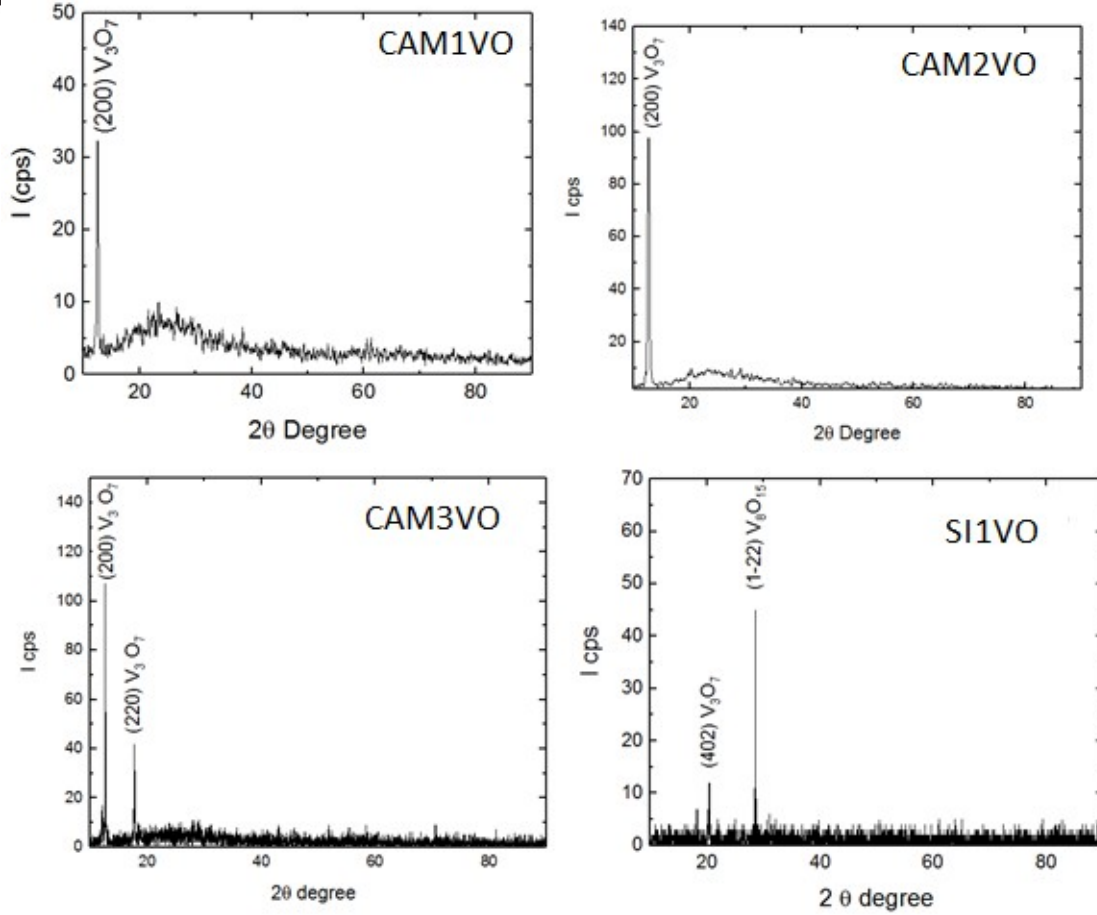
Bu çalışmada ince filmleri elde etmek için vanadyum pentoksit tozu nitrik asit/hidroklorik asit içerisinde çözünerek kaplama çözeltisi elde edilmiştir. Silisyum tabakalar ve soda-lime camı altlıklar bu çözeltiler içerisinde daldırılarak yüzeylerinin kaplanması sağlanmıştır. Kristalleşmeyi sağlamak için her defasında filmler 400 derece de 5 dakikalık sürelerle ara tavlama işlemine tabi tutulmuştur. Bu şekilde filmler 10 kat kaplandıktan sonra yine 400 ile 500 derece arasındaki fırında bir saat son tavlama işlemi uygulanmıştır. Daha sonra filmlere ait ölçümler icra edilmiştir. Farklı parametrelerle elde edilen filmler CAM1VO, CAM2VO, CAM3VO ve SI1VO olarak isimlendirilmiştir. Diğerlerinden farklı olarak CAM3VO 500 derecede tavlansmıştır. CAM1VO dışındaki tüm filmlerde ise çözücü olarak nitrik asit kullanılmıştır. SI1VO filmi ise silisyum altlık üzerine kaplanmıştır.

Cam üzerine kaplanan CAM1VO, CAM2VO, CAM3VO isimli filmlere ait XRD sonuçları şekil 1'deki gibidir. Sonuçlar incelendiğinde 2θ açısının 12.571 ile 12.754 arasında değiştiği görülmektedir. Bu durum referanslar incelendiğinde muhtemel V<sub>3</sub>O<sub>7</sub> kristal yapısının (200) hkl düzlemine işaret etmektedir. CAM3VO filmlerinde ayrıca 17.806 2θ açısıyla aynı kristal yapının (220) düzlemine karşılık gelen yapı görülmüştür. Bu farklılığın nedeni olarak CAM3VO filminin diğerlerinden farklı olarak 500 derecede son ısıl işleme tabi tutulmuş olmasının etkili olduğu düşünülmektedir. Burada CAM1VO isimli film dışındaki tüm filmlerde çözücü olarak hidroklorik asit kullanılmıştır. Sonuçlara bakıldığında bu durumun yapısal özelliklerde çok belirgin bir etki yapmadığı görülmektedir.

Filmlere ait tanecik boyutu XRD verilerinden elde edilmiştir. Elde edilen tanecik boyutu ortalama 3.94 nm olmakla birlikte 500 derece son ısıl işleme tabi tutulmuş CAM3VO isimli

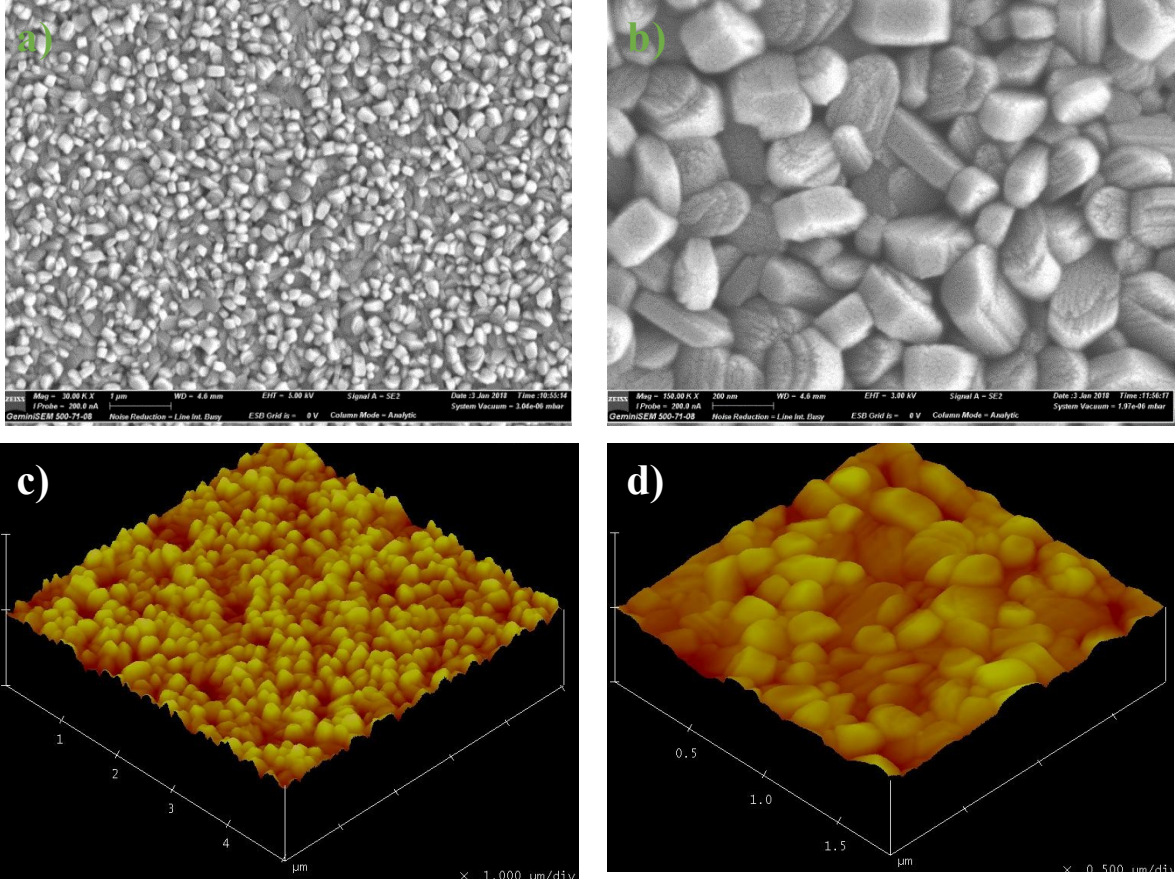
filmde bu boyut ani bir yükselme gösterip 20.88 nm'e yükselmiştir. Bu sonuç son tavlama sıcaklığının tanecik boyutunu belirleme de etkili bir parametre olduğunu gösterir.

Çözücü madde olarak hidroklorik asidin kullanıldığı çözelti kullanılarak p-Si wafer üzerine film kaplanmış ve 500 derece son tavlama işlemi uygulanan yapı SIIVO olarak adlandırılmıştır. SIIVO'a ait sonuçlar incelendiğinde diğerlerinden farklı olarak 20.396 ve 28.678 açılarında pik verdiği görülmektedir. Bu açılar referanslardan  $V_3O_7$  kristal yapısının (402) düzlemi ile  $V_8O_{15}$  yapısının (1-22) düzlemine işaret etmektedir. Bu sonuç kullanılan altlığın kristal yapının oluşumunda son tavlama sıcaklığından daha önemli bir etken olduğunu göstermektedir. Yine tanecik boyutuna bakıldığında SIIVO için 280 nm olduğu görülmüştür ki bu sonuç diğerinden on katından fazladır. Bu sonuç da tanecik boyutunda kullanılan altlığın son tavlama sıcaklığına göre çok daha etkili olduğunu göstermektedir. Assim, çalışmasında  $SiO_2$  filmler için tavlama sıcaklığının etkilerini araştırmış ve benzer bir şekilde tanecik büyüklüğünün tavlama sıcaklığı ile arttığını gözlemlemiştir yazar bu büyümeyi ada birleşimleri ile açıklamıştır [10]. Yarima, çalışmasında ZnO/ $SiO_2$  Nano kompozitleri için tavlama sıcaklığının kristal boyutunu arttırdığını ancak morfolojik boyutu düşürdüğünü gözlemlemiştir [11].



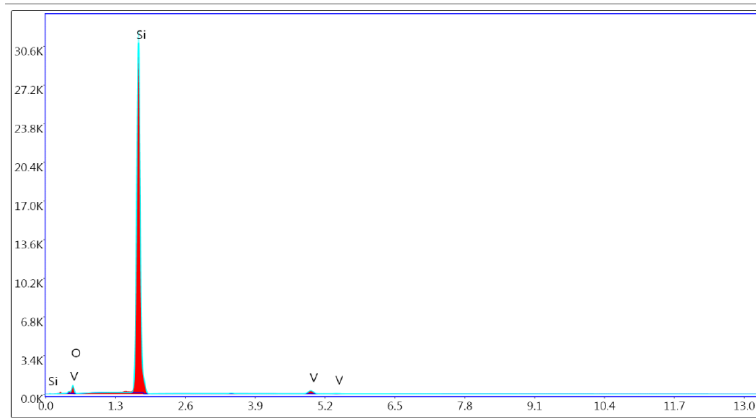
*Şekil 1 CAM1VO, CAM2VO, CAM3VO, SI1VO filmlerine ait XRD sonuçları.*

SI1VO isimli filme ait SEM, AFM incelemeleri yapılmış ve şekil 2'deki sonuçlar elde edilmiştir. SEM ve AFM görüntüleri incelendiğinde tanecikli yapının görece homojen bir dağılım gösterdiği ve incelenen bölgede yarıkların ve boşlukların bulunmadığı görülmektedir. AFM sonuçlarından SI1VO filmimize ait ortalama kök yüzey pürüzlülüğü değeri (RMS) 39.66 nm olarak bulunmuştur. XRD sonuçlarından elde edilen 280 nm tanecik boyutu ile kıyaslandığından yüzeyin %7 civarında bir pürüzlülüğe sahip olduğu söylenebilir. Assim, çalışmasında anodik oksidasyon yöntemi ile Si üzerine SiO<sub>2</sub> filmler büyütmüş ve 3.124 ile 5.482 nm arasında değişen RMS değerleri elde etmiştir [10]. Liu, çalışmasında SiO<sub>2</sub> filmler için 5.8 ile 8.8 nm arasında değişen RMS değerleri elde etmiştir [12]. Orel, çalışmasında sol-jel yöntemi ile cam üzerine vanadyum oksit filmler kaplamış ve 6 ile 11 nm arasında değişen RMS değerleri elde etmiştir. Bu çalışmalardaki sonuçlara bakıldığında elde ettiğimiz filmin görece pürüzlü olduğu görülmektedir. Bu sonuç pürüzlülük gerektiren uygulamalarda bir avantaj sağlarken pürüzsüzlük istenen uygulamalarda literatürdeki yöntemler kullanılarak pürüzlülüğün giderilmesi sağlanabilir [13].



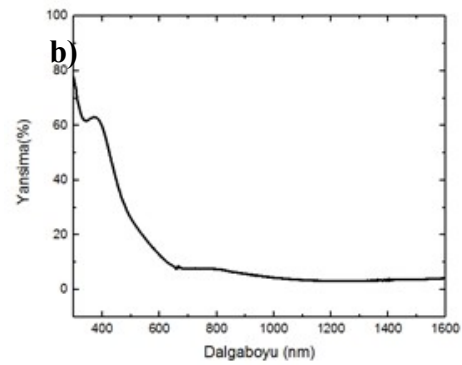
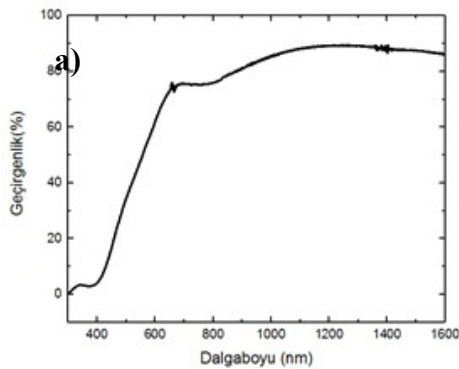
**Şekil 2** CAMIVO, CAM2VO, CAM3VO, SIİVO filmlerine ait a) 135x92  $\mu\text{m}$  SEM, b) 55x37  $\mu\text{m}$  SEM, c) 5x5  $\mu\text{m}$  AFM, d) 1,85x1,85  $\mu\text{m}$  AFM görüntüleri.

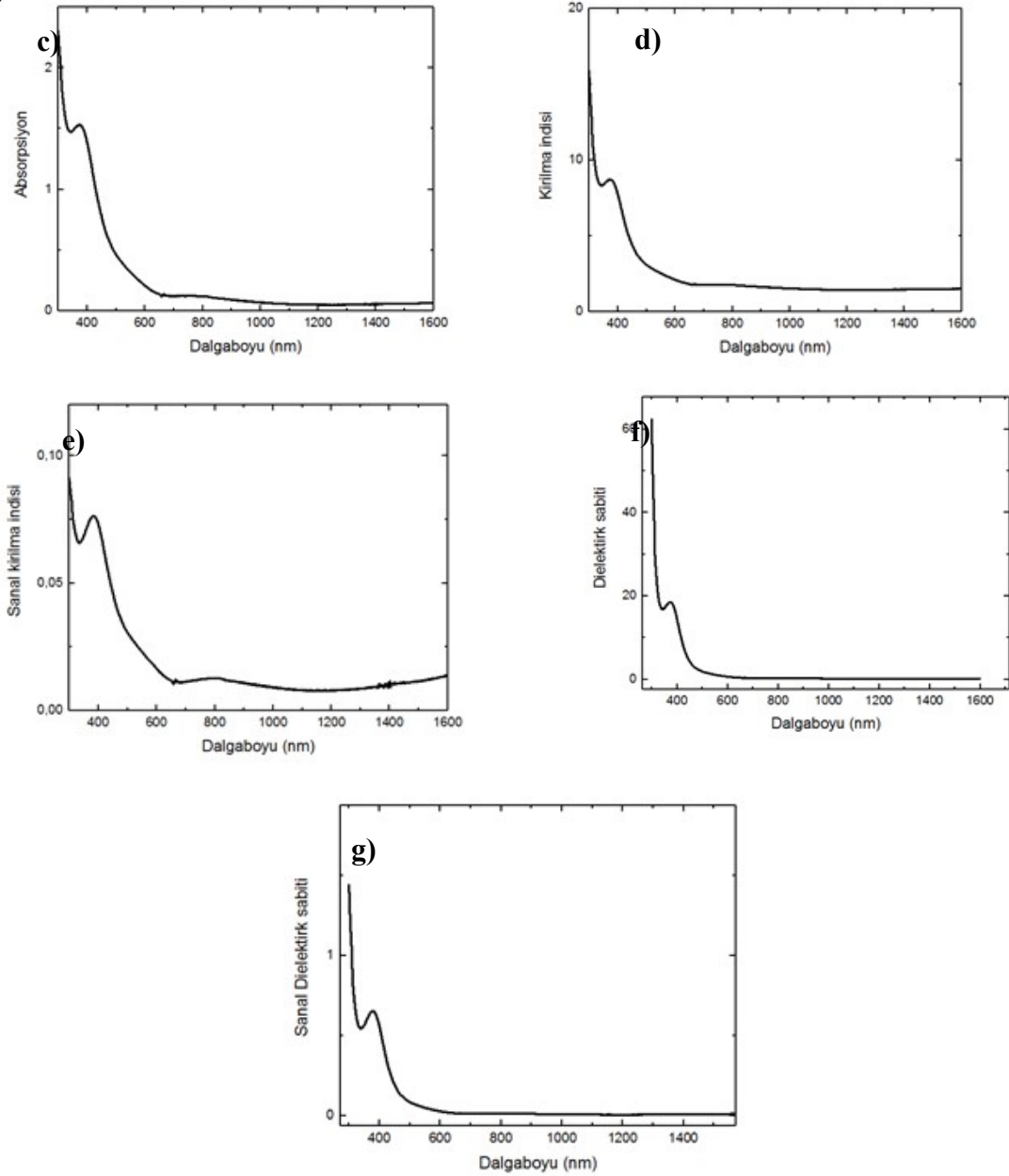
SIİVO filmimize ait EDX analizleri yapılmış ve sonuç şekil 3'deki gibi bulunmuştur. Sonuçlar elde ettiğimiz yapının tabandan kaynaklı olarak %90.55 silisyum, %5.67 oksijen, %3.78 vanadyum içerdiğini göstermektedir. Bu sonuç filmimizin istediğimiz bileşenlerden elde edildiğini göstermektedir.



**Şekil 3** VO4 nolu filme ait EDX histogramı.

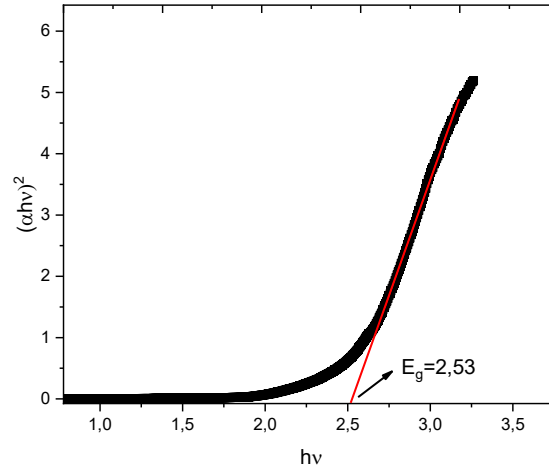
CAM3VO filmimize ait yakın kızıl ötesi – mor ötesi bölge optik ölçümler gerçekleştirilmiş olup sonuçlar şekil 4’te paylaşılmıştır. Sonuçlar incelendiğinde filmin 6000 Å dalga boyu altındaki görünür ve mor ötesi bölgede geçirgenliğin düşük olduğu görülmektedir. Bu durum filmlerde gözlenen kahverengiye kaçan renk ile de uyusmaktadır. 6000 Å üzerindeki görünür kırmızı ve yakın kızılötesi bölgeye denk gelen dalga boylarında ise filmlerin yüksek geçirgenlik gösterdiği görülmektedir. CAM3VO filmimize ait yansımaya ve absorpsiyon grafiklerinin geçirgenlik grafiği ile uyum içerisinde olduğu görülmektedir. Kırılma indisinin dalga boyuyla değişimine bakıldığında 3460 Å dalga boyunda birinci minimuma ulaştığı sonrasında küçük bir artış gösterip 3750 Å dalga boyundan sonra hızla düşüş gösterdiği görülmektedir. 6650 Å dalga boyu sonrasında ise neredeyse sabit kaldığı görülmektedir. Benzer davranışlar yansımaya, absorpsiyon ve dielektrik grafiklerinde de görülmektedir. Cam üzerine kaplanan diğer filmler için de benzer sonuçlar elde edilmiştir. Lamsal, çalışmasında  $Al_2O_3$  taban üzerine farklı fazlarda vanadyum oksit filmler için optik ölçümler yapmış bizdeki 3750 Å dalga boyundakine benzer dönüm noktaları elde etmiştir [2]. Tabata, çalışmasında iyon ışını sıçratma yöntemi ile  $SiO_2$  filmler oluşturmuş ve benzer bir şekilde 4000 Å yakınlarında yükselen bir absorpsiyon elde etmiştir [14]. Yazar bu durumu 3260 Å dalga boyuna denk gelen enerjide tetiklenecek oksijenler arasında peroksi bağlarının oluşması ile ilişkilendirmiştir.





**Şekil 12** CAMIVO filmine ait optik ölçümleri; a) Geçirgenlik-dalga boyu b) Yansımada dalga boyu c) Absorbsiyon- dalga boyu d) Kırılma indisi – dalga boyu e) Sanal kırılma indisi – dalga boyu f) Dielektrik sabiti dalga boyu g) Sanal Dielektrik sabiti dalga boyu

Vanadyum oksit ince filmler için optik bant genişliği soğurma verileri ve eşitlik 1 kullanılarak hesaplanmıştır.  $(\alpha h\nu)^2 - hv$  grafiği çizilip grafiğin  $h\nu$  eksenini kestiği noktadan  $E_g$  değeri bulunmuştur. Bu işlem sonucundan CAMIVO3 için  $E_g$  değeri şekil 5'te görüldüğü gibi 2.53 eV olarak bulunmuştur. Optik bant genişliği literatürdeki çalışmalarda  $VO_2$  için 0.6,  $V_2O_5$  için 2.3,  $V_3O_7$  için 2.2,  $V_2O_3$  için 0.66,  $ZnO$  için 3.26,  $ZrO_2$  için 3.26 ve  $SiO_2$  için 1.1 eV olarak bulunmuştur [6, 15, 16, 17, 18]. Bulduğumuz sonuç literatürdeki değerlerle karşılaştırıldığında  $V_3O_7$  ve  $V_2O_5$  için elde edilen sonuçlara yakın olduğu görülmektedir.



Şekil 13 CAMIVO filmine ait  $(\alpha hv)^2 - hv$  grafiği ve bulunan  $E_g$  değeri.

## SONUÇ

Bu çalışmada VOx tabanlı ince filmler ekonomik bir yöntem olan wet chemical yöntemiyle soda lime camı ve p-Si wafer üzerine farklı parametreler kullanılarak kaplanmıştır. Kullanılan çözeltilerde nitrik asit ve hidroklorik asit olmak üzere iki farklı çözücü madde kullanılmıştır. Tüm filmlere aynı parametrelerle ara ısıl işlem uygulanırken son tavlama sıcaklıkları 400 ve 500 olarak değiştirilmiştir. Filmlere ait XRD sonuçları incelendiğinde çözücü farkının belirgin bir etki yapmadığı, son tavlama sıcaklığının ise tanecik boyutunda ciddi değişikliğe yol açtığı görülmektedir. Taban olarak p-Si kullanıldığında ise hem kristal yapının değiştiği hem de tanecik boyutunun katlandığı görülmüştür. Filmlere ait SEM ve AFM sonuçları incelendiğinde tanecikli yapının düzgün yapıda olduğu görülür. AFM sonuçlarından elde edilen RMS yüzey pürüzlülük değeri ise 39.66 nm olarak bulunmuştur. p-Si üzerine kaplanmış filme ait EDX analizleri %90 üzerinde silisyum ve %4'e yakın vanadyum gösterirken %5.67 oranında oksijen

içeriği vermiştir. Cam üzerine kaplanan VOx filmimize ait yakın kızıl ötesi - mor ötesi bölgede optik ölçümler yapılmış ve birçok parametrenin dalga boyu ile değişimi incelenmiştir. Elde edilen sonuçlar literatürdeki benzer çalışmalar ile karşılaştırılmıştır. Optik ölçümler kullanılarak  $(\alpha hv)^2 - hv$  grafiği çizilmiş ve Tauc / Davis–Mott modeli kullanılarak optik bant genişliği bulunmuştur. Bulunan sonuçlar literatürdeki sonuçlar ile karşılaştırılmıştır. Sonuç olarak elde ettiğimiz filmlerin sahip olduğu özelliklerin birçok



yarıiletken aygıt için uygun olduğu ve bu konuda yapılacak çalışmaların önünün açık olduğu anlaşılmaktadır.

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**REFİK HALİT KARAY’IN “MEMLEKET  
HİKÂYELERİ” ADLI ESERİNDE MİLLÎ UNSURLAR**

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**ÖZET**

Refik Halit Karay, yerli meseleleri ve Anadolu insanının yaşam tarzını hikâyeleştiren bir yazardır. Eserlerinde toplumsal yapı, sosyal çözülme ile millî unsurlar kendini gösterirken, eski devir ile yeni devir karşılaştırmalarına rastlarız. Türk toplumunun geçirdiği değişim temasını işlediği eserlerinde batılılaşmanın etkisini eleştirir ve değerlerin kaybolduğundan yakınlıkla millî unsurlara dönmeyi ister. Karay eserlerinde Anadolu insanının özelliklerini ve toplumsal yaşamı tasvir ettiği gibi Anadolu’nun mekânsal güzelliğinden sık sık bahsetmektedir. Toplumsal hareketlilik bağlamında ise; Karay’ın hikâyelerinde kahramanlar realist ve hayatın içinden çıkmıştır. Realist bir yazar olarak aynı zamanda edebiyat anlayışında öze dönük olmayı, milli olmayı kendi değerlerini yaşatmayı ve korumayı ön plana alan bir tavırla hareket etmiştir. O her zaman gelenekten kopmaktan kaçınan bir yazar olmuştur ve millî olmayı her bağlamda dile getirmiştir. Yenilik ve değişimi batılılaşma yönünde kabul etmesi ile birlikte, aynı zamanda geleneğe ve öze bağlı bir zihniyet içinde dönemin eleştirisini yapar. Millî unsurlara, geleneğe ve eskiye karşı her zaman sadakat hissedilen bir yazar olmuştur. Öncelikle *Memleket Hikâyeleri* kitabında yer alan metinler odak noktası alınarak Karay’ın eserlerine yansıyan toplumsal sorunlar çözümlenmeye çalışılmıştır. Dolayısıyla çalışmada Karay’ın eserlerinde hissedilen tecrübelerinin ve gözlemlerinin yaşadığı dönemle ilişkisi değerlendirilerek, Karay’ın eserlerine yansıyan toplum ve onun topluma bakış açısı ve bunun millî unsurlara bağlı kalarak nasıl hikâyeleştirdiği üzerinde durulmuştur.

**AnahtarKelimeler:** Refik Halit Karay, Memleket Hikâyeleri, Milli Unsurlar, Anadolu.

**THE NATIONAL FACTORS REFİK HALİT KARAY’S IN THE “MEMLEKET  
HİKÂYELERİ” TITLE WORK.**

**ABSTRACT**

Refik Halit Karay is a writer who narrates the local issues and the lifestyle of the Anatolian people. In his Works, while society structure, social disintegration and national factors show themselves, comparisons of old and new periods are encountered. He criticizes the effect of the westernization in his works, in which he deals with the theme of the change that Turkish society has undergone, and would like to return to national factors, complaining that values are lost. Karay often talks about the spatial beauty of Anatolia, as well as describing the characteristics of the Anatolian people and social life in his works. In the context of social mobility; The heroes in Karay’s stories are realistic and come out life. As a realist writer, also acted with an attitude that prioritizes being self-centered in his understanding of literature, being national, keeping his own values alive and protecting them. He has always been a writer who avoids breaking with tradition and has expressed being national in every context. Along with accepting innovation and change in the direction of westernization, he also criticizes the period in a mentality that is based on tradition and essence. He has always been a writer who feels loyalty to national factors, tradition and the past. First of all, the texts in the *Memleket Hikâyeleri* book were focused on and the social problems reflected in Karay’s Works were tried to be resolved. Therefore, in the study, the relationship between Karay’s experiences and observations felt in his works and the period in which he lived, the society reflected in Karay’s Works and his perspective on society and how he narrated it by adhering to national factors were emphasized.

**Keywords:** Refik Halit Karay, Hometown Stories, National Factors, Anatolia,

## GİRİŞ

Tarihsel bir varlık olan insanın yaşamı ancak ortak bir dille ifade edilebilir. Dil, duygu ve düşüncelerin taşıyıcısıdır. Dünya üzerinde birçok dil mevcuttur. Milletleri birbirinden ayıran özelliklerin başında dil gelmektedir. Bundan dolayı dil milli varlığın ve benliğinin ayrılmaz bir parçasıdır. Milli dil, ait olduğu milletin hayatını, özlemine, sevincini dile getirir, bu dile getirilişinin en güzel aracı edebiyattır.

"Bizde millî romantik duyuş tarzı millî mücadele ile başlamıştır. Millî hafıza, bu dönemde büyük bir uyanışla harekete geçmiş ve milletin yaşam tarzında, davranışlarında ve eserlerinde kendini göstermiştir. Bu dönemde Türkler üzerinde kurulmaya çalışılan hâkimiyet karşısında bağımsızlığını kaybetme korkusuyla köşeye sıkışan millet, kurtuluşu milli şuurda bulmuştur. “ (TURAL S. , 2000). Bu şuur kazanma durumu, mücadelenin seyrini değiştirir.

Millî mücadele döneminde sanatkarlar eserlerinde halka yönelerek, halkın anlayabileceği bir dille yazarak halkın millî ruhu uyandırmayı amaçlamışlardır. Bu sanatkarların başında Ziya Gökalp, Yahya Kemâl Beyatlı ve Mehmet Akif Ersoy gelmektedir. Gökalp eserlerinde uzak geçmişini anlatarak, bugüne aktarmayı düşünmüştür. Yahya Kemâl, kazanılan zaferlere eserlerinde yer vererek millî hisleri uyandırmayı amaçlamıştır. Mehmet Akif Ersoy da, bozulan sosyal hayatı İslâmî prensiplerle düzeltmeyi arzu etmektedir. Netice itibariyle üç sanatkar da ortak bir ülkü etrafında farklı yöntemlerle bir araya gelmişlerdir. Üçünün de bir tek amacı vardır; millî şuurunu oluşturmak. Bu amaç gerçekleşmiş ve halk millî benliğini tehdit eden esaret zincirini millî bir şuurla kırmış ve yeniden doğurmuştur. Refik Halit Karay da sürgünde olduğu bu yıllarda vatan özlemi ve aşkı ile milli unsurlarla duyuş tarzının ifadesi olan önemli hikâyelere imza atmıştır.

Edebiyat bulunduğu toplumun gelişiminden ve toplumsal oluşumun ruhundan ayrı olması beklenemez. “Her insan bulunduğu çağın insanıdır” sözünden hareketle Refik Halit Karay’ın öze ve milli duruşa dönme çabasının anlatıldığı bu makalede “Memleket Hikâyeleri” eseri üzerinden yola çıkarak millî ve yerli unsurlar üzerine düşüncelerine yer vereceğiz.

### 1) Karay’ın Eserlerinde Anadolu Toplumunu ve Anadolu İnsanı

Memleket Hikâyeleri, yazarın Anadolu toplumu ve insanını betimleyici bir tarzda anlatarak toplumdaki bozulmayı ve yozlaşmayı anlattığı Anadolu insanının özünden ve milli duruşundan uzaklaştığı, çoğunlukla İstanbul’un köhne semtlerinde, Anadolu’nun

kasabalarında ve köylerinde geçen hikâyelerdir. Bu hikâyelerde Karay özellikle bürokratlar üzerinde durmakta

olup söz konusu bürokratlar mevcut bozukluklara, kötü çevre şartlarına, bürokratik koşullara karşı durmaya çalışsalar da ortamın geri kalmışlığı sebebiyle iş yapamaz hale gelmektedir.

Hikâyelerinde Anadolu halkının zaaflarını, meziyetlerini, komik durumlarını, yaptıkları hataları, acınası hallerini yansıtan yazar ayrıntıları iyi biçimde tespit edebilmekte ve dikkatli bir gözlem yapmaktadır. Kişi ve olayları en ince detaylarına kadar izleyen Karay için “muharrir-ressam” diyenler de olmuştur. Yaşadıklarından ve gözlemlediklerinde anılarında da bahseder.

Karay, eserlerinde Anadolu'nun coğrafi ve mekânsal güzelliklerinden söz etmekte, insanların toplumsal yaşamını ve bireysel özelliklerini betimlemektedir. Hikâyelerinin önemli bir bölümünde Anadolu coğrafyası betimlenmekte, mekânların güzelliği ifade edilmektedir.. Kasabaların doğal güzelliği yanında kasaba sakinlerinin işsizliği (tembel manasıyla kullanılmış) dikkat çekici şekilde betimlenir.

Karay bolca betimlemelere yer vererek bu eserinde Anadolu'yu ve Anadolu insanını gözler önüne sermiş.Burada asıl amaç memlekete ve milli unsurlara değinerek öze dönme isteğinden başka bir şey değildir.Bu betimlemelerden en önemlisi olan bu eser ve Anadolu manzarasını bizlere ilk olarak veren yazarlardan birisi olan Karay , ötelenmiş Anadolu insanının ikinci ve üçüncü sınıf insan haline gelmesinden utanç duyarak bu konuya değinen yani öze ve milli olmaya değinen yazar çokça betimlemelere yer verilmiştir.Öyle ki eserin giriş kısmında Prof. Sabri Esad Siyavuşgil'in şu yorumundan Refik Halid Karay'ın milli ve öze dönük çalışmasının nedeni önemli olduğu , Anadolu ve Anadolu insanının tarihteki yerine dikkat çektiği Memleket Hikayeleri adlı eserinin önemini ve değerini vurgulamıştır..

*"Ben Edebiyat'a biraz meraklıyım. Eskiden bu merakım estetiğin sınır içinde kalırdı, şimdi biraz daha derine gidip kitaplardan yazarlarına, yazarlardan çağların düşüncelerine ve toplumların davranışına doğru uzanmak isterim. Mesela çok eskiden büyük üstad Refik Halid'in Memleket Hikâyeleri'ni salt bir güzel yazı okumak keyfi, katkısız bir edebi zevk için ezberlemiştim, şimdi onları yeniden okuyor ve her birinde, o edebi keyfin ötesinde, bambaşka hazineler keşfediyorum. Bana onlar, vatan Anadolu'nun yarım yüzyıl içinde değişen ve değişmeyen davranışlarına en keskin ışığı tutuyor Onlar sayesinde üstad Refik Halid'in öze*

*varmaktaki büyük kudretine ve zamanı yenen eşsiz görüş ve anlayışına bambaşka bir anlayışla hayran oluyorum.*



*Bana o hikâyeler, bugün Anadolu'nun insan ve sosyal hayatı üzerinde ve yazılacak en azametli psikoloji ve sosyoloji eserlerinden daha etraflı, daha derin, daha dolu ve daha gerçek geliyor. Öyle sanıyorum ki bu hikâyeleri okumadan Anadolu'yu anlamanın, anlamaya başlamanın imkânı yok. Bavuluna kamerasını, not defterini, Mahmut Makal ve Fakir Baykurt'un eserlerini doldurarak Anadolu'yu keşfe hazırlananlara, haritaya bakmadan ve yola çıkmadan önce, o yarım yüzyıllık Memleket Hikâyeleri'ni okumalarını salık veririm.*

*Ne yalan söyleyeyim, ben insanları iyi anlatan ve sevdiren edebiyatın taraflısıyım. Olaylara ve zamana, asıl o duru kafa ve engin insan aşkıyla eserler dayanabiliyor da ondan." (Karay, Memleket Hikayeleri, 2012, s. 9)*

## **2) Refik Halit'in Hikâyelerin de Anadolu Kasabaları ve Milli Tipler**

Anadolu'da geçen sürgün yıllarının bir ürünü olan *Memleket Hikâyelerinde* Refik Halit Karay Anadolu kasabaları ve kasaba yaşamı ile ilgili detaylara yer vermektedir. Her yazarın bağlı bulunduğu bir ekol ve sahip olduğu bir dünya görüşü, bir ilham kaynağı vardır. Edebi metinlerde beklenen, yazarın bunu edebi eserin estetiğine zarar verecek ya da gücünü aşacak düzeyde ortaya koymamasıdır.

Karay'ın kasaba tiplerini meydana getiren hikâyeleri arasında “*Yatık Emine*”, “*Şeftali Bahçeleri*”, “*Vehpi Efendinin Şüphesi*”, “*Sarı Bal*”, “*Şaka*” ve kasaba-köy arasındaki bir hikâyeyi içeren “*Boz Eşek*”tir. Adı geçen hikâyelerde yazar temalar, şahıs kadrosu, konular, karakterlerin kişilik özellikleri, sosyal statüleri ve kasaba sosyal yaşamına ilişkin *görüntülere* yer vermektedir. Söz konusu hikâyelerde yer alan “kasaba tipleri”nde olayların genel olarak düşmüş haldeki kadınların çevresinde gelişmesi, gerici ve bağınaz zihniyet ile ağırlaşan geleneksel yapı, klişe haline gelen yargılar ve dinsel cehalet kasabanın temel özellikleridir. Haricen, kasabaya memur olarak gelen kişilerin sosyal yaşamda oluşturduğu yeni duruş, imaj, meşrutiyet öncesi ve sonrasındaki yıllarda idarenin ve yönetimin gözden çıkardığı korkak, tembel, aksiyondan uzak, kadına ve eğlenceye düşkün, toplum problemlerine ve topluma duyarlı olmayan memur tiplerini de kasabalarda ortak özellik olarak ortaya konmaktadır.

Karay her ne kadar Anadolu kasabalarını realist bir yaklaşım ve gözlemle ortaya koymakta ise de söz konusu hikâyelerde dahi Anadolu insanına ulaşılammış, merkeze alınamamıştır. Bu nedenle Refik Halit sonrasında Anadolu kasabaları dini ve din yaşamını belirtmek için “hırpalanmıştır.”

Refik Halit Karay ile birlikte kasabalar eşraf olgusu ile anılır hale gelmiş ve edebiyatta ağa-eşraf tiplmesi yerleşmiştir. Bu hikâyelerde eşraf tipleri iki biçimde görülmektedir. Anadolu kasabalarında görülen, küçük esnaf iken ticarete atılmış, topraktan kopmuş, bir açıdan “kasaba ağası” veya “türemiş zengin” olarak adlandırılabilir, çoğunlukla kötülük ve zorbalık ile tiplenen eşrafın yanında; ekonomik açıdan güçlü, kökleri geçmişe dayanan, siyasi otorite ve yönetime nüfuzları dayanan, kasabadaki sosyal hayata yön veren eşraf tiplmesi mevcuttur. İnsan ve toplum merkezli hikâyeye anlayışına sahip olan Karay, realizm gereği toplumun kötücül ve hastalıklı taraflarını, kötümser bir yaklaşım ile toplum için aktarmaktadır.

Bu noktada özellikle şu belirtilmelidir: Karay’ın insan-mekân ve toplum üçgeninde, yerli yerinde kullandığı düşmüş kadın unsuru, Cumhuriyet dönemine ait eleştirel gerçekçi veya sosyal gerçekçi yazarlar tarafından farklı algılanarak siyasi bir unsur olarak kullanılmıştır.

### **3) Milli Tarihimiz ve İnsanımız**

Edebiyat ve tarihin kesişimin de milli romantizm mevcuttur. Milli romantik duyuş tarzı ile yazar tarihsel bir olaydan yola çıkar ve onu edebi çerçevede yeniden biçimlendirir. Ortaya çıkan eser artık tarihi değil edebi bir eserdir. Yazarın temel amacı, edebi eserin duyuş dünyasından geçirdiği bireyde milli bir heyecan meydana getirmektir. Böylelikle estetik heyecanla oluşan haz ile bireyde mensubiyet şuuru oluşturulması istenmektedir. Karay da eserlerinde bu amaca sahiptir.

Karay, maruz kaldığı sürgünler sonucunda başka bir yaşamı görmüş, vatana farklı bir gözle bakma yetisi kazanmıştır. Milli romantik duyuş tarzı ile eserlerini kaleme alan Karay, bireyi edebi ve tarihi metinlerin arasında bir yolculuğa çıkarmaktadır. I. Dünya Savaşı’ndan tükenmiş, güçsüz, bitmiş ve yorgun biçimde çıkan millet ve insanlar yok olma tehlikesi ile karşı karşıya kalmış, hasta bir insan misali her şeyden elini ayağını çekmiş durumdadır. Savaş sonrasında halk sahipsizlik ve kimsesizlik karşısında bir savaş vermek zorunda kalmıştır.

Açlık ve yoksulluğun yanında bir de ahlaki çöküntü ortaya çıkmıştır. Milli mücadelenin başlaması ile birlikte ülkede bir kurtuluş umudu filizlenir. Parça parça haldeki bu umut birleşerek milli bir harekete dönüşür. Bu döneme ait yaşantılar Karay’ın “Memleket Hikâyeleri”nde gözler önüne serilmektedir.

Refik Halit Karay tarafından kaleme alınan “Bir Saldırı” ile “Garip Bir Hikâye”, ilk sürgün dönüşünde yazılmış olup savaştan dönen iki yedek subayın çaresiz ve yoksul hallerini anlatmaktadır. Savaştan sonra millet, kazanan devletlerarasında paylaşılmak ve bu devletler tarafından parçalanmak istenmiştir. Yenik haldeki halk yabancı askerlerin zulmüne uğramış, hakir görülmüştür. Örneğin “Kuvvete Karşı” adlı hikâyede Amerikan askerlerinin şımarıklığı, görgüsüzlüğü, azgınlığı anlatılmaktadır.

Milli romantik duyuş biçimi ile Anadolu insanına yönelen Karay, halkın yaşantısını bütün gerçekliği ile kelimelere dökmüş, ananelere ait unsurlara da yer vermiştir. Milli romantizm için tarihi ve folklorik malzemenin değeri inkâr edilemez.

Anadolu insanının ezilişini ve acılarını anlatan Refik Halit milletin yüceliğini de ifade etmiştir. Buna göre bir Türk ahlak dışı davranışlarda bulunamaz. Buna iltifat edenlerin azınlık kimlikleri ile öne çıkması önem taşımaktadır.

Tarihi olmadan bir milletin ilerlemesi mümkün değildir. Geçmişini önemsemeyen ya da görmezden gelen bir milletin geleceği olması da mümkün değildir. Refik Halit, topluma ait olan tüm değerleri geçmiş ile hal arasında bağ kurarak ustalıkla işlemiştir.

### 3) Sürgünde Milli Duruş Tarzı

Refik Halit, Anadolu’yu gözler önüne sermiş usta bir kalemdir. Bunu bu kadar ustalıkla yapmasındaki etkenlerden biri de yaşadığı sürgünlerdir. Dönemin siyasi durumundan dolayı uzun süre sürgün hayatı yaşayan Karay, vatan toprağı denilen coğrafyayı keşfetme imkânını bulmuştur. Toprak ve insan bütünlüğünü gören Karay, Memleket Hikâyeleri ile edebiyatın Anadolu’ya açılmasına öncülük etmiştir.

Sürgün yılları Karay’ı görmediğı mekânlara, karşılaşmadığı insanlara ve hayatlara götürmüştür. Bu yüzden “Memleket Hikâyeleri”nde geleneksel, mahalli ve milli hayatın yaşandığı yerleri işlemiştir. Karay, *"Anadolu’yu bir köylü olarak değil varlıklı bir şehir delikanlısı olarak gördüm ve anlattım"* diyor. (Mert, s. 68) İnsanın yaşadığı mekânın tarihi ile coğrafyası arasında bir bütünlük vardır. Anadolu coğrafyasını ve insanını milli duyuş tarzı ile ele alan yazar da bu bütünlüğün farkına varmıştır. Memleket Hikâyelerinde mekân Anadolu coğrafyası ve İstanbul’dur. Karay, Anadolu insanını anlatırken dar bir mekânda sıkışmış olan insanın ruh halini betimlemektedir.

Dönemim siyasi şartlarının da etkisiyle halk, bu dar mekânlara kısıtılıp sürgün hayatı yaşıyordu. Millet, kendi topraklarında sürgündü. Toprağı özgür olmayan bir milletin kendisinin de özgür olması düşünülemezdi. Burada yaşayanlar çevresiyle ilişki kuramayan, kendi dünyalarında yaşayan insanlardır. Halk mecburi bir kabulleniş ile bu hayatı yaşıyordu.

"... Sanki buraya insanlar yokuşları tırmana tırmana değil, gökten serpilerek gelmişler ve inmeğe iz bulamayarak öyle dünyaya ilgisiz bir küme halinde kalmışlardı." (Karay, Memleket Hikayeleri, 2012, s. 12)

Aynı ortamda büyüyen insanlar arasında çok sıkı bir bağlantı vardır. "Yatık Emine"de insanlar sevmeyi, sevmeyi. Hoşgörüyü, empatiyi bilmediği için birbirlerini kıskanır. "Şeftali Bahçeleri" eserinde ise zengin, fakir herkes eğlenceden payını aldığı için kimse kimseyi kıskanmaz. Buda yazarın kendi has bakış açısı ve yazma tekniğiyle ilgilidir.

Milli romantik doğa anlayışının karşısına çıkarılan mekân İstanbul'dur. İstanbul yalılarını, köşkerlerini, mekânların eğlence hayatının olduğu bir güzelliştir. Bunu çok iyi bilen Karay, İstanbul'a özlem duymaktadır. İstanbul, Anadolu'nun aksine saflığını, temizliğini, dürüstlüğü yitirmiştir. Berbat bir hale gelmiş ve yaşanılmaktan çok tiksiniyen bir mekân haline gelmiştir. Anadolu'da milli ve mahalli değerlerle yaşayan insanlar, İstanbul'a gelince ilk değişimi kılık kıyafetinde yaşamıştır. Batılılar gibi giyinip kuşanıp, onlar gibi bir hayat sürmeye özenmişleridir. Bir eserinde geçen şu cümleler bize her şeyi özetliyor aslında "*Nebile babasındaki değişikliğin farkına vardı: Kasketi atmış, başına siyaha yakın, kadifemsi bir şapka geçirmişti; pantolonu baldırından kopçalı ve büzmeli değildi artık... Mintanı da bırakmış kravatlı gömlekle giyiyordu. Ayakkabıları iki renkli, pırıl pırıldı.*" (Karay, Memleket Hikayeleri, 2012, s. 179)

Sonuç itibariyle toprak, bir milletin varlığının göstergesidir. İnsan yaşadığı mekânla ve torağıyla vardır. Mekân yoksa millet de yoktur. Karay, yaşadığı sürgünlerden sonra toprağa farklı bir gözle bakmış ve hikâyelerinde milli romantik bir duyuş tarzı sergilemiştir. Bundan dolayı eserlerinde milli duruş sergilemesi öze dönmek istemesi gördüğü, değerlendirdiği toplum üzerinden yola çıkarak ulaşılmış sonuçlar silsilesidir.

Anadolu'nun ve Anadolu halkının Türk hikâyesinde işlenmeye başlaması ve yer edinmesi noktasında önemli katkıları olan Refik Halit Karay, Anadolu'daki sürgün hayatının izlerini taşıyan ve 1919'da yayımlanan "Memleket Hikâyeleri"yle edebiyatın Anadolu coğrafyasına açılmasına katkı sağlamıştır.

#### 4) Milli Duruş ve Lisan

Bir toplumun varlığının, yükselmesinin ve kendisini kabul ettirmesinin ana malzemesi olarak dil görülür. Bir milletin fende ve edebiyatta bir yerlere gelmesi, yine dil ile hayata geçecektir.. Ancak, bu dil milli bir dil olmalıdır.

Karay bulunduğu topluluğun aksine eserlerinden yalın ve sade bir dil kullanarak Anadolu'ya ve halkına ulaşmayı amaçlamıştır. Yazar sade ve anlaşılır diliyle halkın sesi haline gelmiştir ve Türkçe de ki sadeliğin ve yalınlığın öncüsü karakter olmuştur. Öyle ki Ziya Gökalp "Türkçeyi en iyi yazan muharrir Refik Halit'tir." demiştir.

Refik Halit Karay, Türk dilinin, ona gönül vermiş en usta işçisidir. İlk kez özentisiz bir dil kullanan Karay, kıvrak üslubu ve canlı tasviriyle edebiyatımızda bir ilke imza atmıştır. Ve "Öz Türkçe" hareketini destekleyenlerinin başında yer almıştır. Karay, hikâyelerin ve bu hikâyelerdeki kahramanların isimlerini bilinçli bir şekilde seçmiştir. Bunlar, halkın günlük dilde kullandığı sıradan isimler olarak Türk kimliğini temsil ederler.

Milli duruşu ve bilinci uyandırmayı amaçlayan Karay, halka yönelerek onların kullandığı dil ile hikâyelerini kaleme almıştır. Öykülerinin gücünü sağlayan baş etken dildir. "Cer Hocası"nda başkışı Asım, vaaz etmek üzere ilk olarak köylünün karşısına çıktığı zaman o güzel Türkçesinin halim, tatlı ahengiyle konuşmaya başlar. Halk ilk başta şaşırır daha sonra bu sözleri anlayarak, anladığı için de beğenerek kendinden geçer. Asım, tatlı konuşmasıyla bütün köye kendini sevdirebilir. Daha sonra ise o yalın Türkçesiyle uysal, sevimli sesi ile vaaza başlar;

*"Her zamanki gibi o ilk anlaşmazlık burada da görüldü; "yüzler şaşkınlıkla kırıştı. Bir süre bu halde kaldı; sonra kırışıklar açıldı, açıldı, merak içinde kalmış bir yüz durumu aldı. Köyün muhtarı, çuha şalvarlı adam, gözlerini kapamış, her beğendiği, iyi anladığı sözün arkasından başını sallıyor, içini çekiyordu."* (Karay, Memleket Hikayeleri, 2012, s. 157)

İşte bu Cer Hocası bir bakıma Karay'ın ta kendisidir. Onun çok temiz ve çok güçlü bir Türkçesi vardır. Sözcük dağarcığı çok zengindir ve sözcükleri yerli yerinde kullanır. Karay'ın eserlerinde aslında kendi benliğini, kendi işleyiş tarzını karakterlere yansıtarak adeta yaşamış ve eserde öze dönük çalışmanın insanın kendisinden başlayarak topluma ve halka yayılması gerektiğinin, farkındalığın oluşmasının insanın kendisinden başlayacağına en iyi örneklerden birisidir.

İstanbul Türkçesinin bütün inceliğine ve şiiriyetine, naifliğine vakıf olan yazar, halk ağzından aldığı sözlü anlatım şekillerinden geniş ölçüde yararlanmıştır. Şu sözlerle bunu

destekleyebiliriz; *“Babasının sesini işittikçe garazdan yüreği burkularak ve öğrendiği İstanbul lehçesini unutarak memleket ağzıyla söyleniyordu.”* (Karay, Memleket Hikayeleri, 2012, s. 183)

Bir dil devrimcisi olan Refik Halit Karay, hikâyelerinde ustalıkla Türkçeyi kullanmış ve milletin bilinçlenmesinde öncülük etmiştir. Milletin birlik ve beraberliğe ihtiyacı olduğu bir dönemde, milletin diliyle eserlerini veren Karay, Milli dil ile Milli benliğe ulaşmıştır. Onun kullandığı dil, geleceği müjdeleyen, pürüzsüz, sade ve kıvrak bir Türkçedir.

## SONUÇ

Refik Halit Karay toplumsal ve politik yazıları nedeniyle defalarca Anadolu'ya ve Anadolu'dan uzak yerlere sürgün edilmiş, bu geçen zamanda yazmaktan vazgeçmemiş, yaşadığı deneyimleri anlatmış, önemli eserler kaleme almış bir yazardır. Sürgün yılları Karay'ın eserlerinin gelişmesinde ve ortaya çıkmasında büyük rol oynamıştır. Meşrutiyet ve Cumhuriyet dönemlerinin yakın şahitlerinden biri olan Karay, gözlem gücü yüksek bir yazardır. Etrafındaki gelişmelerle ilgili kayıt tutan bir mukayyit, aynı zamanda yaşadığı dönemin de güçlü bir tanığı konumundadır. Zengin bir kelime dağarcığına sahip olan yazar kelimeleri yerli yerinde kullanmakta, sade bir üslup kullanmaktadır ve çağdaşlarından da bu yönüyle ayrılmaktadır. Ortaya koyduğu memleket tasviri kendine has bir tarza sahiptir. Sade üslubu, mükemmel betimleyici özelliği, dil zenginliği ve ince işçiliği ile eserlerini özenle işlemiştir.

Milli romantizm, bireyin kendisinden başlayarak topluma ait değerler ışığında geçmiş ile şimdi arasında bağ kurarak geleceğini şekillendirmesi hareketidir. Sanatçı, ait olduğu milletin tarihi, coğrafi ve kültürel değerlerini kendi ruh ve hayal dünyası ile yorumlayıp halkın milli benliğe erişmesine öncülük eder. Milli romantikler, güçlerini milletin yaşadığı coğrafya ve yarattığı kültürel değerlerden alırlar.

Milli unsurlar ile yazdığı hikâyelerde yönünü millete çevirip onların anlayabileceği bir dille yazarak Türk edebiyatında milli bir edebiyatın oluşmasını sağlamıştır. Karay, hikâyelerin de tarihe değinerek millette var olan değerleri devam ettirmeyi amaçlamıştır. Savaştan çıkan perişan bir milletin yok olma ile karşı karşıya kaldığı bir dönemde yeniden diriliş için toplumun uyanması gerekiyordu. Bunun için bu dönem sanatçıları eserlerini verirken buna özen göstermişlerdir.

Refik Halit Karay da bu sanatçılar arasında olup, eserlerinde bunu mükemmel işlemiş ve halka ulaşmayı başarmıştır. Tarihi olaylar onda halkın bilincini uyandırma da amaç ve araçtır. Millete ait olan tarihe, kültürel değerlere, inançlara ve bunların insanın beyninde, kalbinde oluşturduğu etkiye dayanarak eserlerini ortaya çıkartan Karay ayrıca mekân, insan ilişkisini gözler önüne

sermiş ve mekânın hayatları nasıl değiştirdiğini ve milli bir kimlik oluşturmadaki önemine değinmiştir.

Mekânlar, insanın ruh dünyasını ve yaşam koşullarını belirler. Kişi, önce kendi mekânında daha sonra topluma ait ortak bir mekânda hayatını idame ettirir. Sanatçı, eserlerindeki milli romantik tabiat anlayışıyla doğanın muhteşemliği karşısında insanın tepkisini ölçmektedir.

Bunları yaparken milli dili kullanan yazar, milli dilin milli kimliği oluşturma da önemli bir yere sahip olduğunu gözler önüne sermiştir. Toplumların tarihi, ortak bir dille yazılmıştır ve toplum bu ortak dili kullanarak tarihini öğrenmiştir. Milli bir dille var olan toplum, yine milli bir dil ile geleceğini oluşturacaktır. Türkçenin bütün güzelliklerini ve muhteşemliğini eserlerinde sergileyerek öz Türkçe hareketinin öncüsü olmuştur.

Milli unsurlar ile değerlendirdiğimiz Refik Halit Karay, gerek dönemin siyasi, gerekse sosyal şartlarını göz önünde tutarak, Anadolu'ya ve Anadolu halkına yönelmiş ve halkın milli bilincini harekete geçirerek, geleceğe ışık tutan usta kalemlerden biri haline gelmiştir.

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## **SURVEY OF PRECIPITATION TRENDS IN THE HIRFANLI DAM BASIN**

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### **ABSTRACT**

The effects of global climate change on hydro-meteorological parameters vary on a regional basis. For this reason, regional surveys are important and necessary to determine the effects of global climate change. In addition, surveys on climate parameters are needed for regional planning. In this study long-term trend analysis of precipitation series are determined in the Hirfanlı dam basin of Turkey. Records are acquired from the Turkish State Meteorological Service for the period of 1968 to 2017 for Gemerek, Kayseri, Kirsehir, Nevsehir, Sivas, and Zara. Mann-Kendall and Spearman's Rho are used for trend analysis with 95% confidence levels. The results of Mann-Kendall and Spearman's Rho are similar. According to the results of the precipitation series increase was determined but statistically significant trends couldn't be determined at 95% confidence levels.

**Keywords:** Precipitation, Mann-Kendall, Spearman's Rho, Climate Change

## **1. INTRODUCTION**

Global climate change has become an important problem affecting civilization around the world. Global climate change manifests itself to different degrees in various geographies in Turkey. These effects were investigated using hydro-meteorological climate parameters (Yu et al., 1993; Cooley and Chan, 2017; Yacoub and Tayfur, 2019; Coloiera, 2020; Singh and Kumara, 2021). Studies on climate and climate componenets have reported that temperatures have increased and precipitation has decreased in recent years (Kuyucu et al., 2017). As can be seen in the literature, the effects of global climate change on various hydro-meteorological parameters are being investigated for Turkey (Turkes, 1996; Kadioglu, 1997; Partal and Kahya 2006; Kizilelma et al., 2015; Dogan et al., 2015; Topuz et al., 2020; Bacanli and Tanrikulu, 2017; Ay and Kisi, 2017; Keskin et al., 2018; Zeybekoglu and Karahan, 2018; Ceribasi, 2018; Ulke Keskin and Ozkoca 2018; Abbasnia and Toros, 2020; Terzi and Ilker 2020).

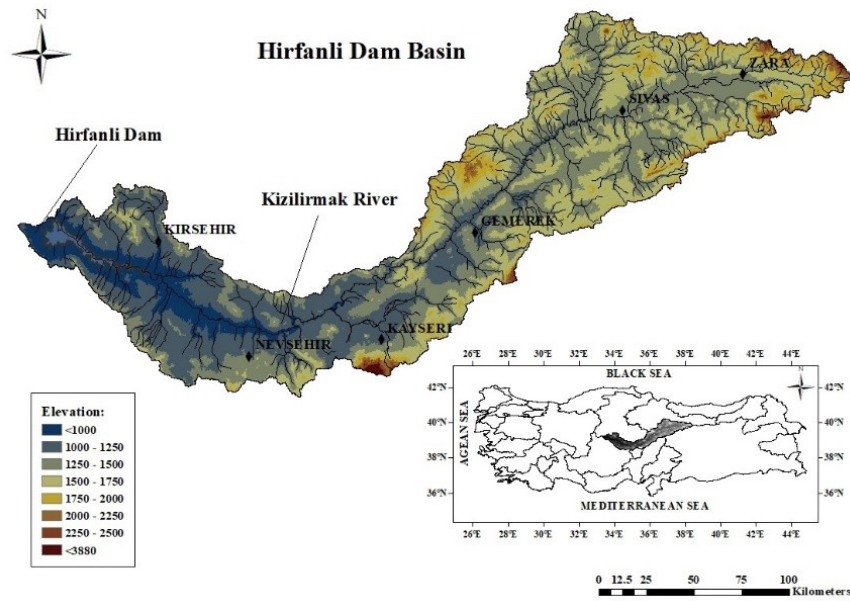
In this paper, Hirfanli Dam basin, which is located in the semi-arid climate region where climate change can be seen due to its location, was chosen as the study area. Precipitation series analyzes were made by using Mann Kendall (MK; Mann, 1945; Kendall, 1975) and Spearman's Rho (SR; Sneyers, 1990; Yue et. Al, 2002; Yenigun et al., 2008).

## **2. STUDY AREA**

The sub-basin that feeds Hirfanli Dam, which is located between the longitudes of 33.3°E and 38.7°E and the latitudes of 38.3°E and 40.1°N, is in Kizilirmak River basin. Its surface area is approximately 26700 km<sup>2</sup>. With its 1355 km length, the Kizilirmak river is one of the major water resources of Turkey. Hirfanli Dam was built on Kizilirmak River in 1959 to control floods and for hydropower use. Hirfanli Dam basin has high topographic features with a mountainous plateau. The altitude varies between 799-3880 m (Fig. 1) and decreases from the east to the west in the basin. In the west of the basin, plateaus and meadows are more

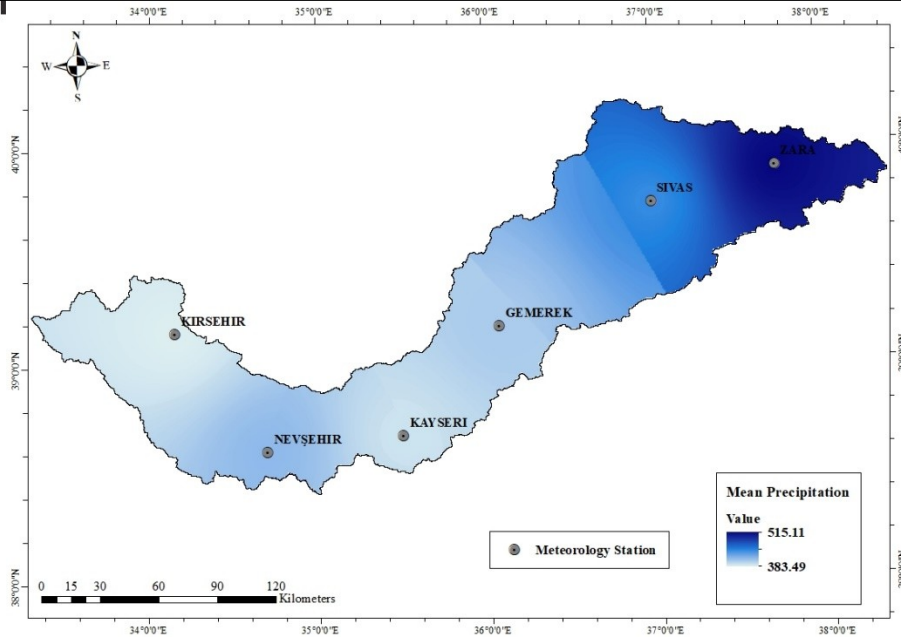
common. Volcanic mountains are also found in this area with wide plains around them.

Erciyes Mountain is among the most important volcanic mountains in the basin. The Eastern basin has high, rugged and mountainous plateaus, and the low hills in the area are the most important surface elements. In the basin, a typical dry climate is dominant, and the Hirfanli Dam basin covers plateaus, meadows, and pastures for animal grazing and wide plains for agricultural activities. For this reason, agriculture is a major economic factor in the basin (Yildiz, 2009, 2014; Oguzturk and Yildiz, 2016).



**Figure 1.** The geographical and Topographical Situation of the Hirfanli Dam Basin, Turkey. (Zeybekoglu and Akturk, 2021)

Precipitation records between 1968 and 2017 were obtained from the Turkish State Meteorological Service (TSMS). The mean precipitation of the basin is 424.82 mm. In addition, geographical and meteorological details of the stations are given in Table 1. Precipitation in the basin increases from west to east. The spatial distribution of precipitation is given for the basin in Figure 2.



**Figure 2.** Spatial Distribution of Annual Precipitation in the Hirfanlı Dam Basin (Zeybekoglu, 2022)

**Table 1.** Geographical and Statistical Information of Stations and Data

Stations	Latitude (N)	Longitude (E)	Elevation (m)	P <sub>min</sub> (°C/year)	P <sub>max</sub> (°C/year)	P (°C/year)
Gemerek	39.11	36.04	1173	276.00(2013)	681.50(2010)	403.31
Kayseri	38.44	35.29	1093	202.70(2016)	614.10(1988)	390.13
Kirsehir	39.09	34.10	1007	254.20(2013)	541.90(1987)	383.49
Nevşehir	38.35	34.40	1200	281.00(2013)	589.00(1987)	413.20
Sivas	39.45	37.01	1285	284.80(1973)	587.10(2012)	443.70
Zara	39.54	37.45	1348	329.20(2013)	700.30(1988)	515.11

### 3. FINDINGS

The MK and SR were applied to identify the tendency in the Hirfanlı Dam Basin stations recorded by TSMS in the period of 1968-2017. The results of the precipitation analyzes performed at 95% confidence levels are shown in the Tables 2.

**Table 2.** Results of MK and SR

Stations	Z <sub>Cr</sub>	Z <sub>MK</sub>	Trend	Z <sub>SR</sub>	Trend
Gemerek	±1.96	-0.08	Downward	-0.03	Downward
Kayseri	±1.96	1.14	Upward	1.05	Upward
Kirsehir	±1.96	-0.36	Downward	-0.25	Downward
Nevşehir	±1.96	-0.23	Downward	-0.19	Downward
Sivas	±1.96	0.86	Upward	0.79	Upward
Zara	±1.96	-1.70	Downward	-1.72	Downward

According to trend analyses results (Table 2), a significant upward/downward trend ( $Z > |Z_{Cr}|$ ) could not be determined. An upward trend detected Kayseri and Sivas. Gemerek, Kirsehir, Nevsehir and Zara have downward trend. The findings of precipitation results, obtained by MK and SR methods for the Hirfanli dam basin, show parallelism.

#### 4. CONCLUSION

In this study, the effect of global climate change on the precipitation series in the Hirfanli Dam Basin was investigated. The precipitation data measured by TSMS in the period 1968-2017 were used. In the precipitation series of the stations in the basin, a downward trend was detected in four of the six and an upward trend in two of them. As a result of global climate change, drought in the basin is expected to increase even more in the future. Activities related to the efficient use of water resources should be carried out. Information, prevention and sustention activities should be carried out against possible negative effects in agricultural activities. Existing urban green spaces should be protected and afforestation activities should be increased.

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**SURVEY OF TEMPERATURE TRENDS IN THE HIRFANLI DAM BASIN**

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**ABSTRACT**



The effects of global climate change on hydro-meteorological parameters vary on a regional basis. For this reason, regional surveys are important and necessary to determine the effects of global climate change. In addition, surveys on climate parameters are needed for regional planning. In this study long-term trend analysis of temperature series are determined in the Hirfanli dam basin of Turkey. Temperature records are acquired from the Turkish State Meteorological Service for the period of 1968 to 2017 for Gemerek, Kayseri, Kirsehir, Nevsehir, Sivas, and Zara. Mann-Kendall and Innovative Trend Analysis are used for trend analysis with 95% confidence levels. According to the results of the temperature series upward trend was determined. The results of Mann-Kendall and Innovative Trend Analysis are similar but increasing significant trends were determined by Mann Kendall except Zara.

**Keywords:** Temperature, Mann-Kendall, Innovative Trend Analysis, Climate Change

## **1. INTRODUCTION**

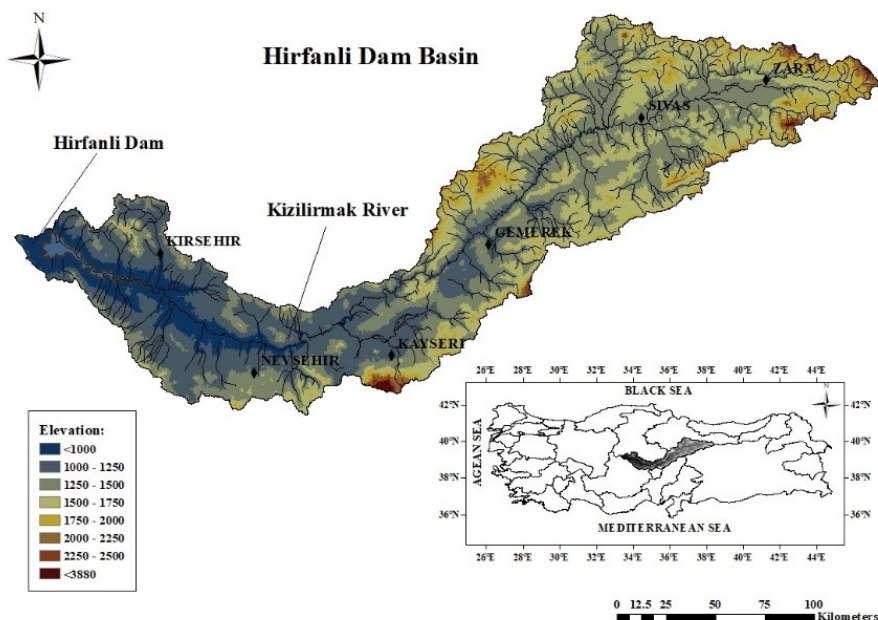
Global climate change has become an important problem affecting civilization around the world. Global climate change manifests itself to different degrees in various geographies in Turkey. These effects were investigated using hydro-meteorological climate parameters (Yu et al., 1993; Cooley and Chan, 2017; Yacoub and Tayfur, 2019; Coloiera, 2020; Singh and Kumara, 2021). Studies on climate and climate componenets have reported that temperatures have increased and precipitation has decreased in recent years (Kuyucu et al., 2017). As can be seen in the literature, the effects of global climate change on various hydro-meteorological parameters are being investigated for Turkey (Turkes, 1996; Kadioglu, 1997; Partal and Kahya 2006; Bacanli and Tanrikulu, 2017; Ay and Kisi, 2017; Zeybekoglu and Karahan, 2018; Ceribasi, 2018; Ulke Keskin and Ozkoca 2018; Abbasnia and Toros, 2020; Ilker and Terzi, 2021).

In this paper, Hirfanli Dam basin, which is located in the semi-arid climate region where climate change can be seen due to its location, was chosen as the study area. Temperature

series analyzes were made by using Mann Kendall (MK; Mann, 1945; Kendall, 1975) and Innovative Trend Analysis (ITA; Sen, 2012, 2015, 2017).

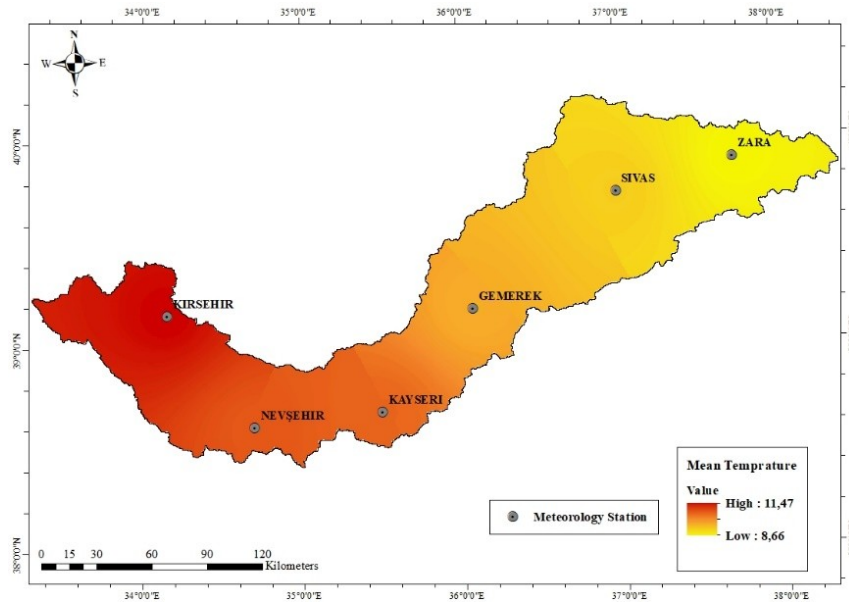
## 2. STUDY AREA

The sub-basin that feeds Hirfanli Dam, which is located between the longitudes of 33.3°E and 38.7°E and the latitudes of 38.3°E and 40.1°N, is in Kizilirmak River basin. Its surface area is approximately 26700 km<sup>2</sup>. With its 1355 km length, the Kizilirmak river is one of the major water resources of Turkey. Hirfanli Dam was built on Kizilirmak River in 1959 to control floods and for hydropower use. Hirfanli Dam basin has high topographic features with a mountainous plateau. The altitude varies between 799-3880 m (Fig. 1) and decreases from the east to the west in the basin. In the west of the basin, plateaus and meadows are more common. Volcanic mountains are also found in this area with wide plains around them. Erciyes Mountain is among the most important volcanic mountains in the basin. The Eastern basin has high, rugged and mountainous plateaus, and the low hills in the area are the most important surface elements. In the basin, a typical dry climate is dominant, and the Hirfanli Dam basin covers plateaus, meadows, and pastures for animal grazing and wide plains for agricultural activities. For this reason, agriculture is a major economic factor in the basin (Yildiz, 2009, 2014; Oguzturk and Yildiz, 2016).



**Figure 1.** The geographical and Topographical Situation of the Hirfanli Dam Basin, Turkey. (Zeybekoglu and Akturk, 2021)

Temperature records between 1968 and 2017 were obtained from the Turkish State Meteorological Service (TSMS). The mean temperature of the basin is 10.03°C. In addition, geographical and meteorological details of the stations are given in Table 1. The temperatures in the basin decrease from west to east. The spatial distribution of temperature is given for the basin in Figure 2.



**Figure 2.** Spatial Distribution of Mean Temperatures in the Hirfanli Dam Basin (Zeybekoglu, 2022)

**Table 1.** Geographical and Statistical Information of Stations and Data

Stations	Latitude (N)	Longitude (E)	Elevation (m)	T <sub>min</sub> (°C/year)	T <sub>max</sub> (°C/year)	T <sub>mean</sub> (°C/year)
Gemerek	39.11	36.04	1173	6.94 (1992)	11.77 (2010)	9.64
Kayseri	38.44	35.29	1093	8.41 (1992)	13.23 (2010)	10.54
Kirsehir	39.09	34.10	1007	9.43 (1992)	13.78 (2010)	11.47
Nevsehir	38.35	34.40	1200	8.49 (1992)	13.64 (2010)	10.70
Sivas	39.45	37.01	1285	6.64 (1992)	11.99 (2010)	9.19
Zara	39.54	37.45	1348	5.94 (1992)	11.27 (2010)	8.66

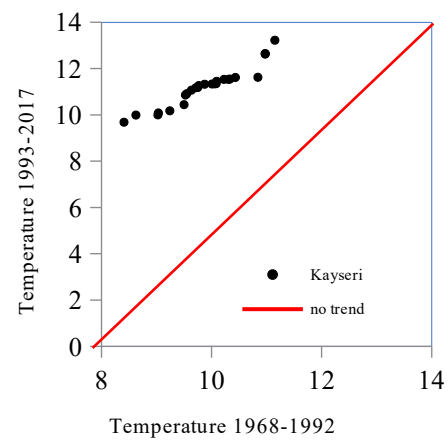
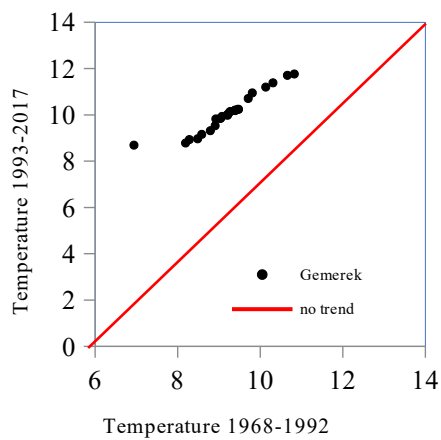
### 3. FINDINGS

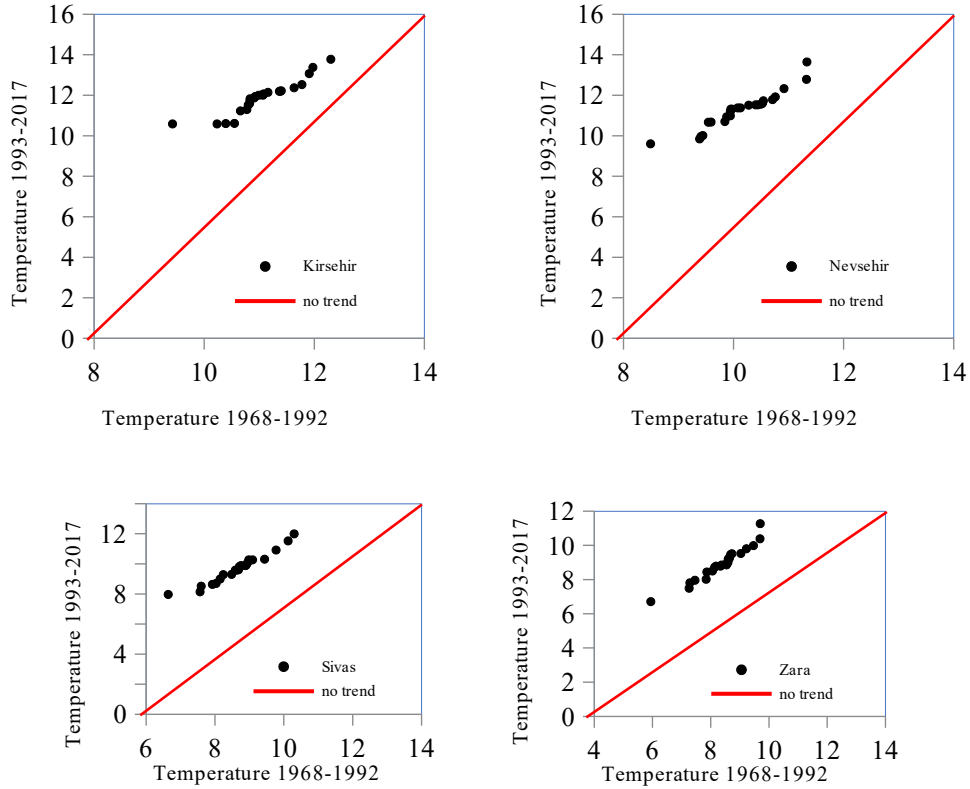
The MK and ITA were applied to identify the tendency in the Hirfanli Dam Basin stations recorded by TSMS in the period of 1968-2017. The results of the temperature analyzes

performed at 95% confidence levels are shown in the Tables 2. Graphical results of ITA also shown Figure 4.

**Table 2.** Results of MK and ITA

Stations	$Z_{Cr}$	$Z_{MK}$	Trend	$CL_{ITA}$	s	Trend
Gemerek	$\pm 1.96$	<b>2.46</b>	<b>Significant upward</b>	$\pm 0.0568$	0.0341	Upward
Kayseri	$\pm 1.96$	<b>4.80</b>	<b>Significant upward</b>	$\pm 0.0695$	0.0526	Upward
Kirsehir	$\pm 1.96$	<b>3.35</b>	<b>Significant upward</b>	$\pm 0.0645$	0.0337	Upward
Nevsehir	$\pm 1.96$	<b>4.02</b>	<b>Significant upward</b>	$\pm 0.0673$	0.0457	Upward
Sivas	$\pm 1.96$	<b>3.36</b>	<b>Significant upward</b>	$\pm 0.0581$	0.0413	Upward
Zara	$\pm 1.96$	1.77	Upward	$\pm 0.0508$	0.0225	Upward





**Figure 3.** Graphical Results of ITA

According to temperature results (Table 2 and Figure 3), increasing trends were determined at all stations. As stated by MK results statistically significant upward trends ( $Z > Z_{Cr}$ ) were determined in the Gemerek, Kayseri, Kirsehir, Nevsehir and Sivas. On the other hand, the ITA results of basin, a significant upward trend could not be determined but stations have upward trend. The findings of this results, obtained by MK and ITA methods for the Hirfanli Dam basin, show parallelism for temperature series.

#### 4. CONCLUSION

In this study, the effect of global climate change on the temperature series in the Hirfanli Dam Basin was investigated. The temperature data measured by TSMS in the period 1968-2017 were used. An upward trend has been determined throughout the basin. As a result of global climate change, drought in the basin is expected to increase even more in the future. In line with this expectation, it is important to identify risks and hazards, take all necessary precautions, take responsibility for disasters and to raise awareness in order to prevent and

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reduce damages within the scope of the modern disaster management (Karaman, 2016) approach (Gunduz, 2022).

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## MATERYALİST DEĞERLERİN STATÜ TÜKETİMİ İLE İLİŞKİSİ: AMİSH TOPLULUĞU ÖRNEĞİ ÜZERİNDEN BİR DEĞERLENDİRME

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### ÖZET

Materyalist tüketiciler, mutluluğu maddiyatta yani sahip olduklarında aramaktadırlar. Statü tüketimi ise tüketicilerin statü göstergesi olan ürünleri satın almalarıdır. Dolayısıyla bu tüketicilerde amaç, gösteriş amaçlı tüketim yapmaktan önce satın aldıklarıyla statü kazanmaktır. Bu çalışmanın temel amacı, materyalizm ile statü tüketimi arasında ilişki olup olmadığını ele almaktır. Araştırmada ayrıca tüketicilerin meslekleri ile materyalist değerleri ve statü tüketimleri arasında bir farklılık olup olmadığına da bakılmıştır. Son olarak bu çalışmada tüketicilere Amishler gibi günümüz koşullarında bile hala geleneksel hayatlarına devam eden bir topluluğun üyesi olmak isteyip istemeyecekleri de sorulmuştur. Böylece geleneksel yaşamlara öykünen tüketicilerin materyalist ve statü tüketimi eğilimleri de incelenmiştir. Bu amaçlar doğrultusunda anket yöntemi ile 439 katılımcının cevabı değerlendirilmiştir. Araştırmada elde edilen bulgulara göre materyalizm ile statü tüketimi arasında anlamlı bir ilişki bulunmaktadır. Bir başka deyişle materyalist eğilimi artan tüketicilerin statü tüketim eğilimleri de artmaktadır. Ayrıca tüketicilerin statü tüketimleri mesleklerine göre farklılaşmaktadır. İş yeri sahibi, öğretmen ve doktor tüketicilerin statü tüketimi eğilimleri daha yüksektir. Doktor, iş yeri sahibi ve öğrencilerin materyalizm puanlarının çok yüksek olduğu görülmektedir. Amish Topluluğu'nun üyesi olmayan tüketicilerin bu sonuca paralel şekilde doktor, iş yeri sahibi ve öğrenciler olduğu görülmektedir. Amish Topluluğu'na üye olmak istemeyen tüketicilerin ise (öğretmen, emekli, işçi ve akademisyen) materyalizm puanları düşüktür. Bu çalışma, kapsamlı meslek gruplarını ele alarak statü tüketimi ve materyalizm arasındaki ilişkiyi incelemiş olması açısından önemlidir. Ayrıca bu tüketicilerin geleneksel yaşama bakış açıları da ele alınmıştır. Dolayısıyla bu tüketicilerin statü tüketim eğilimleri ve materyalist eğilimlerinin değerlendirilmesiyle gelecek araştırmalara ışık tutmak hedeflenmektedir. Araştırmada elde edilen bulgularla araştırmacılara ve işletmelere çeşitli öneriler sunulmuştur.

**Anahtar Kelimeler:** Materyalizm, Statü Tüketimi, Tüketici Davranışı, Meslekler, Amish Topluluğu

**THE RELATIONSHIP OF MATERIALIST VALUES AND STATUS  
CONSUMPTION: AN EVALUATION ON THE CASE OF THE AMISH  
COMMUNITY**

**ABSTRACT**

Materialist consumers seek happiness in material things, that is, in what they have. Status consumption, on the other hand, is when consumers buy products that are status indicators. Therefore, the aim of these consumers is to gain status with what they buy before conspicuously consuming. The main purpose of this study is to examine whether there is a relationship between materialism and status consumption. In the study, it was also examined whether there is a difference between the professions of consumers, their materialistic values and their consumption of status. Finally, in this study, consumers were also asked whether they would like to be a member of a community such as the Amish, who still continue their traditional lives even in today's conditions. Thus, the materialist and status consumption tendencies of consumers who emulate traditional lives were also examined. In line with these purposes, the answers of 439 participants were evaluated with the questionnaire method. According to the findings of the research, there is a significant relationship between materialism and status consumption. In other words, the status consumption tendencies of consumers whose materialistic tendencies increase also increase. In addition, the status consumption of consumers differs according to their professions. Business owner, teacher and doctor consumers tend to consume higher status. It is seen that the materialism scores of doctors, business owners and students are very high. In parallel with this result, it is seen that the consumers who do not want to be a member of the Amish Community are doctors, business owners and students. Consumers who do not want to be members of the Amish Community (teacher, retired, worker, and academic) have low materialism scores. This study is important in that it examines the relationship between status consumption and materialism by addressing comprehensive professions groups. In addition, the perspectives of these consumers on traditional life are also discussed. Therefore, it is aimed to shed light on future research by evaluating the status consumption tendencies and materialistic tendencies of these consumers. Various suggestions were presented to researchers and businesses with the findings obtained in the study.

**Keywords:** Materialism, Status Consumption, Consumer Behavior, Professions, Amish Community

**NOT:** Dicle Üniversitesi, Fen Bilimleri Enstitüsü, Mimarlık Anabilim Dalında Yapılan ve Prof.Dr. İclal ALUÇLU tarafından yürütülen tez çalışmasından üretilmiştir.

## 1. GİRİŞ

Ürün çeşitliliği ile birlikte alım gücünün artması, sosyal medya aracılığıyla tüketim alışkanlıklarının teşhiri ve mütevazılığın yerini gösterişin alması, materyalizmin tüketici hayatlarına ne derece etkili olduğunun göstergeleridir. Nitekim maddiyat ve mülk edinme gücü materyalist tüketicileri mutlu edebilen öğelerdir. Maddiyatın mutluluk getirmediğine yönelik geleneksel bakış açısı günümüzde şekil değiştirmektedir. Maddi gücü olan tüketicilerin konforu, internetle birlikte daha göz önünde olmaya başladıkça tüketicilerin bazıları mutluluğu maddiyatta aramaya başlamışlardır. Örneğin Kamal (2013), sosyal medya ile materyalizm arasında anlamlı bir ilişki olduğunu belirtmektedir. Maddiyat bu tüketiciler için sadece mutluluk getirmemekte aynı zamanda onlara statü de kazandırmaktadır.

Tüketim, aynı zamanda bir iletişim biçimidir. Bu nedenle tüketim kültürünün yaygınlaşması ile birlikte ürünler yeni anlamlar kazanmaya başlamıştır. Tüketiciler satın aldıkları ürünlerle kendilerini tanımlamakta, toplumda yer edinmekte, sosyalleşmekte ve statü kazanmaktadırlar. Dolayısıyla materyaller, salt maddi öge olmaktan öte anlamlar kazanmışlardır. Bu maddi ürünler, tüketicilere işlevsel faydalar sağladığı gibi statü de kazandırabilmektedir. Statü, tüketicilerin ait oldukları grupta konumlandıkları yer olarak tanımlanabilir. Her bireyin toplumda bir statüsü bulunmaktadır. Toplum nezdinde ne kadar yüksek statüde olunursa birey bunu bir kazanım olarak görebilir. Statü kazanmak veya göstermek adına yapılan tüketim şekli de statü tüketimidir. Yani tüketiciler, toplumda bir konum edinebilmek için ürünler satın almaktadırlar. Hele ki tüketimin, lüksün ve gösterişin giderek popüler olduğu dünyamızda statü kazanmak tüketimle çok daha ilişkili hale gelmeye başlamıştır. Nitekim Topçu vd. (2020), materyalizm ile gösterişçi tüketim arasındaki ilişkide sosyal statü gösteriminin aracılık etkisi olduğunu belirtmektedirler. Zengin ve Döngül (2022) ise statü tüketiminin gösteriş tüketimini pozitif yönde etkilediğini tespit etmişlerdir. Bu araştırmada statü tüketimi ile materyalizm arasındaki ilişki incelenecektir. Bu ilişki ele alınırken tüketicilerin meslekleri ile statü tüketimleri ve materyalist eğilimleri arasındaki ilişki de ele alınacaktır. Her iki durum, Amish toplulukları gibi geleneksel yaşam koşulları olan toplulukların bir üyesi olma istekliliğiyle birlikte değerlendirilecektir. Böylece günümüz koşullarında statü tüketimi ve materyalist eğilimleri olan tüketicilerin geleneksel yaşam koşullarına ilişkin düşüncelerine dair fikir edinilmeye çalışılacaktır. Nitekim Amsihler, Amerika'nın bazı eyaletlerinde yaşayan, güçlü kültürel ve dini inançları sayesinde ayrı ve biyolojik olarak izole edilmiş bir topluluk oluşturmuşlardır (Patton, 2009). Bu topluluk yaşam tarzlarıyla diğer topluluklardan farklılaşmaktadır. Amishler, lüzumsuz gördükleri her şeyin tüketimini reddederler, bu yaşam

biçiminde hayatın tadını çıkarmaya yönelik aktiviteler çok azdır ve son derece disiplinlidirler (Yayla, 1997). Bu çalışma, geleneksel yaşam tarzına bakış açısı örneği üzerinden statü tüketimi ve materyalist eğilimi ele alması ve mesleklerle bu tüketim şekilleriyle ilişkisine bakılması açısından özgün bir araştırmadır. Elde edilen sonuçlarla hem ilgili literatüre değerli bir katkı sunulması hem de uygulayıcılara öneriler geliştirilmesi hedeflenmektedir.

## **2. STATÜ TÜKETİMİ**

Statü, bir tüketicinin toplum içerisinde yer aldığı konumudur (TDK, 2022). Bu konum; tüketicilerin eğitimi, mesleği, geliri, yetenekleri, başarıları veya makamı gibi özellikleriyle kendisini gösterebiliyorken tüketicilerin satın aldıkları ürünlerin nitelikleriyle de olabilmektedir. Satın alınan ürünle statü kazanma arzusu ise statü tüketimini ifade etmektedir. Tüketilen ürünler bu özelliklere sahip olduğuna dair birer done oluşturduğundan tüketiciler statü kazandıran ürünleri satın alma eğilimi taşıyabilmektedirler. Statü tüketimi yapan tüketiciler, satın aldıkları ürünlerle statülerini yükseltmek ve itibar kazanarak farklılaşmak istemektedirler (Clark vd., 2007; Mai ve Tambyah, 2011).

İlgili literatürde statü tüketimi ile gösteriş tüketimi kavramlarının birbirleri yerine kullanıldığı görülmektedir (Truong vd., 2008). Ancak statü tüketimi ve gösteriş tüketimi farklı kavramlardır (Eastman vd., 1999). Gösteriş tüketimi, tüketicilerin lüks ve pahalı ürünler satın alarak toplumdaki diğer bireylere gösteriş yapmak amacıyla yaptıkları bir tüketim biçimidir. Statü tüketiminde ise statü kazanmak adına yapılan bir tüketim söz konusudur. Yani statü temsil eden bir ürünü satın alma isteği statü tüketimidir ve tüketici statüsünün toplum tarafından onaylanmasını arzulamaktadır, lüks bir ürünü başkasına gösterme arzusuyla satın almak ise gösteriş tüketimidir (Gökalliler vd., 2011). Statü tüketiminde ürünün diğer tüketiciler tarafından görünmesi öncelikli bir arzu değilken gösteriş tüketiminde ürünün diğer tüketiciler tarafından görünmesi öncelikli bir arzudur (O’Cass ve McEwen, 2005). Statü tüketiminde statü göstergesi olan ürünlere sahip olabilmek önemlidir (Türkmen ve Erten, 2020). Statü tüketimi, gösteriş tüketiminin bir boyutudur (Marcoux vd., 1997) ve statü tüketiminde tüketicilerin satın aldıkları üründen bireysel haz almaları ve benlik saygısı kazanmaları söz konusudur (Truong vd., 2008). Nitekim Yapraklı ve Özkan (2021), benlik algısının statü tüketimi üzerinde pozitif yönde bir etkisi olduğunu belirtmektedirler. Aynı zamanda statü tüketimi yapan tüketiciler, gösterişçi bir biçimde tüketim yaparak toplum tarafından saygı görme arzusu duyabilirler (Boğa ve Başçı, 2016).

Statü tüketimi ve materyalist eğilimle ilgili yapılmış çeşitli araştırmalar mevcuttur. Eastman vd. (1997), Amerikalı, Çinli ve Meksikalı tüketicilerin materyalist eğilimlerinin farklılaştığını ancak statü tüketimi açısından anlamlı bir farklılık olmadığını belirlemişlerdir. Yapılan araştırmalarda statü tüketimi ile materyalist eğilim arasında anlamlı bir ilişki olduğu (Wang ve Wallendorf, 2006; Goldsmith ve Clark, 2012; Lertwannawit ve Mandhachitara, 2012) ve materyalizmin statü tüketimi üzerinde etkisi olduğu ortaya konulmuştur (Fitzmaurice ve Comegys, 2006; Riquelme vd., 2011; Aslay vd., 2013; Ajitha ve Sivakumar, 2017; Bozbay ve Başlar, 2019; Türkmen ve Erten, 2020; Eşitti ve Erdem, 2021).

### **3. MATERYALİZM**

Türk Dil Kurumu'nda materyalizm, maddecilik olarak tanımlanmıştır (TDK, 2022). Dolayısıyla tüketicilerin maddiyata ve dünyevi şeylere verdikleri önem düzeyi materyalist eğilimi ifade edebilir. Richins ve Dawson (1992), materyalizmi değer ve inanç olarak tanımlamaktadırlar. Araştırmacılara göre materyalist tüketiciler, daha yüksek gelir düzeyine ulaşmak istemektedirler, kişilerarası ilişkilere göre finansal güvenliğe daha çok önem vermektedirler, başkaları için değil kendileri için alışveriş yapmayı tercih etmektedirler ve hayatlarından daha az memnundurlar.

Ward ve Wackman (1971), tüketicilerin materyalizmi sosyalleşme aracı olarak gördüklerini belirtmektedirler. Materyalist eğilimi olan tüketicilerin daha iyi bir statüde görünmeye ve maddi öğelere ulaşabilme başarılarıyla toplum içinde yer edinmeye çalıştıkları söylenebilir. Odabaşı (2017), materyalist tüketicilerin hayatlarının merkezinde mülk edinme olduğunu, mülk sahibi olmayı başarı olarak gördüklerini ve bu şekilde mutlu olacaklarına inandıklarını belirtmektedir. Materyalist eğilimi olan tüketiciler için edinmiş oldukları mülkiyet bir başarı sembolüdür (Dingus, 2014). Holt (1995) ve Browne ve Kaldenberg (1997) materyalizmin bir kişilik özelliği olduğunu belirtmektedirler. Belk (1984) ise materyalist tüketicilerin kıskanç, cimri ve mülkiyetçi olduklarını söylemektedir.

Materyalizm, dünyevi ürünlere yönelik sahip olma arzusu içerdiğinden doğrudan tüketimle ilişkilidir ve bu konuda yapılmış çeşitli araştırmalar mevcuttur. Ger ve Belk (1996), materyalist eğilimin kültürden kültüre değişiklik gösterdiğini belirtmektedirler. Araştırmada elde edilen sonuçlara göre materyalizm ne Batı'ya özgüdür ne de doğrudan refahla ilgilidir. Örneğin Rumenler Amerikalılara göre daha materyalistlerdir. Materyalizmin, moda giyim üzerinde etkisi olduğu tespit edilmiştir (O'Cass, 2001). Materyalist tüketiciler, satın

alımlarında daha stratejik davranarak maddi öğelerle mutlu olmak için satın alım yapmaktadırlar (Xu, 2008).

Balıkçioğlu ve Volkan (2016), yapmış oldukları araştırmada materyalist eğilim arttıkça gösteriş tüketimi eğiliminin arttığını, sosyal medyanın, akran iletişiminin materyalist eğilim düzeylerinde etkili olduğunu tespit etmişlerdir. Danacı (2020), materyalist eğilimin hedonik tüketim ve kompulsif satın almada etkili olduğunu belirtmektedir. Akkaya vd. (2021), materyalizm ve marka sadakati arasında anlamlı bir ilişki olduğunu göstermişlerdir.

#### 4. AMİSH TOPLULUĞU

Amishler, tarihi 1600'lü yıllara dayanan bir topluluktur (Tharp, 2007). Bu topluluk, Kuzey Amerika'nın kırsal kesimlerinde yaşayan İsviçreli/Alman, Anabaptist-Hıristiyan bir halktır (Anderson ve Potts, 2020). Benzersiz ve disiplinli yaşam biçimleriyle birçok araştırmacının ilgisini çeken bu topluluk günümüz modern dünyasından yalıtılmış bir yaşam sürmektedir. Amishler, Jacob Ammann isimli bir kilise liderinin liderlik yaptığı Anabaptist hareketinin en muhafazakar mezhebini oluşturmaktadırlar ve Kutsal Kitap'a geri dönüş yapılması gerektiğini savunmaktadırlar (Çavuş vd., 2021). Dolayısıyla Katolik ve Protestanların öğretilerinden farklılaşan bir inanç sistemleri vardır. İnanç sistemleri çok katıdır ve kilise doktrinine uymayan üyeler Amish yaşam tarzını yerine getirmediklerinden diğer üyeler tarafından Meidung'u (kaçınma) uygulanır (Kraybill, 2001).

Amishler, dini inançları ve inançlarının gereklilikleri olan yaşam kurallarını uygulayarak kendilerini modern dünyadan kasıtlı olarak soyutlamış olan bir toplumsal alt gruptur (Fuchs vd., 1990). Bu topluluk üyeleri genellikle çiftçilik yaparak geçinmektedirler. Bazıları küçük işletmeler kurarak mobilya, mobil evler veya ahırlar inşa etmekte veya el sanatları yapıp satarak veya gıda maddeleri üreterek geçimlerini sağlamaktadırlar (Howley vd., 2008). Bu geçim tarzları, hem dini ilkelerine hem de yaşam biçimlerine uygun bir geçim şeklidir (Hostetler, 1993). Günümüz teknolojik aletlerini kullanmayı reddetmektedirler. Aslında teknolojiye karşı bu reddedişlerinin arkasında dini gerekçeleri dışında kültürel bir tavır da bulunmaktadır. Nitekim alçakgönüllülük, eşitlik ve sadelik gibi değerleri destekleyen teknolojileri seçmektedirler ki bu çok sınırlıdır, örneğin onlar için otomobiller çekicidir, hızlıdır ve mütevazı değildir ancak at arabaları öyle değildir (Wetmore, 2007). Amishlerin modern dünyanın yaşam şeklini reddetmeleri, benzersiz kimliklerini korumaya yardımcı olmaktadır (Wetmore, 2007).

Amishlerin karakteristik bazı yaşam ilkeleri şu şekilde özetlenebilir (Yayla, 1997; Öztürk, 2010): Şiddete karşı çıkan Amishler askerlik yapmayı reddederler. Dünyevi şeylerden uzak kalmak istediklerinden elektrik veya telefon gibi şeylerden uzak kalmaktadırlar. Zorunda kaldıklarında ankesörlü telefon kullanmaktadırlar. Çalışkan olmak, sade yaşamak, dürüstlük

önemli ilkeleri arasındadır. Güneş doğmadan çalışmaya başlarlar ve güneş battıktan kısa bir süre sonra yatarlar. Eğlence gibi aktiviteler hayatlarında yer almaz ve çocuklar sıkı bir disiplinle yetiştirilmektedir. Gereksiz harcamalardan kaçınırlar. Oy vermeyi reddetmektedirler. Genellikle siyah veya beyaz renklerde ve sade giyimi tercih etmektedirler. Bu araştırmada, günümüz koşullarına adapte bir şekilde yaşayan tüketicilerin Amish topluluğunun (basit, sade ve disiplinli yaşam şekilleri çerçevesinde) bir üyesi olmak isteyip istemeyecekleri üzerinden yürütülmüştür. Dini inançlardan bağımsız, Amish topluluğunun yaşam ritüelleri sözlü ve görsel olarak aktarılan tüketicilere bu şekilde yaşamak isteyip istemeyecekleri sorulmuştur. Böylece bu tüketicilerin materyalist eğilimleri ile statü tüketimleri arasındaki ilişki incelenmiştir. Sonuç olarak, tüketicilerin günümüz teknolojik koşullarına ve tüketim davranışlarına rağmen geleneksel yaşam biçimleri üzerine bir bakış açısı ortaya konulmaya çalışılmıştır.

## 5. ARAŞTIRMA ve BULGULAR

### Araştırmanın Amacı

Bu çalışmanın amacı; tüketicilerin materyalist eğilimleri ile statü tüketimleri arasındaki ilişkiyi incelemektir. Bu ilişki ele alınırken Amishler örneği üzerinden tüketicilerin; basit, sade ve geleneksel bir yaşam tarzına olan bakış açıları ele alınacaktır. Araştırmada ayrıca bu tüketicilerin meslekleri ile materyalist eğilimleri ve statü tüketimleri arasındaki ilişki değerlendirilecektir. Elde edilen sonuçlar doğrultusunda işletmelerin pazar bölümlendirmede daha isabetli hedef kitleye ulaşabilmeleri ve tutundurma çalışmalarında bu doğrultuda stratejiler geliştirmeleri hedeflenmektedir. Araştırma sonuçları ile ilgili literatüre ve araştırmacılara katkıda bulunulacaktır.

### Araştırmanın Önemi

Demografik özellikler pazar bölümlendirmenin önemli bir ölçütüdür. Belirli bir geliri ve yaşam tarzını temsil etme özelliği olan meslekler, bu ölçütler arasında önemli bir yere sahiptir. İlgili literatüre bakıldığında tüketicilerin meslekleri ile statü tüketimleri ve materyalist eğilimleri arasındaki ilişki ile ilgili çok az çalışma olduğu görülmüştür. Bu nedenle materyalist eğilim ve statü tüketiminin tüketicilerin meslekleri ile ilişkisi tespit



edilerek bu mesleklere yönelik, işletmelerin spesifik stratejiler geliştirebilmeleri ve dolayısıyla emek, zaman ve masraftan tasarruf edebilmeleri önemlidir. Tüketicilerin materyalist eğilimleri ile statü tüketimleri arasındaki ilişki, özellikle bu yönde pazarlama faaliyeti yürüten işletmeler açısından pazarlama

politikalarını yönlendirebilmeleri için önem taşımaktadır. Bu çalışma sonucunda elde edilen verilerle hem işletmelere öneriler geliştirilecek hem de literatüre katkı sunulacaktır.

### **Araştırmanın Örnekleme**

Araştırmanın evreni, Türkiye'deki 18 yaşından büyük tüketicileri kapsamaktadır. Kolayda örnekleme yöntemi ile 452 katılımcıya ulaşılmıştır. Bu örnekleme yöntemi, araştırmanın hedef kitlesinin olabileceği yerlerden keyfi olarak birimlerin seçildiği birimlerle yapılmaktadır (Şahan ve Özgenel, 2021). Örneklemin büyüklüğü hesaplanırken hata payı %5 alınmıştır, güven aralığı ise %95 olarak belirlenmiştir. Anketler, 15 Temmuz-15 Eylül 2022 tarihleri arasında yüz yüze uygulanmıştır. Yüz yüze anketler, Samsun ve Ankara'da yer alan dernek, hastane, belediye, okul, sendika, üniversite, lokâl ve kültür merkezlerinde uygulanmıştır. Ankara Türkiye'nin gelişmiş ve kozmopolit bir şehridir. Samsun ise Karadeniz Bölgesi'nin en gelişmiş şehridir ve araştırmacının görev yaptığı kurum bu şehirde yer almaktadır. Yanlış veya eksik doldurulmuş 13 anket değerlendirmeye alınmamıştır. Toplam 439 anket değerlendirmeye alınmıştır.

### **Veri Toplama Yöntemi ve Aracı**

Çalışmada kullanılan anket, dört bölümdür. İlk olarak anketler uygulanmadan önce katılım sağlamak isteyen tüketicilere Amish topluluğunun yaşam tarzını aktaran kısa bir video içeriği izlettirilmiştir. Daha sonra, tüketicilerin basit, sade ve tüketimden uzak bir yaşamı zihinlerinde canlandırabilmeleri için yazar tarafından bir senaryo kurgulanmıştır. Tüketicilere aktarılan senaryo şu şekildedir "Amish Topluluğu Amerika'nın Doğu yakasındaki çeşitli eyaletlerde yaşayan 200 bin kişiden oluşan bir topluluktur. Bu topluluk yaşam tarzlarıyla diğer topluluklardan farklılaşmaktadır. Yaşamlarını birtakım kurallarla şekillendirmektedirler. Örneğin sadece siyah ve beyaz renkte giyinmekte, gösterişli olduğunu düşündükleri için kıyafetlerinde düğme kullanmamakta, teknolojik ürünleri kullanmayı reddetmektedirler. Genellikle çiftçilik yaparak geçinen bu topluluk üyeleri tarlalarını hayvan ve insan gücüyle sürmektedirler. Şiddetten uzak, sade, çalışkan ve dürüst bir yaşamı benimseyen Amishler, güne güneş doğmadan başlarlar ve güneş battıktan kısa bir süre sonra yatarlar. Topluluk bireyleri lüzumsuz gördükleri her şeyin tüketimini reddederler, hayatın tadını çıkarmaya

yönelik aktiviteler çok azdır ve son derece disiplinlidirler. Okuduğunuz bu bilgiler doğrultusunda elinizde Amish Topluluğu'na benzer bir topluluğun üyesi olma imkânınız olduğunu düşünün. Bu senaryodaki gibi yaşama ihtimalinizi hayal ederek lütfen aşağıdaki soruyu yanıtlayın.” Senaryo tekniği, eş zamanlı yanıt alabilme imkânı verdiği için ve daha gerçekçi sonuçlara ulaşmayı sağladığından etkili bir yöntemdir (Marta vd., 2003). Bu bölümde tüketiciler, Amishler gibi bir topluluğun üyesi olmayı isteyip istemediklerini belirtmektedirler. İkinci

bölümde tüketicilerin materyalist eğilimlerini ölçmek için Richins and Dawson (1992) tarafından geliştirilen 18 ifadeli ölçek kullanılmıştır. Üçüncü bölümde ise statü tüketimi eğilimi için Kilsheimer (1993) tarafından geliştirilen 14 ifadeli ölçek kullanılmıştır. Her iki ölçek de tek faktörlüdür. Ölçekte yer alan ifadeler, 5'li Likert ölçeğinde sorulmuştur (1-Kesinlikle Katılmıyorum, 2-Katılmıyorum, 3-Kararsızım, 4-Katılıyorum, 5-Kesinlikle Katılıyorum). Dördüncü bölümde ise katılımcıların cinsiyet, yaş, eğitim, gelir durumları ve mesleklerin olduğu demografik bilgileri içeren sorular yer almaktadır. Araştırma kapsamında ankete dahil edilen meslek grupları literatür taranarak belirlenmiştir (Aslay vd., 2013; Keskin ve Baş, 2015; Özden, 2019). Meslek grupları şu şekildedir; doktorlar, öğrenciler, iş yeri sahipleri, öğretmenler, emekliler, işçiler ve akademisyenler.

#### **Araştırmanın Hipotezleri ve Modeli**

Materyalist eğilim ile statü tüketimi arasında anlamlı bir ilişki olduğu sonucuna ulaşan araştırmalar mevcuttur (Heaney vd., 2005; Goldsmith vd., 2010; Podoshen ve Andrzejewski 2012; Chan vd., 2015; Tokgöz, 2018). Fitzmaurice ve Comegys (2006) materyalist eğilimi yüksek olan tüketicilerin statü sahibi ürünlere yöneldiklerini belirtmektedirler. Bu doğrultuda aşağıdaki hipotez geliştirilmiştir:

H1. Tüketicilerin statü tüketimleri ile materyalist eğilimleri arasında anlamlı bir ilişki bulunmaktadır.

Günümüzde bazı tüketicilerde eski günleri veya geleneksel yaşam tarzını özleme duygularının geliştiği söylenebilir. Vintage (geçmişe ait modanın günümüzde birebir kullanılması) veya retro (en az 20 yıl önceki döneme ait şeylerin moda tasarımında kullanımı) gibi moda akımları geçmişe ve eskiye özlem ve bu zamanları anma duygularının sonucunda gelişmiştir (Yetmen, 2011). Sürekli değişime maruz kalan tüketicilerin geçmişe özlem duymaları ve eski anlamları yeniden yaşama arzuları olağan bir süreçtir (Pınarbaşı ve Aysuna, 2017). Bu doğrultuda aşağıdaki hipotezler geliştirilmiştir:

H2. Amish toplumunun bir üyesi olmak isteyen ve istemeyen tüketicilerin materyalist eğilimleri farklılık göstermektedir.

H3. Amish toplumunun bir üyesi olmak isteyen ve istemeyen tüketicilerin statü tüketimleri farklılık göstermektedir.

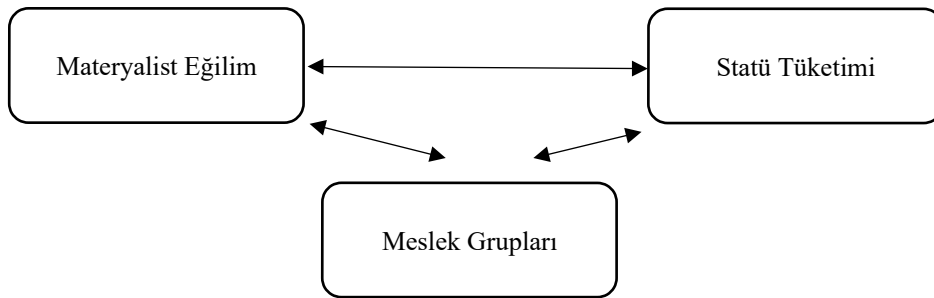
Çolak ve Görkem (2019), öğrencilerin maddi gelirleri ve yaşları nedeniyle materyalist eğilimlerinin düşük olduğunu belirtmektedirler. Özden (2019), tüketicilerin yaşam tarzları ve meslekleri ile statü tüketimleri arasında anlamlı bir ilişki olduğunu tespit etmiştir. Bu çalışmada aynı zamanda tüketicilerin meslekleri ile statü tüketimleri arasında anlamlı bir ilişki olduğu

görülmüştür. Eşitti ve Erdem (2021), tüketicilerin meslekleri ile statü temelli turizm tüketimi arasında anlamlı bir ilişki olduğunu tespit etmişlerdir. Bu doğrultuda aşağıdaki hipotezler geliştirilmiştir:

H4. Tüketicilerin meslekleri ile materyalist eğilimleri arasında anlamlı bir ilişki bulunmaktadır.

H5. Tüketicilerin meslekleri ile statü tüketimleri arasında anlamlı bir ilişki bulunmaktadır.

Bu hipotezler doğrultusunda geliştirilen araştırmanın modeli Şekil 1'deki gibidir.



Şekil 1. Araştırmanın Modeli

### Verilerin Analiz Yöntemi

Veriler IBM SPSS V23 ile analiz edildi. Normal dağılıma uygunluk Kolmogorov-Smirnov ve Shapiro-Wilk testleri incelendi. İkili gruplara göre normal dağılmayan verilerin karşılaştırılmasında Mann-Whitney U testi kullanıldı. Mesleklere göre normal dağılmayan ölçek puanlarının karşılaştırılmasında Kruskal Wallis testi kullanıldı ve çoklu karşılaştırmalar Dunn testi ile incelendi. Normal dağılmayan veriler arasındaki ilişkinin incelenmesinde Spearman's rho korelasyon katsayısı kullanıldı. Açıklayıcı faktör analizinde faktör çıkarımı

çin temel bileşenler analizi metodu ve döndürme işlemi için de varimax yöntemi kullanıldı.

Analiz sonuçları nicel veriler için ortanca (minimum – maksimum) şeklinde kategorik veriler frekans ve yüzde olarak sunuldu. Önem düzeyi  $p < 0,050$  olarak alındı.

## BULGULAR

Açıklayıcı faktör analizinde faktör çıkarımı için temel bileşenler analizi metodu ve döndürme işlemi için de varimax yöntemi kullanılmıştır. KMO değeri 0,701 ve Bartlett testi kıkare değeri de 1042,496 ( $p < 0,001$ ) olarak elde edilmiştir. Bu değerler veri setinin faktör analizi için uygunluğunu ortaya koymaktadır. 14 maddeden oluşan ölçeğin Extraction değerleri incelendiğinde madde 11'in 0,271 olarak elde edilmiş olup 0,3 aşağısında olduğu için ölçekte

çıkarılmıştır. Ölçekten çıkarıldıktan sonra analiz tekrarlanmıştır. Exctaction değeri 0,3 üzerinde ve Anti-image korelasyon matrisinde de köşegen değerlerinin tamamının 0,5'in üzerinde olduğu elde edilmiştir. Döndürülmüş bileşenler matrisinde faktör yükleri incelendiğinde bazı maddelerin birden fazla faktör altında yer aldığı elde edilmiştir. Bir maddenin iki farklı faktör altında yer alması faktör analizi için kabul edilebilir bir durum olmadığından ve bir maddenin farklı faktörler altındaki değerleri arasındaki farkın 0,1'den küçük olması durumuna ölçekten çıkartılması gerekmektedir. Madde 2, 6, 4 maddeleri başka faktörler altında da yer aldığı için bu maddeler ölçekten çıkarılmıştır. Toplamda 4 madde ölçekten çıkarılmıştır. Bu maddelerde ölçekten çıkarıldıktan sonra elde edilen sonuçlar Tablo 1'de sunulmuştur.

**Tablo 1.** Statü Ölçeği'nin açıklayıcı faktör analizi

	Faktör 1	Faktör 2	Faktör 3	Extraction (Çıkarım)
Sosyal gruplara katılmaktan hoşlanırım*	-0,778			0,611
Sosyal bir insan olduğumu düşünmüyorum	0,755			0,589
Sosyal etkinliklerden hoşlanmam	0,729			0,538
Yeni insanlarla tanışmaktan hoşlanmam	0,716			0,514
Yalnız olmayı başkalarıyla olmaya tercih ederim	0,572			0,334
Statüsü olan yeni ürünlerle ilgilenirim		0,778		0,609
Bir ürün gösterişli ise benim için daha değerlidir		0,678		0,471
Statüye sahip olan ürünler için daha fazla para ödeyebilirim		0,676		0,465
Ürünleri yalnızca fonksiyonel amaçları için satın alırım*			-0,848	0,719
Göstermelik nedenlerle ürün satın alırım			0,825	0,705
Öz-değer	2,557	1,554	1,445	
VAO	25,575	15,536	14,452	
KVAO	25,575	41,111	55,564	

Madde çıkarma işlemleri gerçekleştirildikten sonra KMO değeri 0,689 ve Bartlett testi kıkare değeri de 742,054 (p<0,001) olarak elde edilmiştir. Bu değerler veri setinin faktör analizi için uygunluğunu ortaya koymaktadır. Analiz sonucunda 3 faktörlü bir yapı ortaya konmuştur. Toplamda 3 faktör ile toplam varyansın %55,56'lık kısmı açıklanmaktadır.

Faktör 1'e ait ölçek ifadelerinin, diğer tüketicilerle ilişkiler üzerine olduğu görülmüş ve bu faktöre "sosyal faktör" adı verilmiştir. Faktör 2'ye ait ölçek ifadelerine bakıldığında statüsü olan ürünlere kişisel olarak öncelik verme üzerine olduğu görülmüş ve bu faktöre "kişisel faktör" ve son olarak faktör 3'e ait ifadelerin statüsü olan ürünlere ayrılan bütçe ile ilgili olduğundan bu

faktöre "finansal faktör" adı verilmiştir. Materyalizm Ölçeği'nin açıklayıcı faktör analizi Tablo 2'de sunulmuştur.

**Tablo 2.** Materyalizm Ölçeği'nin açıklayıcı faktör analizi

	Faktör 1	Extraction (Çıkarım)
Daha fazla maddi varlığı satın almaya mali gücüm yetseydi daha mutlu olabilirdim.	0,917	0,841
Fonksiyonel olmayan şeyler için de para harcamak hoşuma gider.	0,911	0,830
Hayatımda lüksü severim.	0,904	0,817
Sahip olmadığım şeylere sahip olsaydım daha iyi bir hayatım olabilirdi.	0,887	0,786
Hayattaki en önemli başarılarından biri de maddi varlıkların kazanımıdır.	0,873	0,763
İnsanları etkileyen şeylere sahip olmak hoşuma gider.	0,863	0,745
Sahip olduğum maddi varlıklar hayatta ne kadar iyi şeyler yaptığımı anlatır.	0,859	0,738
Pahalı ev, araba, giysi satın alan insanlara hayranlık duyarım.	0,853	0,727
Mümkün olduğunca mal mülk kaygısından uzak olacak kadar basit yaşamaya çalışıyorum.*	-0,844	0,712
Sahip olduğum maddi varlıklar benim için önemli değildir.*	-0,835	0,698
Daha iyi maddi varlığa sahip olmak beni daha fazla mutlu etmezdi*	-0,826	0,682
İnsanların sahip oldukları şeylerin miktarını başarının bir göstergesi olarak görmem.*	-0,812	0,660
Satın aldığım şeyler beni mutlu eder.	0,810	0,656
Hoşlandığım şeyleri satın almaya gücüm yetmediği bazı zamanlar canım çok sıkılabiliyor	0,769	0,592
Genellikle sadece ihtiyaç duyduğum şeyleri satın alırım.*	-0,761	0,579
Hayattan zevk almak için gerekli her şeye sahibim.*	-0,741	0,550
Diğer insanların sahip olduğu maddi varlıklara çok dikkat etmem.*	-0,725	0,526
Sahip olduğum her şey iyi bir hayat geçirmek için ihtiyaç duyduğumdur.	0,616	0,380
Öz-değer	12,28 1	
VAO	68,22 8	

KVAO	68,22 8	
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K-M-O= 0,969; Bartlett: 8230,874;  $p < 0,001$ , \*ters maddeler, VAO: Varyans açıklama oranı, KVAO: Kümülatif varyans açıklama oranı

Açıklayıcı faktör analizinde faktör çıkarımı için temel bileşenler analizi metodu ve döndürme işlemi için de varimax yöntemi kullanılmıştır. KMO değeri 0,969 ve Bartlett testi kıkare değeri de 8230,874 ( $p < 0,001$ ) olarak elde edilmiştir. Bu değerler veri setinin faktör analizi için uygunluğunu ortaya koymaktadır. 18 maddeden oluşan ölçeğin Extraction değerleri incelendiğinde 0,3 üzerinde ve Anti-image korelasyon matrisinde de köşegen değerlerinin tamamının 0,5'in üzerinde olduğu elde edilmiştir. Tek faktörlü bir yapı elde edilmiş olup herhangi bir madde çıkarımı yapılmamıştır. Ölçeklere ait güvenilirlik sonuçları Tablo 3 ve Tablo 4'te sunulmuştur.

**Tablo 3.** Materyalizm Ölçeği'ne ait güvenilirlik sonucu

	Ortalama	S. sapma	Cronbach's alfa
Pahalı ev, araba, giysi satın alan insanlara hayranlık duyarım.	2,932	1,484	0,972
Hayattaki en önemli başarılarından biri de maddi varlıkların kazanımıdır.	3,093	1,638	
İnsanların sahip oldukları şeylerin miktarını başarının bir göstergesi olarak görmem.	3,123	1,532	
Sahip olduğum maddi varlıklar hayatta ne kadar iyi şeyler yaptığımı anlatır.	3,077	1,586	
İnsanları etkileyen şeylere sahip olmak hoşuma gider.	3,549	1,490	
Diğer insanların sahip olduğu maddi varlıklara çok dikkat etmem.	3,171	1,464	
Genellikle sadece ihtiyaç duyduğum şeyleri satın alırım.	2,729	1,456	
Mümkün olduğunca mal mülk kaygısından uzak olacak kadar basit yaşamaya çalışıyorum.	3,087	1,481	
Sahip olduğum maddi varlıklar benim için önemli değildir.	3,629	1,442	
Fonksiyonel olmayan şeyler için de para harcamak hoşuma gider.	3,324	1,606	
Satın aldığım şeyler beni mutlu eder.	3,761	1,430	
Hayatımda lüksü severim.	3,212	1,635	
Hayattan zevk almak için gerekli her şeye sahibim.	3,139	1,458	
Sahip olduğum her şey iyi bir hayat geçirmek için ihtiyaç duyduğlarımdır.	3,986	1,264	
Sahip olmadığım şeylere sahip olsaydım daha iyi bir hayatım olabilirdi.	3,462	1,588	
Daha iyi maddi varlığa sahip olmak beni daha fazla mutlu etmezdi	3,604	1,460	
Daha fazla maddi varlığı satın almaya mali gücüm yetseydi daha mutlu olabilirdim.	3,499	1,561	
Hoşlandığım şeyleri satın almaya gücüm yetmediği bazı zamanlar canım çok sıkılabiliyor	2,866	1,501	

Toplamda 18 maddeden oluşan Materyalizm Ölçeği'nin cronbach's alfası 0,972 olarak elde edilmiş olup ölçek yüksek güvenilirlikte elde edilmiştir.

**Tablo 4.** Statü Ölçeği'ne ait güvenilirlik sonucu

Faktör	Maddeler	Ortalama	S. sapma	Cronbach's alfa
Sosyal	Sosyal bir insan olduğumu düşünmüyorum	2,153	1,230	0,757
	Sosyal etkinliklerden hoşlanmam	1,738	0,983	
	Yalnız olmayı başkalarıyla olmaya tercih ederim	1,852	1,099	
	Sosyal gruplara katılmaktan hoşlanırım	1,904	1,166	
	Yeni insanlarla tanışmaktan hoşlanmam	1,959	1,162	
Kişisel	Statüsü olan yeni ürünlerle ilgilenirim	4,469	0,880	0,523
	Statüye sahip olan ürünler için daha fazla para ödeyebilirim	4,563	0,814	
	Bir ürün gösterişli ise benim için daha değerlidir	4,617	0,727	
Finansal	Göstermelik nedenlerle ürün satın alırım	4,312	1,049	0,603
	Ürünleri yalnızca fonksiyonel amaçları için satın alırım	4,103	1,103	

Genel Cronbach's alfa 0,637

Ölçeğe ait genel cronbach's alfa katsayısı 0,637 olarak elde edilmiş olup ölçek oldukça güvenilir elde edilmiştir. Sosyal, kişisel ve finansal faktörlerin ise cronbach's alfa katsayıları sırasıyla 0,757, 0,523, 0,603 olarak elde edilmiştir.

Katılımcıların demografik verileri Tablo 5'te sunulmuştur.

**Tablo 5.** Demografik özellikler

	Frekans (n)	Yüzde (%)
Cinsiyet		
Kadın	236	53,8
Erkek	203	46,2
Yaş		
18- 28 yaş arası	70	15,9
29-39 yaş arası	112	25,5
40-50 yaş arası	140	31,9
51 yaş ve üzeri	117	26,7
Eğitim durumu		
İlköğretim	20	4,6
Lise	83	18,9
Ön Lisans	101	23
Lisans	153	34,9
Yüksek Lisans	40	9,1
Doktora	42	9,6
Meslek		
Akademisyen	57	13
Doktor	44	10
Emekli	52	11,8
İş Yeri Sahibi	59	13,4
İşçi	53	12,1
Memur	63	14,4
Öğrenci	55	12,5
Öğretmen	56	12,8

Aylık gelir		
Asgari ücretten az	51	11,6
5.500-10.500 TL	115	26,2
10.501-15.500 TL	98	22,3
15.501-20.500 TL	106	24,1
20.501 TL üzeri	69	15,7
Amish Topluluğu'nun bir üyesi olmak isterim.		
Hayır	192	43,7
Evet	247	56,3

Katılımcıların %56,3'ü Amish Topluluğu'nun bir üyesi olmak isterken %43,7'si istememektedir. Katılımcıların %53,8'inin kadın, %31,9'unun 40-50 yaş aralığında olduğu, %34,9'unun lisans, %14,4'ünün memur, %26,2'sinin 5.500-10.500 TL aralığında aylık gelirin olduğu görülmüştür.

Katılımcıların meslek gruplarına göre Amish Topluluğu'nun bir üyesi olma istekleri Tablo 6'da sunulmuştur.

**Tablo 6. Mesleklere göre Amish Topluluğu'nun üyesi olma istekliliği**

		Frekans (n)	Yüzde (%)
Akademisyen	Evet	40	70,1
	Hayır	17	29,8
Doktor	Evet	5	11,3
	Hayır	39	88,6
Emekli	Evet	45	86,5
	Hayır	7	13,4
İş Yeri Sahibi	Evet	5	8,4
	Hayır	54	91,5
İşçi	Evet	44	83,01
	Hayır	9	15,2
Memur	Evet	50	79,3
	Hayır	13	20,6
Öğrenci	Evet	8	14,5
	Hayır	47	85,4
Öğretmen	Evet	50	89,2
	Hayır	6	10,7

Tablo 6'da görüldüğü gibi doktor, işyeri sahibi ve öğrenciler sırasıyla %88,6; %91,5 ve %85,4 oranlarında Amish Topluluğu gibi bir grubun üyesi olmak istemeyeceklerini belirtmektedirler. Ölçeklerin tanımlayıcı istatistikleri Tablo 7'de sunulmuştur.

**Tablo 7. Ölçek puanlarına ait tanımlayıcı istatistikler**

	Ortalama	S. sapma	Ortanca	Minimum	Maksimum
Materyalizm puanı	3,29	1,24	3,83	1,22	4,94



Sosyal Faktör (Statü Ölçeği)	1,92	0,81	1,80	1,00	4,40
Kişisel Faktör (Statü Ölçeği)	4,55	0,58	4,67	2,00	5,00
Finansal Faktör (Statü Ölçeği)	4,21	0,91	4,50	1,00	5,00
Statü Ölçeği genel puan	3,17	0,50	3,00	2,20	4,60

Materyalizm puan ortalaması 3,29, Statü Ölçeği'nin sosyal faktör ortalaması 1,92; kişisel faktör ortalaması 4,55 ve finansal faktör ortalaması 4,21 olarak elde edilmiş olup Statü Ölçeği genel puan ortalaması 3,17 olarak elde edilmiştir. Materyalizm Ölçeği ile Statü Ölçeği arasındaki ilişkinin incelenmesi Tablo 8'de sunulmuştur.

**Tablo 8.** Materyalizm Ölçeği ile Statü Ölçeği arasındaki ilişkinin incelenmesi

	Materyalizm puanı	
	r	p
Sosyal Faktör (Statü Ölçeği)	0,158	<b>0,001</b>
Kişisel Faktör (Statü Ölçeği)	0,346	<b>&lt;0,001</b>
Finansal Faktör (Statü Ölçeği)	0,017	0,715
Statü Ölçeği genel puan	0,233	<b>&lt;0,001</b>

r: Spearman's rho korelasyon katsayısı

Materyalizm ile statü tüketiminin sosyal faktörü arasında istatistiksel olarak anlamlı pozitif yönlü çok zayıf bir ilişki bulunmuştur ( $r=0,158$ ;  $p=0,001$ ). Materyalizm ile statü tüketiminin kişisel faktörü arasında istatistiksel olarak anlamlı pozitif yönlü zayıf bir ilişki bulunmuştur ( $r=0,346$ ;  $p<0,001$ ). Materyalizm ile statü tüketiminin finansal faktörü arasında istatistiksel olarak anlamlı pozitif yönlü zayıf bir ilişki bulunmuştur ( $r=0,233$ ;  $p<0,001$ ). Bu doğrultuda “H1. Tüketicilerin statü tüketimleri ile materyalist eğilimleri arasında anlamlı bir ilişki bulunmaktadır.” hipotezi reddedilememiştir. Amish Topluluğu'nun bir üyesi olmayı isteme ve mesleklere göre ölçek puanlarının karşılaştırılması Tablo 9'da sunulmuştur.

**Tablo 9.** Amish Topluluğu'nun bir üyesi olmayı isteme ve mesleklere göre ölçek puanlarının karşılaştırılması

	Materyalizm puanı	Sosyal faktör	Kişisel faktör	Finansal faktör	Statü Ölçeği genel puan
Amish Topluluğu'nun bir üyesi olmak isterim.					
Hayır	4,44 (2,22 - 4,94)	1,80 (1,00 - 4,40)	5,00 (2,00 - 5,00)	4,50 (1,50 - 5,00)	3,10 (2,20 - 4,60)
Evet	2,17 (1,22 - 4,56)	1,60 (1,00 - 4,00)	4,67 (2,33 - 5,00)	4,50 (1,00 - 5,00)	3,00 (2,20 - 4,40)
Test ist.	3523,500	23372,000	17570,500	22970,000	21954,000
p*	<b>&lt;0,001</b>	0,795	<b>&lt;0,001</b>	0,560	0,181
Meslek					
Akademisyen	2,28 (1,61 - 4,33)a	1,80 (1,00 - 3,60)ac	5,00 (2,33 - 5,00)a	4,50 (2,00 - 5,00)ac	3,00 (2,60 - 4,30)a
Doktor	4,39 (3,78 - 4,89)b	1,60 (1,00 - 4,00)ab	5,00 (4,33 - 5,00)ac	4,50 (3,00 - 5,00)acd	3,20 (2,40 - 4,30)ac
Emekli	1,83 (1,22 - 4,72)a	2,00 (1,00 - 3,00)ac	4,33 (2,67 - 5,00)b	4,00 (1,00 - 5,00)d	3,00 (2,20 - 3,60)a
İş Yeri Sahibi	4,72 (3,39 - 4,94)b	2,20 (1,00 - 3,80)c	5,00 (4,33 - 5,00)c	4,50 (4,00 - 5,00)ac	3,40 (2,80 - 4,40)c
İşçi	2,44 (1,78 - 4,56)a	1,60 (1,00 - 4,40)ac	4,67 (3,00 - 5,00)ab	4,50 (2,00 - 5,00)ac	3,10 (2,60 - 4,60)a
Memur	1,72 (1,28 - 4,56)a	1,60 (1,00 - 3,20)a	4,33 (2,00 - 5,00)b	4,50 (2,00 - 5,00)cd	3,00 (2,30 - 4,00)a
Öğrenci	4,33 (3,50 - 4,78)b	1,40 (1,00 - 2,00)b	4,67 (4,00 - 5,00)ac	3,00 (1,50 - 4,50)b	2,70 (2,20 - 3,10)b
Öğretmen	2,31 (1,22 - 4,50)a	1,70 (1,00 - 3,80)a	4,67 (3,67 - 5,00)ac	5,00 (4,00 - 5,00)a	3,30 (2,70 - 4,40)ac
Test ist.	239,886	58,626	105,630	111,700	119,453
p**	<b>&lt;0,001</b>	<b>&lt;0,001</b>	<b>&lt;0,001</b>	<b>&lt;0,001</b>	<b>&lt;0,001</b>

\*Kruskal Wallis testi, \*\*Mann-Whitney U testi, a-d: Aynı harfe sahip meslekler arasında bir fark yoktur, ortanca (minimum – maksimum)

Amish Topluluğu'nun bir üyesi olmayı istemeye göre materyalizm puan ortancaları arasında istatistiksel olarak anlamlı bir fark bulunmuştur ( $p<0,001$ ). Üye olmak istemeyenlerin ortancası 4,44 iken üye olmak isteyenlerin ortancası 2,17 olarak elde edilmiştir.

Bu doğrultuda “H2. Amish toplumunun bir üyesi olmak isteyen ve istemeyen tüketicilerin materyalist eğilimleri farklılık göstermektedir.” hipotezi reddedilememiştir.

Amish Topluluğu'nun bir üyesi olmayı istemeye göre statü tüketiminin kişisel faktör puan ortancaları arasında istatistiksel olarak anlamlı bir fark bulunmuştur ( $p<0,001$ ). Üye olmak istemeyenlerin ortancası 5,00 iken üye olmak isteyenlerin ortancası 4,67 olarak elde edilmiştir. Amish Topluluğu'nun bir üyesi olmayı istemeye göre diğer puan ortancaları arasında bir farklılık elde edilmemiştir ( $p>0,050$ ).

Bu doğrultuda “H3. Amish toplumunun bir üyesi olmak isteyen ve istemeyen tüketicilerin statü tüketimleri farklılık göstermektedir.” hipotezi reddedilememiştir.

Mesleklere göre materyalizm puan ortancaları arasında bir farklılık vardır ( $p<0,001$ ). Akademisyenlerin ortancası 2,28, doktorların ortancası 4,39, emeklilerin ortancası 1,83, iş yeri sahiplerin ortancası 4,72, işçilerin ortancası 2,44, memurların ortancası 1,72, öğrencilerin ortancası 4,33, öğretmenlerin ortancası 2,31 olarak elde edilmiştir. Bu farklılık doktorlar, iş yeri sahipleri, öğrenciler ile diğer meslek grupları arasındaki iken bu üç meslek grubu arasında bir farklılık yoktur.

Bu doğrultuda “H4. Tüketicilerin meslekleri ile materyalist eğilimleri arasında anlamlı bir ilişki bulunmaktadır.” hipotezi reddedilememiştir.

Mesleklere göre statü tüketiminin sosyal faktörü puan ortancaları arasında bir farklılık vardır ( $p<0,001$ ). Akademisyenlerin ortancası 1,80, doktorların ortancası 1,60, emeklilerin ortancası 2,00, iş yeri sahiplerin ortancası 2,20, işçilerin ortancası 1,60, memurların ortancası 1,60, öğrencilerin ortancası 1,40, öğretmenlerin ortancası 1,70 olarak elde edilmiştir. Mesleklere göre statü tüketiminin kişisel faktörü puan ortancaları arasında bir farklılık vardır ( $p<0,001$ ). Akademisyenlerin ortancası 5,00, doktorların ortancası 5,00, emeklilerin ortancası 4,33, iş yeri sahiplerin ortancası 5,00, işçilerin ortancası 4,67, memurların ortancası 4,33, öğrencilerin ortancası 4,67, öğretmenlerin ortancası 4,67 olarak elde edilmiştir. Mesleklere göre statü tüketiminin finansal faktörü puan ortancaları arasında bir farklılık vardır ( $p<0,001$ ). Akademisyenlerin ortancası 4,50, doktorların ortancası 4,50, emeklilerin ortancası 4,00, iş yeri sahiplerin ortancası 4,50, işçilerin ortancası 4,50, memurların ortancası 4,50, öğrencilerin ortancası 3,00, öğretmenlerin ortancası 5,00 olarak elde edilmiştir. Mesleklere göre Statü

Ölçeği genel puan ortancaları arasında bir farklılık vardır ( $p<0,001$ ). Akademisyenlerin ortancası 3,00,

doktorların ortancası 3,20, emeklilerin ortancası 3,00, iş yeri sahiplerin ortancası 3,40, işçilerin ortancası 3,10, memurların ortancası 3,00, öğrencilerin ortancası 2,70, öğretmenlerin ortancası 3,30 olarak elde edilmiştir. Meslek gruplarına ait çoklu karşılaştırma sonuçları ise Tablo 7’de harflendirme ile gösterilmiştir.

Bu doğrultuda “H5. Tüketicilerin meslekleri ile statü tüketimleri arasında anlamlı bir ilişki bulunmaktadır.” hipotezi reddedilememiştir.

## SONUÇ

Statü tüketimi, ürün ve marka tercihinde önemli bir faktördür (Tsai, 2005; Nelissen ve Meijers, 2011). Bu nedenle statü tüketimi ile ilgili araştırmaların ve etkileyen faktörlerin ele alınması önem taşımaktadır. Bu araştırmada öncelikle tüketicilerin materyalist değerleri ile statü tüketimleri arasındaki ilişki ele alınmıştır. Elde edilen bulgulara göre tüketicilerin materyalist değerleri ile statü tüketimleri arasında anlamlı bir ilişki olduğu görülmüştür. İlgili literatürde yapılan araştırmalarda da benzer sonuçlara ulaşıldığı görülmektedir (Heaney vd., 2005; Goldsmith vd., 2010; Podoshen ve Andrzejewski 2012; Chan vd., 2015; Tokgöz, 2018). Materyalist değerlere sahip tüketiciler, maddiyata fazla önem vermektirler. Bu bireylerin statü tüketimi yapma eğiliminde olmaları şaşırtıcı değildir. Materyalist bireylerin, diğer tüketicilere statülerini göstermek ve sahip olduklarını ifşa etmek eğiliminde oldukları düşünülebilir.

Araştırma kapsamında tüketicilerin materyalist değerleri ile statü tüketimleri arasındaki ilişki ele alınırken tüketicilerin Amish Topluluğu’nda yaşamak isteyip istemeyecekleri de sorulmuştur. Amishler gibi bir toplulukta yaşamak istemeyen tüketicilerin materyalist eğilimleri ve statü tüketimleri diğer tüketicilere göre daha düşük çıkmıştır. Geleneksel bir yaşam özleminde olan tüketicilerin, materyalist değerlerinin ve statü tüketimi eğilimlerinin düşük olması beklenilebilir. Ancak bu araştırmada şaşırtıcı olan tüm katılımcıların materyalist eğilimlerinin statü tüketimi ile çok yakın ortancalara sahip olduğu tespit edilmiştir. Amish topluluğunda yaşamak isteyebilecek tüketicilerin materyalizm puanları düşük olduğu halde statü tüketimi eğilim puanlarının daha yüksek olduğu görülmektedir. Dolayısıyla tüketiciler, Amish topluluğu gibi geleneksel bir topluluğun parçası olmak isteseler dahi statü tüketimi eğiliminde olabilmektedirler. Bu durum, sosyal medya gibi platformların da etkisiyle tüketim ve gösterişe yönelik ilginin artmasından kaynaklandığı düşünülebilir. Ayrıca yaşam

standartlarının artmasının tüketicileri gösterişe sevk ettiğinden bu duruma sebep olduğu düşünülebilir (Kastanakis ve Balabanis, 2012).

Araştırmada son olarak tüketicilerin meslekleri ile statü tüketimleri ve materyalist eğilimleri arasında bir farklılık olup olmadığı ele alınmıştır. Elde edilen sonuçlara göre doktor, iş yeri sahibi ve öğrencilerin materyalizm puanları akademisyen, emekli, işçi, memur ve öğretmenlere göre daha yüksektir. Akademisyen, emekli, memur ve öğrencilerin statü tüketim eğilimleri ise doktor, iş yeri sahibi ve öğretmenlere göre daha düşüktür. Elde edilen bulgulara göre tüketicilerin mesleklerine göre statü tüketim eğilimleri arasında farklılık bulunmasına rağmen statü tüketimi genel puan ortancalarına bakıldığında puanların birbirlerine çok yakın olduğu görülmektedir. Dolayısıyla az önce de söylendiği gibi materyalist puanları düşük ve geleneksel yaşamlara özlem duyan tüketicilerin bile statü tüketim eğilimleri düşük değildir. Bu durumun günümüz tüketim toplumlarının bir göstergesi olduğu düşünülmektedir. Yapılan araştırmalarda çalışan tüketicilerin emekli ve işsiz tüketicilere göre ve öğrencilerin işsiz tüketicilere göre daha yüksek statü temelli turizm tüketimi yaptığı görülmüştür (Eşitti ve Erdem, 2021).

Elde edilen bu bulgulara göre uygulayıcı ve araştırmacılara aşağıdaki öneriler geliştirilmiştir:

- Materyalist değerler ile statü tüketimi arasında bir ilişki olduğundan maddiyatın önemine vurgu yapan özellikle lüks işletmeler, statü kazanımına yönelik tutundurma çalışmaları yapabilirler.
- Materyalist değerleri daha yüksek olan doktor, iş yeri sahibi ve öğrenci gruplarına yönelik yapılacak tutundurma faaliyetlerinde mutluluk, sahip olma, başarı, imaj, mülkiyet veya popülerlik gibi kavramlar üzerinde durulabilir.
- Akademisyen, öğretmen, memur, emekli ve işçi meslek gruplarına yönelik daha geleneksel temaların olduğu tutundurma faaliyetleri yapılabilir.
- Gelecekteki araştırmalar, materyalist eğilim ve statü tüketimi arasındaki ilişkiyi teknolojik ürünler, beyaz eşya veya hazır giyim gibi farklı sektörlerde ele alabilirler.

Bu araştırmanın sadece maddi ve zaman faktörleri nedeniyle Ankara ile Samsun'da yürütülmüş olması ve 439 tüketiciye ulaşılmış olması nedeniyle kısıtları bulunmaktadır. Gelecekteki araştırmaların Türkiye'nin farklı şehirlerinde, daha çeşitli meslek gruplarıyla ve daha geniş bir katılımcı sayısı ile daha kapsamlı olması sağlanabilir.

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## **MATEMATİK ÖĞRETİMİNİ PLANLAMAYA DAİR ÖĞRETMEN GÖRÜŞLERİNİN ÇEŞİTLİ DEĞİŞKENLERE GÖRE ANALİZİ**

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### **ÖZET**

Matematik öğretimi, bilim ve teknoloji ile doğrudan alakalı bir disiplindir. Çağımızda endüstri ve ekonominin bilim ve teknoloji tabanlı olması, matematik öğretimini her zamankinden daha önemli kılmaktadır. Etkili ve verimli bir matematik öğretiminde ise planlama çok önemlidir. Bu itibarla matematik öğretmenlerinin öğretimi planlama bilgi ve becerisine sahip olmaları önemli bir gerekliliktir. Bu araştırmanın amacı matematik öğretmenlerinin, öğretimi planlamaya dair görüşlerini belirlemek ve bunları çeşitli değişkenlere göre değerlendirmektir. Tarama modelinde yürütülen araştırmanın evreni, Siirt ilindeki resmi ortaokul ve liselerde görevli matematik öğretmenleridir. Örneklem ise bu evrenden amaçlı örnekleme ile belirlenmiş, gönüllü 118 matematik öğretmeninden oluşturulmuştur. Araştırma verileri anket formu ile toplanıp, SPSS paket programı aracılığıyla betimsel istatistiki teknikler kullanılarak çözümlenmiştir. Analizler sonucu, matematik öğretmenlerinin, etkili bir matematik öğretimi için planlamanın önemine inandıkları ve bu konudaki rol ve sorumluluklarını benimsedikleri anlaşılmıştır. Ancak bu sorumluluklarının yasal zemine dayandırılmasını benimsememişlerdir. Bu öğretmenlerin öğretimi planlamada referans aldıkları değişkenler; öğrenciler, öğretim programı, ders kitabı, merkezi sınavlar ve yöneticiler şeklinde sıralanmaktadır. Ancak bu öğretmenler, planlamada velileri dikkate almayı reddetmişlerdir. Araştırmaya katılan öğretmenler, öğretimi planlamada kendilerini yeterli görmekte olup; bu konuda çoğunlukla internette yararlanmaktadırlar. Bu durum, katılımcı öğretmenlerin çoğunlukla, teknolojik ortamda doğmuş olan Y Kuşağına mensup olmalarıyla ilişkilendirilmiştir. Araştırmada son olarak katılımcı matematik öğretmenlerinin, planlamada ilerlemeci ve yapılandırmacı yaklaşım ile esasici yaklaşım arasında kaldıkları ve bunun da Türkiye'deki eğitimin, öğretim programı ile merkezi sınavlar ikilemi arasında kalmasına bağlı olabileceği sonucuna varılmıştır.

**Anahtar Kelimeler:** Öğretimi Planlama, Matematik Öğretimi, Matematik Öğretmenleri, Etkili Matematik Öğretimi.

**ANALYSIS OF TEACHER'S OPINIONS ON PLANNING MATHEMATICS  
TEACHING ACCORDING TO VARIOUS VARIABLES**

**ABSTRACT**

Teaching mathematics is a discipline directly related to science and technology. The fact that industry and economics are based on science and technology in our times makes mathematics teaching more important than ever. Planning is very important for effective and efficient mathematics teaching. In this respect, it is an important requirement for mathematics teachers to have the knowledge and ability to plan teaching. The aim of this research is to determine the views of mathematics teachers on teaching planning and evaluate them according to various variables. The universe of the research carried out in the scanning model is mathematics teachers on duty in official secondary and high schools in the province of Siirt. The sample was created from 118 volunteer mathematics teachers determined by purposeful sampling from this universe. The research data were collected with a questionnaire form and analysed using descriptive statistical techniques through the SPSS package program. As a result of the analyses, it is understood that mathematics teachers believe in the importance of planning for effective mathematics teaching and adopt their roles and responsibilities in this regard. But they have not adopted the basis of these problems on the legal ground. The variables referenced by these teachers in teaching planning are listed as students, curriculum, textbook, central exams and administrators. But these teachers refused to take into account parents in planning. Teachers participating in the research consider themselves adequate in planning the teaching and most often use the Internet in this regard. This situation has been associated with the fact that the participating teachers are mostly of Generation Y, who were born in the technological environment. In the research, it was concluded that the participating mathematics teachers are between the progressive and constructivist approach in planning and the basic approach, which may depend on the fact that education in Turkey remains between the curriculum and the central exams dilemma.

**Keywords:** Teaching Planning, Mathematics Teaching, Mathematics Teachers, Effective Mathematics Teaching.

## **GİRİŞ**

Bilim ve teknolojinin çağa damgasını vurduğu günümüzde matematik öğretimi her zamankinden fazla önem kazanmıştır. Çünkü matematik, teknolojinin temel girdileri arasında sayılmaktadır. Teknoloji ise hâlihazırda toplumların ekonomik ve sosyal gelişmişliğinin en belirgin göstergeleri arasında kabul edilmektedir. Hatta Göker (1997) ve Özen'e (2004) göre, günümüz bilim ve teknolojisi matematiğin bir eseridir (Aktaran: Tangül, 2017). Nitekim bu öneme binaen 2000 yılı “Dünya Matematik Yılı” olarak ilan edilmiş (Ersoy, 2003) ve matematiğin bu yükselişinin ciddi yansımaları olmuştur. Bu yansımaların neticesi olarak da gelişmiş ülkelerin eğitim programlarında matematik dersi önemli bir yer tutmaktadır. Benzer şekilde Türkiye’de de matematik dersi tüm eğitim kademelerinde önemli ağırlık teşkil etmektedir (Tuncel ve Kuzu, 2019; Baş, 2019). Bu durumun, ülkemizin bilimsel ve teknolojik bakımından gelişimi için önemi tartışılmazdır. Ancak tartışılması gereken, bilimsel, teknolojik, ekonomik ve sosyal gelişim için ne denli önemli olan matematik öğretiminin etkililiğidir.

Matematik öğretiminin etkililiği, öğretmen ve öğrenci niteliği, program, yönetim, aile ve çevre gibi birçok değişkene bağlıdır. Bunlardan öğretim programı (müfredat), uygulamadaki öğretim sürecinin temel belirleyicisi olarak öne çıkmaktadır. Çünkü etkili bir matematik öğretimi, her şeyden önce nitelikli bir öğretim programı ve bunun doğru uygulanmasına bağlıdır. Matematik öğretim programının doğru uygulanması ise ancak isabetli planlama ile mümkündür. Çünkü planlama olmadan, sürdürülen bir öğretme ve öğrenme faaliyetinin başarı şansı yoktur. Zira öğretim, planlama ile yapılacak bir süreçtir (Akpınar ve Özer, 2008: 122). Bu yüzde, öğretimi planlama, etkili matematik öğretimi için olmazsa olmazlar arasındadır. Bundan olsa gerek, eğitim literatüründe ve birçok ülkedeki uygulamalarda öğretimi planlama, temel öğretmenlik becerileri veya “öğretimsel beceriler” (Bayındır, Çavdar ve Gökçe, 2016) arasında sayılmaktadır. Bu itibarla birçok ülkede olduğu gibi Türkiye’de de öğretimi planlama resmi yükümlülük ve pedagojik bir gereklilik olarak kabul edilmektedir.

Matematik öğretimini planlama, öncelikle bu programın anlaşılmasını, yani program okur-yazarlığı bilgi ve becerisini gerektirir. Bunun yanında, okuldaki yöneticiler ve meslektaşlar başta olmak üzere, öğrenciler ve öğrenci velileri gibi gruplarla ekip çalışmasına dayanır. Her ne kadar resmi işleyişi ile temel alınan eğitim felsefesine göre değişebilse de, çağdaş anlayışta, öğretimi planlamada öğrenci, program, ders kitabı, öğretmen, aile ve çevrenin dikkate alınması beklenir (Akpınar, 2017). Etkili bir matematik öğretimi için bu faktörlerin

dikkate alınması kritik öneme sahiptir. Ancak uygulamada matematik öğretmenlerinin sözü geçen bu faktörleri ne denli dikkate aldıkları tartışmalıdır. Bu tartışmalara veri sağlamak bakımından matematik

öğretmenlerinin, öğretimi planlama algı, görüş ve uygulamalarına dair araştırmalar önemlidir. Dolayısıyla amacı, matematik öğretimini planlamaya dair öğretmen görüşlerini çeşitli değişkenlere göre analiz etmek olan bu araştırmanın literatüre katkı sağlaması beklenebilir.

## YÖNTEM

Betimsel nitelikteki bu araştırma, tarama (survey) modelinde yürütülmüştür. Literatürde betimsel tarama veya tarama olarak adlandırılan bu model, belirlenmiş olan bir grup üzerinde yürütülen, bu gruptakilerin çalışmayla ilgili görüş, düşünce ve tutumlarını belirlemeyi amaçlayan çalışmalardır (Karakaya, 2012). Bu araştırmada tarama modeli, resmi ortaokul ve liselerde görev yapan matematik öğretmenlerinin planlama ile ilgili mevcut durumlarını betimlemek amacıyla kullanılmıştır.

## Evren ve Örneklem

Araştırma evrenini, 2022-2023 eğitim öğretim yılı güz döneminde Siirt ilindeki resmi ortaokul ve liselerde görev yapan toplam 476 (296 ilköğretim +180 Lise) matematik öğretmeni (<http://siirt.meb.gov.tr/>) oluşturmaktadır. Örneklem ise, amaçlı örnekleme yoluyla bu evrende ulaşılabilen ve araştırmaya katılmaya gönüllü toplam 118 matematik öğretmeninden oluşmaktadır. Literatürde konuyla ilgili farklı bilgiler olmakla birlikte, anket veya ölçekteki madde sayısının en az iki katı (Kline, 1994 Aktaran Büyüköztürk, 2022) veya soru sayısının, 5, 10 tercihen de 20 katı kişiden veri toplanması gerektiği yönünde çalışmalar vardır (Terzi, 2019; Güngör, 2016; Karakoç ve Dönmez, 2014). Araştırmada veri toplama aracı olarak kullanılan anket (questinaire) toplam 23 maddeden müteşekkil olduğu için çalışmaya gönüllü katılım sağlayan 118 öğretmen, örneklem için yeterli kabul edilmiştir.

**Tablo 1:** Örneklemi Teşkil Eden Öğretmenlerin Demografik Bilgileri

Değişkenler		f	%
Cinsiyet	Kadın	61	51.7
	Erkek	57	48.3
Mezun Olunan Fakülte	Eğitim	88	74.6
	Fen-Edebiyat	30	25.4
Öğrenim Durumu	Lisans	99	83.9
	Lisansüstü	19	16.1
HİE Alma Durumu	Evet	57	48.3
	Hayır	61	51.7
	1-5 Yıl	53	44.9

Kıdem	6-10 Yıl	26	22.0
	11-15 Yıl	11	9.3
	16-20 Yıl	15	12.7
	21 ve üzeri	13	11.0
Toplam		118	100

### Veriler ve Analizi

Bu araştırmada veriler, araştırmacılar tarafından geliştirilen “Matematik Öğretimini Planlamaya Dair Öğretmen Görüşleri Anketi” (ÖPÖGA) ile toplanmıştır. Anketin geliştirilmesinde Büyüköztürk’ün (2022) önerdiği; sorunun tanımlaması için literatür taraması, taslak soruları yazma ve bu soruları uzman görüşüne göre gözden geçirme şeklindeki sistematik izlenmiştir. Uzmanlardan (ikisi eğitim bilimci akademisyen ve üçü matematik öğretmeni) alınan dönütler doğrultusunda, taslak sorular, araştırma konusuna uygunluk, açıklık ve anlaşılabilirlik bakımlarından düzeltmeye tabi tutularak toplam 23 maddelik ÖPÖGA’ne son şekli verilmiştir. Ankette yer alan maddeler “3 *Evet*”, “2 *Kısmen*” ve “1 *Hayır*” olmak üzere üçlü şekilde derecelendirilmiştir. Bundan sonra, ÖPÖGA gönüllülük esasına göre, Siirt ilinde ortaokul ve lise matematik öğretmenlerine dağıtılmıştır. Bir haftalık süreden sonra okullardan geri dönen toplam 121 anket formundan üçü uygun olmayan ve eksik doldurma sebepleriyle elenerek, geriye kalan 118 anket formu analiz için değerlendirmeye alınmıştır. Analizlerde SPSS paket programı kullanılarak, betimsel istatistiki tekniklerden frekans ve yüzde alma testleri; öğretmen görüşlerinin demografik değişkenlere göre analizinde ise Ki-kare testi kullanılmıştır. Analizlerde anlamlılık düzeyi olarak  $p=0.05$  kabul edilmiştir.

### 3. BULGULAR ve YORUMLARI

#### 3.1. Matematik Öğretiminde Planlamanın Öneme Yönelik Öğretmen Görüşleri

Araştırmaya katılan matematik öğretmenlerinin, öğretimde planlamanın önemine dair görüşleri Tablo 2’de yer almaktadır.

**Tablo 2:** Matematik Öğretiminde Planlamanın Öneme Dair Öğretmen Görüşleri

No	Görüşler	Evet		Kısmen		Hayır	
		f	%	f	%	f	%
1	Etkili bir matematik öğretiminde planlama gerekli midir?	110	93.2	7	5.9	1	.8
2	Matematik öğretiminde planlama pedagojik bir gereklilik midir?	99	83.9	18	15.3	1	.8
3	Matematik öğretiminde planlama yasal olarak zorunlu olmalı mıdır?	41	34.7	53	44.9	24	20.3
4	Öğretimi planlama öğretmenin temel görevlerinden birisi midir?	79	66.9	37	31.4	2	1.7
5	Öğretimi planlama, temel bir öğretim becerisi midir?	82	69.5	34	28.8	2	1.7



6	Sızce, matematik öğretiminde planlama aslında kırtasiye midir?	13	11.0	51	43.2	54	45.8
7	Planlama olmadan da etkili matematik öğretimi yapılabilir mi?	14	11.9	70	59.3	34	28.8

Tablo 2 incelendiğinde; araştırmaya katılan matematik öğretmenlerinin, etkili bir matematik öğretimi için planlamayı çok büyük oranda (%93.2; n=110) gerekli gördüğü anlaşılmaktadır. Bu öğretmenler, matematik öğretiminde planlamayı, yine büyük oranda (%83.9; n=99) pedagojik bir gereklilik olarak görmekte ve öğretimi planlamayı da temel bir görev (%66.9; n=79) ve öğretim becerisi (%69.5; n=82) olarak kabul etmektedirler). Benzer araştırmalar (Öztürk ve Akyüz, 2016) tarafından da desteklenen bu bulgular, araştırmaya katılan matematik öğretmenlerinin, öğretimde planlamaya dair olumlu görüşlere sahip oldukları biçiminde yorumlanabilir. Öğretmenlerin konuyla ilgili olumlu görüşlere sahip olması, etkili bir matematik öğretimi için çok önemlidir. Çünkü etkili öğretimin çıktısı ve göstergesi sayılabilecek öğrencilerin aktif öğrenmelerinin, dersin planlanmasıyla ilişkili olduğu (Vural, 2004 aktaran: Günhan, 2006) belirtilmektedir. Bundan olsa gerek, ülkemizde ilkokullarda matematik dersine yönelik denetimlerde müfettişlerin en fazla planlama çalışmalarına önem verdiği (Mermer, 2012) belirlenmiştir.

Ancak matematik öğretiminde planlamaya bu denli olumlu bakan aynı öğretmenlerin, öğretimi planlamanın yasal zorunlu olmasına fazlaca olumlu bakmamaları (“Evet” (%34.7; n=41) ve “Kısmen” (%44.9; n=53) ve planlama yapılmadan da etkili matematik öğretimi yapılabileceği şeklindeki maddeyi de “Kısmen” (%59.3; n=70) benimsemiş olmaları dikkat çekicidir. Olumlu bakış açısıyla bu bulgu, araştırmaya katılan öğretmenlerin, temel bir öğretim becerisi olarak kabul ettikleri pedagojik bir gerekliliği, yasal zorunluk olarak değil de, sorumlulukları gereği yerine getirmeye meyilli oldukları şeklinde yorumlanabilir. Kuşkucu bir bakış açısıyla ise bu bulgu, araştırmaya katılan öğretmenlerin, pedagojik yeterlilikler bakımından yasal yükümlülük ve denetime mesafeli tutumlarıyla da ilgili olabilir. Ancak çağdaş ülkelerde öğretmenlerin alan ve pedagojik yeterlilikler bakımından belirli standartlara tabi tutuldukları (Elçiçek ve Yaşar, 2016) dikkate alındığında, öğretmenlerin bu mesafeli tutumlarının etkili bir matematik öğretimi için önemli bir eksilik olduğu değerlendirilebilir.

Matematik öğretmenlerinin Tablo 2’de yer alan maddelere yönelik görüşleri arasında demografik değişkenlere göre anlamlı fark olup olmadığını belirlemek üzere Ki-kare ( $X^2$ ) testi uygulanmıştır. Test sonucunda öğretmen görüşleri arasında cinsiyet, mezun olunan fakülte, öğrenim durumu ve kıdeme göre anlamlı farklılık bulunmazken; HİE alma durumuna göre 7. maddede anlamlı fark ( $X^2_{(df=2)}=6.612$ ;  $p=0.048$ ) olduğu belirlenmiştir. Buna göre, HİE alan matematik öğretmenleri (Hayır %64.7; n=22), planlama olmadan etkili matematik öğretimi yapılamayacağı görüşünü, bu eğitimi almayanlara (Hayır %35.3; n=12) göre daha fazla benimsemişlerdir. Bu durum, HİE’in öğretimi planlama gibi temel öğretim becerisi

konusundaki başarısı olarak yorumlanabilir. Nitekim ilgili araştırmalar (Özmantar ve Önala, 2017) matematik öğretmenlerinin HİE’i kısmen verimli olarak gördüklerini göstermiştir. Ancak HİE’in öğretmenlerin temel öğretim becerilerine katkı sağladığı (Önen, Mertoğlu, Saka ve Gürda, 2009) şeklindedir.

### 3.2. Matematik Öğretiminde Planlama Uygulamalarına Yönelik Öğretmen Görüşleri

Araştırmaya katılan matematik öğretmenlerinin, öğretimde planlama yapmalarına dair görüşleri Tablo 3’te yer almaktadır.

**Tablo 3:** Matematik Öğretiminde Planlama Uygulamalarına Dair Öğretmen Görüşleri

No	Görüşler	Evet		Kısmen		Hayır	
		f	%	f	%	f	%
8	Öğretimde planlama, öğretim programına göre mi yapılmalıdır?	68	57.6	44	37.3	6	5.1
9	Öğretimde planlama, ders kitabına göre mi yapılmalıdır?	27	22.9	66	55.9	25	21.2
10	Öğretimde planlama, öğretmene ait bireysel bir iş midir?	52	44.1	45	38.1	21	17.8
11	Öğretimde planlama, zümre kurulunca mı yapılmalıdır?	41	34.7	52	44.1	25	21.2
12	Öğretimi planlamada okul yöneticilerinin de rolü olmalı mıdır?	22	18.6	52	44.1	44	37.3
13	Sizce, matematik öğretim planları esnek mi olmalıdır?	84	71.2	31	26.3	3	2.5
14	Matematik öğretim planları merkezi sınavlara göre mi yapılmalıdır?	30	24.5	60	50.8	28	23.7
15	Matematik öğretim planları velilerin talebine göre mi yapılmalıdır?	5	4.2	16	13.6	97	82.2
16	Matematik öğretim planları öğrencileri dikkate almalı mıdır?	70	59.3	41	34.7	7	5.9

Araştırmaya katılan matematik öğretmenlerinin, planlama uygulamalarına dair görüşlerinin yer aldığı Tablo 3 incelendiğinde; öğretmenlerin, planlamada dikkate aldıkları unsurlar şu şekilde sıralanabilir. Öğrenciler (%59.3; n=70), öğretim programı (%57.6; n=68), ders kitabı (%55.9; n=66) ve merkezi sınavlar (%50.8; n=60). Öğretimi planlamada yöneticilerin rolünü Kısmen (%44.1; n=52) benimseyen öğretmenler, bu süreçte öğrenci velilerini dikkate almayı ise büyük çoğunlukla (Hayır %82.2; n=97) benimsememişlerdir. Matematik dersi planlarının esnek olması (%71.2; n=84) yönünde görüş belirten öğretmenler, bu yükümlülüğün zümre kurulundan (Kısmen%44.1; n=52) ziyade, düşük oranla da olsa bireysel olduğu (Evet %44.1; n=52) görüşündedirler. Araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama uygulamalarını gösteren bu bulgular, ülkemiz eğitimine özellikle de 2005 yılından sonra önemli yansımaları olan İlerlemeci (Ulubey ve Aykaç, 2017) ve yapılandırmacı yaklaşımlara uygundur. Zira bu yaklaşımlarda öğretim süreci, esas olarak öğrenci ve öğretim programına göre planlanıp, uygulanmaktadır. Ancak öğretmenlerin, planlamada öğrenci velilerini dikkate almayı büyük oranda reddetmeleri, ülkemizde okul ile aile ilişkisinin henüz istenilen düzeyde

olmadığı şeklinde yorumlanabilir. Oysaki araştırmalar, eğitimde veli/aile katılımının öğrencinin akademik, sosyal ve kişisel gelişiminde pozitif yönde etkilediğini göstermektedir (Ardakoç, 2020). Bu itibarla, etkili bir matematik öğretimi için okul ile öğrenci velileri arasında sağlam bir ilişkinin kurulması önemlidir (Erdoğan, 2000). Dolayısıyla araştırmaya katılan öğretmenlerin bu konuda farkındalık düzeylerinde eksiklik olduğu yorumu yapılabilir. Öğretmenlerin Tablo 3'te yer alan maddelere yönelik görüşleri arasında demografik değişkenlere göre anlamlı fark olup olmadığını belirlemek üzere yapılan Ki-kare ( $X^2$ ) testinin sonuçlarına göre, öğretmen görüşleri arasında cinsiyet, kıdem ve HİE alma durumuna göre anlamlı farklılık belirlenmemiştir. Ancak öğrenim durumuna göre öğretmen görüşleri arasında 10. ( $X^2_{(df=2)}=6.245$ ;  $p=0.044$ ) maddede anlamlı farklılık belirlenmiştir. Buna göre, “Öğretimde planlama, öğretmene ait bireysel bir iş midir?” maddesini, lisans mezunu öğretmenler (Evet %90.4;  $n=47$ ), lisansüstü mezunlarına (Evet%9.6;  $n=5$ ), göre daha çok benimsemişlerdir. Bunun anlamı, lisansüstü eğitimi almış öğretmenlerin, öğretimde planlamayı bireysel olarak görmeyip, takım çalışması olarak gördükleri şeklinde yorumlanabilir. Nitekim araştırmalar (Göksoy ve Yenipınar, 2015) grupta (zümre) çalışmanın, eğitim ve öğretim çalışmalarının başarısında önemli bir işlevi olduğunu göstermiştir. Lisansüstü mezunu matematik öğretmenlerinin buna dair olumlu farkındalıkları, bu düzeyde aldıkları eğitime bağlanabilir. Fakülte değişkenine göre öğretmen görüşleri arasında, 11. ( $X^2_{(df=2)}=6.791$ ;  $p=0.034$ ) ve 13. ( $X^2_{(df=2)}=6.672$ ;  $p=0.036$ ) maddelerde anlamlı farklılık belirlenmiştir. Buna göre, “Öğretimde planlama, zümre kurulunca mı yapılmalıdır?” görüşünü, eğitim fakültesi mezunu öğretmenler (Evet%61.0;  $n=25$ ), fen-edebiyat fakültesi mezunlarına (Evet%39.0;  $n=16$ ), göre daha çok benimsemişlerdir. Benzer şekilde, “Sizce, matematik öğretim planları esnek mi olmalıdır? “görüşünü de, yine eğitim fakültesi mezunu öğretmenler (Evet%79.8;  $n=67$ ), fen-edebiyat fakültesi mezunlarına (Evet%20.2;  $n=17$ ), göre daha çok benimsemişlerdir. Bu bulgular, matematik öğretimini planlamada esneklik ve grup çalışması konularında, eğitim fakültesi mezunu öğretmenlerin, fen-edebiyat fakültesi mezunlarına göre farkındalık düzeylerinin daha yüksek olduğu biçiminde yorumlanabilir. Zira okul amaçlarının gerçekleştirilmesinde zümre çalışmaları (Sertkaya, 2016) ile planlamada esnekliğin öğretmen özerkliği (Öztürk, 2012) bakımından önemli olduğu bilinmektedir.

### **3.3. Matematik Öğretimini Planlamada İhtiyaç ve Yeterliliğe Yönelik Öğretmen Görüşleri**

Araştırmaya katılan matematik öğretmenlerinin, öğretimde planlama konusundaki ihtiyaç ve yeterliliklerine dair görüşleri Tablo 4'de yer almaktadır.

**Tablo 4:** Matematik Öğretimini Planlamada İhtiyaç ve Yeterliliklerine Dair Öğretmen Görüşleri

No	Görüşler	Evet		Kısmen		Hayır	
		f	%	f	%	f	%
17	Öğretimi planlama konusunda kendinizi yeterli görüyor musunuz?	66	55.9	51	43.2	1	.8
18	Öğretimi planlama konusunda hizmet-içi eğitim aldınız mı?	26	22.0	30	25.4	62	52.5
19	Fakültede aldığınız dersler, öğretimi planlamada size katkı sağladı mı?	45	38.1	52	44.1	21	17.8
20	Planlamada yöneticilerden destek almaya ihtiyacınız var mıdır?	8	6.8	48	40.7	62	52.5
21	Öğretimi planlama konusunda yöneticilerden destek almakta mısınız?	6	5.1	38	32.2	74	62.7
22	Planlamada meslektaşlarınızdan destek almaya ihtiyacınız var mıdır?	34	28.8	61	51.7	23	19.5
23	Planlamada meslektaşlarınızdan destek almakta mısınız?	36	30.5	56	47.5	26	22.0
24	Öğretimi planlama konusunda internetten destek almakta mısınız?	64	54.2	48	40.7	6	5.1

Tablo 4 incelendiğinde, araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama konusunda kendilerini yeterli gördükleri(%55.9 Evet ve %43.2 Kısmen) ve bu konuda HİE almadıkları (%52.5 Hayır) anlaşılmaktadır. Katılımcı öğretmenler, fakültede alınan derslerin öğretimi planlamaya “kısmen” katkı sağladığı (%38.1 Evet ve 44.1 Kısmen) görüşündedirler. Bu durumda, öğretmenlerin öğretimi planlama yeterliliğini mesleklerini icra ederken kazandıkları iddia edilebilir. Öğretmenlerin bu deneyimlerinin kaynağını belirlemek için araştırmaya eklenen ilgili maddelere verilen cevaplardan şu yorum yapılabilir: Araştırmaya katılan öğretmenler, öğretimi planlama konusunda yöneticilerden beklenti duymamakta (%52.5 Hayır) ve destek de görememektedirler (%62.7 Hayır). Bu konuda meslektaşlarından Kısmen” (%51.7) destek beklentisi içerisinde olan bu öğretmenler, bu desteği yine “Kısmen” (%47.5) görmektedirler. Öğretimi planlamada öğretmenlerin büyük çoğunluğunun (%54.2 Evet ve %40.7 Kısmen) internetten destek aldığı anlaşılmaktadır. Bu bulgulara dayalı olarak, araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama konusundaki yeterliliklerinin, okul yönetimi veya meslektaşlardan ziyade internet kaynaklı olduğu yorumu yapılabilir.

Öğretmenlerin Tablo 4’de yer alan maddelere yönelik görüşleri arasında demografik değişkenlere göre anlamlı fark olup olmadığını belirlemek üzere yapılan Ki-kare ( $X^2$ ) testi, öğrenim durumu ve HİE alma durumuna göre anlamlı farklılık olmadığını göstermiştir. Ancak cinsiyet, mezun olunan fakülte ve kıdem değişkenlerine göre öğretmen görüşleri arasında anlamlı farklılık bulunmuştur. Cinsiyete göre öğretmen görüşleri arasında  $17.(X^2_{(df=2)}=8.723;$

$p=0.013$ ) ve  $24.(X^2_{(df=2)}=8.603; p=0.014)$  maddelerde anlamlı farklılık belirlenmiştir. Buna göre, erkek matematik öğretmenleri (%59.1;n=39), kadınlara (%40.9;n=27) göre, öğretimi

planlama konusunda kendisini daha yeterli görmektedir. Ancak öğretimi planlamada kadın öğretmenler (%64.1;n=41), erkeklere (%35.9; n=23) göre internetten daha fazla yararlanmaktadırlar. Bu bulgular, matematik dersinde öğretimi planlama konusunda cinsiyetin önemli bir değişken olduğu şeklinde yorumlanabilir.

Mezun olunan fakülte değişkenine göre öğretmen görüşleri arasında  $19.(X^2_{(df=2)}=8.257; p=0.016)$  maddede anlamlı farklılık belirlenmiştir. Buna göre, eğitim fakültesi mezunu matematik öğretmenleri (%73.3;n=33), öğretimi planlamada yöneticilerden destek almaya, fen-edebiyat fakültesi mezunlarına göre (%26.7;n=12) daha çok ihtiyaç duymaktadırlar. Eğitim fakültesi mezunu matematik öğretmenlerinin lisansta öğretimi planlama ile ilgili dersler aldıkları; fen-edebiyat fakültesi mezunlarının ise buna yönelik dersleri pedagojik formasyon kursunda aldıkları dikkate alındığında, bu bulgu oldukça dikkat çekicidir. Bu durum iki olasılığa bağlı olabilir. Birincisi, öğretmen adaylarına öğretimi planlama bilgi ve becerisi kazandırma konusunda, pedagojik formasyon kursunun, eğitim fakültesi lisans eğitiminden daha etkili olması. İkincisi ise, öğretmen olmak amacıyla eğitim fakültelerini tercih eden ve yaklaşık dört yıl boyunca öğretmenliğe dair dersler alan eğitim fakültesi mezunu matematik öğretmenlerinin, öğretimi planlama konusunda, “bilim adamı ve öğretmen yetiştirmek gibi ikili amaca sahip fen-edebiyat fakültesi” (Yüksel, 2011) mezunu öğretmenlerden daha duyarlı olması ve kendilerini geliştirme konusundaki farkındalıklarının daha yüksek olması.

Kıdem değişkenine göre öğretmen görüşleri arasında  $20.(X^2_{(df=8)}=16.884; p=0.031)$  maddede anlamlı farklılık belirlenmiştir. Buna göre, “Planlamada yöneticilerden destek almaya ihtiyacınız var mıdır?” maddesini, 1-5 yıl kıdemli öğretmenler, “Kısmen” derecesine göre %54.2 (n=26) oranında, benimserken; bu oran 21 yıl ve üzeri kıdemlilerde %0.4’te (n=2) kalmıştır. Bu bulgu, mesleğe yeni başlayan matematik öğretmenlerinin, öğretimi planlamada yöneticilerden destek almaya, kıdemli öğretmenlerden daha fazla ihtiyaç duyduğu şeklinde yorumlanabilir. Nitekim kıdemli öğretmenlerin zaman içerisinde öğretimi planlama bilgi ve becerilerini geliştirdiği belirtilebilir.

## **SONUÇ VE ÖNERİLER**

Öğretimi planlama, sistem açısından ele alındığında etkili öğretimin sacayakları arasındadır. Planlama, sistemin formel yol haritası olan öğretim programı açısından ele alındığında,

programının uygulanma aşaması olan öğretim sürecinin temel belirleyicilerinden birisidir.

Öğretmen nitelikleri açısından ele alındığında ise öğretimi planlama, temel öğretim becerileri arasında sayılmaktadır. Bütün bunlardan hareketle, adeta insan yetiştirmede zihin inşa etme

projesi olan öğretimi planlamanın, eğitim ve öğretim kalitesi bakımından yaşamsal öneme sahip olduğu söylenebilir. Zira günümüz dünyasında ülkelerin kaderi ile eğitim ve öğretim kalitesi oldukça ilişkili hale gelmiştir. Bu durum, bilim ve teknoloji ile doğrudan alakalı matematik öğretiminin niteliği için de geçerlidir. Bu itibarla, matematik öğretiminde planlama, aslında sadece eğitim ve öğretim niteliği için değil, dolayısıyla Türkiye'nin bilimsel ve teknolojik kalkınması için de kritik öneme sahiptir. Matematik öğretiminin planlanmasına dair öğretmen görüşlerini irdeleyen bu çalışmada ulaşılan sonuçlara aşağıda yer verilmiştir:

Matematik öğretimi doğru planlamanın öncülleri öğretmenlerin bu konudaki bilişsel birikimleri kadar duyuşsal özelliklerine de bağlıdır. Birçok öğretim modelinde belirtildiği üzere, öğretimin kalitesinde inanç ve niyet (Akpınar, 2017) gibi duyuşsal özelliklerin belirleyici olduğu hatırlandığında, bu konuda olumlu tutuma sahip olmayan bir öğretmenin, bu çağa ve bu çağın mevcut öğrencilerine yönelik uygulanabilir bir planlama yapması beklenemez. Araştırmada buna yönelik maddelere dair bulgular Tablo 2'de yer almaktadır. Buna göre, araştırmaya katılan matematik öğretmenlerinin, etkili bir matematik öğretimi için planlamanın önemine inandıkları ve bu konudaki rol ve sorumluluklarını benimsedikleri anlaşılmaktadır. Bu durum matematik öğretiminin niteliği bakımından çok önemlidir. Zira planlama, öğretmenlerin bilişsel potansiyelinin yansıdığı temel öğretim enstrümanlarından (Rowland, 2009'dan aktaran: Tanışlı, Ayber ve Karakuzu, 2018). Aynı öğretmenlerin, bu rol ve sorumluluklarının yasal bir temele dayandırılmasına mesafeli bir tavır takınmaları, dikkat çekicidir. Buradan hareketle, araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama konusundaki duyuşsal özelliklere sahip olmalarına rağmen, konuyla ilgili yasal denetim ve standartlara mesafeli oldukları sonucuna varılabilir. Bu mesafeli tavrın arka planın, yasal denetimle gerekli standartlara sahip olmama korkusunun tetiklediği iş güvencesi veya ekonomik kaygılar olabilir.

Araştırmaya katılan matematik öğretmenlerinin, öğretimi planlamanın önemi konusundaki görüşleri demografik değişkenler açısından ele alındığında, bu öğretmenlerin ilgili duyuşsal farkındalıklarının HİE ile arttığı sonucuna varılmıştır.

Etkili bir matematik öğretimi, her şeyden önce buna dair öğretimi planlamanın doğru yapılmasına bağlıdır. Öğretimin doğru planlanması, esas alınan felsefe ve anlayışlara göre

değişebilmektedir. Dolayısıyla öğretmenlerin planlamada referans aldıkları kaynaklar, aslında onların felsefi ve pedagojik zihinsel arka planını göstermektedir. Araştırmada buna yönelik öğretmen görüşlerine dayalı veriler Tablo 3'te yer almaktadır. Bu veriler analiz edildiğinde, katılımcı öğretmenlerin öğretimi planlamada referans aldıkları değişkenlerin; öğrenciler, öğretim programı, ders kitabı, merkezi sınavlar ve yöneticiler şeklinde sıralandığı

anlaşılmaktadır. Buradan hareketle, ders kitabı ve merkezi sınavlar hariç tutulduğunda, araştırmaya katılan matematik öğretmenlerinin ilerlemeci ve yapılandırmacı yaklaşımları özümstedikleri sonucuna varılabilir. Zira Türkiye'de özellikle 2005 yılından sonra eğitimde ilerlemeci ve yapılandırmacı yaklaşımın esas alındığı bilinmektedir. Öğretmenlerin planlamada, ders kitabı ve merkezi sınavları referans almaları konu odaklı esasici eğitim felsefesini (Akpınar, 2017) çağırırsa da durum farklı olabilir. Şöyle ki, Türkiye'de resmi olarak okullarda öğrenci merkezli ilerlemeci ve yapılandırmacılık egemen olsa da, merkezi sınavlar ağırlıklı olarak konu merkezli bir yaklaşımla yapılmaya devam etmektedir. Dahası, Türkiye kamuoyunda mevcut konjektürde eğitim ve öğretmen kalitesi bu merkezi sınavlara bağlı olarak değerlendirilmektedir. Dolayısıyla araştırma katılan öğretmenlerin, öğretimi planlamada öğrenci ve öğretim programını referans almaları ilerlemeci ve yapılandırmacılıkla ilgili olsa da, ders kitabı ve merkezi sınavları referans almaları ise, bunların esasiciliğe yakınlığından ziyade, Türkiye'de ki sözü edilen konjektürle alakalı olduğu iddia edilebilir. Araştırmaya katılan matematik öğretmenlerinin, öğretimi planlamada, öğrenci velilerini dikkate almayı büyük oranda reddetmeleri ise iki sonuca bağlı olabilir. Birincisi, daha önce değinildiği gibi öğretmenlerin denetim ve gözetime mesafeli tavırları olabilir. İkinci ise, bu öğretmenlerin, eğitim niteliği için okul ve aile işbirliğinin öneminde yönelik farkındalıklarının düşük olması olabilir. Öğretmenlerin, öğretimi planlamayı zümre kurulunca yapmayı kısmen benimsemeleri, bunların öğretimsel faaliyetleri takım çalışması olarak değil de, bireysel bir etkinlik olarak görmelerine bağlı olabilir. Oysa, öğretmenlerin planlamayı birlikte yapmaları onlara hem güven verebilir ve hem de gelişimlerini destekleyebilir (Tanışlı, Ayber, ve Karakuzu, 2018).

Araştırmaya katılan matematik öğretmenlerinin, öğretimi planlamada referans aldıkları değişkenler konusundaki görüşleri demografik değişkenler açısından ele alındığında, bu öğretmenlerin ilgili bilişsel ve duyuşsal farkındalıklarının, lisansüstü eğitim ve mezun olunan fakülte (eğitim fakültesi lehine) gibi değişkenlere bağlı olarak yükseldiği sonucuna varılmıştır.



Etkili bir matematik öğretiminin doğru planlama ve doğru planlamanın ise, okul yönetimi, konjektürel ve çevresel koşulların yanında, öğretmenlerin duyuşsal farkındalık ve bilişsel potansiyeline de bağlı olduğu bilinmektedir. Bunlardan duyuşsal farkındalıkla ilgili sonuçlara yukarıda temas edilmiştir. Bu konuda araştırmaya katılan öğretmenlerin bilişsel potansiyeline yönelik görüşlerine dayalı veriler Tablo 4’te yer almaktadır. Buradan hareketle, araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama konusunda kendilerini yeterli gördükleri anlaşılmaktadır. Ayrıca, konu ile ilgili beyanlardan, araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama konusundaki yeterliliklerinde, okul yönetimi veya

meslektaşlardan ziyade interneti referans aldıkları belirtilebilir. Araştırmada bu durumun, beş olasılığa bağlı olabileceği değerlendirilmiştir. Birincisi, okul yöneticilerinin görevleri arasında olan öğretmene rehberlik işlevini (Gülbahar, 2014) tam olarak yerine getirmemeleri. İkincisi, göreve yeni başlayan öğretmenlere atanan danışman öğretmenlerinin benzer şekilde rehberlik görevlerini (Topsakal ve Duysak, 2017) tam olarak yerine getirmemeleri. Üçüncüsü, öğretimi planlamada takım çalışması (Yenipınar, 2019) ve meslektaş istişaresi anlamı da olan zümre öğretmenler kurulunun işlevsel olmaması. Dördüncüsü, katılımcı öğretmenlerin, 1980 ile 2000 yılları arasında teknolojinin içinde doğmuş olan Y Kuşağının (Şahin, Turan ve Karadeniz, 2021), bilgi ve becerilerini geliştirmede öncelikle internete başvurmalarıdır. Araştırmaya katılan öğretmenlerin çoğunlukla (%66.9) 1-10 yıllık kıdeme sahip genç katılımcılar olması, bu olasılığı desteklemektedir. Beşinci olasılık ise, araştırmaya katılan öğretmenlerin, araştırma, istişare ve çaba göstererek plan yapma yerine, kolaycılığı tercih ederek internetten hazır planları alıp, kendilerine uyarlamaları olabilir.

Araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama yeterliliğine dair görüşleri demografik değişkenler açısından ele alındığında, matematik dersinde öğretimi planlama konusunda cinsiyetin önemli bir değişken olduğu, eğitim fakültesi mezunu ile mesleğe yeni başlayan öğretmenlerin, öğretimi planlamada kendisini geliştirmeye daha açık olmaları sonucuna varılmıştır.

Son tahlilde, araştırmaya katılan matematik öğretmenlerinin, öğretimi planlama konusundaki tutumları ile uygulamaları tam anlamıyla tutarlılık göstermemektedir. Bunun olası birçok nedeninden söz edilebilir. Bunlar arasında, araştırmada ortaya çıkan, Türkiye’de mevcut öğretim programlarının referansları ile merkezi seçme ve yerleştirme sınavları gibi uygulamadaki konjektürel durumlar arasındaki tutarsızlık önemlidir. Bu durumda öğretmenler, ilerlemeci ve yapılandırmacı okul ile esasici merkezi sınavlar ikilemi arasında kalmakta ve bu durum onların öğretim programlarına da yansımaktadır.

Araştırma bulguları ve bu bulgulara dayalı olarak ulaşılan sonuçlardan hareketle aşağıdaki önerilere yer verilmiştir:

- Öğretmen yetiştiren eğitim, ilahiyat ve diğer fakülte programları ile pedagojik formasyon programlarına öğretimi planlama ile ilgili dersler eklenmelidir.
- Öğretmen yetiştiren eğitim, ilahiyat ve diğer fakülte programları ile pedagojik formasyon programlarında çeşitli dersler bağlamında verilen öğretimi planlama konuları uygulamalı olarak işlenmelidir.
- İl milli eğitim müdürlükleri ile üniversiteler koordineli olarak öğretmenlere yönelik, öğretimi planlama farkındalığı, bilgisi ve yeterliği kazandıracak etkinlikler düzenlemelidir.
- Okullarda zaman zaman gerçekleştirilen denetimlerde öğretim planları daha detaylı olarak sorgulanmalıdır.
- Okul yöneticileri, öğretimi planlamadaki denetim, kontrol ve rehberlik gibi rol ve sorumluluklarını daha etkili şekilde yerine getirecek adımlar atmalıdırlar.
- Okul yöneticileri, öğretimi planlamada takım çalışması bağlamında, zümre veya şube öğretmenler kurulunu daha işlevsel hale getirecek önemleri almalıdırlar.
- Üniversitelerin eğitim bilimleri alanındaki lisansüstü programlarında öğretimi planlamaya daha fazla ağırlık verilmelidir.

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## **DUYGULARIN ALGIYA TESİRİ -MERSİYE ÖRNEĞİ-**

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### **ÖZET**

Duygu ve düşüncelerini etkili bir biçimde okuyucuya sunma gayesini taşıyan şair, seslerin uyum ve ahenginin yanı sıra sözcüklerin anlam zenginliği ve derinliğinden de istifade eder. Bu yolla az sözle çok şey ifade edebilme imkanı bulduğu gibi okuyucuya kendi ruh dünyasının kapılarını da açar. Şairin edebi sanatlarla bezediği her mısra onun varlığı anlamlandırma şeklini, hayata bakışını, çevreyi neden ve nasıl yorumladığını kısaca iç dünyasını ortaya koyar. Zira şair; içinde bulunduğu ruh hâlinin etkisiyle insanların günlük yaşamında sıkça karşılaştığı pekçok gerçeği yeniden anlamlandırır, kavramlara yeni manalar yükler, varlıklar arasında yeni ilişkiler kurar. Bu nedenle edebi sanatları, sanatkarın iç dünyasının birer yansıması olarak kabul edip değerlendirmek gerekir. Biz bu bakış açısıyla klasik şiirin en içten, en samimi ifadelerini bulabileceğimiz mersiye türünü yine duyguların en orijinal yansıması olarak kabul edebileceğimiz hüsn-i ta'lîl ve tecâhül-i ârif sanatları çerçevesinde ele aldık. Farklı bakış açılarını ortaya koyabilmek, aynı varlığın başka zihinlerde değişik şekillerde anlamlandırılışını özgün örnekleriyle sunabilmek adına bir dönem sınırlaması yapmamayı tercih ettik. Türün inceleme imkanı bulduğumuz metinlerinden bir seçme yapma yoluna gittik.

**Anahtar Kelimeler:** Türk İslam Edebiyatı, Mersiye, Hüsn-i ta'lîl, Tecâhül-i ârif

## **THE INFLUENCE OF EMOTIONS ON PERCEPTION -EXAMPLE OF ELEGY-**

### **ABSTRACT**

The poet, who aims to present his feelings and thoughts to the reader effectively, benefits from the semantic richness and depth of the words as well as the harmony and harmony of the sounds. In this way, he not only has the opportunity to express a lot with few words, but also opens the doors of his own spiritual world to the reader. Each verse that the poet adorns with literary arts reveals his way of making sense of existence, his view of life, why and how he interprets the environment, briefly his inner world. Because the poet; With the influence of the mood he is in, he reinterprets many facts that people frequently encounter in their daily lives, gives new meanings to concepts, and establishes new relationships between beings. For this reason, it is necessary to accept and evaluate literary arts as a reflection of the artist's inner world. From this point of view, we discussed the elegy genre, in which we can find the most sincere and sincere expressions of classical poetry, within the framework of the arts of hüsn-i ta'lıl and tecâhül-i arif, which we can consider as the most original reflection of emotions. We chose not to limit a period in order to present different perspectives and to present unique examples of the meaning of the same entity in different ways in other minds. We chose to make a selection from the texts of the genre that we had the opportunity to examine.

**Keywords:** Turkish Islamic Literature, Elegy, Hüsn-i ta'lıl, Tecâhül-i ârif

## **GİRİŞ**

Ölüm hayattaki en önemli gerçeklerden ve tarih boyunca insanoğlunun zihnini en çok meşgul eden olgulardan biridir. Böylesine önemli bir olgunun sanata dolayısıyla edebiyat ve şiire yansımaları da kaçınılmazdır. Öyle ki sevilen birinin yitirilmesi karşısında deruni bir elemin dışa vurumu olarak dile getirilen manzumelerin, şiir türünün ilk örnekleri olduğu ifade edilmektedir.<sup>10</sup>

Klasik edebiyatta birinin ölümü nedeniyle duyulan acıyı anlatmak üzere yazılan şiirlere mersiye denir.<sup>11</sup> Klasik mersiyede üç ana bölüm vardır. Bunlardan ilki ölen kişinin erdemlerinin anlatıldığı övgü bölümüdür.<sup>12</sup> Övgü, mersiyelerde kullanılan temel üslup olarak kabul edilebilir.<sup>13</sup> Bu övgü genellikle mübalağalı bir biçimde sunulur.<sup>14</sup> Övgü bölümünde ölenin olumlu özelliklerini anlatarak değerini vurgulayan şair,<sup>15</sup> ikinci bölüm olan ağlama bölümünde ise arkasında bıraktığı acıyı içten ve duygusal bir üslupla dile getirir. Üçüncü ve son bölümde de geride kalanlara, yaşanan kayıp sonrası duyulan acıya sabretmeleri tavsiye edilir. Mersiyeler, hüznün ve kasvetli ifadelerle dolu olmalarına ve çok defa tekdüze bir üslup taşımalarına rağmen dil ve sanat bakımından oldukça zengindir. Mersiyelerin övgü ve ağlama bölümleri beyan sanatlarının en çok kullanıldığı kısımlardır.<sup>16</sup> Bu bildiride duyguların algıya tesiri, mersiye türünün ağlama bölümünden örneklerle, hüsn-i ta'lîl ve tecâhül-i ârif sanatları çerçevesinde ele alınacaktır.

## **Kainatta Yas: Şairin Kalemde Matemin Ahengi**

Kıymet verilen kişinin yitirilmesi sonucu duyulan acı ve üzüntünün dile getirildiği mersiyelerde şair, teşhis sanatı vasıtasıyla yasa tüm kâinatı dâhil eder. Hüznünü çevresiyle bütünleştirir ve dış dünyada gerçekliği olan hadiseleri, içinde bulunduğu ruh hâlinin etkisiyle,

<sup>10</sup> Mustafa İsen, *Acıyı Bal Eylemek Türk Edebiyatında Mersiye* (Ankara: Akçağ Yayınları, 1994), 1-3.

<sup>11</sup> Metin Akkuş, *Klasik Türk Şiirinin Anlam Dünyası Edebi Türler ve Tarzlar* (Erzurum: Fenomen Yayınları, 2007), 153.

<sup>12</sup> M. Faruk Toprak, "Mersiye", *Türkiye Diyanet Vakfı İslâm Ansiklopedisi* (Ankara: TDV Yayınları, 2004), 29/215.

<sup>13</sup> Akkuş, 153.

<sup>14</sup> Mehmet Arslan – Mehtap Erdoğan, *Kerbela Mersiyeleri* (Ankara: Grafiker Yayınları, 2009), 53.

<sup>15</sup> Akkuş, 153.

<sup>16</sup> Toprak, 29/215.



herkesçe bilinen gerçek sebebinin dışına çıkarak<sup>17</sup> kaybedilenin hüznüyle açıklar. Nitekim insan, psikolojik bir gerçeklik olarak çevresini içinde bulunduğu hâlet-i rûhiyyeye göre yorumlar. Şairler bunu sanatkârane bir buluşla ifade eder. Varlıklar arasında yeni ilişkiler kurar, sıra dışı tablolar çizer. Hüsn-i ta'lîl sanatı vasıtasıyla hakikati imha edip yerine orijinal bir hayal yerleştirir.<sup>18</sup> Kozmik

unsurları, bitkileri ve hayvanları, mevcut ve tabii niteliklerini kullanarak, birer matemzedeye dönüştürür. Bu genelde kapalı istiare yoluyla yapılır ve şair kendisine benzetilene açıkça zikretmezken onu hatırlatacak, onunla ilgili bir unsuru kullanır. Ağlamak, feryat etmek, göğsü yumruklamak, saçları yolmak, karalar giymek, gözyaşı dökmek, boyun bükme gibi insana has mateme yönelik eylemleri ay, güneş, yıldız gibi kozmik unsurlara; gül, lale, menekşe gibi bitkilere; bülbül, kumru, kartal gibi kuşlara yükleyerek teşhis sanatına yer verir. Teşbih ve teşhis sanatları şairin hayalini inşa etmesi için birer basamak olurken, asıl gaye mevcut gerçeği hayalî bir sebep ile açıklamak ve ifadeye güzellik katmaktır. Aynı ilginin istifham yani soru sorma yoluyla sunulduğu ifadelerde ise hüsn-i ta'lîl yerini tecâhül-i ârife bırakır. Burada üzerinde durulması gereken her iki sanatın da mevcut durumun yarattığı hissin dolayısıyla hüznün dışı vurumu olmasıdır.

Ay, yüzeyindeki kelef tabir edilen lekeleri ve ayın ilk günlerinde aldığı yay/hilâl şekli ile; güneş ise rengi dolayısıyla şairlerin hayal dünyasındaki yerini alır. Şeyhî (öl. 832/1429) *Zerd oldı âfitâb yüzün tırmaladı mâh*<sup>19</sup> mısraında kapalı istiare yoluyla güneş ve ayı Germiyanoglu Yâkup Bey'in (öl. 831/1428) ölümü üzerine yas tutan iki insana benzetir. Güneşin rengini bu üzüntü ile sararıp solmasına, ayın yüzeyindeki lekeleri ise bu acıyla yüzünü parçalamasına bağlar.

Aynî Efendi (öl. 1253/1837), Sultan Selim Han'ın (öl. 1223/1808) vefatı sonrası güneşin üzüntüden sarılık hastalığına yakalandığını belirtir. Ayın hilal hâlini de bu dertten dolayı zayıflık, düşkünlük yaşamasına bağlar:

*Âfitâba bu marazdan sarılık itdi eser*

*Mâh-ı nev her ay başında böyle bir za'fı çeker*<sup>20</sup>

Revânî (öl. 930/1523-24) aynı his ve hayal ile bağlantılı sorular sorar. Bu sorular şairin cevap almak için sorduğu sorular değil âdeta kendi kendine konuşması sayılabilecek, samimi ifadeleri olarak karşımıza çıkar:

<sup>17</sup> M. Yekta Saraç, *Klasik Edebiyat Bilgisi: Belagat* (İstanbul: Gökkuşbu Yayınları, 2018), 230.

<sup>18</sup> Bahir Selçuk, "Hakikati İmhâ Hayâlî İnşâ: Redde Dayalı Hüsn-i Ta'lîl Sanatı Üzerine", *Fırat Üniversitesi Sosyal Bilimler Dergisi* 31/1, 61.

<sup>19</sup> Mustafa İsen – Cemal Kurnaz, *Şeyhî Divanı* (Akçağ Yayınları: Ankara, 1990), 92.

<sup>20</sup> Mehmet Arslan, *Antepî Aynî Divanı* (İstanbul: Kitabevi Yayınları, 2004), 496.

*Göge boyatsa n'ola câmesini mâh-ı münîr*

*Güneşün tutsa ne var yüzini gamdan yerekan<sup>21</sup>*

Bosnalı Asım'ın (öl. 1122/1710) mersiyesinde hilal, Faiz Efendi'nin ölümünden dolayı yas tutan dünyanın, kendisini parçalamak için kullandığı elmas renkli kılıç olur:

*Degüldür mah-ı nev bir hançer-i elmâs-gûn almış*

*Eline itmek ister kendüyi gerdûn sad-pâre<sup>22</sup>*

Diyarbakırlı Hâmî Ahmed (öl. 1160/1747), Diyarbakır Valisi Köprülüzâde Abdullah Paşa'nın eşinin vefatı vesilesiyle kaleme aldığı mersiyesinde, ayın hilal hâlini şekil itibariyle tırnağa benzetir. Gökyüzü bu yastan dolayı bir matemzede gibi hilal tırnaklarıyla yüzünü parçalamış ve bizim şafak zannettiğimiz kızılık ortaya çıkmıştır:

*Şafak degül görinen nâhun-ı hilâl ile çerh*

*Boyandı kanına itdükte hâriş-i ruhsâr<sup>23</sup>*

Revânî, II. Bayezid'in (öl. 918/1512) genç yaşta vefat eden oğlu Şehzade Mahmud (öl. 912/1507) için kaleme aldığı mersiyesinde şafağın kızılığını feleğin üzüntüsünden kan ağlamasına bağlar. Feleği, ağlamaktan gözüne kan oturmuş bir matemzede olarak kişileştirir:

*Gûşe-i çarhda sanman ki şafakdur görinen*

*Ağlamakdan felegün gözine oturmuş kan<sup>24</sup>*

Revânî, başka bir mersiyesinde feleğin, II. Bayezid'in diğer oğlu Şehzade Alemşah (öl. 909/1503) için yas tutup, ateşli ahlar çektiğini belirtir. Şairin bu istiareyi kullanmasına şimşekle gök gürültüsü zemin hazırlar ve şair tabii hadiselerle gerçek dışı sebepler üretir. Aynı mersiye de gece bir matemzede gibi karalar giymektedir:

*Şimşek degül durur görinen bang-i ra'd ile*

*Bir odlu âhidur felegüñ k'olmuş âşikâr*

*Şeb aldı egnine yine kara libâsını*

*Şeh-zâdenüñ meger tutar ol dahı yasını<sup>25</sup>*

<sup>21</sup> Ziya Avşar, *Revânî Dîvânı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2017), 53.

<sup>22</sup> Orhan Kurtoğlu, *Bosnalı Âsım Dîvânı (İnceleme-Tenkitli Metin)* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2018), 145.

<sup>23</sup> Kadri Hüsnü Yılmaz, *Diyarbakırlı Hâmî Ahmed Divanı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2017), 236.

<sup>24</sup> Avşar, 53.

<sup>25</sup> Avşar, 48-49.

Zâtî'nin (öl. 953/1546) hayal dünyasında ise Müeyyedzâde'nin (öl. 922/1516) yasını tutan gece, tıpkı bir matemzede gibi saçlarını kesmektedir. Kapalı istiare ile insana benzetilen gecenin, saçlarını kesmek için kullandığı kesici alet ise doğuşu ile gecenin karanlığını bir kılıç gibi kesip ortadan kaldıran güneştir. Aynı dertten muzdarip olan güneş de sarı saçlarını çözmüş, dağıtmış kan ağlamaktadır:

*Şeb tîğ-ı âftâb ile gîsûsın itdi kat*

*Kan ağladı çözüp saçını mihr-i subgâh<sup>26</sup>*

Kemâlpaşazâde (öl. 940/1534) ise gökyüzünü Yavuz Sultan Selim'in (öl. 926/1520) yası nedeniyle eline ay ve güneş taşlarını almış, durmadan sinesini döğen bir insana benzetir. Dünyanın kendi eksenini etrafında dönmesi sonucu gece ve gündüzün birbirini takip etmesini şairane bir sebeple izah eder. Aynı mersiyede feleği kederden beli bükülmüş bir ihtiyara benzetirken, zamana da annelik vasfını yükler. Kar ve yağmur feleğin gözünden dökülen yağ olur:

*Mihr ü mehdên elinde iki taş*

*Durmadan çarh sînesini döger*

*Beli bükildi pîr-i gerdûnun*

*Mâder-i dehr itdi derd ile âh*

*Berf ü bârân degül-durur felegin*

*Gönli gözi yanar ü aglar anı<sup>27</sup>*

Yıldızlar yasa dâhil edilirken kişileştirilen yine gökyüzüdür. Enerji üreten ve yoğun ışık saçan bu plazma kütleleri şekil ve renk itibarıyla şairlerin hayal dünyasındaki yerini alır. Necâtî Bey (öl. 914/1509), Şehzade Mahmud için kaleme aldığı mersiyesinde redde dayalı hüsn-i ta'lîl sanatını kullanır ve yıldızlar bu keder neticesinde gözyüzünün çektiği ateşli âh olur:

*Yılduz degüldür atılan illâ ki âsumân*

*Her gice odlu odlu ider bî-şümâr âh<sup>28</sup>*

Tâcîzâde Câfer Çelebi'nin (öl. 921/1515) II. Bayezid için kaleme aldığı mersiyede ise yıldızlar zamanın gözünden dökülen gözyaşlarıdır:

*Yılduz degül düşen giceler gözyaşdır ol*

*Çeşm-i zamâne derd ile olmuştur eşk-bâr<sup>29</sup>*

<sup>26</sup> Orhan Kurtoğlu, *Zâtî Dîvânı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2017), 265.

<sup>27</sup> M. A. Yekta Saraç, *Şeyhülislâm Kemâlpaşazâde* (İstanbul: Şûle Yayınları, 1999), 80, 82.

<sup>28</sup> Ali Nihad Tarlan, *Necâtî Beg Divanı* (İstanbul: Millî Eğitim Basımevi, 1963), 112.

<sup>29</sup> İsmail Erünsal, *Tâcîzâde Câfer Çelebi Dîvânı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2018), 297.

Şairler bu yasa yalnız kozmik unsurları dâhil etmez. Tabiat da bu dertten nasibini alır.

Edebiyatımızda gençliği, canlılığı, tazeliği, neşeyi ilkbahar temsil ederken; hastalığın, hüznün, ölümün, matem-in sembolü hazandır. Sonbaharda, güneşli gün sayısının azalıp kapalı ve kasvetli havanın hâkim olması, soğuk ve sert esen rüzgarın etkisiyle ağaçların yapraklarını dökmesi, çiçeklerin solması, şairlerimiz için yasa uygun atmosferi hazırlar. Zira hüznün de insanın gönül bahçesini soldurur ve ruhunda kasavet hakimiyetini kurar. Tabiatla matem, rüzgar habercisinin kara haberi soğuk esintisi ile getirmesinin ardından başlar. Bu haber sonrası saçlarını yolan ağaçlar, hemen renkli giysilerinden soyulup kara çullar giyer:

*Fürkat zamânı gibi irişdi dem-i hazân*

*Âşık yüzi gibi yine zerd oldı bostân*

*Encüm gibi döküldi yire berd-i şâhsâr*

*Rûz-ı kıyâmet irdi gülistâna nâgehân*

*Soydı çıkardı câmelerini ecel gibi*

*Eşcâr-ı bâga fasl-ı hazan eyledi ziyân*

*Dünyâsını değışdürüben fasl-i nev-bahâr*

*Bu gam gumâmı ile karardı kamu cihân*

*Kanı ol dem ki şenliğı var idi gülşenün*

*Saçın yolar şecer kara çullar geyüp hemân*

*Âfet irüp çiçeklere yumuldu gözleri*

*Gösterdi rûy-ı serdini mirât-ı âsumân*

*İrgürdi bu sovk haberi var ise sabâ*

*Zerd ü nizar olup bozuldu düşdi bostân*

*Yırtup yüzini agladı mâh-ı felek-zede*

*Meşgûl oldı mâtem-i Sultân Mehemmede<sup>30</sup>*

Muini de Şehzade Mustafa için yazdığı mersiyesinde kara haberi bahçeye saba ile ulaştırır. Rüzgarın etkisi ile ağaçların salınmasını ve çiçeklerini dökmesini bu üzücü habere bağlar.

<sup>30</sup> Mehmed Çavuşoğlu, *Yahyâ Bey Dîvanı* (İstanbul: İstanbul Üniversitesi Edebiyat Fakültesi Yayını, 1977), 159.

Servi ve çınar aldıkları haber ile aklını yitirmiş, divane salınmakta ve tüm varlıklarını etrafa saçmaktadır:

*Salar başını vü karsar elini gülşende*

*Meger ki serv ü çınâra cünûn kâr itdi*

*Delürdi bu gam ile bâğa çekdiler suyu*

*Girince bâğa söğüt bir zamân karâr itdi*

*Çemende hâr çeküp gonca üstine hançer*

*Tebessüm eyledüğine bu demde âr itdi*

*İştdi cümle şecerler zih itdi endâmı*

*Sabâ çü bâğa bu peygâm ile güzâr itdi*

*Şükûfe akçesini saçdı yire hep eşcâr*

*Ki yani rûhı için varını nisâr itdi<sup>31</sup>*

Behiştî (öl. 979/1571) de Kerbela konulu mersiyesinde; nergisin, menekşenin, lalenin, sünbülün ve susenin mevcut bitkisel özelliklerini kullanarak bağda bir matem atmosferi inşa eder:

*İrişdi gülşene bâd-ı sabâ peygâm-ı mâtemle*

*Gam u gussayla ezhâr-ı çemen hep kıldı vâveylâ*

*Sarardı nergisüñ beñzi benefşe boynunu bükdi*

*Derûnuñ lâlenüñ yakdı bu gam itdi tenin ifnâ'*

*Dögünüp gömgök itdi cismini sünbül bu mihnetle*

*Düşüpdür hançere sûsen idüp gam resmini icrâ*

*Gülistânuñ sanevber kadleri hep ser-nigûn oldı*

*Esince bâd-ı mâtem şiddet-i bâd-ı semûm-âsâ<sup>32</sup>*

Sonbaharın rüzgarı, kara haberi tabiata ulaştırmakla kalmaz, ara ara yaslarını tekrar hatırlamaları ve feryat etmeleri için ağaçları tahrik eder. Yerden toprak alır ve başlarına saçar. Şair, sonbaharda şiddetle esen rüzgarın toprağı havalandırıp etrafa saçmasını şairane bir sebeple izah eder:

*Dem-be-dem feryâdlar eylen diyü tahrîk idüp*

<sup>31</sup> Ayhan Gültaş, "Bilinmeyen Şehzâde Mustafa Mersiyeleleri", *Kubbealtı Akademi Mecmuası* 18/3 (Temmuz 1989), 42.

<sup>32</sup> Yaşar Aydemir, *Behiştî Dîvânı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2018), 83.

*Her dirahıtun başına toprak saçar bâd-ı bahâr<sup>33</sup>*

Gül bu derd ile kana boyanır, lalenin bağıryanar. Menekşe boynunu bükerek, sünbül saçların yolar:

*Bu derd kana boyadı ruhsârını gülün*

*Burdı bu gussa boynını miskîn beneşşenün*

*Yoldı bu derd saçların âşüfte sünbülün*

*Yandurdu bağını bu belâ nârı lâlenün<sup>34</sup>*

Nergisin gözüne kederden uyku girmez olur. Bu dertten perişan olmuş, solmuş gülü kendine getirmek isteyen şebnem gülün ağzına su damlatır:

*Gülün ağzına şebnem tamzurur su*

*Gözine nergisün girmezdi uyhu<sup>35</sup>*

Yapısı itibarıyla göz yaşına benzeyen şebnem, kimi zaman da nergisin gözünden yas ile dökülen yaş olur:

*Olur pür-nem çemende çeşm-i nergis eşk-i şebnemle*

*Görüp her subh-dem hûnîn-şafak hurşîd-i rahşânî<sup>36</sup>*

Divan şiirin âşık kuşu bülbül de bağı gelen kara haberden etkilenir ve artık güle sevdasından ötmez de bir mersiyehan olur:

*Meger bülbül çemende mersiye-hân oldu ezhâre*

*Perişân hâl-i sünbül gonçeler mebhût u ebkemdür<sup>37</sup>*

Kumru inleyerek; kartal karalar giyerek; doğan kendine zarar vererek bu mateme iştirak eder:

*Bâz-ı devlet yoldı bâlin andelib efgân ider*

*İniler kumrı anançün karalar geydi ukâb<sup>38</sup>*

Bu âh u efganları işiten deniz, aldığı acı haberle bir matemzede gibi ellerini birbirine vurur:

*Deryâ kulağına irecek nâle vü figân*

*Keffin biri birine urup acıdı heman<sup>39</sup>*

Dağlar karalar giyer, bağına taş basar; nehirler deli divane olup başlarını taştan taş vurur:

*Tag üzre sanmañuz görinenler bulut durur*

<sup>33</sup> Ferhat Musluoğlu, *Hayretî Dîvânı (Tenkitli Metin – Dil İçi Çeviri)*, (Çanakkale: Paradigma Akademi, 2022), 100.

<sup>34</sup> Hamit Bilen Burmaoğlu, *Lâmi 'î Çelebi Divanı (Hayatı, Edebi Kişiliği, Eserleri ve Divanı'nın Tenkitli Metni)* (Erzurum: Atatürk Üniversitesi, Sosyal Bilimler Enstitüsü, Doktora Tezi, 1983), 158.

<sup>35</sup> Hüseyin Tugi, *Musîbetnâme* (Haz. Şevki Nezihi Aykut) (Ankara: Türk Tarih Kurumu Yayınları, 2010), 109.

<sup>36</sup> Mahmut Kaplan, *Neşâtî Dîvânı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2019), 45.

<sup>37</sup> Kaplan, 45.

<sup>38</sup> Ahmet Mermer, *Karamanlı Aynî Dîvânı* (PDF: Kültür ve Turizm Bakanlığı Yayınları, 2020), 163.

<sup>39</sup> Çavuşoğlu, 164.

*Dîvâne oldı taşlar ile döginüp yürür  
Başı açuk yalıñ ayak âb-ı revân dahi<sup>41</sup>*

*Gezer gülşende zencîrin sürür mecnûn olup cûlar  
Beneşşe ser-fikende bâr-ı sad endûh ile hamdur<sup>42</sup>*

Revânî, ağaçları ve ırmağı duaları ile yasa dâhil eder. Kapalı istiare yoluyla ırmağı tesbih çeken, ağaçları ise el açmış dua eden bir insana benzetir. Suyun yüzeyindeki hava kabarcıkları ve ağaçların dallarının yukarı doğru oluşu bu istiareye zemin hazırlar ve şair tabii hadiseleri orijinal bir hayal ile okuyucuya şöyle sunar:

*Tesbîh idüp habâbı geçürsin ko cûybâr  
Kulsun du'âyı rûhına el kaldurup çenâr<sup>43</sup>*

Şairlerin benzer ilgileri “neden” “niçin” gibi soru zarfları ile ortaya koyması ise hüsn-i ta'lîl-i ortadan kaldırmakta ve tecâhül-i ârifî devreye sokmaktadır. Ancak her ikisi de aynı hissin aynı hüznün tezahürüdür:

*Bâ'is ne hayret ile salar serv başını  
Mûcib nedür ki suya atar tâcını habâb*

*Hikmet nedür ki bülbül ider dâyimâ figân  
Bu nice sır durur ki giyer karalar gurâb<sup>44</sup>*

*Beneşşe göğe boyanmış nedendür  
Yüreği lâlenün yanmış nedendür*

*Nedendür goncanun bağı dolu kan  
Nedendür hâtır-ı âlem perîşân<sup>45</sup>*

*Aceb mi şâh-ı gül pür-dâg iderse şimdi bâzûsın  
N'ola hûnîn âlem kaldursa lâle vakt-i mâtemdür<sup>46</sup>*

<sup>40</sup> Avşar, 49.

<sup>41</sup> Avşar, 48.

<sup>42</sup> Kaplan, 45.

<sup>43</sup> Avşar, 49.

<sup>44</sup> Avşar, 47.

<sup>45</sup> Tuği, 5.

<sup>46</sup> Kaplan, 45.

## SONUÇ

Mersiyeler, sevilen birinin kaybedilmesi sonucu yaşanan üzüntünün dile getirildiği manzumelerdir. Ölenin iyiliklerini sayarak değerini vurgulamak, geride kalanların acılarını dile

getirmek ve onlara sabır telkin etmek maksadıyla yazılan mersiyeler edebî sanatlar açısından oldukça zengin metinlerdir.

Mersiyelerde hüznün yoğun bir şekilde dile getirildiği ağlama bölümünde şairler yaşadıkları acıyı çevresi ile bütünleştirir ve bütün kâinat bu yasa iştirak eder hâle gelir. Ay, güneş, yıldız gibi kozmik unsurlar; gül, lale, menekşe gibi bitkiler; bülbül, kumru, kartal gibi kuşlar birer matemzede olarak karşımıza çıkar. Tıpkı bir insan gibi ağlar, ağlamaktan gözlerine kan oturur, karalar giyer, yaşadığı acı neticesinde kendisine zarar verir hâle gelir. Şair bu hayali kurarken sözkonusu unsurların mevcut özelliklerinden istifade eder. Hayalini inşa ederken teşbih ve teşhis sanatlarını birer basamak olarak kullanır. Bu yolla okuyucuyu kurduğu hayale ikna eder ve gerçeği şairane bir sebeple izah eder.

İçinde bulunduğu durumun tesiriyle bilinen bir hususu bilmiyormuşcasına ifade eden şair aynı his ve hayal ile bağlantılı sorular sorar. Bu sorular şairin cevap almak için sorduğu sorular değil adeta kendi kendine konuşması sayılabilecek, samimi ifadeleri olarak karşımıza çıkar. Bu ifadeler tecâhül-i ârif ve ona bağlı bir sanat olarak ifade edilebilecek olan istifhamın en güzel örneklerini ortaya koyar. Şairler bu yolla arştan ferşe uzanan bir matem atmosferi inşa eder ve hüznünü okuyucuya etkili bir biçimde sunar.



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**DEVLET ARŞİVLERİNE GÖRE VEFATINDAN ÖNCE MUSTAFA KEMAL  
ATATÜRK İLE İLGİLİ ORTADOĞU BASININDA YER ALAN GAZETE  
HABERLERİ ÜZERİNE BİR DEĞERLENDİRME**

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**ÖZET**

Bu çalışmanın amacı Mustafa Kemal hayattayken Ortadoğu basınında hakkında çıkan haberlerin analiz edilerek değerlendirilmesidir. Çalışmada yer alan gazete haberleri resmi devlet arşivlerine dayanmaktadır. Ortadoğu, en eski uygarlıklara ev sahipliği yapan ve çok çeşitli medeniyetlerin gelip geçtiği; coğrafyanın ötesinde ortak tarihi, kültürü ve ekonomisiyle öne çıkan özgün yapıda bir bölgedir. Haberleri analiz edilecek gazeteler Kahire, Beyrut, Mumbai, Filistin ve diğer Ortadoğu şehirlerinde yayınlanmış ya da farklı ülkelerde yayımlansa dahi bu coğrafya ile ilgili haberleri içeren yayınlardır. Ortadoğu, Türkler ve Atatürk ile ilgili genelden özele bir kronoloji çalışmasının ardından, gazete haberlerine dair içerik analizi yöntemi uygulanmıştır. Gazete haberlerinin geneline bakıldığında yaklaşık 400 yıl Osmanlı hakimiyetiyle yönetilen Ortadoğu'da Türkiye Cumhuriyeti'nin takip edildiği kolaylıkla anlaşılmaktadır. Analize göre Türkiye Cumhuriyet ve Atatürk, tüm dünyada olduğu gibi Ortadoğu'da da yakından takip edilmiş ve olumlu ya da olumsuz ayırt edilmeksizin Atatürk'ün karizmatik liderliği ve kısa sürede tüm dünyada ses getiren inkılap ve reformları Ortadoğu'da fark edilmiştir. Bu durum, Mustafa Kemal Atatürk'ün askeri dehası ile başlayan tanınırlığının devlet yönetiminde devam ettiğini ve dış dünyada yakından takip edildiğini göstermektedir.

**Anahtar Kelimeler:** Ortadoğu, Atatürk, Dış Basın

**ACCORDING TO THE STATE ARCHIVES, AN EVALUATION ON THE  
NEWSPAPER IN THE MIDDLE EAST PRESS ABOUT MUSTAFA KEMAL  
ATATÜRK BEFORE Her DEATH**

**ABSTRACT**

The aim of this study is to analyze and evaluate the news about Mustafa Kemal in the Middle East press when he was alive. Newspaper news are based on official state archives. The Middle East is a home to the oldest civilizations and a wide variety of civilizations have passed; It is a region with a unique structure that stands out with its common history, culture and economy beyond geography. The newspapers whose news will be analyzed are those that were published in Cairo, Beirut, Palestine and other Middle Eastern cities, or even if they are published in different countries, they contain news about this geography. After a general chronological study about the Middle East, Turks and Atatürk, content analysis method was applied to newspaper news. When the newspaper news are assessed generally, it is easily understood that the Republic of Türkiye is followed in the Middle East, which had been ruled by the Ottoman domination for about 400 years. According to the analysis, the Republic of Türkiye and Atatürk were followed closely in the Middle East as well as the rest of the world, and Atatürk's charismatic leadership and his reforms, which made an impression all over the world in a short time, were noticed in the Middle East, regardless of whether they were positive or negative. This shows that the recognition of Mustafa Kemal Atatürk, which started with his military genius, continues in the state administration and is closely followed in the outside world.

**Key Words:** Middle East, Atatürk, Foreign Press



## **1. GİRİŞ**

Türkiye Cumhuriyeti'nin kurucu lideri Mustafa Kemal Atatürk askeri, siyasi ve devlet yönetim dehası ile Türk basınında olduğu kadar tüm Dünya basınında geniş yer bulmuştur. Özellikle yaklaşık 400 yıl Türk hâkimiyeti ile yönetilen Ortadoğu'da çıkarılan gazetelerde Türkiye ve Mustafa Kemal ile ilgili haberler geniş şekilde yer almıştır.

Bu çalışmanın amacı, Atatürk hayattayken Ortadoğu basınında hakkında çıkan gazete haberlerini çözümlmek ve değerlendirme yapabilmektedir. Çalışmada Ortadoğu ülkelerinde yayınlanan ve devlet arşivinde yer alan çeşitli gazetelerin haberleri derinlemesine incelenmiştir. İçerik analizi ve değerlendirme öncesinde Ortadoğu ve Türklerin yolunun kesişmesinden, Ortadoğu'da hakimiyet kuran devletler ve Atatürk'ün Ortadoğu'da görev yaptığı yıllara kadar kronolojik bir özet çalışması yapılmıştır.

## **2. ORTADOĞU**

### **2.1. ORTADOĞU VE TÜRKLER**

Ortadoğu insanlığın doğuşundan itibaren bilinen en eski medeniyetlerin beşiği olmuş, hakimiyet kurmak isteyen uygarlıklar arasında paylaşılmayan bir bölge olarak çok sayıda devletin hükümlanlık sürdüğü ve hakimiyet kuranların rekabet gücünü artırdığı verimli ve stratejik topraklarıdır. Mısır, Mezopotamya ve Anadolu uygarlıkları tarihin bilinen en eski uygarlıkları olup insanlığın gelişimindeki kritik aşamalara ev sahipliği yapmışlardır. Nil deltasından İran topraklarına ve Doğu Akdeniz kıyılarına, Anadolu'dan Arap Yarımadası'na kadar uzanan geniş bir coğrafya tarihten günümüze Ortadoğu olarak anılmaktadır. Kozmopolit yapısıyla çok kültürlülüğü, çok dinliliği, aynı din içerisinde yer alsada dahi çok sayıda mezhebe sahip olması, zengin yer altı ve yer üstü kaynaklara sahip olması, doğu-batı ve güney-kuzey arasında stratejik bir konumda olması bölgeye özgü özelliklerdir. Bölgenin karakteristiğini etki eden en önemli gelişmeler eski uygarlıkların varlığı, İslamiyet'in ortaya çıkması ve yayılması, farklı Türk devletlerinin etkinliği ile istikrarlı ve uzun vadeli Osmanlı İmparatorluğu hakimiyetidir.

Abbasiler döneminde Türk komutanların önemli görevlere getirilmesi ve özellikle 751 yılında Çinlilere karşı yapılan Talas Savaşı'nda Türklerin İslam'ı yakından tanıma şansı yakalaması ve birçok kaynağa göre Türklerin İslamiyet'e geçmesi Ortadoğu'nun kaderini değiştirecek önemli gelişmelerdir. Bağdat'tan Hassa alayına gönderilen Türk Valisi Ahmet Bin Tulun'un bağımsızlığını ilan ederek bugün Tulunoğulları olarak anılan Mısır'da kurulan ilk Türk ve Müslüman devleti kurması Ortadoğu ve Türkler açısından önemli bir siyasi gelişmedir

Osmanlı İmparatorluğu'na kadar Gazneliler, Büyük Selçuklular, Harzemşahlar, Memlûklüler gibi farklı Türk devletlerinin hüküm sürdüğü Ortadoğu saldırılara açık yapısı ve hükmedeni güçlü kılan stratejik konumu nedeniyle istikrarın zor sağlandığı bir bölge olmuştur.

## **2.2. ORTADOĞU VE OSMANLI İMPARATORLUĞU**

Osmanlı İmparatorluğu'nda doğu seferleri ile bilinen ve tamamlanmayan Anadolu birliğini tamamlamaya çalışan Yavuz Sultan Selim, devletinin Ortadoğu'da ilerlemesinde en önemli katkıları sunan padişahlardandır. Yavuz Sultan Selim (1512-1520) ve Kanuni Sultan Süleyman (1520-1566) devirlerinde Osmanlı Devleti'nin Ortadoğu hâkimiyetini belirleyen dört büyük harekât yapılmıştır, bunlar; İran (Doğu) Seferi; Suriye- Mısır Seferi, Irakeyn Seferleri ve Hind- Yemen Seferleri'dir (Alkan, 2016). Büyük Mısır Seferi sonucunda, Memluk devletinin yıkılması, Osmanlı'nın İslam dünyasında lider olması, kutsal emanetlerin İstanbul'a getirilmesi ve nihai olarak Suriye, Filistin, Lübnan, Ürdün, Hicaz ve Mısır'ın Osmanlı hakimiyetine geçmesi Osmanlı İmparatorluğu'nun Ortadoğu'daki gücünü ve istikrarını perçinlemiştir. Kanuni Sultan Süleyman döneminde Tebriz'in ve sonrasında donanma güçleri ile Kuzey Afrika'nın tamamen fethedilmesiyle birlikte Osmanlı İmparatorluğu Ortadoğu ve Afrika'da en geniş sınırlarına ulaşmıştır.

Gerileme ve dağılma döneminde Ortadoğu ve Kuzey Afrika'da kaybedilen topraklara rağmen I. Dünya Savaşı'na kadar Ortadoğu büyük ölçüde Osmanlı hakimiyetinde kalmıştır.

## **2.3. ORTADOĞU VE ATATÜRK: İLK GÖREV YERİ VE ASKERİ BAŞARI**

Mustafa Kemal'in Harp Akademisi'ni bitirdikten sonra Kurmay Yüzbaşı olarak merkezi Şam'da bulunan 5. Ordu'ya atanması ve bu şekilde ilk görev yerinin Ortadoğu oluşu bölgeyi yakından tanınmasına ve tanınmasına sebep olmuştur. Mustafa Kemal'in erken dönem askeri başarısının pekişmesinde önemli bir yeri olan ve Osmanlı ile İtalyan Krallığı arasında 1911 yılında gerçekleşen Trablusgarp Savaşı bugünkü Libya olarak anılan bölgede gerçekleştirilmiştir. Savaş sırasında Binbaşı rütbesi ile aktif rol oynayan Mustafa Kemal, Tobruk muharebesini yönetmiştir.

## **2.4 ORTADOĞU VE I. DÜNYA SAVAŞI**

Önceki bölümde bahsedildiği üzere Mustafa Kemal'in Osmanlı ordusundaki önemi ve liderliği Trablusgarp ve Balkan Savaşları'nda artmıştır. 1905 yılında Suriye bölgesinde genç bir subayken, I. Dünya Savaşı esnasında Çanakkale cephesinde lider ve belirleyici komutan konumuna kısa sürede yükselmiştir ve bu yükseliş 19 Mayıs 1919 yılında Bandırma Vapuru ile Samsun'a çıkılan bağımsızlık mücadelesi yolunda Anadolu'nun kaderini belirlemiştir.

Osmanlı'nın son döneminde tekrardan yükselişi için birçok fikir akımı ortaya çıkmıştır. İttihat-ı İslam olarak ilk kez 1869 yılında kullanılan ve sonrasında ilk kez 1875 yılında Pan-İslamizm

olarak kullanılan akıma göre Osmanlı hilafet gücünü kullanarak tüm dünyadaki Müslümanlar üzerinde bir güç ve liderlik sağlayabilir ve düşmanlara karşı rekabet edebilirdi (Hülagü, 2006). I. Dünya Savaşı'nda Ortadoğu cephelerinde verilen mücadelede Pan-İslamizm'in bir kurtuluş yolu olmadığı anlaşılmıştır. Irak, Suriye-Filistin ve Hicaz-Yemen cephelerinde Osmanlı ağır yenilgiler almış ve Müslüman Arapların yanında yer almadığını deneyimlemiştir. I. Dünya Savaşı esnasında Ortadoğu cephelerinde Osmanlı açısından önemli kayıplar yaşanmış, bölge halkı başta İngilizler olmak üzere İtilaf devletleri ile sıkı biçimde işbirliği yapmışlardır.

### 3. MUSTAFA KEMAL ATATÜRK HAYATTEYKEN ORTADOĞU BASININDA HAKKINDA YER ALAN HABERLER

#### 3.1. ORTADOĞU GAZETELERİ

Bu çalışmada 1930 ile 1937 yılları arasında Ortadoğu'da yer alan çeşitli illerde basılan gazetelerdeki Mustafa Kemal Atatürk ile ilgili haberler incelenmiştir.

Farklı tarih ve sayılı pek çok gazete haberi incelenmiş ve bu haberler konularına göre tasnif edilerek ele alınmıştır. Aşağıdaki tabloda inceleme gerçekleştirilen gazete haberlerine yer verilmiştir.

**Tablo 4:** Ortadoğu Gazeteleri

GAZETE ADI	YAYINLANDIĞI YER	YAYIN TARİHİ
El İkbal	Beyrut	15.01.1930
El Ahrar	Beyrut	01.10.1930
El Mukattam	Kahire	14.11.1931
El Mukattam	Kahire	18.11.1934
Bombay Chronicle	Hindistan (Haber Filistin Hakkında)	20.08.1937

#### 3.1.1 EL İKBAL (15.01.1930 TARİHLİ GAZETE HABERİ)

El İkbal gazetesi Beyrut'ta yayınlamaya başlayan ve Ortadoğu basınında o dönem için yer tutan bir gazetedir. I. Dünya Savaşı esnasında Araplar arasında Osmanlı'ya karşı oluşan kara propagandayı karşılamak ve tersine çevirmek adına Suriye cephesinde görevli Ahmet Cemal Paşa tarafından Ortadoğu'da gazetelerinde muhabir olarak görevlilerin çağrılarak verilen



bilgilerle onlar tarafından yazılan “El-Bi‘setu’l-‘İlmiyye ilâ Dar’il-Hilafeti’l-İslamiyye” isimli hatıra kitabının yazarlarından biri de El İkbal gazetesi yazarıdır (Şanverdi & Dağbaşı, 2022). Gazete haberi aşağıdaki gibidir (El İkbal, 1930). “Başvekalet; *Türkler yağmur duasına çıkıp duaları kabul olunuyor.*

*“Kahirede Türkçe çıkan Musavat gazetesinin neşrettiği bir makalede Mustafa Kemal Paşa ile İsmet Paşa ve bazı vekiller arasında ihtilaflar mevcut olduğundan İsmet Paşa’nın ajanlar vasıtasıyla ilan ettiği tekzibe rağmen tekit etmiş ve bu meyanda mezkur makalede zikrettiği delillerden “Lazikiye” refikimizin tercüme ettiği şu garip hadiseyi serdetmiştir:*

*Ankara ve havalisine hayli müddetten beri yağmur yağmadığından Dini hürriyetlerine malik olmayan ahaliden mürekkep bir heyet İsmet Paşa’ya müracaat edip milletin yağmur duasına çıkmalarına müsaadesini talep etmişlerdir. İsmet Paşa’nın mezkur heyetin talebine karşı hiddetle verdiği cevapta (bilinmeyen kısım)...*

*Biz sizi yüksek ve medeni milletlerin arasına geçirmek için çalışırken sizin hala irticanızı ve hurafet kabilinden itikadınızı gittikçe arttığını görüyoruz. Duanın yağmura ne münasebeti vardır? Demiş ve onları kovmuştur. Meyusen çıkan heyet Cenabı hakkın bu Ladinileri kendilerine nasıl musallat ettiğini düşünerek ikinci bir tedbir hatırlarına gelmiş ve Mustafa Kemal Paşa’ya gidip ondan müsaade almak keyfiyetini beyinlerinde kararlaştırmışlardır. Müşarünileyhin huzuruna azimet ederek meseleyi kendilerine arz ederek İsmet Paşa’ya daha evvel bu husus hakkında müracaat ettiklerinden ondan gördükleri hakareti de söylemişlerdir. Bunun üzerine Mustafa Kemal Paşa kendilerine müsaade vermiş ve evet ne demek, duanın tesiri olmaz mı? Ben kimsenin itikadına müdahale etmem, siz hürsünüz. Benim Ladini olduğumu size kim söylemiştir. Demek milletin benden nefretini mucip olacak bu gibi desiselerde hala bulunanlar vardır. Haydi efendiler duaya çıkınız ve benim için Cenabı haktan merhamet isteyiniz demiştir. Ertesi gün duaya çıkmak için millet toplanmış ve mekteple talebesi ve gençler önde oldukları halde erkekler ve kadınlar alay halinde tekbir okuya okuya şehir haricindeki sahraya çıkmışlardır. Orada bir Hoca tarafından okunan şu “yarabbi yağmur göndermek suretile bizim dünyamızı kabul etmeyecek olursan üzerimize yıldırımlar indir, bizi mahvet ve yağmursuz bizi geri iade etme” Duaya Milet amin dedi. Hocanın mezkur duası ikmal olmadan Cenup tarafından küçük bir bulut zuhur etmiş ve büyüye büyüye Ankara’nın ufkunu örtmüş şimşekler ve gök gürültüleri başlamış ve birazdan sonra sel gibi yağmurlar yağmıştır.”*

Gazete haberinde Atatürk’ün milletin dini itikat ve duygularına ne kadar saygı duyduğu ve empati ile yaklaştığı açıkça görülmektedir. Milletten uzak ya da onların duygu, düşünce ve

inançlarından bağımsız bir lider olmadığı belirtilmiş, bu gibi asılsız iddiaların kendisine sıklıkla yapıldığı anlaşılmaktadır.

### 3.1.2 EL AHRAR GAZETESİ (01.10.1930 TARİHLİ GAZETE HABERİ)

El Ahrar gazetesi o dönemde Beyrut'ta yayın hayatına başlamış ve çok meşhur olamadan yayın hayatını tamamlamış bir Ortadoğu gazetesidir.

“

Türkiye Kabinesi'nin Değiştirilmesinde Ne Hikmet Var? (Ahrar, 1930)” başlıklı haberde halkın Mustafa Kemal Atatürk'ten memnun olup olmadıkları üzerine görüşler yer almakta ve Mustafa Kemal Paşa ve İsmet Paşa arasında olduğu iddia edilen siyasi bir çekişmeden bahsedilmektedir.

### 3.1.3 EL MUKATTAM GAZETESİ

El Mukattam gazetesi 1888 yılında Faris Nimr tarafından Kahire'de yayın hayatına başlatılmış bir gazetedir. Mısır devleti tarafından 1954 yılında kapatılana kadar yayın hayatına devam etmiştir. Milli Mücadele ve Mustafa Kemal Atatürk'ü destekleyen El Ahbar ve nispeten tarafsız kalan El Ahram'ın aksine İngiliz yanlısı bir tutum izleyen El Mukattam, I. Dünya Savaşı esnasında İtilaf devletlerine karşı olmayan nadir Mısır yayınlarından (Yılmaz M. S., 2009). Milli Mücadele ve Atatürk'e karşı yaptığı ilk yayın 1919 yılında yayınlanmış ve genelde kullandığı argümanlar İngilizler ile uyumlu olarak İstanbul hükümeti ve azınlıkları önceleyen bir tutum olmuştur (Mukattam, 1919). Ayrıca devamındaki yıllar yaptığı haber ve yayınlarda Mustafa Kemal ve Ankara hükümeti ile İstanbul hükümeti ayrımını güden ve tarafını ikinciden yana kullanan bir üslup tercih etmiştir (Pürmüşlü, 2015).

#### 3.1.3.1 (14.11.1931 TARİHLİ GAZETE HABERİ)

Araştırmaya konu devlet arşivinde yer alan “Gazi Mustafa Kemal'in güzel bir rüyası” isimli haberde Atatürk Orman Çiftliği ile ilgili görüşlere yer verilmiştir (Mukattam, Mustafa Kemal'in Güzel Bir Rüyası, 1931).

*“Kahire'de çıkan El Mukattam gazetesinin İstanbul muhabirinden gönderilmiş olup mezkur gazetenin 24.10.1931 tarihli nüshasında intişar eden makalenin Türkçeye mütercem sureti leffen takdim edilmiştir. Efendim Hazretleri:*

*Gazi Mustafa Kemal'in, Ankara'ya yakın bir numune çiftliği vardır. Bu çiftlik de her türlü zirai teşrubeler yapılmakta ve ormanlar için fidanlıklar vücuda getirilmektedir. Kup kuru tepelikleri, az bir zaman içinde cennetasa bir hale ifrag edilmiş olan bu çiftlikte Marmara'yı ve Karadeniz'i andırır göller yapılmış ve bu göllerin etrafında köşkler inşaa edilmiştir. Gazi, bu çiftliği çok ziyaret eder, her ziyaretinde çiftlikte saatlerce kalır, çiftliğin işlerini idare ve bu idaresi neticesinde taktik eyler. B.M.Meclisi azasından bir zat karanlık bir gecenin pek geç*

*bir vaktinde Gazi hazretlerini Marmara gölünün sahili üzerindeki köşklerinden birind, dalgın bir halde durmuş ve biraz uzakta duran yaverinin de dehşet içinde Gazi'ye bakmakta ve müşarünileyhin uzun süren rüyasının neticelenmesini beklemekte bulunduğunu görür. Mebus bey, yaklaşarak Gazi'yi rüyasından uyandırır. Gazi, Marmara'ya bakarak Balkan ve Balkanlıların müstakbel hallerini düşünmekle geçen bu vaziyetinin ne kadar devam ettiğini bilmediğini itiraf eder.*

*“Sana rüyamı nakledeyim” der ve Mebus Bey'e şu beyanatta bulunur: Türk Milleti'nin bütün Balkanı istila ettiğini, siyasi ve medeni hadiseler bir müddet için kanı bastırır fakat nihayette kan her şeyin üstüne çıkar ve her şeyde en büyük kubbesi terkibiye halini alır. Bu böyle olduğu için burada durup Türk Milletinin ıslattığı Balkanın intibahini bekleyerek rüya halinde kendi kendine şunu gördüm ki, Balkanlılar ne vakte kadar bir birlerinden ayrı yaşayacakları gizli olan kanı hakikati ne vakit yükselip Balkan milletlerini birleştirecektir? Önümüzdeki intihapta riyaseti olunmasını ve bu suretle bütün işlerinin vasıtası ile bitirdiğin Fırkanın başında serbest kalımını dilerim. Zira bu gece gördüğüm rüyanın bir hakikati olarak Meydana çıkmasını isterim. Arkadaşlarımdan bir iki zatla birlikte Balkan hükümetleri merkezi olan Atina ve Belgrad'a gidecek Balkan liderlerinin her biriyle ayrı ayrı görüşerek Balkan 'daki bu ayrılığın ne vakte kadar devam edeceğini kendilerinden soracağım. Liderler, bana mikni bir cevap veremeyecek, o vakit ben, kendilerine hakikati ve bu bapta kanaatlerini anlatacak ve mütemadi teşebüsatla müttahip Balkan rüyasını bir hakikat haline çevireceğim. Gazi Hazretlerinin Mebus Bey'e naklettikleri rüyanın hülasası budur. Rüya filvaki çok güzel bir rüyadır. Zaten Gazi bir rüya gördümü derakap faaliyete başlar. Türkiye-Yunan ittiyadi bu faaliyetlerden biridir. Fakat Gazi'nin bu rüyası daha geniş bir ittiyadi istihdaf etmektedir. Bunun için Gazi'nin, bu ittiyadi programını...*

Haberden anlaşıldığı üzere Mustafa Kemal Atatürk sadece ülke meselelerinde değil uluslararası meselelerde de etkin ve belirleyici bir tutum izlemekte ve bu tüm dünya tarafından dikkatle izlenmektedir. Böylesine bir haberin Mısır yayınında yer alması Atatürk'ün diplomatik konulardaki karizması ve tanınırlığı ile örtüşmektedir.

### **3.1.3.2 (18.11.1934 TARİHLİ GAZETE HABERİ)**

18 Kasım 1934 tarihli “Türkler Niçin Gazi'yi Seviyorlar ve Gördüğüm Mustafa Kemal ve Muşaruleneyhin Evsaf ve Sadeliği” isimli haberde yapılan bir mülakatta Atatürk'ün ülkeyi ecnebi işgalinden kurtardığı ve İtilaf devletlerinin tüm Suriye ve Arap topraklarını alsa dahi Türk topraklarına dokunamayacağı ifade edilmiştir; işgal sonrası ülkenin kalkınması ve

çiftçiler, köylüler ve esnafa yapılan desteklerle halkın yararına yapılan diğer uygulamalardan övgü ile bahsedilmiştir (Mukattam, Türkler Niçin Gazi'yi Seviyorlar ve Gördüğüm Mustafa Kemal ve Muşaruleneyhin Evsaf ve Sadeliği, 1934).

### 3.1.4 BOMBAY CHRONICLE (20.08.1937 TARİHLİ GAZETE HABERİ)

Bombay Chronicle 1910 yılında Pherozeshah Mehta tarafından Hindistan'ın Mumbai şehrinde kurulmuş ve 1959 yılına kadar yayın hayatına devam etmiş bir gazetedir. Sıklıkla Ortadoğu

hakkında haberler yayınlayan gazetenin araştırmaya konu bu haberinde Atatürk'ün Filistin uğruna yapabilecekleri ve Avrupa'yı ihtar etmesi yer almaktadır (Bombay Chronicle, 1937).

*Baş Vekalet Yüksek Makamına*

*Bombay Chronicle gazetesinin 27/VII/937 tarihli nushasında "Filistin'e el sürülemez, Kemal Paşa Avrupa'ya ihtar ediyor" başlığı altında bir yazı intişar etmiştir. Bu yazının Türkçe örneği ilişik olarak sunulmuştur. Bu vesile ile saygılarımı tekrarlarım.*

*Dahiliye Vekili Bombay Cronicin 7.7.937 Filistin'e el sürülemez. Kemal Paşa Avrupa'ya ihtar ediyor. Türkler mukaddes topraklarda yabancı Hakimiyetine tahammül etmeyeceklerdir. Türkçe hakimiyeti milliye gazetesi Kemal Atatürk'ün Türkiye millet meclisinde irad etmiş olduğu bir nutuktan bahsediyor. Aşağıdaki satırlar bu nutkun Filistin'e taalluk eden kısmından alınmıştır. "Arapların Avrupa... (okunamayan kelime) nüfuz edemeyip bu Sözde istiklal kelimesine inandıkları ve bu uğurda Arap memleketlerini Avrupa emperyalizmine esir kıldıkları çok şayanı teessüftür Kemal Atatürk'ün, Filistin'in, Arabistan'da vuku bulacak hareketin merkezini teşkil ettiği takdirde bura Araplarına yapılacak herhangi bir fenalığa Türklerin de tahammül edemeyeceğini söylemektedir.*

*"Arapların arasında mevcut olan karışıklığı ve hoşnutsuzluğu kimse bizim kadar bilemez. Biz vakıa birkaç sene Araplardan uzak kaldık. Fakat şimdi kendimize kafi derecede güvenip ve kudretimizi bildiğimiz için İslamiyetin mukaddes yerlerini Musevilerin ve Hristiyanların nüfuzunun altına girmesine mani olacağız. Binaenaleyh şunu söylemek istiyoruz ki buraların Avrupa emperyalizminin oyun sahası olmasına müsaade etmeyeceğiz. Biz şimdiye kadar dinsiz ve İslamiyet'e lakayt olmakla ittiham edildik. Fakat bu ittihamlara rağmen peygamberin son arzusunu yani, mukaddes toprakların daima İslam hakimiyetinde kalmasını temin için hemen bugün kanımızı dökmeğe hazırız. Cedlerimizin, Selahaddin'in idaresi altında, uğruna hristiyanlarla mücadele ettikleri topraklarda.*

Haberden anlaşılacağı üzere Mustafa Kemal Atatürk'ün uluslararası meselelerdeki belirleyici ve net tutumu Ortadoğu ve Hindistan basını tarafından takip edilmektedir.

#### **4. SONUÇ**

Bu çalışmada, devlet arşivinden edinilen Mustafa Kemal Atatürk hayattayken Ortadoğu basınında hakkında yer alan haberler incelenmiş ve içerik analizi yapılmıştır. İçerik analizi öncesinde Türkler, Mustafa Kemal Atatürk ve Ortadoğu hakkında genelden özele bir kronoloji çalışması gerçekleştirilmiştir. Kahire, Beyrut ve Mumbai’de basılan El Mukattam, El Ahrar, El

İkbal ve Bombay Chronicle’da yer alan Mustafa Kemal Atatürk haberlerindeki ortak özellik Atatürk’ün belirleyici ve etkin ulusal ve uluslararası tutumunun yakından takip edilmesidir. Genel olarak İngiliz yanlısı bir gazete olmasına rağmen El Mukattam gazetesi dahil tüm gazetelerde Mustafa Kemal Atatürk ve Türkiye ile ilgili olumlu bir imajın oluşu dikkat çekmektedir. Ayrıca Mustafa Kemal Atatürk’in ulusal meselelerin yanı sıra beynelmilel gelişmelerde de etkin, kararlı ve dikkat çeken bir politika izlemesi Ortadoğu basınından anlaşılmaktadır.

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**REKLAMLARDA KULLANILAN ÖDÜL BOYUTUYLA EDİMSSEL KOŞULLANMA UYGULAMALARI VE BU UYGULAMALARIN TÜKETİCİLER ÜZERİNE ETKİSİ**

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**ÖZET**

Günümüzde aynı sektörlerde kaliteli ürün veya hizmet ortaya koyan binlerce firma, kendi ürünlerini, hizmetlerini ön plana çıkarmak için farklı uygulamalara başvurumaktadırlar. Reklam, halkla ilişkiler, sponsorluk, tüketicinin ödüllendirilmesi gibi birçok faaliyeti içine alan bu etkinlikler artan rekabet ortamında firmalar için artık bir zorunluluk olarak karşımıza çıkmaktadır. Bu uygulamalardan birisi olan ödüllendirme ile firmalar ürünlerini tanıtmak, satışlarını arttırmak ve müşteri sadakatini sağlamak gibi birçok amaçla ödül uygulamalarını kullanmakta ve daha çok müşteriye hitap etmeyi amaçlamaktadırlar. Öğrenme en basit tanımıyla kişi de kalıcı ve istendik davranışın oluşmasıdır. Öğrenmenin gerçekleşmesi için de ortaya atılan çok sayıda kuram vardır. Skinner tarafından ortaya konulan edimsel koşullanma kuramı ise ödül ve ceza ile öğrenmenin sağlanacağını yani kalıcı ve istendik davranışın gerçekleşeceğini savunmaktadır. İşte bu noktada reklamcılar devreye girmekte ve ödüle giden yolu nihai hedef kitleye aktarmaktadır. Ödülden reklamlarla haberdar olan tüketici istenen davranışı gerçekleştirmekte ve ödülü almaktadır. Sürekli veya belirli aralıklarla ödüllendirilen davranış yani satın alma, harcama yapma alışkanlığına dönüşmektedir. Reklamlarla duyurulan süreçte firmalar açısından varılmak istenen nokta da tam olarak budur yani sıradan bir davranışın alışkanlığa dönüşerek sürekli hale getirilmesi ve müşteri sadakatinin sağlanmasıdır.

Bu çalışmada literatür tarama yöntemi kullanılarak reklamlarla öğrenilen ödül uygulamalarından örnekler verilecek ve bu uygulamaların tüketici üzerinde ne derece etkili olduğu ortaya konmaya çalışılarak ödül uygulamalarının öğrenme, yani kalıcı davranış oluşturmadaki etkisi incelenecektir.

**Anahtar Kelimeler:** Ödül, pazarlama, edimsel koşullanma, alışkanlık, öğrenme, müşteri sadakati



**PRACTICE CONDITIONING APPLICATIONS WITH THE REWARD DIMENSION  
USED IN ADVERTISEMENTS AND THE EFFECT OF THESE APPLICATIONS ON  
CONSUMERS**

**ABSTRACT**

Today, thousands of companies that offer quality products or services in the same field apply to different methods in order to highlight their own products and services. These activities such as advertising, public relations, sponsorship, and rewarding the consumer, are now a necessity for companies in an increasingly competitive environment. With rewarding the consumers, which is one of these applications, companies use this application for many purposes such as promoting their products, increasing their sales, ensuring customer loyalty, and thus they aim to appeal to more customers. Learning, in its simplest definition, is the formation of permanent and desired behavior in the person. For the realization of learning there are many theories put forward. Practice conditioning theory put forward by Skinner, argues that reward and punishment will undergo learning, thus occurrence of permanent and desired behavior. It is at this point where advertisers transfer and clear the final destination of the reward to the target audience. The consumer, who is aware of the reward through advertisements, performs the desired behavior to receive the reward. Behavior that is rewarded continuously or periodically, which is purchasing, turns into a habit of spending. This is exactly the point that companies aim to reach in the process of advertisements, which is turning an ordinary behavior into a habit and ensuring customer loyalty. In this study, using the literature review method, examples will be given of rewards learned through advertisements, and the effect of reward practices on learning, which is creating permanent behavior, will be examined by trying to reveal how effective these practices are on the consumer.

**Keywords:** Reward, marketing, practice conditioning, habit, learning, customer loyalty.

## **1 GİRİŞ**

İnsan farklı amaçlar için sürekli öğrenen bir varlıktır ve bu öğrenme süreci doğduğumuz ilk andan başlayarak yaşamın sonuna kadar devam eder. Doğduğu ilk andan itibaren etrafını gözleyen insan zamanla yürüme, konuşma, iletişim kurma, kültürel öğeleri, insanlarla ilişkilerini düzenleyen her türlü detayı yaşantıları sonucu öğrenir. Bu süreçte insan iletişim araçları olarak nitelendireceğimiz araçlardan da birçok şey öğrenir. Televizyon, radyo, basılı materyaller, reklam afişi vb. olarak sayabileceğimiz bu araçlar insanlara tüketim alışkanlıkları oluşturma, satın alma davranışları konusunda da bilgiler verir.

Bu öğrenme sürecinde insan birçok farklı detaydan beslenirken firmalarda ürünleriyle ilgili birçok özelliği, yeniliği iletişim araçları vasıtasıyla oluşturulan reklamlar aracılığıyla insanlara aktarırlar. “ Öğrenme kavramı bir psikolojik faktör olarak tüketici davranışlarının şekillenmesinde ve açıklanmasında etkili olmakta ve reklamcıların reklamın izleyici kitlesi olan bireylerin reklama yönelik algılamalarında ve reklamı değerlendirmelerinde önemli bir etken olarak dikkati çekmektedir. Bu bağlamda bir kavram olarak öğrenme ve öğrenmenin insan tarafından nasıl gerçekleştirildiğini açıklayan öğrenme kuramları da hedef kitle davranışlarının belirlenmesi ve hedef tüketici kitlenin etkileneceği reklamların oluşturulmasında dikkate değer bir önem kazanmaktadır.(Elden, 2003:29)

Ödül ve ceza uygulamalarıyla davranışların yönlendirilebileceğini savunan edimsel koşullanma da reklamlarda ödül uygulamalarından haberdar etme noktasında sıklıkla kullanılmaktadır.

Reklamlar insanların hayatının her alanında karşı karşıya kaldıkları bir olgu olarak karşımıza çıkmaktadırlar. Evinde televizyon izleyen, radyo dinleyip gazete okurken reklamlarla karşı karşıya kalan insanlar evlerinden çıktıklarında açık hava reklamları ile karşılaşmaktadırlar. Reklam unsurlarının bu kadar hayatımızda olması reklamlardan birçok şey öğrenmemizle sonuçlanmaktadır. Reklamlar ürünler, hizmetler, firmalar hakkında bilgi verirken insanların tüketim alışkanlıklarını şekillendirmede de etkili olarak kullanılmaktadır. Satın alma ve ikna davranışının oluşmasında etkili olan reklamlar da birçok yöntem kullanılırken ödüllendirme uygulamaları da kullanılan yöntemler arasında yer almaktadır.

## **2. EDİMSSEL KOŞULLANMA ve REKLAM**

Bir davranışın sonuçlara bağlı olarak değişikliğe uğraması olarak tanımlanabilecek edimsel koşullama, B.F. Skinner’ın çalışmalarıyla elde edilen sonuçlara dayalı olarak ortaya

konmuştur. Kişi olumlu sonuçlara neden olacak davranışları gerçekleştirirken, olumsuz sonuçlar söz konusu olduğunda kaçınmaktadır. Skinner'a göre, belirli çevresel uyarıcılara karşılık ortaya

çıkan tepkiler koşullanabildiğine göre, çevresel uyarıcılardan bağımsız ve içten gelen hareketler ortaya çıkan edimler de koşullanabilir. Davranışların öğretilmesi ya da biçimlendirilmesi için edimsel koşullamadan yararlanılabilir. (Özabacı, Özmen, 2005:138)

Skinner'in edimsel koşullamayı ortaya koyarken birçok deneye başvurmuştur. Bunlardan en bilineni fareler ile yaptığı deneydir. Skinner'in fareler üzerinde yaptığı kafes deneyi şu şekilde gerçekleşmiştir. Deneyde, aç bırakılan bir fare, düzeneği önceden hazırlanmış deney kutusuna bırakılır. Deney kutusunda, istenildiğinde yakılabilen ışık, dokunulduğunda kutuya peynir düşüren bir manivela ve ayrıca kutunun tabanında elektrik şoku düzeneği vardır. Fare kutunun içinde dolaşırken “tesadüfen” manivelaya dokunur ve bunun üzerine kutuya bir parça peynir düşer. Birkaç benzer davranıştan sonra farenin kafes içindeki dolaşma alanı daha çok manivelanın olduğu bölgede yoğunlaşır. Daha sonra fare manivela ile peynir arasında bağlantıyı kurarak, istediği zaman peynire ulaşmayı öğrenir. (<https://eksiegitim.blogspot.com/E.T.12/9/2022>).

Skinner'in fare deneyide ortaya koyduğu bu durum birçok başka hayvanın eğitilmesinde de kullanılmıştır. Örneğin görme engelliler için eğitilen köpekler, sirklerde çeşitli gösterilerde kullanılan hayvanlar edimsel koşullanma kullanılarak eğitilmektedirler (Kasapoğlu, 2005:63-64)

Pekiştirmenin gücüne vurgu yapan bu kuramın iddiasına göre pekiştirmeyi kontrol eden kişi aynı zamanda davranışı da kontrol etmiş olmaktadır. Zaman içinde edimsel koşullanmaya bazı eleştiriler getirilmiş olsa da davranışların kontrol edilip edilmeyeceği asla sorgulanmamıştır. Tartışma konusu olan davranışı kimin ya da neyin kontrol edeceği. Bu konuda, ebeveynler, eğitimciler, hükümet ve siyasal gruplar, reklamcılar hatta terör örgütleri bile kullanıcı konumundadır. Bir bireyin davranışlarını kontrol etmek demek onun hayatına yön vermek anlamına gelmektedir. Etik boyutlarını bir yana bırakırsak bunu başarmak oldukça zordur fakat edimsel koşullanma bunun mümkün olabildiğini iddia etmekte ve tavsiyelerde bulunmaktadır. (Karaman, 2020:128)

### **3- REKLAMLARDA KULLANILAN EDİMSSEL KOŞULLANMA UYGULAMALARI**

Ödüllendirme günümüzde özellikle müşteri sadakati sağlama adına oldukça yaygın bir şekilde kullanılmaktadır. Özellikle market, ulaşım, havayolu, bankacılık, eğitim, yiyecek içecek gibi

sektörlerde tüketici sürekli farklı şekillerde ödüllendirilmektedir. Bu ödüllendirmeler yapılırken reklamlar da bu ödüllerin duyurulması noktasında etkin bir şekilde kullanılmaktadır.

Satın alma davranışı sıradan bir davranış gibi görünse de özellikle memnuniyet yaratan boyutuyla haz ve tatmini beraberinde getirebilmektedir. Edimsel koşullanma boyutuyla bakılırsa kişinin yaptığı alışverişten haz alması bir bakıma kişinin davranışı sonucu ödüllendirilmesidir. Bu durum pazarlamacılar açısından son derece önemli bir durum olarak karşımıza çıkmaktadır (Umud, 2019)

“Reklamda kepek sorunu, renkli giysilerdeki zorlu kirler, yaşlanma korkusu, karşı cins tarafından beğenilme, istediği bir sorununa çözüm getiren ya da bir beklentisine cevap bir ürünle karşılaşan tüketici bu ürünü aldığı ve kullandığında da reklamda dile getirilen tatmine ulaşırsa, o marka bu ürünü tekrar kullanacaktır. Bu nedenle reklamlarda tüketicilerin sorun ve beklentileri dile getirilerek bu sorunların nasıl giderildiği ve beklentilerin nasıl karşılandığının ifade edilmesi tüketiciye söz konusu marka ürünü kullandığında nasıl bir olumlu pekiştirici yani ödülle karşılaşacağını gösterecektir. Bu durum edimsel koşullanma ile açıklanmaktadır. Ancak bu ödüllerin alışkanlık yaratacak şekilde sürekli tekrarlanması yerine belli dönemlerde (yılbaşı, bayram, belli bir dönem gibi) veya belli bir alışveriş tutarı üzerinden ödüllendirmeye gidilmesi ve ödülün anında tüketiciye sunulması (mağazada alışveriş sonrası hemen sunulan indirim ya da armağan gibi) davranışın pekiştirilerek öğrenmenin gerçekleşmesinde daha etkili olacaktır.” (Elden, 2003:19).

Şampuan almak için bir markete girdiğimizde ve tercih ettiğimiz şampuanın yanında aynı markanın farklı bir ürünün hediye olarak verilmesi insanları mutlu eder. Şampuan alma sıradan bir davranışken ödüllendirildiğinde firma ve alışveriş yapan insan için farklı boyutlara ulaşır. Firma için tüketiciyi ödüllendirdiği için şampuan alma davranışının tekrarlanma ihtimalinin artması veya müşteri sadakatinin artırılması olarak karşımıza çıkan bu durum tüketici için de ödülle doyuma ulaşan psikolojik bir faktör ve tekrarlanan davranışlar olarak karşımıza çıkmaktadır.

Edimsel koşullanmanın bir boyutu olarak düşüneceğimiz ödüllendirme uygulamaları özellikle bankalar tarafından da sıklıkla ve çok boyutlu olarak kullanılmaktadır. Banka ve kredi kartlarıyla tüketici her alışveriş yaptığı zaman ödüllendirilmekte ayrıca belirli kez tekrarlanan alışverişte de toplu puan verilerek tüketici ödüllendirilmektedir. Bankaların uyguladığı taksit uygulamaları da ödül uygulamasının bir boyutudur. Tek seferde yüklü bir ödeme

yapacak olan bu ödemeyi farklı ödeme seçenekleriyle yapmakta ve bu durum tüketiciyi rahatlatmaktadır. Herkesi kapsayan bu uygulamalar günümüzde harcama sektörleri analiz edilerek artık kişiye özel olarak da uygulanabilmekte ve müşterilere özel ödül teklifi, ödül uygulamaları bankacılık

sektörü tarafından sıklıkla kullanılmaktadır. Bankacılık ve havacılık sektörünün kullandığı mil uygulaması ise başka bir ödül uygulamasıdır.

Ödüllendirme uygulamalarını etkili bir şekilde kullanan başka bir sektör ise meşrubat firmalarıdır. Yılbaşı, bayram, ramazan ayı gibi özel dönemlerde sıklıkla ödüllendirme uygulamalarını uygulayan meşrubat firmaları çok farklı ve özgün ödüllendirme şekilleriyle hedef kitlelerini daha fazla satın almaya ikna etmeye çalışırken aynı zamanda firmalarına olan sadakati arttırmaya çalışmaktadırlar. Reklamlarda kullandıkları kutup ayısı karakterini bir süre sonra oyuncak haline getirerek belirli kez yapılan alışverişten sonra alıcılara hediye olarak veren firma ayrıca belirli sayıda kapak toplayan müşteriye basketbol topu, bardak, tepsi, kavanoz ve bol miktarda meşrubat hediye etmektedir.

Ödül uygulamalarında reklamın yeri ise genelde haber verme noktasında devreye girmektedir. Tüketiciyi ödüle götüren yol ilk olarak reklamlarda dile getirilmektedir. Yeni yıla özel, bayrama özel diyerek başlanılan sözler beş alışverişe şu kadar ödül verilecek ile devam etmekte ve çarpıcı görseller, mizah, ihtiyaçlar kullanılarak tüketiciler reklamlarla ödülünden haberdar edilmektedir.

“Reklama verilen olumlu tepki pekiştirme ve ödüllendirme ile arttırılabilir. Basılı bir reklamda yeni bir temizlik ürünüyle yapılan fırın temizleme gibi ufak tefek fakat hoşlanılmayan bir ev işi gösterilebilir. İnsanlar bu reklamda şu kadar indirimle bu ürünü X alışveriş merkezinden edinebileceklerini öğrendiklerinde, elde edecekleri indirimin ortaya koyduğu ödülü almak için harekete geçeceklerdir. Ürünün bir kez denenmesi ve memnun kalındığı takdirde tekrar satın alınması yoluyla oluşan bir süreç söz konusu olduğu için deneme-yanılma yoluyla öğrenme olarak da adlandırılan edimsel koşullanmada, reklamı yapılan üründen istediği yönde tatmin elde eden bir tüketici olumlu yönde pekiştirme gerçekleştirmiştir.” (Elden,2003:21). Bu şekilde olumlu yönde pekiştirilen yani ödüllendirilen bu davranışın tekrarlanma ihtimalinin yükseldiğini şu noktada söylemek mümkündür.

Firmalar ödüllendirme uygulamalarını her yaşta insan için uygulamakta ve sağdık müşteri kitlelerini arttırma adına özellikle çocuklara yönelik ödül uygulamalarına da sıklıkla başvurmaktadırlar. Özellikle özel günlerde bir mağazaya giren çocuklara üzerinde kendi

markalarının ve logolarının olduğu balonlar, oyuncaklar gibi hediyeler vererek o çocukların büyüdüklerinde kendi ürünlerini almaları için temelleri atmaktadırlar. Birçok firmanın yiyecek menüleri içinde çocuklara yönelik menüler vardır. Bu menülerden alındığında yanında hediye oyuncaklarda çocuklara ek bir ücret ödemedi verilir. Bu şekilde çocuklar tekrar tekrar ödüllendirilirler. İstendik davranışların oluşması ve sadık müşteri kitleleri oluşturmak için

henüz sağlıklı kararlar verip uygulayamayan çocuklara yatırım yapmak firmalar için çok akıllıca bir yatırım olarak görülmekte ve bir çok firma ödül uygulamalarıyla çocukları hedef alabilmektedir.

#### 4- SONUÇ

Edimsel koşullanmanın ödül boyutuyla reklamlarda kullanılmasının hem firmalara hem de tüketicilere sağladığı bazı faydalar vardır. Tüketici açısından ödül, kupon, indirim olarak somut bir şekilde değerlendirebileceğimiz faydalar zamanla firmaya ürüne karşı oluşacak duygusal bağlarla çok farklı boyutlara ulaşabilmektedir.

Ödül uygulamalarının temel amacı olan sadık müşteri kazanımı, yapılan araştırmalara göre rekabet ortamında hayatta kalmaya çalışan işletmeler için pazar paylarını koruyabilmelerine yardımcı olmaktadır. Etkili bir ödül programı ile müşteri sadakatini arttırmak, sadık müşterilerin fiyat hassasiyetini azaltmak, müşterilerle ilgili önemli bilgilere ulaşmak, ortalama satışları yükseltmek, özel bölümlendirme stratejileri yapabilmek ve markaya karşı tutumu güçlendirmenin mümkün olduğu belirtilmiştir. Bunun yanında, ödül ve başka uygulamalarla oluşturulan sadık müşteriler işletmeye artan ve sıklaşan satışlar, düşen maliyetler ve olumlu tavsiyeler gibi birçok avantaj sağlamaktadır. Ödül programlarının işletmelere sağladığı faydaları tatmin, bağlılık, satın alma eğilimi, fiyat hassasiyeti, daha fazla ödeme eğilimi, ziyaret etme sıklığı, olumlu yorum ve tavsiyeler ile veri sağlama olarak sıralayabiliriz (Atay,2020:26)

Ödül uygulamalarından haberdar eden reklam ise bu noktada hayati öneme sahip olmaktadır. Ödülden farklı mecralarda yer alan reklamlarla haberdar olan tüketici firmayla ve ürünle buluşmakta firma ve tüketicinin buluşması gerçekleşmektedir.

Skinner'in öğrenme kuramında yer alan pekiştirme davranışta bulunan kişinin ödüllendirmesi olarak ele alınmakla birlikte burada kişinin davranışının farkında olması edimsel koşullanmayı çok güçlü bir konuma getirmektedir. Davranışının farkında olan birey bilerek ve isteyerek satın alma davranışı göstermekte ve bilinçli bir eylem gerçekleştirmektedir.

Yapılan çalışmalarda göstermiştir ki edimsel koşullanmanın yani ödül uygulamalarının öğrenmeye etkisi tartışılmaz bir gerçektir. Satın alma, tüketici olma gibi ayrıntılar da insanlar tarafından reklamlarında etkisiyle öğrenilen durumlar arasında yer almaktadır. Ödüllerin hem tüketiciye hem de firmalara sağladığı faydalar düşünüldüğünde, edimsel koşullanmanın, öğrenmenin, ödülün ve reklamın, hem firmalar hem tüketiciler için ihtiyaçtan öte bir durum olduğu görülmektedir.

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**SİYASAL İLETİŞİM KAMPANYALARINDA KARİKATÜR VE CAPSLAR İLE  
MİZAHIN KULLANIMI: İSTANBUL BÜYÜKŞEHİR BELEDİYESİ SEÇİMLERİ  
ÖRNEĞİ (31 MART -23 HAZİRAN 2019)**

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**ÖZET**

İnsanları eğlendiren, rahatlatan, aynı zamanda düşündüren mizah insanlık tarihi kadar eski bir geçmişe sahiptir. Birçok unsuru olan mizahın çok eski zamanlardan bu yana kullanılan türleri olduğu gibi sosyal medyayla birlikte ortaya çıkan türleri de olmuştur. Mizah insanlar tarafından eğlence için değerlendirilirken birçok alan da mizah ve unsurlarını farklı amaçlarla kullanmıştır. Siyasetçiler ve siyasal iletişim profesyonelleri de mizahı hedef kitlelerini etkilemek, ikna etmek ve sempati uyandırma gibi amaçlarla kullanmakta ve bu alanda yaratıcı çalışmalar yapmaya özen göstermektedirler. Bu çalışmada siyasal İletişim çalışmalarında oldukça eski bir geçmişe sahip olan siyasal karikatürler ve sosyal medya araçlarının ortaya çıkmasıyla görülmeye başlanan ‘caps’ler 31 Mart ve 23 Haziran Tarihinde yapılan İstanbul Büyükşehir Belediye Başkanlığı seçimleri üzerinden ele alınacaktır. Karikatür ve capslerde görülen anlamların dışında görünmeyen örtük mesajların olacağı düşüncesiyle göstergebilimsel çözümleme tekniği kullanılmıştır. Yapılan bu çalışmayla karikatür ve caps gibi gülmece unsurlarının nasıl bir siyasal iletişim aracına dönüştüğü, güldüren ve düşündüren karikatür ve capslerin hedef kitlelerini ikna sürecinde nasıl kullanıldığı 31 Mart ve 23 Haziran tarihinde İstanbul Büyükşehir Belediye Başkanlığı seçimleri üzerinden ele alınacaktır. Evren



olarak internet ortamı kullanılmış, çalışma için iki adet karikatür ve iki adet caps kullanılmıştır.

**Anahtar Kelimeler:** Siyasal İletişim, Karikatür, Caps, Gülmece, İstanbul Büyükşehir Başkanlığı Seçimi (31 Mart -23 Haziran 2019)

**USE OF CARTOON AND CAPS AND HUMOR IN POLITICAL COMMUNICATION  
CAMPAIGNS: THE CASE OF ISTANBUL METROPOLITAN MUNICIPALITY  
ELECTIONS (31 MARCH -23 JUNE 2019)**

**ABSTRACT**

The history of humor that entertains, breaks boundaries and let people wonder is as old as humanity itself. Humor, which has been used since ancient times, consisted of many types and components, as well as new types that emerged with modern social media. While humor is used by people for entertainment, many other fields have used humor and its elements for different purposes. Politicians and political communication professionals also use humor to influence and persuading their target audiences and arousing sympathy, and they work to carry out creative studies in this field. In this study, with an old history in political communication and with the emergence of modern social media, political caricatures and ('caps'/memes) which have been widely popular in the recent times, will be discussed in the example of Istanbul Metropolitan Municipality elections held on March 31 and June 23. Semiotic analysis technique has been used with the thought that there are invisible messages beyond the shown meanings in the caricatures and ('caps'/memes). In this study, it will be discussed how instruments such as caricatures and ('caps'/memes) turn into a political communication tool, how they have been used to make people laugh and think are used in the process of persuading their target audiences will be discussed through the Istanbul Metropolitan Municipality elections held on March 31 and June 23. For this study, two caricatures and two ('caps'/memes) were used that have been published on online.

**Keywords:** Political Communication, Caricature, 'Caps', 'Gülmece', Istanbul Metropolitan Municipality Elections (31 March -23 June 2019)

## **1 GİRİŞ**

Tarihi çok eski dönemlere dayanan mizah tarih boyunca farklı amaçlarla halk içinde çok yaygın bir şekilde kullanılmıştır. Düşündürten eğlendiren mizah aynı zamanda haksızlığa uğrayan halk için dönem dönem bir silah olarak da kullanılmıştır. Mizah unsurları arasında yer alan karikatür ise çizgilerle oluşturulan ve insanların daha çok komik yönlerine ve eksikliklerine yönelen gülmece unsurları olarak karşımıza çıkmaktadır. Karikatürün duygu, düşünce, gibi unsurları geniş kitlelere kolaylıkla ve eğlendirerek ulaştırması güçlü yönlerinden bir tanesi olarak değerlendirilmektedir. Caps uygulamaları ise karikatüre göre çok daha yeni bir uygulamadır ve Capsler basit bilgisayar uygulamaları ile bir fotoğrafın altına yazılar yazıp bu yazıların renklendirilmesi ile oluşturulur. Ancak fotoğraf ve yazı bir araya geldiğinde bir gülmece unsuruna dönüşmektedir.

Aziz siyasal iletişimi, “siyasal aktörlerin belli ideolojik amaçlarını, belli gruplara, kitlelere, ülkelere ya da bloklara kabul ettirmek ve gerektiğinde eyleme dönüştürmek, uygulamaya koymak üzere çeşitli iletişim tür ve tekniklerini kullanmaları” olarak tanımlamaktadır (Aktaran; Demir,2018:89). Belli grupları kitleleri etkilemek ve istendik davranışlar oluşturmak için siyasal iletişimde birçok teknik kullanılmaktadır. Mizah ise siyasetçilerin ve siyasal iletişimi dizayn eden profesyonellerin de oldukça yaygın bir şekilde kullandıkları unsur olarak son yıllarda yoğun bir şekilde karşımıza çıkmaktadır.

Literatürde mizah unsuru olan karikatür üzerine oldukça fazla çalışmaya rastlanmıştır. Karikatürle ilgili çalışmalarda ise gerçekleşen bir seçim ele alınarak seçim sürecinde çizilen karikatürler farklı başlıklar altında irdelenmiştir. Özellikle internet ortamı, yeni medya gibi unsurlar değerlendirildiğinde ise caps çalışmalarının siyasal iletişim çalışmalarında oldukça yoğun olarak kullanıldığı görülmüştür. İnternet ortamında yer alan karikatür ve capslerin özellikle yeni medya araçlarıyla kitlelere hızlı ve etkili bir şekilde ulaştığı görülmüştür.

Yapılan bu çalışmayla karikatür ve caps gibi gülmece unsurlarının nasıl bir siyasal iletişim aracına dönüştüğü, güldüren ve düşündüren karikatür ve capslerin hedef kitlelerini ikna sürecinde nasıl kullanıldığı 31 Mart ve 23 Haziran tarihinde İstanbul Büyükşehir Belediye Başkanlığı seçimleri üzerinden ele alınacaktır.

## 2 MİZAH NEDİR.

Batı kaynaklı görüşlere göre mizahın geçmişi milattan önce 4. Ve 5. Yüzyıl Yunan şehir devletlerine kadar ulaşmaktadır. Hititlerde adı Prurilli Ayinleri olan Yunanlılarda ise Dionysos

şenlikleri mizahi içerikleri olan eğlence şekilleridir. Antik dönemlerde iyi ile kötünün sürekli bir çatışma halinde olduğuna inanılırdı. İyinin ve kötünün mücadelesi sonucu kötüye karşı iyinin galip gelmesi üzerine eğlenceler düzenlenirdi. Kötü güçlerin insanlar üzerinde oluşturduğu korku ve yılgınlık bu tür eğlencelerle aşılmaya çalışılmış ve mizah ortaya çıkmıştır(Yardımcı, 2010, 3)

Mizah, fikirleri düşünceleri şaka ve nüktelerle çeşitlendirerek aktaran yazı türü olarak tanımlanmakla birlikte zamanla daha farklı ve ağır türleri de içine alan bir terim olarak karşımıza çıkmaktadır. Temel amacı güldürme olarak tanımlansa da mizahın farklı amaçları da vardır. Mizah insanları güldürürken insanlarda ve toplumda var olan aksaklıkları, olumsuzlukları, eleştirme ve iğneleme, düzeltme gibi amaçları da bünyesinde örtük bir şekilde barındırmaktadır. Mizah halk zekasının bir ürünüdür ve kin ve intikam duygusu yoksa mizahta küçük düşürme amacı yoktur. (<https://islamansiklopedisi.org.tr/> E. T. 13/10/2022).

Filozoflarca da tanımlanan mizah Aristoteles'e göre ahlak sanat ve dini aşağılayan bir tavır iken Platon'a göre kıskançlıktan kaynaklanan talihsiz bir kendini tanımama durumudur. Gerçekliğe gülünç sıra dışı, eğlenceli, bir şekilde yaklaşan mizahın ana çatısını eleştirel olması oluşturur. Mizahta temel amaç insanları aşağılamak ve değerleri küçümsemek olmasa da insanlarda ve olaylarda yer alan bir takım uyuşmazlık, çarpıklık ve gülünçlükleri açığa çıkarma ve göz önüne getirme olarak açıklanabilir. Mizah ezilenin ezene karşı kullandığı bir sanatsal silah olarak ifade edilse de bunun tersi durumlarda tarihte gözlenmiştir. Mizahın sorunları görünür hale getirmesi onu popüler muhalefet biçimlerinden birisi haline getirmiştir. Mizah sayesinde kahramanlar üretilerek eleştirilmek istenen kişilere, kurumlara mesajlar aktarılmış, topluma verilmek istenen çok sayıda mesaj mizahın gösterişli ve komik üslubu içinde hedefe gönderilmiştir(Nisan &Şeker; 2017:317,318)

Mizah eski türk devletlerinde ve Osmanlı da sözlü eserlerle kendine yer bulmuştur. Karadeniz fıkraları, Nasrettin Hoca fıkraları, Keloğlan fıkraları, Bektaşî fıkraları, Karagöz, Ortaoyunu, Meddahlar sözlü mizahımızın önemli unsurlarını oluşturmaktadır. Osmanlı döneminde Tanzimat'la birlikte yazılı eserler de görülmeye başlar. Bu durumu ilk örnekler batı edebiyatının da etkisiyle mizah dergileri olmuştur. Siyasal konularında işlendiği bu dergilere en güzel örnek Diyojen dergisidir. İlk olarak bir karikatür de Diyojen dergisin de yer almıştır. Diyojen dergisi dönemin yönetimi aleyhine yayınladığı birçok karikatürden dolayı defalarca kapanmıştır. Osmanlının son döneminde ve Cumhuriyetin ilk yıllarında karikatür, Gülyeryüz, Karagöz gibi birçok dergi yayın hayatına başlar. Cumhuriyetin kuruluşundan günümüze ise Türk Mizah hayatında birçok dergi ve anlayış kendisine yer bulur. Bunlardan Marko Paşa dergisi, Cemal

Nadir'in yarattığı Amcabey Karakteri, Rıfat Ilgaz'ın Hababam Sınıfı serisi, Turhan Selçuk'un Abdülcanbaz Karakteri, 1980 sonrası ise Gırgır dergisi Türk mizah hayatının önemli temsilcileri olarak değerlendirilebilir (Güder, F. Z. 2012:50-59)

### 3. SİYASAL İLETİŞİMDE MİZAH

“Mizahın tarihçesi geçmişte Atinalılara kadar uzansa da mizah ve liderlik konusu 1940'lı yıllardan beri akademik çalışmalara konu olmuş olup her geçen gün daha çok gündeme gelmekte ve tartışılmaktadır. Ancak yine de bu alanda yapılan çalışmaların yeterli olduğu söylenememektedir. Türkiye'de mizah konusu daha ziyade liderler hakkında yapılan mizah ve çizilen karikatürler bağlamında ele alınmıştır” (Devran ve Gül, 2016:380)

Mizah, sosyal medya ve yazılı basın aracılığıyla kolayca hedef kitlelere ulaşması ve takip edilmesi nedeniyle toplumu etkilemek için sık sık tercih edilmiştir. İş adamları, politikacılar, sanatçılar toplumun beğenisini kazanmak için mizaha başvurmuşlardır. Mizah savaş dönemlerinde bile düşmanı küçük düşürmek, alay etmek için kullanılmıştır. Mizah sosyal ve siyasi çalkantıların, kavganın ve basıların arttığı dönemlerin enstrümanıdır (Taşçıoğlu & Çavdar, 2017:388)

Mizah çarpıklıkların, düzensizliklerin gösterilmesin de çok etkili bir silah olarak karşımıza çıkmaktadır. Siyasetçiler ise muhalefet olsun iktidar olsun karşı tarafta yer alan eksilikleri, aksaklıkları mizahı kullanarak her daim hedef kitleleri önünde tutmaya çalışmışlardır. Ayrıca mizahı, mizahi dili iyi kullanan siyasetçiler halk tarafından sempatik bulunmuştur. Siyasetçilere sağladığı bu tür faydalardan ötürü ve yeri geldiğinde iktidarı, muhalefeti zor durumda bırakan bir silah olmasından dolayı mizah siyasetçilerce ve siyasal iletişim

çalışmalarında yer alan profesyoneller tarafından sık sık kullanılan bir unsur olarak arşımıza çıkmaktadır.

Türk siyasetin de de mizahı ustaca kullanan ve hazırcevaplığıyla öne çıkan birçok siyasetçi vardır. Bunlardan gazeteci kimliğiyle de tanınan Osman Yüksel Serdengeçti renkli kişiliğiyle ve hazır cevaplarıyla Türk siyasal mizah hayatına renk katmıştır. Milletvekili olarak meclise giren Serdengeçti bir zorunluluk olarak mecliste kravat takması istenildiğinde önce kravat takmamış daha sonrasında ise kravatı beline takarak meclise girmiştir. Bu durumu ise yasalarda kravatın nereye takılacağı ifade edilmiyor sonuçta kravatla meclise geldim diyerek olayı eleştirirken mizahı da etkili bir şekilde kullanmıştır (<https://tr.wikipedia.org/> E.T. 13/10 /2022)

Türk siyasal tarihinde mizah denince akla gelen bir diğer siyasetçi ise Süleyman Demirel'dir. Demirel yaptığı konuşmalarda ve karikatürlerde yer alması ile mizahi bir unsur olarak her zaman yer almıştır. Özellikle söylemleriyle karikatürlere bile konu olan Demirel gazeteci Tan Oral tarafından 12 Eylül 2005 tarihinde açılan "Demirel ve Demokrasi" adlı karikatür sergisini

gezerken kendi söylemlerinin karikatürleştirilmesine kendisi de gülerken tepki vermiştir. Karikatür de ise Demirel'in "Enflasyon düşüyor da biz mi tutuyoruz" cümlesi kullanılmıştır (<https://www.milliyet.com.tr/gundem/kendi-karikaturu-demireli-guldurdu-253764>)

#### 4. BİR GÜLMECE UNSURU OLARAK KARİKATÜR VE CAPS

Karikatür insanlığın ilk dönemlerinden bu yana kullanılan bir iletişim aracı olarak karşımıza çıkmaktadır. Antik dönemde Roma İmparatorluğu bünyesinde yer alan Pompei şehrinde çıkarılan vazolarda karikatür denebilecek çizimlere rastlanmıştır. Karikatür kelimesi İtalyanca yer alan "caricare" sözcüğünden türemiştir. Caricare sözcüğü ise Fransızca'da çarpıtılmış çizim, hücum etmek anlamında kullanılmaktadır. (Yavuz, 2009:108)

"Karikatür muhaliftir. Siyasal alanda da kendisini gösterir. Özellikle iktidar söz konusu olduğunda iktidarın yanlışlarını ele alarak bir bombardımana başlar. Karikatürün ulaşımının kolay olması ve görsel olarak kısa net ve anlaşılır olması, karikatürün siyasal iletişim sürecinde ele aldığı konulara nokta atışı yaparak seçmenin kararlarını etkilemekte, onda istedik yönde değişiklikler meydana getirmektedir. Politik karikatürün, sadece iktidarı hedef aldığını söylemek en büyük yanlışlardan birisidir. Politik karikatür, muhalefet yanlış yaptığı zaman muhalefeti de eleştirmektedir. Burada karikatüristin, hangi ideolojik görüşe bağlı olan

gazete, dergi gibi mecralarda çizimler yaptığı ise önemli bir husustur.” (Taşçıoğlu & Çavdar, 2017:388-389)

Eğlendirmek amacıyla ortaya çıkarılan görsellere günümüzde “caps denmektedir. İngilizce yakalamak anlamında gelen “capture” kelimesinden türeyen sözcük kullanıcılarca internetten elde ettikleri ve bilgilendikleri fotoğrafları tanımlamak için kullanılan kelimelerdir. Yapılan işlemde yakalamak ifadesiyle belirtilmek istenen hareketli sahneden istenen karenin yakalanması işidir. Yapılan bu uygulama yakalanan fotoğrafların güldürü öğeleri içeren şekillere dönüştürülmesiyle orijinal ya da üzerinde oynanmış fotoğraflara yazılar eklenmesi ile eğlenceye yönelik mizahi bir anlatım türüne dönüştü. İlk başlarda film veya video kullanılarak oluşturulan bu görseller için günümüzde her türlü görsel kullanılmaya başlanmıştır. Bir nevi fotomontaj olarak değerlendirilebilecek “caps”ler yazılarla desteklenerek sunulan güldürü unsurlarıdır. Uygun bulunan fotoğraf basit bir bilgisayar programıyla istenildiği şekilde düzenlenerek ve uygun yazılarla birlikte gülmece unsuruna dönüştürebilir. “Capsler oluşturulurken verilecek mesaja göre fotoğraf sayıları da arttırılabilir. İdeolojik herhangi bir düşüncüyü aktarmak, reklam yapmak, eğlendirmek, korkutmak gibi birçok amaçla hazırlanan

caps”ler oldukça kolay ve hızlı hazırlanmasıyla da günümüzde yaygın bir şekilde kullanılmaya başlanmıştır(Güvenç, 2017:110)

## 5. SİYASAL İLETİŞİMDE KULLANILAN KARİKATÜR VE CAPS ÖRNEKLERİ

İnsanları eğlendirmek ve rahatlatmak için kullanılan mizah birçok boyutuyla eski ve yeni medya araçlarında yaygın olarak kullanılmaktadır. Bu araçlardan olan karikatürler siyasal iletişim çalışmalarında epey bir geçmişe sahipken ‘caps’ uygulamaları bu alana yeni girmiş bir tür olarak karşımıza çıkmaktadır. Mizah ve unsurlarını siyasal iletişim anlamında ülkemizde hem muhalefet partileri hem de iktidar partisi sık sık kullanmaktadır. Bu çalışmada 20 yılında siyasal anlamda kullanılan karikatür ve ‘caps’lerden örnekler sunularak bu çalışmalar gösterge bilimsel analiz yöntemiyle irdelenecektir. Caps ve karikatür seçiminde her iki parti ve aday lehine ve aleyhine olmak kaydıyla iki adet capse ve iki adet karikatüre yer verilmiştir. Kullanılan caps ve karikatür örneklerinin seçim döneminde yayınlanmasına dikkat edilmiş ancak seçimden daha önce üretilen ve seçim döneminde de kullanılan çalışmalara da yer verilmiştir. Örneğin Sözcü Gazetesinde 2016 yılında yer alan “Binali diyeceğim bineceksin, inali diyeceğim ineceksin” yazılı caps, sosyal medya da İstanbul Büyükşehir

Belediye Başkanlığı seçim dönemin de de kullanılmıştır. İnternette yer alan verilerin paylaşılması ve uzun süre kaybolmaması ve farklı zamanlarda tekrar tekrar kullanılabilmesi ve etkili olması bu kullanıma gerekçe olarak değerlendirilebilmektedir.

## 5.1.CAPS ÖRNEKLERİ

### Caps: 1



Kaynak: <https://twitter.com/misvakcaps>

**Gösterge:** İstanbul Büyükşehir Belediye Başkanlığı Seçimi Caps

**Gösterenler:** Binali Yıldırım, Ekrem İmamoğlu, Kıbrıs Anıtı, Caps Yazıları

**Gösterilenler:** Rekabet, Başarı, Uzmanlık, Heykel, Anıt, Rum Sempatisi

**Göstergebilimsel Çözümleme:** Caps,te iki ayrı fotoğraf vardır. İlk fotoğrafta Binali Yıldırım konuşma yapar şeklinde yer almaktadır. Binali Yıldırım kask takmış vaziyette ve çalışanların giydiği uyarıcı yelekle fotoğrafta yer almaktadır. Fotoğrafın altında ise “Binali Yıldırım Deyince Aklıma Yaptığı Hizmetler” yazısı yer almaktadır. Binali Yıldırım elleri, duruşu ve surat ifadesiyle konuya hakim bir konuda konuşuyor şeklinde fotoğrafta görünmektedir.

Alt tarafta yer alan Fotoğrafta ise Ekrem İmamoğlu Kıbrıs Anıtı olarak açılan anıtın önünde yer almaktadır. Ekrem İmamoğlu'nun arka tarafında suratları parçalanmış heykeller görülmektedir. Ekrem İmamoğlu'nun surat ifadesi ciddi görünümündedir. Ekrem İmamoğlu'nun yer aldığı fotoğrafın altında ise “Ekrem İmamoğlu Deyince Kırık Makarios Heykeli Gelir” yazısı yer almaktadır.

**Söylem Çözümlemesi:** Ele alınan bu capste İstanbul Büyükşehir Belediye Başkan adayı Binali Yıldırım çalışan emek veren üreten bir işçi gibi gösterilmiş ve yaptığı hizmetlerle hatırlanan bir karakter olarak ortaya konmaya çalışılmıştır. Ulaştırma Bakanlığı yapan Binali

Yıldırım fotoğrafın arkasında yer alan metro inşaatı fotoğraflarıyla capste yer almış turuncu kıyafetiyle aktif bir görüntüyle hedef kitleye aktarılmaya çalışılmıştır. Capste Yıldırım çalışkanlığı ile ön plana çıkartılmış ve yaptıkları ortaya konulmaya çalışılmıştır. Ekrem İmamoğlu ise Beylikdüzü Belediye Başkanlığı döneminde açılışını yaptığı Kıbrıs Anıtı resmiye yer almaktadır. Ekrem İmamoğlu bu anıtın yan tarafında 1959 da kurulan Kıbrıs Cumhuriyeti'nin ilk cumhurbaşkanı olan Başpiskopos III. Makarios'un rölyefinin bulunduğu kısım ile gösterilmiştir. Bu rölyef bir kesimin tepkisini çekmiş ve yunan psikopos ve diğer kişilerin heykelleri parçalanmıştır. Parçalanan Makarios Heykelinin ön tarafında poz veren Ekrem İmamoğlu açtığı ve sonrasında önünde poz verdiği heykel ile birlikte gösterilmiştir. Yapılan çalışmayla seçmene başarılarıyla ön plana çıkan Binali Yıldırım ile heykeller diken ve bu heykellerde Rum bir din adamına yer veren Ekrem İmamoğlu arasında seçim yaparken başarılı olan Binali Yıldırımı tercih etmesi telkin edilmektedir. Caps'te heykelin sağlam halinin değil de kırık halinin kullanılması, din adamı olan Makarios'un vurgulanması da muhafazakâr seçmene niye Ekrem İmamoğlu'na oy vermemesi gerektiği yönünde bir mesaj olarak değerlendirilebilir.

## Caps:2



Kaynak: [https://www.sozcu.com.tr/2016/gundem/sosyal-medyayi-sallayan-binali-capsleri-1241773/?\\_szc\\_galeri=1/6/](https://www.sozcu.com.tr/2016/gundem/sosyal-medyayi-sallayan-binali-capsleri-1241773/?_szc_galeri=1/6/)

**Gösterge:** İstanbul Büyükşehir Belediye Başkanlığı Seçimi Caps



**Gösterenler:** Binali Yıldırım, Recep Tayyip Erdoğan, Caps Yazıları

**Gösterilenler:** Otorite, Yönlendirme, Yönetme,

**Göstergebilimsel Çözümleme:** Caps'ın düz anlamı Recep Tayyip Erdoğan ile konuşan Binali Yıldırım'ın R. T. Erdoğanı dinlemesidir. Etkinliklerde protokol en önde ve yan yana oturmakta ve bu süreçte siyasetçiler sohbet etmektedir. Bu fotoğrafta da iki siyasetçi yan yana yer almaktadır. Ortamın gürültülü olması veya konuşulanların duyulmasının istenmediği düşünülürse Binali Yıldırım, R. T. Erdoğan'a doğru eğilerek söylenenleri dinlemektedir. İki siyasetçinin arkasında ise başka kişiler oturmakta bu kişilerden suratı net görünen kişinin surat ifadesi ise ciddidir.

**Söylem Çözümlemesi:** Caps te Konuşan Recep Tayyip Erdoğan ve onu ilgiyle dinleyen Binali Yıldırım yer almaktadır. Altta yer alan yazı da ise “*Binali diyeceğim bineceksin, İnalı diyeceğim ineceksin*” yazmaktadır. Ulaştırma bakanlığı, Başbakanlık, Meclis Başkanlığı gibi farklı görevler alarak Erdoğan ile uzun yıllar çalışan Binali Yıldırım'ın Erdoğan'a bağlı olarak çalıştığı, onun sözünden çıkmadığı, çıkamayacağı, mizahi bir şekilde vurgulanmak istenmiştir. Seçmene verilmek istenen mesaj ise Binali Yıldırım'ın bağımsız olmadığı ve çalışamayacağı şeklindedir. Ayrıca R. T. Erdoğan'ı otoriter bir tutumla gösteren caps CHP'nin zaman zaman dile getirdiği diktatör söylemine destek verir şekilde capster yer almaktadır.

## 5.2. KARİKATÜR ÖRNEKLERİ

**Karikatür:1**



Kaynak : <https://twitter.com/misvakcaps>

**Gösterge:** İstanbul Büyükşehir Belediye Başkanlığı Seçimi Karikatür

**Gösterenler:** CHP genel başkanı Kemal Kılıçdaroğlu, Ekrem İmamoğlu, Konuşma Balonları

**Gösterilenler:** Düşünceli hal, Endişelenme rahat ol telkini

**Göstergebilimsel Çözümleme:** Karikatürde Ekrem İmamoğlu ve Kemal Kılıçdaroğlu birlikte konuşurken gösterilmiştir. İmamoğlu düşünceli şekilde gösterilirken Kılıçdaroğlu sırtarak resmedilmiştir. İki karakterinde elleri cebindedir. Ancak İmamoğlu'nun bir eli cebindeyken Kılıçdaroğlu'nun iki eli cebindedir.

**Söylem Çözümlemesi:** Karikatürde gösterilen İmamoğlu kendinden emin olmayan bir tavırla ve düşünceli bir şekilde yer almaktadır. İstanbul'u yönetebileceğinden emin olmadığını ifade eden balon yazısında CHP genel başkanı Kılıçdaroğlu'na "Sence ben İstanbul'u Yönetebilir miyim" diye sormaktadır. Kılıçdaroğlu ise "Dert ettiğin şeye bak... Sanki İstanbul'u ben yönetiyorum" diyerek cevap vermektedir. Karikatürdeki söylemler değerlendirildiğinde kendinden emin olmayan başaramayacağını inanan İmamoğlu net bir şekilde görülmektedir. Kılıçdaroğlu'nun verdiği cevap ile aslında CHP'yi biz yönetmiyoruz başka güçler tarafından yönetilen bir parti izlenimi verilmeye çalışılmıştır. Genel olarak karikatüre bakıldığında hedef

alınanın İmamoğlu, Kılıçdaroğlu ve Cumhuriyet Halk Partisi olduğu anlaşılmaktadır.

Seçmene verilen mesaj partitini yönetemeyen, yönetmeyen genel başkan ve onun partisinden aday olan ve kendine güvenmeyen bir adaya oy verme mesajı vardır.

### Karikatür: 2



Kaynak: [https://yandex.com.tr/gorsel/search?text=binali%20y%C4%B1ld%C4%B1r%C4%B1m%20karikat%C3%BCr&lr=103833&pos=4&img\\_url=https%3A%2F%2Fpbs.twimg.com%2Fmedia%2FD7i7h13X4AApseh.jpg&rpt=simage](https://yandex.com.tr/gorsel/search?text=binali%20y%C4%B1ld%C4%B1r%C4%B1m%20karikat%C3%BCr&lr=103833&pos=4&img_url=https%3A%2F%2Fpbs.twimg.com%2Fmedia%2FD7i7h13X4AApseh.jpg&rpt=simage)

**Gösterge:** İstanbul Büyükşehir Belediye Başkanlığı Seçimi Karikatür

**Gösterenler:** Binali Yıldırım, Mikrofon uzatan bir kol, Konuşma Balonları

**Gösterilenler:** Endişe, soruyu ciddiye almama, konuyu dağıtma

**Göstergebilimsel Çözümleme:** Karikatürde Binali Yıldırım ve ona mikrofon uzatan bir televizyon muhabirinin kolu görülmektedir. Karikatürün doğası gereği karakterler abartılı çizimlerle karikatürlerde yer alır. Burada da Binali Yıldırım bedensel hatlarıyla daha abartılı şekilde çizilmiştir. Binali Yıldırım karikatürde daha kilolu ve burnu olduğundan daha büyük resmedilmiştir.

**Söylem Çözümlemesi:** Karikatürde yer alan konuşmalara bakıldığında muhabirin sorduğu “İmamoğlu ile ne zaman canlı yayına çıkacaksınız Sayın Yıldırım” sorusuna Binali Yıldırım “yatcaz kalkcaz” sözünü tekrarlayarak cevap vermektedir. Burada Binali Yıldırım’ın soruya verdiği cevap boyutuyla baktığımızda Yıldırım’ın soruyu savuşturan ve rakibiyle buluşmadan kaçır şekilde cevap verdiği görülmektedir. Ayrıca CHP genel başkanı tarafından siyasi düelloya davet edilen bu davete olumlu cevap vermeyen Erdoğan üzerinden Yıldırım ve partisi zor duruma düşürülmeye çalışılmaktadır.

Seçmene verilen ana mesaj Yıldırımın, aynı Erdoğan gibi siyasi düellodan kaçtığı şeklindedir. Verilmeye çalışılan bir diğer mesaj ise, Yıldırım’ın “yatcaz kalkcaz” cevabı üzerindedir. Verilen bu cevapla Yıldırım’ın konuşma üslubuna gönderme yapılmaktadır. Yavaş konuşan Yıldırım konuşma üslubu karikatürde argo konuşurularak daha da olumsuz bir noktaya taşınmaya çalışılmıştır. Ayrıca partisi tarafından çalışkanlığı ile ön plana çıkartılan Yıldırım karikatürde sürekli “yatcaz kalkcaz” diyerek yalnızca yatan ve kalkan bir karakter olarak resmedilmiş bu şekilde seçmene aslında çok da çalışkan olmadığı mesajı verilmeye çalışılmıştır.

## 6. SONUÇ

Mizah toplumu rahatlatan ve stersini atan yönüyle son derece önemli bir unsur olarak hayatımızda yer almaktadır. Ancak mizahın da sınırları ve kırmızı çizgileri olmalıdır. Hedef alınan kimse nasıl olsa bu bir mizah çalışması diyerek kişinin temel değerlerini ayaklar altına almamalıdır. İncelenen karikatür ve capslerde bu durumun gözetildiği görülmektedir. Rakip olan ve yoğun bir rekabet ortamında seçime giren iki aday için seçilen çalışmalar farklı mesajlar içerse de aşırıya kaçan ve insan onurunu zedeleyen şekliyle düzenlenmemiştir.

Karikatür ve caps gibi gülmece unsurları çoğunlukla gergin ve stresli geçen seçim dönemlerinde bu ortamı yumuşatan ve rahatlatan unsurlar olarak karşımıza çıkmaktadır. Burada incelenen bu çalışmalarda da bu durum gözlenmektedir. Rakipler birbirleriyle ilgili mesajlarını çizginin gücüyle hedef kitlelerine aktarmışlar ve seçim çalışmalarında mizahı kullanarak hem istedikleri mesajları iletmişler hem de güldürerek eğlendirerek ortamın yumuşamasına katkıda bulunmuşlardır.

Seçilen karikatür ve capslerde görüldüğü gibi bir resim ve birkaç cümleden oluşan bu çalışmalardan görünen anlamın dışında çok daha fazla anlam çıkmaktadır. Ağır bir havada geçen seçim dönemleri mizahı kullanan bu tür çalışmalarla bir nebze olsa farklı bir havaya

bürünmektedir. Nitekim Binali Yıldırım ile ilgili haberler incelendiğinde Yıldırım'ın hakkında çıkan capslerle ilgili torunları tarafından “dede hakkındaki capsleri gördüm” sözleriyle bilgilendirildiği ve Yıldırım'ın bu durumu röportajlarda ifade ettiği görülmektedir. Bir başka haberde ise Yıldırım'ın sosyal medya hakkında konuşarak kendisiyle ilgili capsler için gençlere teşekkür ettiği anlaşılmaktadır.

Sonuç olarak sosyal medyanın da yaygın bir şekilde kullanılmasıyla artık herkes elinde medya araçlarıyla dolaşmakta ve mesajlar anında milyonlarca kişiye ulaşmaktadır. Geline nokta her alanda olduğu gibi siyasal iletişim çalışmalarında mizah unsurlarının kullanılması siyasiler için getireceği faydalar düşünüldüğünde, bir tercih olmaktan çıkarak siyasal iletişim çalışmaları için bir zorunluluk halini almıştır.

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**WALTER BENJAMİN'İN SİYASET DÜŞÜNÇESİ:  
KAMUSAL ALANI DENEYİM ZEMİNİNDE DÜŞÜNMEK**

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**ÖZET**

Walter Benjamin genellikle bir kültür eleştirmeni olarak dar bir kapsamda yorumlanır. Oysa çalışmalarının politik müdahaleleri en azından Frankfurt Okulu'nun diğer düşünürlerinden daha belirgindir. Özellikle 1930'lardan itibaren kültür eleştirisi bağlamındaki ilk dönem yazıları, epistemolojik ve estetik bir doğrultu taşısa da, politik-tarihsel bir düşünce ekseninde şekillenmektedir. Benjamin için deneyim kavramı, sadece kapitalist üretim ve mülkiyet ilişkilerinin, modernitenin gelişmesiyle paralel olarak, toplumsal ve kültürel sonuçlarının analiz edildiği sosyolojik bir kavram değildir. Deneyim aynı zamanda, modernitenin kitleselleştiren ve tekillikleri şeyleştirilen, modern toplumun tecrit edici ve topluluk duygusunu körelten yönü itibarıyla bellek, hatırlama ve düşünme gibi zihinsel faaliyetler üzerindeki etkilerinin incelenebileceği bir ekrandır. Benjamin, bu nedenle, siyaseti deneyimden hareketle düşünmeye çalışır. Deneyim bilgisine soyutlama ve genelleştirme yoluyla ulaşmak ya da deneyimin kavrama tabi kılınması; deneyimin üretildiği bağlamın gözden kaybolması anlamına gelmektedir. Nitekim felsefe tarihinde maddi yaşam ve zihinsel yaşam arasında bir ayırım yapılırken; maddi, somut, pratik deyim alanı, düşünce evreni karşısında değersizleştirilmiştir. Benjamin, Dilthey'den itibaren yaşam filozoflarının da şiire, saflıkla özdeşleştirilen doğaya ve mitoslara göndermede bulunarak, hakiki deneyime ulaşmaya çalıştıklarını söyler. Bu bildiri, Benjamin'in estetik ve siyaset düşüncesi bağlamında deneyime dayanan bir kamusal fikrine nasıl ulaşılabileceğini göstermeyi amaçlıyor. Kamusal alanı, deneyim kavramının ışığında düşünmek; güç ve iktidar ilişkilerini vurgulayan, maddi ve somut çıkarların bilgisi üzerinde yapılanmış, tarihte ve bugün egemen kamusal biçimiyle ilişkisinde, farklı nedenlerle damgalanarak kamusal tartışmadan dışlanmış olanların katılımına açık bir kamusal-alan anlayışı geliştirmeyi mümkün kılabilir.

**Anahtar Sözcükler:** Kamusal alan, deneyim, Walter Benjamin, siyaset

**WALTER BENJAMIN'S POLITICAL THOUGHT: THINKING OF THE PUBLIC SPACE ON THE BASIS OF EXPERIENCE**

**ABSTRACT**

Walter Benjamin is often interpreted narrowly as a cultural critic. Yet the political implications of his work are at least more pronounced than those of other thinkers of the Frankfurt School. Especially since the 1930s, his early writings in the context of cultural criticism are shaped on an axis of political-historical thought, even though they have an epistemological and aesthetic direction. For Benjamin, the concept of experience is not just a sociological concept in which the social and cultural consequences of capitalist production and property relations are analyzed in parallel with the development of modernity. Experience is also a screen where the effects of modernity on mental activities such as memory, remembering and thinking can be examined in terms of the massifying and reifying singularities, the isolating aspect of modern society and dulling the sense of community. Benjamin, therefore, tries to think of politics from experience. Reaching the knowledge of experience through abstraction and generalization or subordinating experience to the concept means the disappearance of the context in which the experience is produced. As a matter of fact, while making a distinction between material life and mental life in the history of philosophy material, concrete, practical idiom field has been devalued in the face of the universe of thought. Benjamin says that since Dilthey, philosophers of life have also tried to reach true experience by referring to poetry, nature identified with purity, and myths. This paper aims to show how an experience-based idea of publicity can be reached in the context of Benjamin's aesthetic and political thought. To think of the public sphere in the light of the concept of experience, it can make it possible to develop an understanding of public-sphere that emphasizes power and power relations, is structured on the knowledge of material and concrete interests, and is open to the participation of those excluded from public discussion by being stigmatized for different reasons in relation to the dominant form of publicity in history and today.

**Keywords:** Public sphere, experience, Walter Benjamin, politics



## 1. GİRİŞ

Walter Benjamin genellikle bir kültür eleştirmeni olarak dar bir kapsamda yorumlanır; oysa çalışmalarının politik yönelimleri en azından Frankfurt Okulu'nun diğer düşünürlerinden daha belirgindir. Özellikle 1930'lardan itibaren kültür eleştirisi bağlamındaki ilk dönem yazılarının bilgi kuramsal ve estetik zemininde, politik-tarihsel bir düşünce ekseninde çalışmaya başladığı görülür.

Tecrübe kavramı Benjamin için sadece kapitalist üretim ve mülkiyet ilişkilerinin modernizmin gelişmesiyle paralel olarak ilerleyen toplumsal ve kültürel sonuçlarını analiz etmekte açıklayıcı bir kavram olarak kullanılmaz. O aynı zamanda modern toplumun kiteselleştiren, farklılıkları şeyleştirilen, bireyler arasındaki ilişkileri yarar maksimizasyonuna indirgeyen, kişiyi emek sürecine yabancılaştıran ve emeğinin bireysel ve toplumsal kullanımı üzerindeki tasarruf hakkını elinden alarak bu durumu doğallaştıran bir siyaset ve bilim anlayışı üreten modern toplumun izolasyonist ve dışlayıcı yapısını eleştirmekte ve ona karşı direnmekte nesnel bir zemin oluşturmak amacıyla da kullanılır.

Benjamin'in önemi siyasetin olanaklılık koşulları üzerinde düşünmesi ve bu nedenle de liberal, sosyal demokratik “gerçekçi” siyaset vizyonlarının sistem odaklı ve kurumsalcı ilerleme ve gelişme nosyonlarına karşı direnmesidir. Siyasetin olanaklı olabilmesi için her şeyden önce doğru düşünmek ve doğru yargılarda bulunmak gerekir. Doğru yargıda bulunmak ise anımsama ve geleneğin sağladığı düşünümsellik içinde mümkündür. Düşünümsellik tecrübenin bilgisine dayanmak anlamına gelir. Dolayısıyla siyaset, öznelere kendi tarihleriyle ve kolektif geçmişleriyle diyalektik bir ilişki içinde “kim” olduklarını hatırlayacakları ve bunu şimdi hayata geçirebilecekleri bir anda gerçekleşir. Eğer özne böyle bir “düşünümsel” ve “empatik” deneyim ufkundan mahrumsa, politik yargılarda bulunması ve siyasal alana müdahale etmesi de mümkün değildir.

Benjamin siyasetin temeline tecrübeyi koyar ve tecrübelerin kendi deneyimlerinin bilgisi içinden konuşabilecekleri kanallar oluşturabilmenin önemine dikkat çeker. Tecrübenin bilgisine soyutlama yaparak genelleştirme yoluyla ulaşılması ve tecrübenin kavrama dönüştürülmesi, tecrübenin üretildiği bağlamın gözden kaybolmasını sağlayacaktır. Kaldı ki her soyutlama, soyutlama yapanın imgelemine bağlı kalacağından egemen düşünce ve iktidar yapılarıncı manipüle edilme olasılığı yüksektir. Kurumsalcı düşünce biçiminin rasyonelitesi evrensel bir konuşma ve düşünme dilini, tarihin ve toplumsal ilişkilerin yorumlanmasında genel ve homojen bir bakış açısını zorunlu kıldığı ölçüde tikellerin tecrübesi bastırılmış olur.

Benjamin Tecrübeyi siyasetin merkezine koyarken, geç kapitalizm koşullarında politik öznellik

biçimlerinin oluşturulabileceğine dair güçlü bir inanç besler. Bu bakımdan, modernizmin doğurduğu olumsuz sonuçlar karşısında özgürleşim ve anlam arayışını en fazla estetik bir deneyim sürecine tabi kılarak erteleyen modernizmin diğer yorumcularından ayrı düştüğü söylenebilir. Bu hakim modernist eleştiri içinde, modernizmin yarattığı kırılmaya genellikle bir ‘yas’ duygusu, ‘kaybolmuşluk’ hissi, ‘yönsüzlük’ düşüncesi eşlik eder. Geçmiş deneyim, kimi zaman romantik ve naif kimi zaman da eleştirel bir özlemle anılarak modernizm sürecinin sorgulanmasına vesile olur; ancak modern toplum yapısının çift-yönlülüğü ya da çift-değerliliği pek dikkate alınmaz. Adorno ve Horkheimer en çok da bu konuda Benjamin’le ters düşer. Çünkü Adorno’nun dediği gibi modern gerçekliğin özü dehşettir ve onunla uzlaşma felaketle sonuçlanır.

Öte yandan Habermas, Benjamin’in siyasete duyduğu güveni paylaşır; “tarihte yeni bir başlangıcın imkanı olarak” moderniteyi önemsemesi büyük önem taşır. O’nun kamusal alan analizinin ve iletişimsel eylem kuramının temel özelliği, endüstriyel-ticari gereksinimlerin esasını oluşturduğu modern siyaset anlayışını yeniden “yaşam dünyalarının” gereksinimleri doğrultusunda temellendirmeye çalışmaktır. Benjamin’in “Tecrübe”siyle Habermas’ın “Yaşam Dünyası” kavramları arasında, modern toplum koşulları altında siyasete merkezi bir rol vermek işlevi bakımından benzerlikler kurulabilir. Ancak tecrübenin siyasal-kamusal alana nasıl aktarılması gerektiği, siyasal-kamusal alanla tecrübe arasında nasıl bir ilişki kurulabileceği ve en önemlisi tecrübenin siyasal-kamusal alan için nasıl bir anlam ifade ettiği konusunda aralarında çok temel farklılıklar olduğu söylenebilir. (Habermas’ın kamusal alan düşüncesinin Benjamin’in Tecrübe kuramı açısından sınırlarına aşağıda değinmeye çalışacağım)

## **2. KURAMSAL BOYUT: BENJAMİN’İN DÜŞÜNCESİNDE MODERNİZM VE TECRÜBE**

Benjamin’in siyasal düşüncesinin odağında yer alan Tecrübe kavramının bilgi kuramsal temelleri, onun çok geniş bir alana yayılan sanat ve edebiyat eleştirisi bağlamında erken dönem Alman romantizminin de etkileriyle geliştirmiş olduğu kavramsal yapı üzerine oturur. Benjamin’in Tecrübe analiziyle karşıt ve alternatif bir kamusal alan arasındaki ilişkinin nasıl kurulabileceğine dair varsayımlara geçmeden önce onun Tecrübe anlayışının açıklık kazanması gerekir. Özbek’in dediği gibi, ‘bu aynı zamanda modern tecrübenin tarihsel

yapısına bakmak' demektir (Özbek, 2000: 113). Benjamin'in Tecrübe analizi özellikle Baudelaire üzerinden sanatın modern toplumda geçirdiği dönüşümün izlerinin sürülmesiyle başlar. Baudelaire, modern toplumda lirik şiirin alımlanmasının istisnai hale geldiğini, bunun nedenlerinin de

okuyucunun yaşam tecrübesindeki değişimle açıklanabileceğini söyler. Bu açıdan Benjamin 'Baudelaire üzerine Bazı Motifler' gibi yazıların da Bergson, Proust ve Freud'un düşüncelerinden yararlanarak bir Tecrübe kuramı geliştirir. Eleştirel Kuram'ın genel yönelimlerini takip ederek, modernlik altında tecrübenin değişen yapısını, yaşam felsefesinden ve psikanalizden yararlanarak Marksist bir çerçeve içinden kavramaya çalışır.

Benjamin, modernizmin sonucu olarak ortaya çıkan yaşam tecrübesinin nasıl değiştiğini anlamak için felsefeden yararlanılamayacağını söyler; çünkü tecrübeyle ilgilenen yaşam felsefesi alanı, "insanın toplum içindeki varoluşundan yola çıkmaz". Kitlelerin yapaylaşmış ve standartlaşmış varoluşuna karşı, "hakiki" tecrübeye ulaşmak için girilen çabaların ürünüdür, "yaşam felsefesi". Arendt'in Felsefede Platon'dan beri yapılageldiğini söylediği bir ikili kavrayış sözkonusudur yaşamı: maddi yaşam ve zihinsel yaşam arasında bir ayrım yapılırken, maddi, somut, pratik tecrübenin alanı düşünce evreni karşısında değersizleştirilir. Benjamin, Dilthey'den itibaren yaşam filozoflarının da şiire, saflıkla özdeşleştirilen doğaya ve mitoslara göndermede bulunarak hakiki tecrübeye ulaşmaya çalıştıklarını söyler. Bergson ise diğerlerinden farklı olarak, *Madde ve Bellek* isimli yapıtında, "biyolojiye göre düzenlenmiş olgusal araştırmalara dayanarak belleğin yapısının tecrübenin felsefi olarak anlaşılmasında belirleyici bir rolü olduğunu öne sürer". Bu bakımdan Benjamin Bergson'u önemser. "Gerçekten de tecrübe, hem kolektif hem de özel yaşamda bir gelenek işidir...biriktirilmiş, çoğu kez bilincine varılmamış, ancak bellekte birbiriyle kaynaşmış verilerden oluşur" (Benjamin: 1992e). Ancak yine de Bergson tecrübeyi tarihselleştirmez; "büyük sanayi çağının köreltici tecrübesine" başka bir deyişle "belleksizleşme sürecine" bakmaktan kaçınır.

Bergson tarafından tecrübenin özünün bellekle ilişkilendirilmesi, Proust tarafından uygulamaya geçirilmiştir. Proust, günlük deneyimi hakiki tecrübeye (erfahrung) sentetik yoldan da olsa dönüştürmenin yolunu bulmuştur. Proust'un tecrübe konusunda getirdiği yenilik "iradi bellek ve iradedışı bellek" ayrımına dayanır. Bergson'un kuramındaki "saf bellek", Proust tarafından "iradedışı bellek" olarak ele alınır. Proust'a göre "iradi belleğin" günlük olaylara ilişkin sağladığı bilgi geçmişten hiçbir iz taşımaz; iradi bellek aracılığıyla geçmiş bugüne taşınamaz. Geçmişin izleri hiç beklenmedik anlarda, bir koku, bir görüntü ya da bir tad gibi duyular aracılığıyla elde edilir. Dolayısıyla Proust'a göre "kişinin kendi

hakkında bir imgesi olması ya da kendi tecrübesine hükmetmesi” rastlantısal bir hale gelmiştir. Bu tarihsel durum, insanın kendini çevreleyen yaşam verilerini artık tecrübe aracılığıyla özümseyemediği için ortaya çıkmıştır. Gazeteler ve olup biteni başkasına aktaran gazeteye özgü enformasyon, bu sürecin kanıtlarından yalnızca biridir. Gazetelerin amacı, “olayları okurun deneyimiyle ilgili olabilecek

alandan ayrı tutmaktır”. Gazeteye özgü enformasyon üretim ilkeleri olan, yeni olma, kısalık, anlaşılabilirlik, ve en önemlisi tek tek haberler arasındaki bağıntının yokluğundan, sayfa düzeni ve kullanılan dil üslubuna kadar her şey, enformasyonla tecrübenin birbirinden ayrılmasını destekler. “Bu ayrılmanın bir diğer nedeni de enformasyonun geçiciliği ve kitlesel üretimi nedeniyle “geleneğe” girmemesidir”. Bilincin nesnesini kavraması artık bir dizi mekanik araçlar yoluyla olmaktadır. Bunlar bilinci aslında artan bilgi bombardımanına karşı koruyucu bir işleve de sahiptirler ancak Frederic Jameson’un dediği gibi bunun karşılığında önemli bir bedel ödenir: “Bunlar bizi koruyarak, ama aynı zamanda bize gerçekte ne olduğunu özümleme ya da duyularımızı gerçek kişisel yaşantıya dönüştürme olanağından yoksun bırak(ırlar)” (Jameson, 1997: 69-70). Tarihsel olarak “eski haber etmenin yerini enformasyonun, enformasyonun yerini sansasyonun alması tecrübenin gittikçe daha da köreltiğini” gösterir (Benjamin: 1993). Sayılan bu iletişim biçimlerinin hepsi, en eski anlatı biçimi olan hikayeden ayrılırlar. Hikaye, olup biteni “anlatıcısının hayatının içine gömer ki bir tecrübe olarak dinleyenlere aktarılabilir.” Proust’un başarısı, “günümüz koşullarında pek çok açıdan yalıtılmış durumdaki bireyi iradedışı bellek aracılığıyla, hikaye anlatıcısı figürünü olabildiğince onarma çabasını” (Özbek, 2000. 116) simgeler.

Hakiki anlamda tecrübede ise, bireyin geçmişine ait bazı içerikler kolektif geçmişle birleşirler. Törenleri ve festivalleri ile ritüeller, belleğin bireysel ve kolektif yönlerinin tekrar tekrar içi içe geçmesini sağlayarak, yaşamboyu belleğin vasıtası olurlar. Benjamin saf tecrübe için geleneğin gerekli olduğunu savunmuştur. Bugünle geçmiş arasında, süreklilik ve ilişkilendirme şarttır. Tecrübe tek bir bireye ait olamaz; gerçek bir topluluk yaşantısı içindeki bireyle ilişkili bir şeydir, yalıtılmışlıkla değil. Kapitalist toplumda birey izole edilmiştir. Benjamin geleneksel toplumlarda birey ile kolektif topluluk; bireyin geçmişi ile kolektif geçmiş arasında bir bütünlük olduğunu söyler. Tecrübe, belleği canlı tutan tekrarlar içinde (masallar, şarkılar, öyküler, efsanelerle), yüzyılların kalıpları içinde, kuşaklar arasında aktarılır.

Benjamin metalaşmış çevrenin aşırı yüklemesinin ve kapitalist üretimin hızının ve gelenek yıkıcılığının, bir şok yaşantısı yarattığını söyler. Sadece kapitalist yapılanmanın bütünlüklü

gelenegi parçalanmasından dolayı değil; her yeniden yapılanma da kendini gösteren bir şok yaşantısıdır bu. “İnsan sürekli yıkılan ve değişen nesnelere ve olaylar; ve artan bir kitlelilik içeren, karmaşıklaşmış bir çevrede yaşamının ortaya çıkardığı bir uyarılar seline maruz kalır”. Georg Simmel, kapitalizme geçişle birlikte giderek tarihsel bağlarından kopan birey açısından “metropol ve zihinsel yaşam” ilişkisinde Benjamin’in alıntılıdığı önemli bir düşündürür. Simmel şöyle der: “Modern yaşamın en büyük sorunları, toplumun egemen güçlerine karşı,

tarihsel mirasın, dış kültürün ve yaşam tekniğinin ağırlığına karşı, bireyin kendi varoluş bağımsızlığını ve bireyselliğini koruma çabasından doğar” (Simmel, 1991: 83-84). Modern toplumla birlikte ortaya çıkan şok deneyimi Benjamin’in iki deneyim biçimi arasında ayrım yapmasını kolaylaştırır: tamalgı yeteneği içeren, bellekle iç içe geçmiş ve “süre” içinde tanımlanan hakiki tecrübe olarak *Erfahrung* ile modern toplumsal koşullar altında ancak belli zaman aralıklarında oluşan *Erlebnis*. “*Erfahrung*, kavramının Almanca kökeni olan “*fahren*” (sürmek, yolculuk etmek), hareketlilik, seyahat etmek, etrafta dolanmak ya da seyrü sefer etmek manasını taşıyor. Böylece *Erfahrung*, hem zamana ilişkin bir boyut, yani süre, alışkanlık, tekrar ve dönüş iması yapıyor; hem de tecrübe eden öznenin bir derece risk aldığı ima ediyor...bu yananamlar *Erfahrung*’u daha nötr ve münferit bir oluş olan (İngilizce *Experience*’ın da içerdiği) *Erlebnis*’ten (olay, macera) ayırıyor” (Hansen, 1993: 187). Dolayısıyla ilki normatif bir içeriğe sahipken ikincisi olgusal bir anlama işaret ediyor (Özbek, 2000: 117). Ancak *Erfahrung*’un en önemli özelliği normatif ve olgusal kutuplar arasında gidip gelen bir kavram olmasıdır. *Erfahrung* olarak tecrübe, “ bir yandan, tecrübe sahibi olma ve düşünümsellik, ilişkiler ve bağlantılar görebilme, gerçeklik ve fanteziyi el çabukluğuyla birbirine geçirebilme, bellek ve başka bir geleceği tahayyül edebilme yeteneklerine dayanır. Öte yandan tam da bu yeteneklerin, endüstrileşme, kentleşme ve modern tüketim kültürünün saldırısı altında tarihsel olarak parçalanmasına ve saldırısına ve dönüşümüne işaret eder”. Böylece bu iki boyutun diyalektiği içinde tecrübe, “tarihsel parçalanmanın, kaybın, kopuşun ve değişimin etkilerini kaydedebilme ve bunlarla baş edebilme yeteneğini içeren bir kavram olarak ortaya çıkar” (Hansen, 1993: 188). Baudelaire’in şiirinde, Proust’un romanında ya da Bergson’un felsefesinde modern parçalanmışlığın ve kaybın etkileri kaydedilmekte ve tartışılmaktadır ancak bütün bunlarla baş edebilmenin yollarının gösterildiği söylenemez. Benjamin’i önemli kılan ise, tüm düşünsel uğraşının diyalektik bir *Erfahrung* kavrayışını somutlaştırmak olduğu söylenebilir.

*Erfahrung* olarak tecrübe anlayışı, modern toplumun koşulları altında direniş için yeni imkanlar sunar demiştik. Bunlardan en önemlisi, kitle iletişim araçlarının içerdiği bazı

özelliklerin, montaj gibi yöntemlerle geçekliğin algılanışında alternatif bir anlam çerçevesi üretebilmesi ve böylece anımsama ve düşünömsellik gibi yetiler aracılığıyla ulaşılan sonuçlara benzer etkiler yaratarak kolektif bilinci örgütleyebilmesidir. Benjamin'in teknolojiye karşı köktenci olmayan bu tutumu onun, mekanik üretim çağında sanat yapıtının niteliği üzerine yazdıklarından yola çıkılarak saptanabilir.

### **3. POLİTİK BOYUT: KAMUSAL ALAN VE TECRÜBE**

Habermas'ın kamusal alan modelinin sınırları üzerinde düşünerek demokrasinin ve meşruiyet ilkesinin yeniden kavramlaştırılmasını sağlamaya çalışmak mümkündür. Özellikle Habermas'ın burjuva birey ve insan anlayışının evrenselleştirilmesini dayanak yapan iletişimsel eylem rasyonelitesi dışlayıcı bir işleve sahip olma özelliği nedeniyle tecrübe kuramı açısından sorunludur. Bunu anlayabilmek için Habermas'ın burjuva kamusal alanının yapısal dönüşümüne ilişkin olarak söylediklerini hatırlamak gerekir.

Habermas bir “yapısal dönüşüm” sürecinden bahsederken, başlangıçta kamusal alanının “herkese açık ve herkesçe erişilebilen; özel yurttaşların kamu yararına meseleleri özgürce, rasyonel ve eşit biçimde tartışabildikleri bir alan” (Hansen, 2004: 161) olma özelliğine vurgu yapar. Ancak bu forum alanında toplumsal ve ekonomik çıkarların paranteze alınması bu alanda iktidar ve çıkar ilişkilerinin sürmekte olduğu gerçeğini maskeleymektedir. Bu nedenle kamusal söz söyleme alanında sınıfsal kökenlerin gizlenerek söz'e evrensel ve tümel bir yargı niteliği verilmesi kamusal alan'ın hegemonyayı ve baskıyı meşrulaştırma potansiyelini ortaya koyar. Habermas burjuvanın insanla, mülksahibi/ataerkil'in ise insanoğluyula özdeşleştirilmesi yoluyla burjuva kamusal alanının üzerine temellendiği insanlık fikrinin, belli bir sınıfın öznelliğini genel olarak insan diye doğallaştıran bir ideolojiye dönüşmesini, kamusal alanının parçalanması ya da çözülmesi olarak yansıtır. Dolayısıyla Habermas burjuva kamusal alanının çelişkili doğasını bir çeşit bozulma ya da yozlaşma olarak görme eğilimine girerken bu çelişkileri burjuva kamusal alanının kökenine ilişkin bir sorgulama yönünde genişletmez. Oysa burjuvazinin tarihsel olarak gereksindiği biçimiyle kamusal alan ilkesi üzerinde durmak gerekir. Burjuvazinin kendi çıkarını herkesin çıkarı imiş gibi gösterme arzusu koşullandırmıştır kamusal alan ve bu içinde zorunlu olarak farklılığı ve aykırılığı, rasyonelize edilmeye direneni bastırmayı içerir. Liberal yönetim biçiminin genel oy ilkesi aracılığıyla kamuoyundan yararlanmasının temelinde nasıl ki mülkiyet ve üretim ilişkilerinin sorgulanmasına yönelik hoşnutsuzlukları kanallandırmak başka bir deyişle rasyonelleştirerek ortadan kaldırma eğilimi baskın çıkmaktaysa, burjuva kamusal alanının da sözde herkesin katılımına açık bir tartışma

ve müzakere ortamını hayata geçirme düşüncesinde hegemonyayı derinleştirme isteği ağır basmaktadır.

Diğer taraftan burjuva kamusunun bu baskıcı doğasına rağmen, kendisiyle aynı zamanda ortaya çıkarak onunla yarışan öteki kamusal oluşumlarının varlığı da inkar edilemez. Nancy Frazer' ın anlatısıyla "burjuva kamusal alanıyla fiilen aynı anda ortaya çıkan, ulusçu kamular, popüler köylü kamuları, elit kadın kamuları ve işçi sınıfı kamuları gibi rakip bir 'karşıt-kamu takımı'

bulunuyordu. Diğer bir deyişle, burjuva kamusal alanının birlik ve teklik iddiasına karşı duruş, Habermas'ın öne sürdüğü gibi 19. yy'ın ikinci yarısında başlamadı" (Frazer, 1990: 61). Habermas burjuva kamusal alanından kurtuluş ve özgürleşim yolunda bir "imkan olarak" yararlanmanın peşine düşerken "ortak söz söyleyebilmenin" koşulları üzerinde fazlaca durmuş gibi görünüyor. Bu ancak ortak bir tecrübe bağlamı içinde mümkün olabilecek bir şeydir. Alt sınıfların, bağımlı grupların ve mağdurların tecrübeleri ile bu tecrübelerin baskı ve zor yoluyla tarihsel olarak özgül bir görünüme bürünmesine yol açan ve böylece onların ontolojik statüsünü tayin eden egemen ve yönetici sınıfın tecrübelerinin ortak bir söz söyleme ve düşünme forumunda buluşması mümkün müdür? Böylece politikanın farklı toplum kesimlerinin müzakereleri sonucu ortak bir söze ulaşma etkinliği olarak kavranması gerçektende hâkim konumdakilerin otoritesini ve iktidarını dönüştürmeye ve katılımcı bir demokrasinin önünü açmaya hizmet eder mi?

İşte burjuva kamusal alanının en büyük zaafı, Negt ve Kluge'nin dediği gibi sözde toplumun bütünü temsil etmesine rağmen, tözünü herhangi bir yaşam bağlamını özgül olarak ifade etmeyen bir "ara" alandan almış olmasıdır (Negt ve Kluge, 136: 136). Habermas'ın kamusal alan anlatısının sınırları da bu "ara alanı" imtiyazlandırmayı sürdürmesi ve bu "ara alana" katılımın ve varlığının devam etmesinin hakim güç ve iktidar ilişkilerini meşrulaştırma yönünde bir etkide bulunacağını görmeye yanaşmamasıdır. Burada üzerinde durulması gereken, kitlelerin ya da mağdur ve mağlup konumunda yar alanların böyle bir ara alanda verecekleri mücadelenin niteliği ve sonuçlarıdır. "Eğer kitleler, kamusal alanın desteğiyle gücüne güç katmış bir egemen sınıfla savaşıyorlarsa, bu ümitsiz bir mücadele olur; çünkü kamusal alanı oluşturanlar aslında kendileri olduğu için, bu durumda her zaman aynı anda kendilerine karşıda savaşmış olurlar" (Negt ve Kluge, 2004: 136). Bir başka deyişle, tüm yaşam alanlarını kapsadığı ilan edilen kamusal alanın içinde kitleler, hakim olana karşı mücadeleye kalkarlarsa hegemonyanın en önemli vasfı olan "öteki"nin, "başka"nın da

İçerildiği, kapsandığı kanısının uyanmasına yol açarlar; böylece hakim temsil ve örgütlenme biçimlerinden ayrı bir örgütlenme tarzının oluşması yönünde çaba sarfedilmesi gereksiz hale gelir ve muhalif söylem, tahakküm biçimlerinin sınırları içinde hareket eden rutin bir işleme dönüşür.

#### 4. SONUÇ VE DEĞERLENDİRME

Benjamin'in tecrübe kuramı alternatif bir tarih ve siyaset analizi geliştirmeye çalışması bakımından önemlidir. Ancak bunu idealist ve soyut bir evrenselcilik anlayışı içine düşmeden yapar; bu nedenle liberal ve hatta Marksist tarihselciliği ve siyaset görüşünü soyut ve idealistik

bulduğu için eleştiriye tabi tutar. Onun tecrübe kuramı, siyasetin temeline tecrübeyi koymuş olması ve böylece siyasetin olanaklılık koşulları üzerinde odaklanmasıdır. İnsanların doğru düşünme ve doğru yargıda bulunma imkanlarına sahip olup olmamaları, demokrasinin iletişimin formel ve informel yapılarının herkese açık olmasından kalkarak tanımlanabileceği indirgemeci bir kavrayış tarzını eleştirmek için elverişlidir.

Mağdur ve bağımlı olanların perspektifinden bakıldığında tarihin bugünü sürekli bir kriz halidir; kuraldışılığın kural haline gelmesidir. Burjuva liberal kamusal alan nosyonu Habermasçı müdahale içinde dahi bu “kuraldışılığın” onaylanmasından ve süreklilik kazanmasından başka bir anlamda düşünülebilir mi? Egemen sınıflarla bağımlı sınıfların aynı forumun herkese açık eşit üyeleri olmaları ve birlikte toplumsal gelişme ve siyasal ilerleme yönünde bireysel çıkarları ve ilgileri aşan bir düzeyde müzakere içinde olmaları olanaklı mıdır? Başka bir deyişle burjuva liberal kamusal alanı herkesin çıkarlarını ve tecrübelerini dile getirme kabiliyetine ve bu yönde gelişim gösterme eğilimine sahip midir? Tecrübe anlayışının esasını oluşturduğu bir kamusal alan nosyonu, kamunun farklı görünüm aldığı parlamento, siyasi partiler, sendikalar, sivil toplum kuruluşları ve televizyon gibi her düzeyde hangi toplum kesimlerinin tarihsel ve kolektif tecrübelerinin dile getirildiği, temsil edildiği ve örgütlendiği sorularının sorulmasına yardımcı olur. Bu sorunun yanıtı, temsil mekanizmalarından ve kamusal görünürlük biçimlerinden dışlanan toplum kesimlerini, yaşam tarzlarını gündeme getirebilir ve bu çerçevede meşruiyet sorununa yeni bir boyut kazandırabilir. Meşruiyet kavramı Benjaminci “ilişkilendirme” ilkesinin ışığı altında gerçek yaşam ve politika, geçmiş ve şimdi arasında bağlantı kurularak anlam kazanır. Temsil ve ifade biçimleri ile toplumun geniş ve dezavantajlı kılınmış kesimlerinin gerçek yaşantısı arasındaki kopukluk meşruiyet kavramının temellendirilmesi gereken zemine işaret eder. Benjamin modernizmin sonuçlarını sadece tam algı ve yaşam hakimiyeti gibi tecrübenin unsurlarının



kayıbı bağlamında analiz etmekle kalmaz, aynı zamanda geç kapitalizm, üretim ve mülkiyet ilişkilerinin baskıcı koşulları altında endüstriyel-ticari çıkarların kamusal meseleleri kendi parantezine alarak koşullandırdığı bir ortamda, tecrübenin geri kazanılarak politikanın merkezine yerleştirilmesinin önemini vurgular. Negt ve Kluge'nin alternatif-kamusal alan yorumu bu düşüncüyü geliştirmeye çalışır. Bu nedenle Benjamin'in modernizm analizi üzerine temellenmiş tecrübe kuramını Negt ve Kluge'nin karşıt-kamusal alan analiziyle birlikte okumak bize, hegemonyacı kamusal alan anlatısının ve Habermasçı siyaset vizyonunun ötesinde güç ve iktidar ilişkilerini vurgulayan, maddi ve somut çıkarların bilgisi üzerinde yapılmış, tarihte ve bugün egemen kamusal alan biçimiyle ilişkisinde farklı nedenlerle damgalanarak kamusal tartışmadan dışlanmış olanların katılımına açık bir kamusal-alan anlayışı geliştirme imkânı sağlayacaktır.

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**AKTİF VE PASİF EŞİTLİK: ÇAĞDAŞ SİYASET FELSEFESİNDE BİR ADALET  
TARTIŞMASI**

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**ÖZET**

Çağdaş siyaset felsefesinde adalet, genellikle verili sosyal-politik koşullarda mevcut bulunan bir haksızlığın telafisi anlamına gelir. Haksızlık, kaynakların ya da imkânların eşit ve adil olmayan dağılımı kadar kimliklerin tanınmamasının sonucudur. İlk yaklaşım, dağıtım sorununa odaklanan maddi bir çözüm sunmaya çalışırken; ikincisi, etik-politik bir amaç doğrultusunda, ötekinin tanınması ve içerilmesi anlamına gelen evrenselci ve eşitlikçi toplumsal bir düzenin kurulmasını hedefler. Bu bildiri, Amartya Sen, Robert Nozick ve John Rawls'un liberal ve liberteryen dağıtıcı adalet yaklaşımları ile düşünsel zeminini Hegel'in oluşturduğu, Axel Honneth'in tanınmacı adalet yaklaşımının, ortak öncüllere sahip olduğunu vurguluyor ve adalete ilişkin üçüncü bir yol önermeyi amaçlıyor. Dağıtıcı ve tanınmacı adalet; toplumun hiyerarşik tarzda yapılanmasından çok doğurduğu sonuçları düzenlemeyi amaçladığı için benzerlik göstermektedirler. Dağıtıcı adalet, kimlerin nelere ve ne kadar sahip olduğu soruları ile meşgul olduğu ölçüde, yurttaşın ortak yaşam olanaklarının belirlenmesine katılımını önemsizleştirmekte ve böylece, toplumsal yapı ve kurumsal

bağlamın eleştirisinden kaçınmaktadır. Tanınma etiği ise adaleti, öncelikle bir kimlik sorunu olarak gördüğü; kimliği de öznelarası bir perspektif bağlamında tanımladığı için, toplumsal düzenin asli eleştirisine kuramsal zemin sunmaktan uzak bir tür “sosyolojizme” dönüşmektedir. Bu nedenle, her iki adalet yaklaşımını da pasif eşitlik başlığı altında toplamak mümkündür. Öte yandan, toplumsal düzenin kuruluş mantığının yapı-sökümünü hedefleyen, “aktif eşitlik” bahsinde değerlendirebileceğimiz, farklı bir “adalet” düşüncesinden daha bahsedebiliriz. Jacques Ranciere’in temsil ettiği bu düşünce biçimi; toplumsal düzenin kuruluş mantığını oluşturan hiyerarşiyi, doğal yeterliliklerine uygun düşen bir düzen çerçevesinde tarafların konumlandırılmasına dayandırır. Bu nedenle, toplumsalın kurucu mantığının sekteye uğratılması; tarafların, toplumsal partnerler olarak kendilerini görünür kılacakları ve seslerini duyurabilecekleri siyasal bir uzamın doğması anlamına gelecektir. Böylece, taraflar radikal bir eşitlik fikrine dayanarak, toplumun hiyerarşik örgütlenmesini sorguladıklarında ancak toplumsal bir fail haline gelecek ve bu sayede “adalet” fikrine geçerlilik kazandırabileceklerdir.

**Anahtar sözcükler:** Adalet, pasif eşitlik, aktif eşitlik, siyasal

### ACTIVE AND PASSIVE EQUALITY: A DISCUSSION FOR JUSTICE IN CONTEMPORARY POLITICAL PHILOSOPHY

#### ABSTRACT

In contemporary political philosophy, justice usually means reparation for an injustice existing in given socio-political conditions. Injustice is the result of ignorance of identities as well as the unequal and unjust distribution of resources or opportunities. The first approach tries to offer a material solution that focuses on the distribution problem; second, it aims at the establishment of a universalist and egalitarian social order, which means the recognition and inclusion of the other, in line with an ethical-political purpose. This paper emphasizes that Amartya Sen, Robert Nozick and John Rawls' liberal and libertarian distributive justice approaches and Axel Honneth's recognitionist justice approach, whose intellectual ground is formed by Hegel, have common premises and aims to suggest a third way of justice. Distributive and recognition justice are similar in that they aim to regulate the results they produce rather than the hierarchical structure of society. To the extent that distributive justice is preoccupied with the questions of who owns what and how much, it trivializes the citizen's participation in determining the possibilities of common life, thus avoiding criticism of the social structure and institutional context. Recognition ethics, on the other hand, sees justice primarily as a problem of identity; since it defines identity in the context of an intersubjective perspective, it turns into a kind of "sociology" that is far from providing a theoretical ground for the fundamental critique of the social order. Therefore, it is possible to gather both justice approaches under the heading of passive equality. On the other hand, we can talk about a different idea of "justice", which we can evaluate in the talk of "active equality", which aims at the deconstruction of the foundational logic of the social order. This way of thinking represented by Jacques Ranciere bases the hierarchy that constitutes the foundation logic of the social order on the positioning of the parties within the framework of an order appropriate

to their natural competencies. Therefore, disrupting the constitutive logic of the social, it will mean the emergence of a political space in which parties can make themselves visible as social partners and have their voices heard. Thus, when the parties question the hierarchical organization of the society, based on a radical idea of equality, they will become a social agent and thus will be able to give validity to the idea of "justice".

**Keywords:** Justice, passive equality, active equality, political

## 1. GİRİŞ

Çağımız politik pasiflik çağıdır. Tamamen pasif değiliz. Sonuçta, çoğumuz (hepimiz olmasa da) oy veriyoruz. Siyasi görüşlere sahibiz. Hükümetimizden beklentilerimiz var. Ama siyasi eylemde bulunmuyoruz. Biz örgütlenmiyoruz; siyasi kolektiviteler yaratmıyoruz veya bu tür faaliyetlerle meşgul değiliz. Siyasete de spora olduğu gibi katılıyoruz, yani katılımcı olarak değil de taraftar olarak ve çoğu zaman da daha az istekle katılıyoruz. Nedir bunun nedeni? Daha çok teorik bir neden üzerinde duracağım.

Pek çok düşünür (akla yeni bir örnek olarak Michel Foucault geliyor) kendimiz hakkında nasıl düşündüğümüz ve nasıl davrandığımız arasındaki karmaşık etkileşimlere işaret etmişlerdir. Kim olduğumuz, çoğunlukla benimsediğimiz teorilerin bir ürünüdür. Bu nedenle, toplumların ve kültürlerin entelektüellerin ne düşündüklerinden nasıl etkilendiklerini veya üniversitede sosyal bilimler derslerinde öğretilenlerden nasıl etkilendiğimiz ne fazla abartmak gerekir ne de hafife almak. Toplumun ve bireyin teorik olarak nasıl tanımlandığı ile siyasal edilgenlik açık bir bağ vardır.

O halde ana akım siyaset felsefesinin bir siyasi edilgenlik felsefesi olduğunu göstermek istiyorum. Daha spesifik olarak, bunun bir pasif eşitlik felsefesi olduğunu iddia ediyorum. Pasif eşitlikten çok aktif eşitliğe dayanan bir siyasi düşünce çerçevesi oluşturmak için de Fransız tarihçi ve düşünür Jacques Rancière'in çalışmalarına başvurulabileceğini öne sürüyorum.

Öncelikle, pasif eşitliğin ne anlama geldiğini anlamamız gerekiyor. Pasif eşitliği, eşitliğin devlet kurumları tarafından yaratılması, himaye edilmesi veya korunması şeklinde kısaca tanımlamak mümkündür. Pasif eşitliğin arkasındaki temel fikir, bir tür eşitliğin, eşitliği

tehlikede olanlar adına bir kurum tarafından sağlanması gerektiğidir. Eşitlik, eşitliğin öznelere tarafından alınmak veya yasalaştırılmak yerine onlara verilmeli veya en azından onlar adına korunmalıdır.

Bu, yöneten kurumun fiili eşitliği kendisinin vermesi gerektiği anlamına gelmez. İki farklı yorumu daha mümkündür bu anlayışın. İlk olarak, insanların sahip oldukları veya müdahale edilmediği takdirde doğal olarak sahip olacakları bir eşitlik biçimi zaten söz konusudur ve siyasal kurumun rolü sadece bu eşitliği korumak veya himaye etmektir. Robert Nozick'in liberteryenizminde olduğu gibi, tehlike altında olan aslında eşitlik değil özgürlüktür ve özgürlük, insanların zaten uygulayabilecekleri bir şeydir; bu nedenle devlet tarafından verilmesine gerek yoktur. Devletin görevi, onun bozulmadan devamını sağlamaktır. İkinci yorum da, bir tür eşitliği sağlamak için insanlara eşitlikten başka bir şey verilmesi gerektiğidir. Bu bakımdan John Rawls'un düşüncesi, eşitliği doğrudan sunmak yerine eşitliği sağlayan

şeyleri teşvik etmek olarak okunabilir. Ancak, bu farklı eşitlik yaklaşımları, eşitliğin öznesini aktör/fail olarak görmek yerine edilgen/alıcı konumuna yerleştirdikleri için her iki yaklaşım biçimi de pasif eşitlik fikrinin değişik yüzlerini temsil ederler.

## **2. JOHN RAWLS: CEHALET PERDESİ**

Adil bir dağıtım için ilkelerden yola çıkmak gerekiyorsa, o zaman ilkelerin kendisiyle başlayamayız. Bunun yerine, proje, adil bir dizi ilke üretmek için bir yöntemle başlamalıdır. O halde yöntem yeterliyse, ondan kaynaklanan ilkeler de yeterli olacaktır. Normatif adalet alanına bu şekilde yaklaşmak belirli bir açıdan bilime benzer. Bilimde, kişi bilimsel yöntemi kabul ederse, bu yöntemin sonuçları ile de kendini bağlamış demektir.

Rawls'un kullandığı yöntem, ünlü cehalet peçesidir. Kişi, içinde yaşadığı toplum için tercih ettiği dağıtım ilkelerini seçer, ancak kendisinin o toplumdaki yeri ve nitelikleri hakkında hiçbir bilgisi yoktur. Irk, dini inanç (varsa), fiziksel avantajlar veya dezavantajlar, maddi durum, kişilik özellikleri, cinsiyet: bunların tümü, işgal ettiği toplum için dağıtım ilkelerini seçme konumunda (Rawls'ın terminolojisindeki orijinal konum) olan kişi tarafından bilinmiyordur. Cehalet perdesi, seçiciyi kendisine atfedilebilecek tüm olası konumları hesaba katmasını gerektirdiği için, seçimi yapanlar üzerinde bir tarafsızlığa zorlar. Kişi, bu çıkarların ne olacağını bilmiyorsa, dağıtım ilkelerini seçerken kendi çıkarlarına ayrıcalık tanınması da imkânsızdır. Bu anlamda cehalet perdesi, Kant'ın salt rasyonel varlıklar fikrine tekabül eder.

Tamamen rasyonel bir varlık, belirli çıkarlar veya eğilimler temelinde değil, yalnızca rasyonelliğin emirleri temelinde seçimler yapar.

### 3. ROBERT NOZICK: HAK EŞİTLİĞİ

Yakın zamandaki ana akım çağdaş felsefede, belki de Rawls'un adalet görüşünün en büyük rakibi Robert Nozick'in ve özellikle onun *Anarşi, Devlet ve Ütopya*'sıdır. Batı dünyasındaki egemen sınıflar arasında Nozick'in görüşü belli bir çekiciliğe sahiptir. Özellikle küreselleşmenin gelişile (veya en azından hızlanmasıyla) piyasaların işleyişi lehine hükümetlerin müdahalelerini eleştiren siyasi görüşler yükseliştir. Hükümetler, Ronald Reagan'ın dediği gibi, çözümden çok sorundur. Piyasaların hükümetler üzerindeki önceliğine ilişkin bu görüş en az iki şekilde savunulabilir. Çağdaş düşüncede daha yaygın olan ilki, kapitalist piyasaların dizginsiz bir şekilde işlemesine izin verilmesinin en fazla sayıda insana en büyük iyiliği getireceğidir. Bireysel inisiyatifi teşvik etmek, bir nüfusun her bir üyesinin yaratıcı kaynaklarını serbest bırakır, arz ve talebin verimli çalışmasına izin verir ve ticaret gibi

ekonomik etkileşim yoluyla barışı teşvik eder. Bu görüş, resmi ideoloji olarak başarılı olmaya devam ederken -Washington Konsensüsü'nün merkezi bir ilkesi olmaya devam ediyor- ampirik olarak pek de başarılı olmadı. Serbest-zincirinden boşanmış kapitalist pazarların kapitalistler için iyi olabileceği ortaya çıktı. Başkaları için iyi oldukları daha az açıktır.

Kapitalist piyasaları devlet müdahalesine karşı savunmaya yönelik ikinci yaklaşım, bu piyasaların genel faydasına değil, piyasalardaki katılımcıların haklarına dayanır. Bu yaklaşım, faydacı olmaktan ziyade genel olarak Kantçıdır. Nozick'in benimsediği yaklaşım budur. “Hakları ulaşılabilecek nihai duruma dahil etmenin aksine, bunları yapılacak eylemlere yan kısıtlamalar olarak yerleştirebiliriz: Kısıtlama C'yi ihlal etmeyin.” Bu görüş Rawls'tan farklıdır ve sonuç olarak Kantçı gereksinimlerin farklı bir yorumunu içerir. Rawls'tan farkı, belirli bir dağılımın sonuçlarıyla değil, bu dağılımın meydana geldiği süreçle ilgilenmesinde yatmaktadır. Nozick'e göre adaletin özü, kimin neye sahip olduğu meselesi değil, insanların bir toplumda nasıl etkileşime gireceği meselesidir. Bu nedenle, Nozick'in yaklaşımı ilk bakışta adalete ve nihayetinde eşitliğe daha aktif bir yaklaşım gibi görünebilir.

Nozick, Rawls gibi, adalete yaklaşımını Kantçı olarak görür. Bunu yaparken, vurguyu Kant'ın düşüncesinde Rawls'tan farklı bir noktaya yerleştirir. Rawls'a göre, adalete Kantçı yaklaşımın özünü oluşturan karar verirken herkesi eşit biçimde göz önüne almaktır. Cemaat için adaletle karar verilecekse, kişiler kendi özel ilgi ve eğilimlerinden uzaklaşmalı, herkesin çıkar ve eğilimlerine göre karar vermelidir. Bu, tamamen rasyonel bir varlığın Kantçı idealini yansıtır.

Nozick'in Kantı, saf rasyonaliteden çok, insanlara araç olarak değil, nihai olarak muamele etmekle ilgilenir. "Eylem üzerindeki yan kısıtlamalar, insanların yalnızca araçlar değil, amaçlar olduğu yönündeki Kantçı ilkeyi yansıtır; rızaları olmadan başka amaçlara ulaşmak için feda edilemez veya kullanılamazlar. Kişiler dokunulmazdır."

#### 4. AMARTYA SEN: BECERİLERİ GELİŞTİRMEK

Rawls gibi, devlet gibi kurumların insanların yaşamlarına aktif müdahalesini gerektiren, ancak Nozick'inki gibi, müdahaleyi insanların yaşam koşullarından ziyade kendi kendilerini yaratmalarını teşvik etmeyi amaçlayan bir dağıtımcı adalet teorisi geliştirmiştir. Sen'e göre, bir adalet teorisinin asıl odak noktası, yetenekler dediği şeydir ve o, bu yetenekleri, işlevler dediği şey temelinde tanımlar.

Eylemler ve varlıklar, sahip olunanlarla karşılaştırılmalıdır. Sen için, siyasette adalet neyin bize ait olduğu ya da bize ne verildiği meselesi değildir; daha doğrusu, mesele sadece bununla ilgili değildir. Daha da önemlisi, ne yapabileceğimiz meselesidir. Eylemi bağımsız olarak değerli

olarak kabul eden bir yaşam anlayışı, kısmen filozof Bernard Williams'ın yazılarından alınan, hayatın mülklerden ziyade tasarılar meselesi olduğu fikrini yansıtır. İnsan yaşamını yalnızca bir dizi ilişkisiz eylem olarak değil, zamansal olarak ortaya çıkan bir dizi tasarı olarak düşünmeliyiz. Olabileceğim kişi olmak, benim belirli şeylere sahip olmamı gerektirse de, öncelikle bu sahip olma meselesi değildir. Bu daha çok bir "yapmalar ve varlıklar" meselesidir. Bir yaşama değerini veren şey, kişinin dostlukları ve aşk ilişkilerini sürdürme, anlamlı bir kariyer inşa etme, kişinin atletik veya sanatsal yeteneklerini geliştirmesiyle ve yalnızca bağımsız anların bir toplamı olarak değil, birbirine örülmüş iplikler gibi zamanı tutarlı ve anlamlı bir kalıba dönüştüren başka tasarılarla bağlantılıdır.

Sen için bu anlayışlar, insanların erişmesi gereken malları nasıl kavramamız gerektiğini yapılandırır. Hem faillik ile esenlik arasındaki farkı hem de başarı ile özgürlük arasındaki farkı yansıtan dört parçalı bir ayrım önerir. İkinci ayrım, bir kişinin projelerinde gerçekte elde ettiği şey ile farklı hedefler için çabalamak zorunda olduğu özgürlük arasında bir fark olduğu fikrini yansıtır. Kişinin yapmak istediği şeyi başarabilmesi iyidir; ama aynı zamanda, nihayetinde bu yolları seçmese bile, farklı yollara çıkma özgürlüğüne sahip olmak da iyidir. Bu, insanların yapabileceği seçimlerin çeşitliliğini yakalar.

Siyaset felsefesine bu şekilde yaklaşmanın erdemlerinden biri, eşitlik ve özgürlük arasındaki eski tartışmayı yararlı bir şekilde yeniden çerçevelemesidir. İnsanların, bir toplumun üyeleri

arasında eşitsizliği teşvik edecek şekilde, istediklerini yapma özgürlüğü olmalı mı? Yoksa eşitlik özgürlük pahasına elde edilmesi gereken bir şey mi olmalıdır? Sen'in düşüncesinde bu soru yeni bir kılığa bürünür. İnsanları eşit olarak kabul etmek ve yöneten kurumları bu eşitliği korumakla yükümlü kabul etmek durumunda, insan yaşamının gelişmesi için önemli sayılabilecek diğer eşitlik türlerinin aksine, eşit özgürlük bunda nasıl bir rol oynar? Soruyu bu şekilde sormak sorunu çözmez, ama bizim ona yeni bir şekilde, belki de yeni düşünce yolları açan bir şekilde yaklaşmamıza izin verir.

Ancak üç eşitlik yaklaşımı da pasif eşitlik hattında bulunmaktadır. Nozick ve Rawls için olduğu gibi Sen için de eşitlik, insanların politik olarak ne yaptıklarından ziyade kurumların insanlara vermek zorunda oldukları şeylerle ilgili bir değer olarak görülmektedir. Bu üç düşünür de, insanların nasıl eylemde bulunabilecekleri ile değil, ne elde edeceklerine ile ilgilenmektedir. Bu düşünce tarzı, çağdaş adalet teorilerinin merkezinde bulunur ve onları tanımlamak için kullanılan bir terim etrafında kavramlaştırılır: dağıtımcı adalet teorileri.

Dağıtımcı adalet teorileri, bir toplumun avantajlarının ve sorumluklarının nasıl dağıtılması gerektiği sorusuna odaklanır. Bir toplumun sahip olduğu mallar - serveti, sağlık hizmetleri,

işleri, eğitimi, kaynakları, hakları - nasıl dağıtılmalıdır? Ve bir toplumun gerektirdiği yükümlülükler - toplumun korunması, çeşitli mallarının finansmanı, külfetli işleri- nasıl dağıtılmalıdır? Bu gibi sorular sorarak, dağıtımcı adalet teorilerinin temelde pasif eşitlik anlayışına sahip oldukları hemen görülebilir. Açık bir şekilde ifade etmek gerekirse, dağıtımcı adalet teorileri, tanınması gereken bir tür eşitlik ararlar ve buna dayanarak, bu eşitliği yaratacak, koruyacak veya himaye edecek bir mal dağılımını tartışmaya açarlar.

## **5. SONUÇ**

Dağıtımcı adalet teorileri, farklı açılardan eleştirilmiştir. Iris Marion Young, *Justice and the Politics of Difference* adlı kitabında, dağıtımcı adalet teorilerinin maddi mallara aşırı derecede odaklandığına ve bu malları statik ve değişmez olarak gördüğüne işaret etmektedir. Maddi malların tahsisine odaklanarak, dağıtımcı adaleti teorileri “dağıtım modellerini belirlemeye yardımcı olan sosyal yapıyı ve kurumsal bağlamı görmezden” gelmektedir. Dağıtımcı adalet teorilerinde temel mesele, insanların ortak yaşamlarının yaratılmasına nasıl katıldıkları sorusu yerine kimin neye sahip olduğudur. Bu ise, insanların kolektif ve özerk eylem kapasitesini göz önünde bulundurmaya ihmal eder ve siyasi katılımın demokratik karakterini köreltir.

Young, tüm tahsislerin maddi olması gerekmediğinin altını çizer. Hak veya fırsat tahsislerinden de söz edilebilir. “Fakat,” diye belirtiyor, “dağıtım kavramının bu genişlemesi



ikinci bir soruna yol açmaktadır. Dağıtım paradigması metaforik olarak maddi olmayan sosyal mallara doğru genişletildiğinde, dağıtım kavramı bu maddi olmayan malları sosyal ilişkilerin ve süreçlerin bir işlevi olarak görmek yerine statik şeylermiş gibi temsil eder.” Her şeyden önce dağıtımlarla ilgilenildiğinde, siyasi iktidar alanına ve bunun insanlar üzerindeki etkilerine karşı körleşir. Özellikle, dağıtımcı adalet teorileri, baskı ve tahakküm olgusunu ve bunlardan kaynaklanan sorunları tartışmayı ihmal eder. Baskı, “bazı insanların sosyal olarak genel kabul görmüş ortamlarda tatmin edici ve yaygın becerileri öğrenmesini ve kullanmasını engelleyen sistematik kurumsal süreçlerden veya insanların oyun oynama ve başkalarıyla iletişim kurma veya duygularını ve sosyal hayata bakış açısını ifade etme yeteneklerini engelleyen kurumsallaşmış sosyal süreçlerden oluşur.” Tahakküm ise “insanların eylemlerini veya eylemlerinin koşullarını belirlemeye katılmalarını baskılayan ya da engelleyen kurumsal koşullardan oluşur.” Baskı, insanların kapasitelerini sergilemelerini engeller ve tahakküm, onların kamusal yaşama yeterli ölçüde katılmalarını kısıtlar.

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**ARDAHAN'DA “HAYRAT” HALI ve DÜZ DOKUMA YAYGI GELENEĞİ**

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**ÖZET**

Anadolu'nun farklı kullanım amaçlarına yönelik üretilen halı veya düz dokuma yaygıları arasında “hayrat”, “ölümlük-dirimlik” veya “sargı” adı ile bilinen dokuma örnekleri de mevcuttur. Bu dokumalar, cenaze merasimi sırasında, tabut veya sal üzerine örtülür, mezarlık dönüşünde ise ölen kişinin hayrına, camiye bağışlanır. Yakın zamanlara kadar, Ardahan ve köylerinde devam eden bu uygulamaya göre, “hayrat” adı verilen halı veya düz dokuma yaygılar, her genç kızın, diğer çeyizlik dokumalarına eklenir. Yoksa bile evlendikten sonra dokunarak, günü geldiğinde kullanılmak üzere bir kenarda hazır bekletilir ya da ölen kişinin ardından dokunabilir. 2022 yılında Ardahan merkez ve köylerinde sürdürdüğümüz araştırmalarda, camilerde üst üste serili vaziyette çok sayıda hayrat halı ve düz dokuma yaygısı tespit edilmiştir. Fotoğrafları çekilerek belgelenen eserler, yörenin ölüm ve defin gelenekleri de dikkate alınarak tanıtılmaya gayret edilmiştir.

**Anahtar Kelimeler:** Ardahan, Halı, Düz Dokuma Yaygı, Hayrat.

**“HAYRAT” (CHARITIES) CARPET AND FLAT WEAVE RUG TRADITION IN ARDAHAN**

### **ABSTRACT**

Among the carpets or flat weave rugs produced for different usage purposes in Anatolia, there are also examples of weave known as "hayrat" (charities), "ölümlük-dirimlik" (death- life/ funeral ceremony) or "sargı" (wrapping). These weaves are covered on a coffin or raft during the funeral, and donated to the mosque for the sake of the deceased upon returning from the cemetery. In accordance with this practice, which was preserved in Ardahan and its villages, until recently, carpets or flat weaves called "Hayrat" were added to other weaves of the dowry of each young girl. If not, then it is woven after the wedding or after the deceased and set aside for use when necessary. In the course of research that we conducted in the center and villages of Ardahan in 2022, a large number of hayrat carpets and flat weave rugs lying were found in mosques. Artifacts that have been photographed and documented have been attempted to represent the mortal and burial traditions of the region.

**Key Words:** Ardahan, Carpet (rug), Flat Weave Rug, Hayrat (Charities).

Türkiye'nin kuzeydoğusunda bulunun Ardahan, Kars'a bağlı bir ilçe iken, 1992 tarihinde, Bakanlar Kurulu Kararı ile il statüsüne getirilmiştir. Yaklaşık 2000-2200 m. yüksekliğe sahip ilin yüzölçümü 5.035,51 km<sup>2</sup> dir. Kuzey ve kuzeydoğudan Gürcistan, güney ve güneydoğudan Kars, güneybatıdan Erzurum, doğudan Ermenistan ve batıdan Artvin ile çevrili Ardahan'ın Posof, Damal, Göle, Hanak, Çıldır olmak üzere beş ilçesi bulunmaktadır (Kılıç, 2019: 108-109).

Ardahan'a adını veren kavmin M.Ö. VI. yüzyılda yöreye yerleşen, Kıpçaklar'ın kolu Arda Boyunun olduğu tahmin edilmekle birlikte (Kaplanoğlu, 2012: 27), yörede tarih öncesi kültürlerin ilk aşaması sayılan Paleolitik, Mezolitik ve Neolitik çağlara ait birçok yerleşim yerinin varlığı tespit edilmiştir. Kars-Ardahan çevresinde sırasıyla Kimmerler, İskitler, Persler, İskender İmparatorluğu, Arsaklar, Araplar, Selçuklular, Bagratlılar, Gürcüler, Harzemşahlar, İlhanlılar, Karakoyunlular, Akkoyunlular ve Osmanlılar hakimiyet kurmuştur (Sevindi, 2015: 571-572).

Asırlar boyunca çok sayıda medeniyete ev sahipliği yapması, Ardahan'ın kültürel birikimini zenginleştirmiş, bu sayede sanatsal ve estetik değerinin yanı sıra işlevsel yönü de ağır basan eserler üretilmiştir. Başta Türkmenler olmak üzere, yörede yerleşik her aile, soy ve topluluğun dokuduğu halı ve düz dokuma yaygılar bu açıdan dikkat çekicidir. Özellikle, yer sergisi, yastık, minder, heybe, çuval, namazlık, saf seccade gibi dokuma türleri arasında, "hayrat" adı verilen halı ve düz dokuma yaygılar, malzeme, renk, teknik ve desen özellikleriyle, diğer dokumalardan farklı olmasa bile kullanım amacıyla diğerlerinden ayrılır. Bir kişinin ölümünden önce veya sonra dokunarak hazır edilen ve günü geldiğinde tek seferlik kullanımının ardından, ölen kişinin hayrına camiye bağışlanan bu dokumalar, Türk kültürünün zenginliğini ortaya koyan önemli maddi ürünlerdir.

### **TÜRKLER'DE ÖLÜM VE DEFİN GELENEKLERİ İÇİNDE HALI VE DÜZ DOKUMA YAYGILARIN YERİ**

Ölüm; doğum ve yaşamın ardından insanın karşılaştığı en büyük kişisel tecrübe olmasına rağmen, ölü ve ölüm olgusunun çevresinde gelişen inanç ve uygulamalar, bu durumu toplumsallaştırmıştır.

Türk toplulukları yaşadıkları bölgenin siyasi ve idari yapısının sahip olduğu dinin etkisinde kalarak, ölülerini "yakma, ağaca asma ve toprağa gömme" gibi farklı uygulamaları gerçekleştirmiş olsalar da (Radloff, 1994: 130-133) hepsinin yaşanma biçimini Tengricilik inancı şekillendirmiştir (Ersoy, 2002: 87). Her zaman ikinci bir hayatın var olduğuna duyulan

inanç ise ölümlerin birtakım eşyalarla defnedilmesi geleneğini doğurmuştur. Örneğin İskitler, öbür dünyadaki sosyal düzenin bu dünyadakinden farklı olmadığını düşündükleri için, bu dünyadaki gibi kral, savaşçı veya hizmetkâr olarak kalmasını istedikleri kişilerin yanına ona göre öteberi koymuşlardır. Çin kaynaklarından elde edilen bilgilere göre, Hunlar ölümlerini iç ve dış olacak şekilde yapılmış iki kat tabut içine koyarak bu tabutları altın ve gümüş işlemeli kumaş ve kürklerle örtmüşlerdir (Onay, 2013: 239). Kaşgarlı Mahmud'un "ölu beylerin ve hanların üzerine örtülen bir kumaştan bahsetmesi ve buna "esük" denildiğini" söylemesinden yola çıkarak, cenaze üzerine kumaş vb. bir örtü serildiği anlaşılmaktadır. Bunun bir kumaş, halı-kilim veya keçe olması mümkündür (Deniz, 2012: 476). Hunların özellikle hanedan üyeleri için yaptıkları kurganlara koydukları (Onay, 2013: 239), ağaç tabutlar, ölu hediyeleri, ölen kişinin ölümler dünyasında bu hayattakine benzer bir yaşantı süreceğine inanıldığı için yapılmış minyatür boyutunda farklı nesnelere, küçük masalar, yiyecek kapları, yere serilen ve duvara asılan keçe, halı ve düz dokuma yaygılar, ölümler başının altına konulan yastıklar, yanına konulan silahlar, ölümler mezar giysisi, at kadvraları, at koşum takımları vb. birçok eser, cenaze törenlerine ait maddi kültür unsurlarının örnekleridir (Çoruhlu, 2004: 247).

Göktürklerin ölümler merasimleri Hunlardan pek farklı değildir. Bunlar ölümler ceket giydirip, beline kuşağını sardıktan sonra, yanına yayı ve önüne tahta kabını koymaktadır (Küçük, 2010: 287). Türklerin ölümlerini kıyafetleriyle gömmeler geleneklerinin yanı sıra İslamiyet'e girmeden önce "kiben" adını verdikleri bir tür kefen kullandıkları da bilinmektedir (Deniz, 2012: 476).

Geleneksel Türk dinindeki, ölümler ve defin çevresinde gelişen inanç ve uygulamalar İslam dininin kabulünden sonra da farklı biçimlere bürünerek varlığını korumuştur.

Bu bağlamda Orta Asya'da, özellikle Türkmenlerin ve Azerilerin defin törenlerine bakıldığında, dokuma geleneğinin devamlılığını koruduğu görülmektedir. Değişik fonksiyonlara sahip dokuma yaygılar arasında, özellikle cenaze törenlerinde, ölen kişi "ayatlık" veya "eyatlık" adı verilen halı ya da düz dokuma yaygıya sarılmaktadır (Türkmen, 2018: 662).

Kazakistan'da cenazenin keçeye veya bir beze sarılması geleneği, çok eski zamanlardan bu tarafa aynı şekilde devam etmektedir. Ölen kişi kefenlendikten sonra keçeye (kiyiz) sarılarak, üzerine halı veya kilim (gilem) örtülmektedir. Evde kılınan cenaze namazının ardından, sal benzeri bir aletle kabristana götürülür. Üzerindeki kumaşlar alınıp bir kenara konur. Kilim bir yere serilir ve definden sonra imam ve cenazeyi getirenler (süyekçiler) bunun üzerine oturarak dua eder. Cenaze keçe içinde mezara kadar getirilir ve keçeden çıkartılıp kefeniyle defnedilir (Deniz, 2012: 469).

Kırgızistan’da bir kişi öldüğünde tabutu üzerine halı, kilim veya keçe örtme geleneği vardır. Ölünün mezara götürülmesi sırasında ölen kişinin birinci dereceden akrabası, özellikle kızı veya oğlu tarafından bir örtü örtülür. Halk arasında da “oğlu halı örttü” şeklinde konuşulur (Deniz, 2012: 470).

Özbekistan’da ise ölen kişi yıkanıp, kefenlendikten sonra, halı, kilim ya da şalca (çözgü yüzlü dokuma) adı verilen dokumaya sarılır veya tabutu üzerine örtülür. Bu dokumalar, kimi zaman ölenin anısına, yakınları tarafından sonradan da dokunup, camiye veya türbeye serilebilir. Buna hatıra halı-kilem (estelik gilem) denir (Deniz, 2012: 470).

Özbeklerde, dört kollu tabutun üzerine “bahmal” denilen halı, kilim ya da şalca namazlağ (caynamaz) örtülür. Aynı gelenek Türkmenistan ve Anadolu’da da görülür. Türkmenlerde cenaze kilime sarılmaz ama tabut üzerine yeşil bir örtü serilir. (Deniz, 2012: 470-474).

Uygurlarda ise cenaze yıkandıktan sonra kefenlenerek, siyah veya beyaz bir keçeye sarılır. Defin sırasında keçe çıkarılıp, kefeniyle birlikte gömülür. Ölen kişinin tabutu üzerine halı, battaniye veya güzel ipten dokunmuş bir örtü örtülür (Deniz, 2012: 474).

Orta Asya’dan başlayarak dünyanın birçok yerindeki Türk topluluklarında varlığını devam ettiren ölüm ve sonrasına ait inanış ve uygulamalar, Anadolu’ya benzer şekilde taşınmıştır. Ancak değişen coğrafya, iklim ve karşılaşılan farklı kültürlerin yanı sıra, bu topraklarda yaşanan İslam ve ahiret inancı, ölümle ilgili emir ve yasakları da belirlemiştir. Dolayısıyla, yeniden şekillenen ölüm ve defin gelenekleri içinde, halı ve düz dokuma yaygıların kullanımı da Anadolu’ya özgü bir hal almıştır.

Anadolu insanı yaşı kemale erdikçe veya ciddi bir hastalığa yakalanınca, zihinsel ve fiziksel olarak ölüme hazırlanır. Bu sebeple, ölümden sonra kullanılması için sabun, gülsuyu, havlu takımı, beyaz tülbent, kefen vb. eşyaları bohçalayarak sandığında saklar. Kimi yörelerde, bir halı veya düz dokuma yaygı da cenaze töreni sırasında, tabut veya sal üzerine örtülmesi için, genç kızlar ya da evli kadınlar tarafından dokunarak hazır edilir. Evde dokuma yapmayı bilen yoksa, satın alınır veya sipariş üzerine dokutulur. Günü geldiğinde kullanılan bu dokuma yaygılar, mezarlık dönüşünde diğer aile bireyleri tarafından camiye bağışlanır. Böylece, camiye serilen bu dokumalar üzerinde cemaatin yapacağı her ibadetin sevabından, ölünün de istifade edeceği umulur.

Sayın, Prof. Dr. Bekir Deniz’in ifadesine göre bu gelenek Anadolu’da yeni ortaya çıkmış değildir. Muhtemelen Selçuklular ve Osmanlılar devrinde cami, zaviye, medrese, şifahane gibi dini ve sosyal yapıların halı, kilim vb. sergi ihtiyacı, vakıf gelirleriyle satın almanın yanı sıra bu şekilde bağış yoluyla da karşılanmıştır (Deniz, 1994: 284-287).

Camilere bağış yoluyla gelen halı ve düz dokuma yaygılar, aslında yazılı olmayan birtakım kurallar sayesinde de koruma altına alınmıştır. Öyle ki bu dokumalar, serildiği günden itibaren caminin malı sayıldığı için asla geri istenemez ve diğer dokumalar gibi alınıp, satılamaz. Uzun yıllar içinde camilerde üst üste serilmiş keçe, halı ve düz dokuma yaygı katmanları oluşmasının sebebi budur.

Aynı amaç için kullanılsa bile Anadolu'nun her yöresinde farklı isimler verilen bu halı ve düz dokuma yaygılar, Çanakkale'de "ölümlük kilim", Konya, Aksaray, Kayseri, Kırşehir çevresinde "ahretlik kilim", Manisa, Denizli, Aydın çevresinde "sargı kilimi" (Kayışoğlu Şahin, 2013: 57), Ereğli, Halkapınar (Konya), Aksaray çevresinde "sal halısı-kilimi" veya "salaca halısı-kilimi", Emirdağ (Afyon) civarında "ölümlük", Isparta çevresinde "ölümlük-dirimlik" veya "ahretlik halı-kilim" (Deniz, 2012: 467), yine Isparta civarında "sargı kilimi" (Kılıçarslan ve Etikan, 2015: 79), Çameli (Denizli) yöresinde "ölümlük kilim" (Sökmen, 2021: 108), Burdur civarında "ölümlük-dirimlik" (Güven, 2022: 172) gibi isimlerle anılır.

#### **ARDAHAN VE ÇEVRESİNDE "HAYRAT" DOKUMALARI**

Ardahan'da, ölüm çevresinde gelişmiş, bir dizi dini ve sosyal uygulama mevcuttur. Ölüm olayı vuku bulduğunda öncelikle kişinin çenesi beyaz bir tülbent ile bağlanır. Kolları yanına konur. Bacakları da düzeltilerek ayakları başparmaklarının ucundan bağlanır. Ölen kişinin, üzerindeki mevcut kıyafetleri çıkarılmadan, bir beze, battaniyeye veya bir kilime sarılarak, yönü kibleye gelecek şekilde hazırlanan yer yatağına yatırılır. Mevta çok vakit geçirilmeden yıkanarak, kefenlenir. Namazının kılınmasının ardından cenaze, tabut veya yörede "dört kollu" denilen, iki kalın ahşap sopanın arasına, özel olarak dokunmuş bir kilimin dikilmesiyle yapılmış, sal benzeri aracın üzerine sırt üstü yatırılır. Üzerine ise "hayrat" adı verilen halı veya düz dokuma yaygı örtülür. Mezarlığa taşınan cenaze erkek ise, defin sırasında dokuma toparlanarak bir kenara alındıktan sonra defin işlemi gerçekleştirilir. Ancak ölen kişi kadın ise üzerindeki dokuma yaygı, karşılıklı kenarlarından tutularak, yukarı doğru kaldırılır. Paravan gibi kullanılan bu halı-kilim sayesinde, cenazenin, nikah düşen erkekler tarafından görülmesi engellenir. Defin işlemi bittikten sonra, mezarlık dönüşünde bu halı veya düz dokuma yaygı camiye bağışlanır (19.09.2022 tarihinde Arif Hocaoğlu'ndan şifahen alınan bilgilere göre). Geçmiş yıllarda kadın mevta kabre konurken, kimi zaman paravan niyetine çarşaf veya kumaş da kullanılmış. Bu kumaş, defin işleminin ardından caminin imamına ya da kadın gassala verilmiş. Ancak son yıllarda bu gelenek terkedilmiştir (11.07.2022 tarihinde Turan Şimşek'ten şifahen alınan bilgilere göre).



Köklü bir dokumacılık geçmişine sahip Ardahan'da, hayrat dokumaları kız çeyizlerinin bir parçası olabileceği gibi, kadın evlendikten sonra da kendisi ve kocası adına bir halı veya düz dokuma yaygıyı, kendi elleriyle dokuyarak, kullanılacağı güne kadar bir kenarda bekletir. Hazırda böyle bir dokuması olmayanlar, birinci dereceden bir akrabasının ölümünün ardından da dokuyabilir. Sonradan dokunan hayrat halı-kilimlerinin üzerinde, çoğu zaman ölen kişinin isim, soy isim, ölüm tarihi vb. bilgiler yer alır. Bu kitabi bilgiler halı veya düz dokuma yaygıya diğer nakışlar gibi dokunur (11.07.2022 tarihinde Turan Şimşek'ten şifahen alınan bilgilere göre).

Yörede hayrat dokumaları, ailenin ekonomik durumu iyi ise halı, orta halli ise kilim, bunların ikisini de karşılayacak gücü yoksa keçeden yapılır. Ancak ne olursa olsun hayrat halı-kilim-keçesi başka işlerde kullanılmaz. Bir yere serilmez. Çok darda kalırsa bile satılmaz (19.09.2022 tarihinde Melek Hocoğlu'ndan şifahen alınan bilgilere göre).

Yöre halkı, hayrat halı veya düz dokuma yaygınının, tüm masraflarının %100 helal paradan karşılandığından emin olmak ister. Çünkü bu dokumayı yapmaktaki amacı zaten Allah'ın rızasını kazanmak ve sevap işlemektir. Bundan dolayı dokumayı yapacak kadın kendi eliyle beslediği koyunun yününden dokumasını yapar veya tavuğu, koyunu, ineğinden elde ettiği yumurta, süt, yoğurt, peynir vb. yan ürünleri satarak kazandığı parayı bu işe harcar (19.09.2022 tarihinde Arif Hocoğlu'ndan şifahen alınan bilgilere göre).

Ardahan'ın merkez ve köylerinde yaptığımız araştırmalarda, hemen her camide karşılaştığımız, hayrat halı ve düz dokuma yaygıları, malzeme, renk, teknik ve üslup bakımından, özel bir kurguya sahip değildir. Bütünüyle yörenin gelenekli dokuma karakterini bu dokumalarda da görmek mümkündür. Genellikle taban halısı-kilimi, saf seccade veya namazlık boyutlarında dokunmuştur.

### **DEĞERLENDİRME ve SONUÇ**

Türk topluluklarında ölümden sonraki hayatla ilgili inanç ve uygulamalar, Anadolu'ya taşınırken İslam'daki Ahiret anlayışıyla yeniden şekillenmiştir. Orta Asya'da ölüm ve defin gelenekleri içinde önemli bir yer tutan halı ve düz dokuma yaygılar, bugün farklı şekillerde de olsa hâlâ kullanılmaktadır. Anadolu'nun birçok yöresinde tabut üzerine örtülerek, cenazenin son yolculuğunda ona eşlik eden ve mezarlık dönüşünde camiye bağışlanan bu dokumalar, Ardahan çevresinde köklü bir geçmişe sahiptir.

Ardahan nüfusunun çoğunluğunu oluşturan Oğuzların Karapapak Boyundan gelen Terekemelerin (Konukçu, 1999: 47) yanı sıra kendilerini Türkmen ve yerli olarak tanımlayan

diğer Türkmen gruplarının geçmişten günümüze büyük bir bağlılıkla devam ettirdikleri dokumacılık faaliyetleri sayesinde, camilere bağışlanan halı ve düz dokuma yaygı sayısı da oldukça fazladır.

Geçmiş yıllarda camilere bağışlanan halı ve düz dokuma yaygıların bakımını yöre halkı üstlenmiştir. Bu amaçla her hafta veya iki haftada bir, mahalle ve köy halkından genç kızlar, kadınlar, imece usulüyle camilerin halılarını silkeler, süpürür, her yerin tozunu alırlardı. Ayrıca her sene yaz ayında da camilerin imamları ile cemaatin ortak kararıyla belirlenen bir günde, bütün keçe, halı ve düz dokuma yaygılar toplanarak, dere kenarlarına veya pınar başlarına götürülerek yıkanır (06.07.2022 tarihinde Arife Özcan'ndan şifahi alınan bilgilere göre).

Ancak son yıllarda camiler, duvardan duvara fabrika halıları ile kaplandıkça, bağışlanan dokumalar ya yeni döşemelerin altında kalmış ya da bir köşeye üst üste istif edilmiştir. Camilerin olumsuz ısı ve nem koşullarından dolayı, birçok dokuma çürüme tehlikesiyle karşı karşıyadır.

Yörede çok sık karşılaşılacakla birlikte, bazı camilerde hırsızlık olayları da yaşanmıştır. Bu durumun önüne geçebilmek için, değerli görülen kimi dokumalar ya imamların evlerinde koruma altına alınmış veya camilerin kapıları vakit namazları dışında kilitlenerek önlem alma yoluna gidilmiştir.

Son yıllarda yörede dokumacılık faaliyetleri gerilemeye başladığı için camilere bağışlanan halı ve düz dokuma yaygı sayısı da yok denecek kadar azalmıştır. Bu durumla bağlantılı olarak yöredeki “hayrat” geleneği de unutulmaya başlamıştır. Günümüzde sal veya tabut üzerine örtmek için, camiden tedarik edilen, üzerinde Kur'an-ı Kerim'den ayetlerin yazılı olduğu yeşil renkli örtüler kullanılmaktadır. Ayrıca tabutun üstüne, ölen kadın ise başörtüsü, yazma, erkek ise şapka, bere, kız çocuğu ise gelinlik, duvak, asker ise üniformasının konulduğu da görülmektedir.

Günümüz koşullarında geleneği yeniden canlandırmak pek mümkün görünmese de mevcut halı ve düz dokuma yaygıların koruma altına alınarak gelecek kuşaklara aktarılması, ayrıca bu örnekler doğrultusunda yöredeki dokumacılık faaliyetlerinin yeniden canlandırılması önem taşımaktadır.

FOTOĞRAFLAR



**Fotoğraf 1 (21.06.2022):** Halı, 200 x 310 cm, pamuk x yün, Bağdaşen (Kinzodamal) Köyü  
**Kitabe:** Hayratı: 1981, Calal (Celal) Aydın



**Fotoğraf 2 (22.06.2022):** Halı, 170 x 400 cm, yün x yün, Çamlıçatak Köyü  
**Kitabe:** 1964 Tarih



**Fotoğraf 3 (06.07.2022):** Halı, 195 x 120 cm, yün x yün, Çataldere Köyü  
**Kitabe:** 1946 Sahibi Terzi



**Fotoğraf 4 (06.07.2022):** Halı, 140 x 290 cm, yün x yün, Çataldere Köyü  
**Kitabe:** Ömer Deniz Balhanım



**Fotoğraf 5 (21.06.2022):** Halı namazlık, 70 x 130 cm, yün x yün, Hasköy Köyü  
**Kitabe: -**



**Fotoğraf 6 (20.06.2022):** Halı namazlık, 82 x 144 cm, pamuk x yün, Çatalköprü Köyü  
**Kitabe: 1965**



**Fotoğraf 7 (20.06.2022):** Kilim, Saf seccade, 160 x 340 cm, yün x yün, Yalnızçam Köyü  
**Kitabe:** F. Aras 1965



**Fotoğraf 8 (22.06.2022):** Kilim, 200 x 340 cm, yün x yün, Taşdeğirmen Köyü  
**Kitabe:** -



**Fotoğraf 9 (23.06.2022):** Zili, 130 x 400 cm, yün x yün, Ölçek Köyü  
**Kitabe: -**



**Fotoğraf 10 (22.06.2022):** Kilim, 180 x 440 cm, yün x yün, Karakale Köyü  
**Kitabe: -**



**Fotoğraf 11 (28.06.2022):** Zili, 190 x 320 cm, yün x yün, Değirmenli Köyü  
**Kitabe: -**



**Fotoğraf 12 (06.07.2022):** Kilim, 165 x 350 cm, yün x yün, Çataldere Köyü  
**Kitabe:** Osman



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**EXAMINATION OF ENGLISH LANGUAGE TEACHING UNDERGRADUATE  
PROGRAM IN TERMS OF TARGET SKILLS IN THE PRIMARY AND  
SECONDARY SCHOOL ENGLISH LANGUAGE CURRICULUM**

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**ABSTRACT**

In the Turkish Education System, English course is taught within the framework of the English Language Curriculum prepared by the Ministry of National Education Board of Education. The "target skills" in the English Language Curriculum constitute the main purpose of the English course. It is of great importance that English teachers make students acquire these "target skills" in the education and teaching process. The role of the pre-service English Language Teaching Undergraduate Program is fundamentally and primarily effective in helping teachers acquire target skills to students. The Ministry of National Education carries out continuous studies in the field of education programs, as a requirement of the situation of Turkey, which is in the process of membership to the European Union, in the context of English language teaching and the expectations of the epoch from individuals in terms of language. As a result of these studies, the ministry prepared English Language Curricula at primary, secondary and high school levels in 2018 and gave practice instruction. This situation brought up the development of the English Language Teaching Undergraduate Program of Education Faculties, which train English teachers, in line with the expectations. The Council of Higher Education, especially taking into account the changes made in primary education programs, has started studies in order to make the necessary updates in the English Language Teaching Undergraduate Program. The Council of Higher Education aimed to meet the expectations of the Ministry of National Education for English lessons and teachers with the English language teaching undergraduate program prepared in 2018. The "target skills" included in the English Language Curricula prepared by the Ministry of National Education for the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th Grades in Primary and Secondary Schools in 2018 and The English Language Teaching Undergraduate Program prepared by the Higher Education Council and started to be implemented in 2018 are the subjects of this study. It is of importance that English teachers who graduated from the English Language Teaching Undergraduate Program are competent in making students acquire the target skills in the

English Language Teaching Program. In this framework, Examining the English Language Teaching Undergraduate Program in terms of Target Skills in the English Language Curriculum reveals the significance of this study. The aim of this study is to examine

the English Language Teaching Undergraduate Program in terms of the target skills in the Primary and Secondary School English Language Curriculum and to make the necessary evaluations. Within the framework of this main purpose, answers to the following questions were sought:

1. What are the compulsory Field Education courses in the English Language Teaching Undergraduate Program and how is their distribution according to the semesters?
2. What are the target skills in the English Language Curriculum?
3. What are the English Language Teaching Undergraduate Program courses that these target skills are related to and what are the statements in the contents of these courses?
4. How is the distribution of the statements related to the English Language Curriculum Target Skills in the courses in the English Language Teaching Undergraduate Program according to the semesters? In this study, qualitative research method was used. The data of the research were collected through document analysis. This study is limited to the English Language Curriculum prepared by the Ministry of National Education for Primary and Secondary Schools' 2-8. grades and the English Language Teaching Undergraduate Program prepared by the Council of Higher Education for Education Faculties. Elective courses were not included in the study. The data sources of the study, Primary and Secondary School 2-8 Grade English Curriculum, were obtained from the Ministry of National Education Website; The English Language Teaching Undergraduate Program was obtained from the website of the Council of Higher Education. First, the English Language Curriculum was examined and target skills were presented. Then, the English Language Teaching Undergraduate Program was examined; courses related to the target skills in the English Language Curriculum and their contents were tried to be determined. The data were shown in tables; interpretations of the findings were made. Based on the findings, the conclusions and necessary recommendations were given.

**Keywords:** English Language Teaching, Undergraduate Program, Primary And Secondary School English Language Curriculum, Target Skills.

## **1.INTRODUCTION**

Language and language learning is an indispensable element for human beings. Language is important for the individual's self-expression, as well as for communicating with other individuals. This is a significant issue that should be considered in the socialization process of the individual.

In today's world, where the interaction between societies and ancient cultures continues continuously and intensively, it is an important competence for individuals to use different languages effectively as well as having a command of their mother tongue. People with this competence, while giving importance to global and national elements, also contribute to the construction of societies that are sensitive to different cultures and values (Council of Europe, 2001). In today's world, where the need and opportunities for interpersonal communication have increased, the demand for language learning has increased. Undoubtedly, one of the most important tools that can be used to "keep people of different languages, cultures and nationalities together with a common consciousness" in the European Union countries is a language teaching that includes qualified and rich learning opportunities that can serve the idea of multilingualism (Aytan, Göksel Günaydın, 2021).

Arousing interest and developing an attitude towards learning English at primary and secondary school level is an important issue in the Turkish Education System. In this process, the acquisition of basic language skills depends on the quality of the teacher and the content of the curriculum prepared. The quality of the teacher depends on the pre-service undergraduate programs prepared by the Council of Higher Education, and the quality of the teaching program depends on the quality of the English Language Curriculum prepared by the Ministry of National Education. In both cases, curricula are of great importance.

The curriculum is a program that generally consists of certain categories of knowledge and focuses on skill and practice in some schools, and aims to gain knowledge and skills in a planned manner in line with the aims of the education program (Varış, 1996). The curriculum is a guide that shows the subjects to be taught in various classes and courses at a certain teaching level, their purposes, how many hours each lesson will be taught in a week according to the classes, and teaching methods and techniques (Büyükkaragöz, 1997). In other words, a curriculum is a mechanism of experiences that includes all activities related to the teaching of

a lesson that is planned to be taught to the individual at school or outside of school (Demirel, 2005). Curriculum is a program designed to help students acquire the knowledge and experience of humanity as of its historical development, depending on the goals of the schools, the needs of the individual

and in order to improve his/her abilities, in a way that can affect his/her thoughts, feelings and behaviors (Kocaçınar, 1966; Hesapçioğlu, 1988). Curriculum is a planned effort to influence students in a certain way and to develop their personalities (Alicıgüzel, 1979; Hesapçioğlu, 1988). The curriculum covers all activities related to teaching-learning processes. In another aspect, the curriculum is the whole of the syllabuses (Küçükahmet, 1999). Curriculum is a guide or a project of this nature that shows what, why and how to take place in the teaching-learning process of a course (Özçelik, 1987; Aykaç et al., 2006). However, this covers all activities for the realization of practical objectives rather than a printed guide (Aykaç et al., 2006). The common point in these definitions is that the curriculum is a subcategory of the education program, and it is a process that includes all the activities related to the teaching of the lessons, related to the behaviors related to the knowledge, emotions and skills that are planned to be acquired by the individual at school or out of school.

In the Turkish Education System, the English course is taught within the framework of the English Language Curriculum prepared by the Ministry of National Education Board of Education and Discipline. English language curriculum has been revised in accordance with the general objectives of Turkish National Education as defined in the Basic Law of the National Education No. 1739, along with the Main Principles of Turkish National Education. In designing the new English language curriculum, the principles and descriptors of the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR) were closely followed. The CEFR particularly stresses the need for students to put their learning into real-life practice in order to support fluency, proficiency and language retention (CoE, 2001); accordingly, the new curricular model emphasizes language use in an authentic communicative environment. As no single language teaching methodology was seen as flexible enough to meet the needs of learners at various stages and to address a wide range of learning styles, an eclectic mix of instructional techniques has been adopted, drawing on an action oriented approach in order to allow learners to experience English as a means of communication, rather than focusing on the language as a topic of study. Therefore, use of English is emphasized in classroom interactions of all types, supporting learners in becoming language users, rather than students of the language, as they work toward communicative

competence (CoE, 2001). As the CEFR considers language learning to be a lifelong undertaking, developing a positive attitude toward English from the earliest stages is essential; therefore, the new curriculum strives to foster an enjoyable and motivating learning environment where young learners/users of English feel comfortable and supported throughout

the learning process. Authentic materials, drama and role play, and hands-on activities are implemented to stress the communicative nature of English. At the 2nd and 3rd grade levels, speaking and listening are emphasized; while reading and writing are incorporated in higher grades as students become more advanced. Throughout each stage, developmentally appropriate learning tasks provide a continued focus on building the learner autonomy and problem-solving skills that are the basis for communicative competence. In framing the new curricular model for English, no single teaching methodology has been designated. Instead, an action-oriented approach grounded in current educational research and international teaching standards has been adopted, taking into account the three descriptors of the CEFR comprising learner autonomy, self-assessment, and appreciation for cultural diversity (CoE, 2001). In doing so, it is expected that learners will become confident and proficient users of English, developing appreciation for their own unique culture while learning to understand and value a broad spectrum of international languages and cultures in accordance with CEFR's (MEB, 2018).

The curricular model is divided into 3 learning stages with respect to the language uses, functions and learning materials that are introduced. At the earliest levels, comprising grades 2 through 4, the main emphasis is on listening and speaking. Reading, writing, and grammatical structures are not a focus at this stage, in line with research indicating that younger children learn languages best through songs, games, and hands-on activities (Cameron, 2001). Thus, reading and writing tasks at the lower grade levels are limited. At the earliest stages, learners are introduced to English through cognates; these are believed to provide a bridge between languages, helping learners to transition from the known to the unknown using terms that are easily recognizable (Rodriguez, 2001). This concept is supported by Krashen's (1988) argument that language input must be interesting, relevant and comprehensible to stimulate comprehension. In the 5th and 6th grades, as students continue to develop their language skills, exposure to short texts is introduced. At the same time, these learners may participate in controlled writing activities such as filling out a club membership registration card with their name, date of birth, address, and other concrete, factual

information. In the 7th and 8th grades, older students who have formed the necessary foundation for an understanding of literacy issues will then be exposed to reading and writing as an integral aspect of language learning, such as reading simple texts or writing short, simple stories about their friends (Bayyurt & Alptekin, 2000). This approach follows Cummins' (1984) model, which advocates a progression from cognitively undemanding, context-embedded activities to cognitively demanding, context-

embedded tasks, moving from familiar to unfamiliar concepts in building language and literacy skills (MEB, 2018).

The "target skills" in the English Curriculum constitute the main purpose of the English course. It is of great importance that English teachers acquire these "target skills" in the education process. The role of the pre-service English Language Teaching Undergraduate Program is fundamentally and primarily effective in helping teachers gain target skills to students.

The Ministry of National Education carries out continuous studies in the field of education programs, as a requirement of the situation of Turkey, which is in the process of membership to the European Union, in the context of English language teaching and the expectations of the age from individuals in terms of language. As a result of these studies, in 2018, the Ministry of National Education prepared English Lesson Curriculums at primary, secondary and high school levels and gave practice instructions. This situation brought up the development of the English Language Teaching Undergraduate Program of Education Faculties, which train English teachers, in line with the expectations. The Council of Higher Education has started studies to make necessary updates in the English Language Teaching Undergraduate Program, especially taking into account the changes made in primary education programs. The Council of Higher Education aimed to meet the expectations of the Ministry of National Education for English lessons and teachers with the English Language Teaching Undergraduate Program prepared in 2018.

The "target skills" included in the English Language Curricula prepared by the Ministry of National Education for the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th Grades in Primary and Secondary Schools in 2018 and The English Language Teaching Undergraduate Program prepared by the Higher Education Council and started to be implemented in 2018 are the subjects of this study.

It is of importance that English teachers who graduated from the English Language Teaching Undergraduate Program are competent in making students acquire the target skills in the English Language Teaching Program. In this framework, Examining the English Language Teaching Undergraduate Program in terms of Target Skills in the English Language Curriculum reveals the significance of this study.

The aim of this study is to examine the English Language Teaching Undergraduate Program in terms of the target skills in the Primary and Secondary School English Language Curriculum and to make the necessary evaluations. Within the framework of this main purpose, answers to the following questions were sought:

- 1.What are the compulsory Field Education courses in the English Language Teaching Undergraduate Program and how is their distribution according to the semesters?
- 2.What are the target skills in the English Language Curriculum?
- 3.What are the English Language Teaching Undergraduate Program courses that these target skills are related to and what are the statements in the contents of these courses?
- 4.How is the distribution of the statements related to the English Language Curriculum Target Skills in the courses in the English Language Teaching Undergraduate Program according to the semesters?

In this study, qualitative research method was used. The data of the research were collected through document analysis. This study is limited to the English Language Curriculum prepared by the Ministry of National Education for Primary and Secondary Schools' 2-8.grades and the English Language Teaching Undergraduate Program prepared by the Council of Higher Education for Education Faculties. Elective courses were not included in the study.The data sources of the study, Primary and Secondary School 2-8 Grade English Curriculum, were obtained from the Ministry of National Education Website; The English Language Teaching Undergraduate Program was obtained from the website of the Council of Higher Education. First, the English Language Curriculum was examined and target skills were presented. Then, the English Language Teaching Undergraduate Program was examined; courses related to the target skills in the English Language Curriculum and their contents were tried to be determined. The data were shown in tables; interpretations of the findings were made. Based on the findings, the conclusions and necessary recommendations were given.



This section, in line with the purpose of the research, contains the compulsory Field Education courses in the English Language Teaching Undergraduate Program and their distribution according to the semesters; the target skills in the Primary and Secondary School English Language Curriculum; information and comments on the English Language Teaching Undergraduate Program courses that these target skills are related to and the statements in the contents of these courses.

### 2.1. Compulsory Field Education Courses in the English Language Teaching Undergraduate Program and their Distribution by Semester

Information on the compulsory Field Education courses in the English Language Teaching Undergraduate Program and their distribution according to the semesters is given in Table 1.

**Table 1.** Compulsory Field Education Courses and Distribution by Semester

Undergraduate Courses (14+12=26)	Semesters								Total	
	1	2	3	4	5	6	7	8	F	%
Reading Skills 1	✓								4	15,38
Writing Skills 1	✓									
Listening and Pronunciation 1	✓									
Verbal Communication Skills 1	✓									
Reading Skills 2		✓						5	19,23	
Writing Skills 2		✓								
Listening and Pronunciation 2		✓								
Verbal Communication Skills 2		✓								
Structure of English*		✓								
Critical Reading And Writing			✓						4	15,38
Approaches to Learning and Teaching English*			✓							
English Literature 1*			✓							
Linguistics 1			✓							
Linguistics 2				✓					4	15,38
English Teaching Programs*				✓						
English Literature 2*				✓						
Language Acquisition*				✓						
Teaching English Language Skills 1					✓				3	11,54
Teaching English to Young Learners 1*					✓					
Teaching Language and Literature 1*					✓					
Teaching English Language Skills 2						✓			3	11,54

Teaching English to Young Learners 2*							✓				
Teaching Language and Literature 2*							✓				
Course Content Development in Teaching English*								✓		2	7,69
Translation*								✓			
English Preparation Exam and Evaluation									✓	1	3,85
<b>Total</b>	<b>F</b>	4	5	4	4	3	3	2	1	26	100,00
	<b>%</b>	15,38	19,23	15,38	15,38	11,54	11,54	7,69	7,69	3,35	

\* Courses whose names and contents are not related to target skills.

As seen in Table 1, the number of "Field Education" courses in the English Language Teaching Undergraduate Program is 26. While these courses (F=5) are in the 2nd semester with a rate of

19.23%, in the 1st (F=4), 3rd (F=4) and 4th (F=4) semesters with 15.38%; 11.54% in the 5th (F=3) and 6th (F=4) semesters; It is in the 7th (F=7) semester with a rate of 7.69% and in the 8th (F=2) semester with a rate of 3.85%.

## 2.2.Target Skills in the English Language Curriculum

Information on the target skills in the English Language Curriculum prepared for the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th grades of Primary and Secondary Schools is given in Table 2.

**Table 2.**Target Skills in the English Curriculum (MEB, 2018: 93)

Levels [CEFR*] (Hour/Week)	Grade	Target Skills	Main Activities/Strategies
<b>1</b> [A1] (2)**	2	Listening and Speaking	Total Physical Response (TPR) / Crafts / Drama
	3	Listening and Speaking Very Limited Reading and Writing***	
	4	Listening and Speaking Very Limited Reading and Writing***	
<b>2</b> [A1] (3)**	5	Listening and Speaking Limited Reading *** Very Limited Writing***	Drama/ Animation
	6	Listening and Speaking Limited Reading *** Limited Writing***	
<b>3</b> [A2] (4)**	7	<b>Primary:</b> Listening and Speaking <b>Secondary:</b> Reading and Writing	Theme*****
	8	<b>Primary:</b> Listening and Speaking <b>Secondary:</b> Reading and Writing	

\*CEFR: Common European Framework of Reference for Languages.

\*\*Number of Lesson Hours per Week.

\*\*\*\*The very limited skills in the boxes with this sign refer to simple and short spoken/written texts and materials. For example, in the 2<sup>nd</sup> and 4<sup>th</sup> grades, the main goal is the development of listening and speaking. As Cameron (2001) said, spoken language for children is the language that the child first encounters, understands, practices and learns (p. 18). Therefore, activities aimed at improving reading and writing skills should not exceed the vocabulary level (Example: Children can write “cat” under the cat picture). In addition, reading and writing activities of up to 25 words can be done in limited skills. For example, in the 5<sup>th</sup> and 6<sup>th</sup> grades, reading activities can reach the sentence level, and older students in the 7<sup>th</sup> and 8<sup>th</sup> grades can use reading and writing as an important part of language learning as they acquire the basic knowledge of literacy activities.

\*\*\*\*The main features of theme-based teaching are: Highly contextualized learning environment, vocabulary and grammar structures handled within the framework of a topic, skills and activities that integrate with the theme chosen according to the subject of the lesson (eg, scientists, geography, responsibilities at home, etc.) that enable meaningful situation-based learning.

As seen in Table 2, three language levels have been determined in the Turkish Education System according to the Primary and Secondary School English Language Curriculum, introduced language uses, functions and learning materials. The first level covers grades 2, 3 and 4, the second level covers grades 5 and 6, and the third level covers grades 7 and 8.

On the other hand, there are two language levels in the Primary and Secondary School English Language Curriculum, A1 and A2, according to the Common European Framework of Reference for Languages [CEFR]. A1 language level covers 2nd, 3rd, 4th, 5th and 6th grades, while A2 language level covers 7th and 8th grades. While "listening and speaking" skills, which are among the target skills in the English Language Curriculum, are included in all grades (2-8), "reading and writing" skills are in all grades (3-8), except for the 2nd grade; "very limited reading and writing" skills in 3rd and 4th grades; "limited reading" skill in 5th and 6th grades; "very limited writing" skill in 5th grade; "limited writing" skill in 6th grade; "reading and writing" skills are included in 7th and 8th grades. However, in 7th and 8th grades, "listening and speaking" skills are given as "primary", while "reading and writing" skills are given as "secondary".

### **2.3.English Language Teaching Undergraduate Program Courses Related to Target Skills in the English Language Curriculum and Statements in the Contents of These Courses**

#### **2.3.1.English Language Teaching Undergraduate Program Courses Related to the Target Skills in the English Language Curriculum**

Information on the English Language Teaching Undergraduate Program Courses Related to the Target Skills in the English Language Curriculum is given in Table 3.

**Table 3.** English Language Teaching Undergraduate Program Courses related to the Target Skills in the English Language Curriculum

	Semesters	Undergraduate Courses	Target Skills			
			Listening	Speaking	Reading	Writing
Courses Whose Names and Contents Are Related to Target Skills	1	Reading Skills 1			✓	
		Writing Skills1				✓
		Listening and Pronunciation 1	✓	✓		✓
		Verbal Communication Skills 1		✓		
	2	Reading Skills 2		✓	✓	✓
		Writing Skills 2			✓	✓
		Listening and Pronunciation 2	✓			✓
		Verbal Communication Skills 2		✓		
	3	Critical Reading And Writing		✓		✓
	Total		2	5	3	6
Courses Whose Contents Are Related to Target Skills	3	Linguistics 1	✓	✓		
	4	Linguistics 2		✓		
	5	Teaching English Language Skills 1	✓	✓		
	6	Teaching English Language Skills 2			✓	✓
	8	English Exam Preparation and Evaluation	✓	✓	✓	✓
	Total		3	4	2	2
<b>The overall total</b>			5	9	5	8

As seen in Table 3, the number of compulsory "Field Education" courses in the English Language Teaching Undergraduate Program is 14, which are related to the target skills in the English Language Curriculum. The number of these courses, whose names and contents are related to the target skills in the English Language Curriculum, is 9. These courses are included in the first three semesters of the undergraduate program. The number of courses whose only contents are related to the target skills in the English Language Curriculum is 5. These courses take place in the 3rd, 4th, 5th, 6th and 8th semesters of the undergraduate program.

Among the English Language Teaching Undergraduate Program Courses, 9 courses whose names and contents are related to the target skills in the English Language Curriculum; 6 of them are related to "writing", 5 of them are "speaking", 3 of them are "reading" and 2 of them are "listening" target skills. Of the English Language Teaching Undergraduate Program Courses, 5 courses whose only contents are related to the target skills in the English Language Curriculum; 4 of them are related to "speaking", 3 of them are "listening" and 2 of them are related to "reading" and "writing" target skills.

In general, of the 14 English Language Teaching Undergraduate Program courses that are related to the target skills in the English Language Curriculum, 9 are speaking, 8 are writing, and 5 are "listening" and "reading skills".

While "English Exam Preparation and Evaluation" is the only course related to all target skills out of 14 English Language Teaching Undergraduate Program courses related to the target skills in the English Language Curriculum; It is seen that the "Listening and Pronunciation 1" course "Listening-Speaking-Writing"; "Reading Skills 2" course "Speaking-Reading-Writing"; "Listening and Pronunciation 2" course "Listening-Writing"; "Writing Skills 2" and "Teaching English Language Skills 2" course "Reading-Writing"; "Critical Reading and Writing" course "Speaking-Writing"; "Linguistics 1" and "Teaching English Language Skills 1", "Listening-Speaking"; "Verbal Communication Skills 1", "Verbal Communication Skills 2" and "Linguistics 2" course only "Speaking"; "Reading Skills 1" course only "Reading"; "Writing Skills 1" course is only related to the "Writing" target skills.

### **2.3.2. Statements in the Contents of English Language Teaching Undergraduate Program Courses Related to the Target Skills in the English Language Curriculum**

Table 4 provides information on the statements related to the Target Skills in the English Language Teaching Undergraduate Program courses and their contents, whose both names and contents are related to the Target Skills in the English Language Curriculum.

**Table 4.** English Language Teaching Undergraduate Program Courses and their contents, whose names and contents are related to the Target Skills in the English Language Curriculum

Courses	Statements
Reading Skills 1 (1 <sup>st</sup> Semester)	<ul style="list-style-type: none"> <li>* To grasp different perspectives by using authentic <b>reading</b> pieces such as newspapers, magazines, reviews and academic articles,</li> <li>* Gaining high-level <b>reading</b> skills such as predicting the connections between sentences and the main idea of the article, reaching the main idea and using semantic clues between sentences,</li> <li>* Gaining the habit of <b>reading</b> inside and outside the classroom.</li> </ul>
Writing Skills1 (1 <sup>st</sup> Semester)	<ul style="list-style-type: none"> <li>*Description, comparison, discussion, text production with the types of narration, summary <b>writing</b>, interpretation,</li> <li>*<b>Writing</b> short stories, reviews (on books and/or movies) and formal/informal letters.</li> </ul>
Listening and Pronunciation 1 (1 <sup>st</sup> Semester)	<ul style="list-style-type: none"> <li>*Analysis of authentic <b>listening</b> materials and <b>speech</b> phrases taken from different contexts;</li> <li>*Sound differences and phonological <b>transcription</b> of problematic sounds are covered,</li> <li>*High-level <b>listening</b> skills; basic <b>listening</b> and <b>speaking</b> skills such as vowels, consonants, word stress and intonation, and phonological <b>transcription</b> studies are done.</li> </ul>
Verbal Communication Skills 1 (1 <sup>st</sup> Semester)	<ul style="list-style-type: none"> <li>*Developing <b>verbal communication</b> skills by using appropriate expressions and strategies for various verbal communication situations,</li> <li>* Developing the ability to <b>express</b> feelings and thoughts effectively through mutual <b>speaking</b>, presentation and discussion activities,</li> <li>*Development of <b>speaking</b> and hearing comprehension skills by using up-to-date, authentic, audio-visual materials.</li> </ul>
Reading Skills 2 (2 <sup>nd</sup> Semester)	<ul style="list-style-type: none"> <li>* To be able to comprehend direct and indirect, plain and figurative meanings by examining the information in <b>reading</b> texts,</li> <li>* To be able to convey personal opinions to the texts <b>read</b> in short <b>verbal</b> and <b>written</b> forms.</li> </ul>
Writing Skills 2 (2 <sup>nd</sup> Semester)	<ul style="list-style-type: none"> <li>*<b>Read to write, write to be read,</b></li> <li>* Raising awareness about the applications to be made in the pre-, during and post-<b>writing</b> stages,</li> <li>* <b>Rewriting</b> with explanation,</li> <li>* Composition and homework report <b>writing</b>.</li> </ul>
Listening and Pronunciation 2 (2 <sup>nd</sup> Semester)	<ul style="list-style-type: none"> <li>*<b>Listening</b> sub-skills such as <b>taking notes</b>, making predictions, reaching certain and detailed information, making sense of the context, understanding the essence of the content,</li> <li>*The focus is on authentic <b>listening</b> materials with different English accents drawn from a variety of fields, such as interviews, films, songs, lectures, television programs and news broadcasts.</li> </ul>
Verbal Communication Skills 2 (2 <sup>nd</sup> Semester)	<ul style="list-style-type: none"> <li>*Developing advanced <b>verbal communication</b> skills,</li> <li>*Developing the ability to <b>express</b> feelings and thoughts appropriately through <b>verbal</b> activities such as interviews, presentations and discussions,</li> <li>*Developing advanced <b>speaking</b> and hearing comprehension skills through the introduction and application of hearing comprehension techniques and strategies.</li> </ul>
Critical Reading And Writing (3 <sup>rd</sup> Semester)	<ul style="list-style-type: none"> <li>*To be able to <b>summarize</b> and/or <b>report</b> current studies selected from the field of English Language Education.</li> </ul>

As seen in Table 4, the number of statements included in the contents of the English Language Teaching Undergraduate Program courses, whose names and contents are related to the Target Skills in the English Language Curriculum, is 36. While 13 of these statements are related to "Speaking" target skill, 12 of them are related to "Writing"; 6 of them are related to "Reading"; 5 of them are related to "Listening" target skills.

Table 5 provides information on the English Language Teaching Undergraduate Program courses whose only contents are related to the Target Skills in the English Language Curriculum and the statements about the Target Skills in their contents.

**Table 5.** English Language Teaching Undergraduate Program courses and their contents whose only contents are related to the Target Skills in the English Language Curriculum

Courses	Statements
Linguistics 1 (3 <sup>rd</sup> Semester)	Research on brain and language, lateralization and handedness, evolution of language, human language functioning patterns, language use and language disorders (e.g. simultaneous <b>listening</b> test, split brain, WADA test) Phonology, acoustic, affective and <b>pronunciation</b> phonology, <b>speech</b> organs, phonemes, vowels and consonants, international phonology alphabet, double vowel, triple vowel, <b>utterance</b> ,
Linguistics 2 (4 <sup>th</sup> Semester)	Pragmatics: notation, intuition, principles of <b>speech</b> , speech-act and tact.
Teaching English Language Skills 1 (5 <sup>th</sup> Semester)	Different phases and techniques of <b>listening</b> , <b>speaking</b> , <b>pronunciation</b> and vocabulary teaching.
Teaching English Language Skills 2 (6 <sup>th</sup> Semester)	Detailed examination of different phases and techniques of <b>reading</b> , <b>writing</b> and grammar teaching.
English Exam Preparation and Evaluation (8 <sup>th</sup> Semester)	Types of questions used to measure <b>reading</b> , <b>writing</b> , <b>listening</b> , <b>speaking</b> , vocabulary and grammar levels.

As seen in Table 5, the number of statements included in the contents of the English Language Teaching Undergraduate Program courses, whose only contents are related to the Target Skills in the English Language Curriculum, is 14. While 7 of these statements are related to "Speaking" target skill; 3 of them are related to "Listening", 2 of them are related to "Writing" and "Reading" target skills.

#### **2.4. Statements Regarding the English Language Curriculum Target Skills in the Courses in the English Language Teaching Undergraduate Program**

Table 6 provides information about the English Language Curriculum Target Skills in the courses in the English Language Teaching Undergraduate Program.



**Table 6.** Statements Regarding the Target Skills in the Courses in the English Language Teaching Undergraduate Program and their Distribution by Semester

Target Skills	Courses Whose Names and Contents Are Related to Target Skills			Courses Whose Contents Are Related to Target Skills						Total
	Semesters			Semesters						
	1	2	3	3	4	5	6	7	8	
	f	f	f	f	f	f	f	f	f	F
Listening	3	2		1		1			1	8
Speaking	7	5	1	3	1	2			1	20
Reading	3	3					1		1	8
Writing	4	7	1				1		1	14
<b>Total</b>	17	17	2	4	1	3	2		4	50

As seen in Table 6, the number of statements regarding the English Language Curriculum Target Skills in the courses in the English Language Teaching Undergraduate Program is 50. While "Speaking" is in the first place (F=20) in terms of target skills, "Writing" (F=14) is in the second place; "Listening" (F=8) and "Reading" (F=8) target skills are in the third place.

In the distribution of the statements related to the Target Skills by semesters, the first semester (f=17) and the second semester (f=17) are in the first place, while the third semester (f=6) is the second; 8th semester (f=4) is in third place; 5th semester (f=3) is fourth; The 4th semester (f=1) is in the fifth place. In the 7th semester, there is no statement about the English Language Curriculum Target Skills.

### 3.CONCLUSION AND RECOMMENDATIONS

In this section, the compulsory Field Education courses in the English Language Teaching Undergraduate Program and their distribution according to the semesters; The target skills in the Primary and Secondary School English Curriculum; The results and suggestions about the English Language Teaching Undergraduate Program courses that these target skills are related to and the statements in the contents of these courses are included.

Most of the Compulsory Field Education courses (f=17/F=26) in the English Language Teaching Undergraduate Program are in the first four semesters. Others (f=9) are in the last four semesters. It is noteworthy that only one Compulsory Field Education course took place in the last semester. This situation can be considered as a challenging process for the students in the 1st and 2nd grades. It is useful to pay attention to ensure a balance as much as possible in the distribution of Compulsory Field Education courses over the semesters throughout the undergraduate education process. On the other hand, it has been determined that neither the names nor the contents of a significant part (f=12) of the Compulsory Field Education courses

(F=26) are related to the target skills in the Primary and Secondary School English Language Curriculum. It is thought that this situation will negatively affect teachers' competencies regarding their knowledge and skills on field education. This possible negative effect can be eliminated by associating all Compulsory Field Education course contents with the target skills in the Primary and Secondary School English Curriculum.

The Primary and Secondary School English Language Curriculum in the Turkish Education System is for three language levels. These three levels correspond to the two language levels in the Common European Framework of Reference for Languages. "Listening" and "Speaking" skills, which are among the target skills in the Primary and Secondary School English Language Curriculum, are given more place. "Reading" and "Writing" skills take the second place. While developing the Primary and Secondary School English Language Curriculum, it is important to restructure the existing language levels in terms of the language levels included in the Common European Framework of Reference for Languages. On the other hand, it is very important to include the four basic skills sufficiently and in a balanced way while the program is being restructured.

The number of compulsory "Field Education" courses in the English Language Teaching Undergraduate Program, whose names and contents are related to the target skills in the English Language Curriculum (f=9), is higher than the number of the courses whose only contents are related to the target skills in the English Language Curriculum (f=5). It is important that the names of the courses, along with their contents, are related to the target skills in the English Language Curriculum. Paying attention to this will positively affect the inclusiveness of the undergraduate program regarding the target skills in the primary and secondary school program.

Among the target skills while "Listening" is given more place in the Primary and Secondary School English Curriculum, there are mostly statements related to the "Speaking" target skill in the course contents of the English Language Teaching Undergraduate Program. For this reason, it is important to restructure the course contents of the English Language Teaching Undergraduate Program by taking into account the target skills and their ratios in the Primary and Secondary School English Language Curriculum.

It has been determined that the course contents of the English Language Teaching Undergraduate Program differ in terms of their relationship with the target skills in the English Language Curriculum. These differences can be eliminated by restructuring the

course contents of the English Language Teaching Undergraduate Program to cover all target skills.

It has been concluded that the number of statements in the contents of the English Language Teaching Undergraduate Program courses, whose both the names and the contents are related to the Target Skills in the English Language Curriculum, is higher than the number of the statements in the contents of the courses whose only contents are related to the Target Skills in the English Language Curriculum. This shows that course titles are important in terms of covering target skills. Therefore, as much as possible, target skills should be taken into account when determining course names along with the contents.

It has been determined that most of the statements in the contents of the courses in the English Language Teaching Undergraduate Program are related to the target skill of "Speaking", followed by the target skill of "Writing", and the statements related to the target skills of "Listening" and "Reading" in the last place. Elimination of these differences is possible by taking into account all target skills while restructuring the course contents.

It has been determined that the expressions related to target skills belong to the 1st and 2nd semesters at the same rates among the 8 semesters during the undergraduate education. The balanced distribution of the expressions related to the target skills according to the semesters can be possible with the balanced distribution of the courses related to the target skills.

All the results and suggestions given above require that the target skills in the Primary and Secondary School English Language Curriculum be carefully considered with many dimensions while the English Language Teaching Undergraduate Program is being developed.

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## LİNUS TORVALDS'IN AÇIK KAYNAKLI MİMARİSİ VE UYGULANABİLİRLİĞİNİN ARAŞTIRILMASI

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### ÖZET

Gelişen teknoloji ve kümülatif bir şekilde ilerleyen bilim ile modern yapı ve yapım yöntem-teknikleri, insanın var olduğu dönemden itibaren sürekli ilerlemiştir. Her çağın popüler yapım teknikleri toplumların öncelikle kültürel arayışlarının sonucu olarak buldukları iklim ve coğrafyadan esinlenerek oluşmuştur. Her ulus kendi coğrafyasından ve geçmişinden esinlenerek, yapım teknolojileri geliştirmiş ve bunun sonucunda çeşitli kültürel öğeler içeren yapılar ortaya koymuştur. Bu kültürel yapıların bir kısmı günümüze ulaşmıştır. Bazıları ise çağlar boyunca aşınımlara ve tahriplere uğrayarak yok olmuştur. Geçmişte olduğu gibi günümüzün dünyasında da, artan yapı ihtiyaçlarına yeni ve pratik yaklaşımlar ortaya çıkmıştır. Bunlardan biri olarak çalışmaya konu olan Linux işletim sisteminin mucidi Linus TORVALDS tarafında öne sürülen ekolojik “Açık Kaynaklı Ev” adlı yapı üretim ve planlama modelidir. Emek, yoğun konut tasarımı yaklaşımı, basmakalıp McMansionlar, daha yaygın ve düşük maliyetliken bu yeni modele göre konut tasarımı, fabrikasyon ve teknoloji bir arada kullanılarak, yüksek performanslı, düşük enerjili, masrafsız, esnek ve birden fazla yerde uygulanabilecek konutlar inşa edilebilecektir. Modele göre bu esnek DIY(kendin yap tasarım modeli) tasarım fikri konut endüstrisinin yeniden şekillendirilmesi için bir anahtar olabilecek ve malzemeler bu evlerin yapımında daha fazla kullanılacak. Bu çalışma, yazılımcı Linus TORVALDS'ın “Açık Kaynaklı Evler” olarak tanımladığı konut uygulama modeli çözümlenmesini, Anadolu’da uygulanabilirliği ve uygulandığı takdirde mimarideki ortaya çıkacak faydaların araştırılmasını kapsamaktadır. Çalışmaya konu olan problem, açık kaynaklı ev modelinin Anadolu’daki konut anlayışına pratik ve ekonomik yönden bir çözüm olup olmadığıdır. Söz konusu çalışmanın amacı ise; bu problemin çözümüne katkı sağlayıp, Türkiye’de ortaya çıkan konut ihtiyacını ekonomik ve pratik bir çözüme kavuşturulmasına teknolojik bir mimari model üzerinden ışık tutmaktır. Bu bağlamda çalışmada,

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TORVALDS'in modeline uygun olarak uygulanmış yapı modelleri üzerinden "Açık Kaynaklı Evler" ve "Açık Kaynak Kodlu Mimari" temel prensibi ortaya konulacaktır. Modelin Anadolu'daki konut ihtiyacına ekonomik ve pratiklik yönünden katkısı incelenecektir.

**Anahtar Kelimeler:** Açık Kaynaklı Evler, Açık Kaynak Kodlu Mimari, Linus TORVALDS Mimarisi

**LINUS TORVALDS' OPEN SOURCE ARCHITECTURE AND RESEARCHING ITS  
APPLICABILITY**

**ABSTRACT**

Developing technology and cumulatively advancing science and modern construction and construction methods-techniques have continuously progressed since the time of human existence. The popular production techniques of every age have been inspired by the climate and geography of the societies, primarily as a result of their cultural pursuits. Each nation, inspired by its own geography and past, has developed construction technologies and as a result, has created structures containing various cultural elements. Some of these cultural structures have survived to the present day. Others have been destroyed by erosion and destruction over the ages. In today's world, as in the past, new and practical approaches to increasing building needs have emerged. One of these is the ecological building production and planning model called "Open Source House", put forward by Linus TORVALDS, the inventor of the Linux operating system, which is the subject of the study. While labor-intensive housing design approach, stereotypical McMansions are more common and low-cost, according to this new model, high-performance, low-energy, inexpensive, flexible and multi-site residences can be built by using a combination of housing design, fabrication and technology. According to the model, this flexible DIY design idea could be a key to reshaping the housing industry and materials will be used more in the construction of these homes. This study covers the analysis of the housing application model, which is defined as "Open Source Houses" by software developer Linus TORVALDS, its applicability in Anatolia and the investigation of the benefits that will arise in architecture if implemented. The problem that is the subject of the study is whether the open source house model is a practical and economical solution to the housing concept in Anatolia. The aim of this study is; To contribute to the solution of this problem and to shed light on a technological architectural model for an economical and practical solution to the housing need in Turkey. In this context, in this study, the basic principles of "Open Source Houses" and "Open Source Code Architecture" will be revealed through the building models applied in accordance with the model of TORVALDS. The contribution of the model to the housing need in Anatolia in terms of economy and practicality will be examined.

**Keywords:** Open Source Homes, Open Source Architecture, Linus TORVALDS Architecture

## 2.GİRİŞ

Gelişen teknoloji ve kümülatif bir şekilde ilerleyen bilim ile modern (çağdaş ve her çağın kendisine münhasır olan) yapı ve yapım yöntem-teknikleri, insanın var olduğu dönemden itibaren sürekli ilerlemiştir. Her çağın popüler yapım teknikleri toplumların öncelikle kültürel arayışlarının sonucu olarak buldukları iklim ve coğrafyadan esinlenerek oluşmuştur. Her ulus kendi coğrafyasından ve geçmişinden esinlenerek, yapım teknolojileri geliştirmiş ve bunun sonucunda çeşitli kültürel öğeler içeren yapılar ortaya koymuştur. Bu kültürel yapıların bir kısmı günümüze ulaşmıştır. Bazıları ise çağlar boyunca aşımılara ve tahriplere uğrayarak yok olmuştur.

Bilimin ilerlemesi ile insanoğlu, öncekilerine nazaran daha fonksiyonlu yapım teknolojilerine ulaşmış ve artan ihtiyaçlar ile kültürel yapım teknolojilerinden zaman içerisinde vazgeçmiştir. Kültürel öğeler yerine teknolojinin ilerlemesiyle zaman içerisinde belirli ülkelerde ortaya çıkan yapım teknikleri ve teknolojileri küresel ölçekte her yerde kullanılmaya başlanmıştır.

Geçmişte olduğu gibi günümüzün dünyasında da, artan yapı ihtiyaçlarına yeni ve pratik yaklaşımlar ortaya çıkmıştır. Bunlardan biri olarak çalışmaya konu olan Linux işletim sisteminin mucidi Linus TORVALDS tarafında öne sürülen ekolojik ‘‘Açık Kaynaklı Ev-Yapı’’ adlı yapı üretim ve planlama modelidir. Emek, yoğun konut tasarımı yaklaşımı, basmakalıp McMansionlar, daha yaygın ve düşük maliyetliken bu yeni modele göre konut tasarımı, fabrikasyon ve teknoloji bir arada kullanılarak, yüksek performanslı, düşük enerjili, masrafsız, esnek ve aynı anda birden fazla yerde uygulanabilecek konutlar inşa edilebilecektir. Modele göre bu esnek DIY(kendin yap tasarım modeli) tasarım fikri konut endüstrisinin yeniden şekillendirilmesi için bir anahtar olabilecek ve gerçek malzemeler bu evlerin yapımında çok daha fazla kullanılacak. Model özellikle kırsal ve kentlere uzak yöreler için kısa sürede inşa modülü ve planı oluşturmak amacıyla ortaya çıkmıştır. Michelle Kavurman Designs'ın başkanı Paul Wagner'a göre, yaşam alanlarımızı inşa etmek için kullandığımız malzemelerde köklü ve yeni değişiklikler görmeye devam edeceğiz. Warner'a göre, "Evlerin ve binaların geliştirilebilirliği geleceğin tasarımlarında, tüm konut sistemi içinde yenisi ile kolaylıkla değiştirilebilir parçalar halinde, bir çeşit becerikli iskelet ya da kabuk yaratmak çok büyük rol oynayacak."

Söz konusu bu çalışmada bu tekno-mimari modelin Anadolu'da ki uygulanabilirliği ortaya koymayı amaçlamaktadır. Çalışmaya konu olan problem; açık kaynaklı ev modelinin Anadolu'daki konut anlayışına pratik ve ekonomik yönden bir çözüm olup olmadığıdır. Bu



bağlamda bu modelin uzak köy ve yaşam alanlarında ile şehirlere yakın alanlarda konut ve diğer

yapıların inşa edilmesine yönelik pratik ve ekonomik yönden katkısı incelenecek ve Anadolu için uygunluğu ortaya konulacaktır.

### 3.ARAŞTIRMANIN PROBLEMİ ve HİPOTEZLERİ

Bu araştırmada temel olarak ele alınan problem; açık kaynaklı ev modelinin konut mimarisi başta olmak üzere, mimari uygulamalara ekonomik ve pratik yönünden katkı sağlayıp sağlamadığıdır. Bu doğrultuda oluşturulan hipotezler şunlardır:

**H0:** "Açık Kaynaklı Ev" modeli, kente uzak alanlar ile kentlere yakın alanlarda konut ve yapı ihtiyacına ekonomik ve pratik bir çözüm sunmaktadır.

**H1-a:** "Açık Kaynaklı Ev" modeli, kente uzak alanlar ile kentlere yakın alanlarda konut ve yapı ihtiyacına pratik ancak maliyeti yüksek bir çözüm sunmaktadır.

**H1-b:** "Açık Kaynaklı Ev" modeli, kente uzak alanlar ile kentlere yakın alanlarda konut ve yapı ihtiyacına pratik olmayan maliyeti düşük bir çözüm sunmaktadır.

**H1-c:** "Açık Kaynaklı Ev" modeli, kente uzak alanlar ile kentlere yakın alanlarda konut ve yapı ihtiyacına pratik olmayan ve maliyeti yüksek bir çözüm sunmaktadır.

### 4.ARAŞTIRMANIN AMACI ve ÖNEMİ

Günümüzde teknolojik ve bilimsel alanda her geçen gün yeni gelişmeler olmakta ve bu gelişmelere paralel olarak insanoğlunun yaşam standartları artarken, konfor anlayışları da sürekli değişim göstermektedir. Bütün teknolojik yeniliklerin temelinde olduğu gibi ev-konut teknolojisindeki gelişmelerin temelinde de; ihtiyaçların karşılanması için ekonomik(ucuza mal edilen) ve hızlı(pratik) bir yol olarak yorucu işleri hafifleterek insan verimliliğini arttırmak arzusu vardır (Gönen, 1988: 37). Böylece teknolojinin insanlara sunduğu imkânlar sayesinde daha önce elle yapılan birçok işlem, artık insan müdahalesi olmadan oluşturulan otomasyon sistemleri ile otomatik olarak yapılabilmektedir. (Yumurtacı ve Keçebaş, 2009)

Bu çalışmanın amacı; günümüzde özellikle kırsal alanlarda uygulanmaya başlanılan "Açık Kaynaklı Ev" üretim modelinin ülkemizde uygulanabilir bir yöntem olması üzerinde gerçekleri ortaya çıkarmaktır. Bu sayede kırsal alanlar başta olmak üzere çeşitli deprem, turizm ve sanayi alanları gibi alanlarda hızlı ve değiştirilebilir(kompakt) çeşitli plansal paylaşım ekolü ile her yerde uygulanabilir yapı üretim anlayışı oluşturulabilir. Bu çalışmanın esas önemi ise bu noktada ortaya çıkmaktadır. Çünkü ekonomik yapı üretim modülü olarak da

tanımlanan “Açık Kaynak Kodlu Yapı Üretim” anlayışı yüksek işçilik ve yüksek işçilik ücreti başta olmak üzere yapıların üretim sürecine yönelik çeşitli kolaylıklar sağlamaktadır.

Bilindiği üzere kırsal kesimde, büyük ölçüde yeni konut yapımı ihtiyacı olmakla birlikte, mevcut konutların ihtiyaca cevap verebilecek düzeye çıkartılabilmesi en önemli sorunu teşkil etmektedir. Bu çalışma ile birlikte kırsalda kentleşme kavramının, özellikle üretim bazlı çiftlikler gibi yapıların kurulumundaki hız ve ekonomik model olarak kullanışlılığı test edilmesi bakımından son derece önemlidir.

### 5. LİNUS TORVALDS VE AÇIK KAYNAK KODLU MİMARİ ANLAYIŞ

Linus Benedict Torvalds ( 28 Aralık 1969, Helsinki, Finlandiya) Finlandiya asıllı Amerikalı bir yazılım mühendisi olarak bilinir. Linux işletim sistemi çekirdeğinin geliştiricisi ve proje 1. Kademe yöneticisi olup, ABD'de yaşamaktadır. Transmeta(*Transmeta Corporation*, merkezi Santa Clara, California'da bulunan bir Amerikan fabrikasyon yarı iletken şirketi)di. Bir VLIW çekirdeğine ve Code Morphing Software adlı bir yazılım katmanına dayalı düşük güçlü x86 uyumlu mikroişlemciler geliştirdi. )'daki görevinden ayrıldığından beri OSDL'de (Açık Kaynak Geliştirme Laboratuvarları) tam zamanlı olarak Linux çekirdeği üzerinde çalışmaktadır. Linus, Andrew S. Tanenbaum tarafından geliştirilen Minix işletim sisteminin ihtiyacını karşılayamamasına mukabil, bu sisteme orjinal eklemeler yapmak için geliştirmeye başlamış ancak yazmaya başladığı programı zamanla Unix tarzında kişisel bilgisayarlarda çalışabilecek farklı ve dinamik bir işletim sistemi çekirdeğine dönüştürmüştür. **Linux** adı verilen bu çekirdek ve sistemi günümüzde pek çok farklı bilgisayar mimarisinde ve tüm GNU/Linux dağıtımlarında kullanılmaktadır. Ayrıca bütün bu çalışmaları sonrası Linus Torvalds, 2012 Milenyum Teknoloji Ödülü'ne layık görülmüştür

Söz konusu bu araştırmayı ilgilendiren kısım ise; Linus 'ün ileri sürdüğü yeni yapı üretim modellerinden biri olarak tanımlanan “Açık Kaynaklı Evler” veya “ Açık Kaynak Kodlu Üretim Modeli”nin i uygulanabilirliği üzerinedir. Geçtiğimiz senelerde insanların tek sabit bir fikri vardı. Ancak günümüzde ilerleyen teknoloji ile ilgili yeni kazanımlar elde edilmiştir. Bunlardan biride Linus'un da üzerinde durduğu üç boyutlu yazıcılarıdır. İşte bu noktada Linus'un bir fikri vardı. Ona göre; 3B yazıcı gibi yeni icatlar “bir şeyin üretimi” için gerekli zamanı ve dolayısıyla maliyeti azaltıyor. Artık kullandığımız cep telefonları California'da tasarlanıp Çin'deki fabrikalarda üretilmeyecekti. Herkes tarafından tasarlanıp evinizdeki fabrikadan yani 3B yazıcıdan bastırılacaktı. Nitekim ki günümüzde bu durumun evrildiğini görüyoruz. Emek yoğunlu konut ve yapı tasarımı yaklaşımı, basmakalıp McMansionlar, daha

yaygın ve düşük maliyetliken, bu yeni modelde, konut tasarımı, fabrikasyon ve teknoloji bir arada kullanılarak,

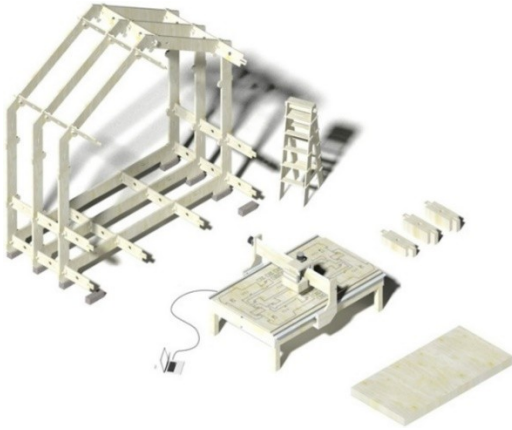
yüksek performanslı, düşük enerjili, masrafsız, esnek ve aynı anda birden fazla yerde uygulanabilecek konutlar inşa edilecektir.

Linus'un Açık kaynaklı mimarisi, evrensel bir altyapı içinde sanal ve gerçek alanların hayal gücü ve oluşumunda yeni prosedürleri savunan, gelişmekte olan bir paradigmadır. Açık kaynak kültürü, modüler tasarım, avant-garde mimari, bilim kurgu, dil teorisi ve nöro-cerrahi gibi çok çeşitli referanslardan yararlanarak, tasarım ve tasarım araçlarının profesyoneller tarafından ortaklaşa kullanımına yönelik mekânsal tasarım açısından kapsayıcı bir yaklaşım benimser ve sıradan vatandaşları kullanıcıları ve üreticileri olarak görür. Yani bir müteahhitte ihtiyaç duymaz. Vatandaş merkezli tasarım şemsiye teriminde daha çok açık kaynaklı mimari kavramını kullanır.

Vatandaş merkezli tasarıma/üretim, Teksas Üniversitesi gibi önde gelen üniversitelerin akademik araştırma birimleri tarafından 1999 yılında çok ciddi bir şekilde öncülük edilmiştir. Earthnomad Vakfı olarak mesleki aplikasyon örgütleri ve ARK tektoniği gibi kuruluşlar, mekâna/yere göre tasarım ve kamu politikasının kesiştiği noktada vatandaş merkezli tasarım hareketi vurgulayan diğer önemli kuruluşlardandır. Daha sonraki yıllarda, hareket, organizasyonlardan ve işbirliklerinden akademik kurumlar tarafından desteklenen topluluk tasarım merkezlerine kadar küresel çapta çeşitli emekleri kapsayacak şekilde büyüdü. Vatandaş(insan) merkezli tasarım hareketinin ve buna bağlı olarak açık kaynak mimarisinin ilkeleri, 1960'lardan beri vatandaş katılımı araştırma ve uygulamaları üzerine biriken bilgi birikimi üzerine inşa edildi.

Yüzyılın başlarında, vatandaş katılımı araştırmaları ve uygulamaları, sosyal ve uygulamalı bilimlerde daha etkili yaklaşımlar ve paradigmlar merceğiyle, Dr. Schaban-Maurer müzakereci tasarım ve fonetik bağlantı kaynağı "Vatandaş Uygulayıcısının Yükselişi", 'Yaşam Deneyimi Anlatı Değişimi' metodolojisinin ilkelerini ve uygulamalarını, içinde kurduğu Mindful Policy Engagement(Akıllı Poliçe Yaklaşımı) alanında ortaya koydu. 2013, 'Mimarlık, Kentsel Tasarım ve Kentsel Planlama Politikası için Vatandaş Katılımında Vatandaş Uygulayıcısının Rollerini: Phronesis Tabanlı Bir Yaklaşım " Çalışma, vatandaş merkezli mimari, kentsel tasarım ve kentsel planlamanın yanı sıra kentsel ve kamu politikasına ilişkin en iyi örnek olay incelemeleri ve en iyi uygulamalardan oluşan bir yapı için titiz bir teorik temel sağlar. Dr. Schaban-Maurer'e göre (LENE) metodolojisi, süreçlerini

Phronetic Engagement ve Mindful Policy ilkeleriyle yeni bir araştırma alanına entegre ederek anlamlı ve etkili tasarım uygulamalarına yol açar.( Mindful Policy Engagement,Schaban-Maurer, 2013: 11)



Şekil 1- Linus'un Açık Kaynak Sistemi Uygulama Aşamaları Ve 3d Yazıcı Ile Yazılmış Yapı Maketi

O zamandan beri, açık kaynak mimarlık pratisyenleri ve akademisyenler, disiplinler arası işbirlikleri, yayınlar, konferanslar ve uluslararası sergiler yoluyla vatandaş merkezli tasarım hareketinin diğer alanlara erişimini ve etkisini artırdı. Son on yılda, açık kaynaklı mimari, bilinçli politika katılım alanı ve vatandaş merkezli tasarım hareketi, en belirginleri 'sosyal etki tasarımı', 'kamu yararına tasarım' ve taraftarları tasarım pratiğini sosyal hizmetle birleştiren 'açık mimari ağı'. Bu erken dönem çabaları, onlarca yıl önce, mimarların, şehir tasarımcılarının, planlamacıların devam eden bağlılıkları yoluyla yeni oluşumlar tarafından ilerletiliyor. Açık kaynak mimarisi, deneyimli profesyoneller kadar amatörlere de dayanır, bireysel "kitlenin dehası" üretici ve izleyici(üretici dışı ) arasındaki ikili ayrımı aşındırır. Sosyal yazılımlar gibi, projenin her aşamasında birden çok kullanıcının temel rolünü kabul eder – ister. Müşteriler ister topluluklar, tasarımcılar veya bina sakinleri olarak; en iyi ihtimalle, sistemleri etkili bir şekilde ölçeklendirmek için güçlü ağ efektlerinden yararlanır. Siyasi farklılıklar gizli otoriterlikten komüniter uzlaşmacılığa kadar çeşitlilik gösterse de, tipik olarak demokratiktir, açık erişim ve katılım ilkelerini kapsar.

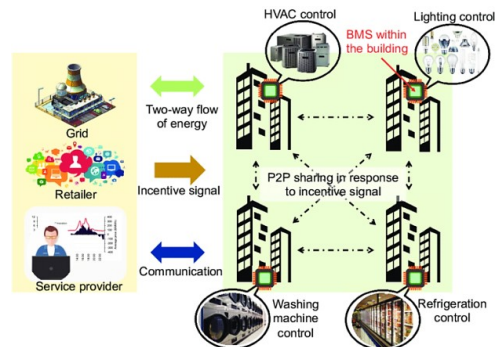
Geleneksel gelişmeler, gelen gelişmelerle ilgili olarak 'topluluğa' danışılan katılım programlarını gerektirir, genellikle odak grupları gibi kör araçlarla, bu genellikle temsil ve girdi eksikliğiyle sonuçlanır veya en kötüsü NIMBYizm ile sonuçlanabilir . Kalabalık tarafından finanse edilen modellerle, sürece dahil edilen katılım biçimleri, alan kullanımının

kullanıcıları tarafından belirlenen şartlara göre optimize edildiği bir tür ortaya çıkan şehirleşmeyi mümkün kılar. İnsanların gücünün bu ıslahı, Hacktivizmin yumuşak, mekansal bir versiyonu olarak görülebilir . Açık kaynaklı mimarinin, açık kaynaklı yazılımın bazı organizasyonel dezavantajlarından mustarip olması muhtemeldir. Projelerin çatallanması(ayrışması), terk

edilmiş projeler, ikiliklerin ortaya çıkması ve binaların kurulu temeliyle uyumsuzluk gibi Organize edilmiş korku, belirsizlik ve şüpheli kampanyaları olasıdır.

Açık kaynak mimarisinin önemli bir yönü, açık işbirliği standartlarının ortaya çıkmasıdır. Ortak, açık, modüler standartların oluşturulması ,OpenStructures projesi tarafından önerilen ızgara gibi, donanım uyumluluğu sorununu ve bileşenler arasındaki arabirimi ele alarak, herkesin herkes için tasarladığı ağlar arasında işbirliğine dayalı çabalara izin verir. Standartlar aynı zamanda parasal olmayan değişim (bilgi, parçalar, bileşenler, fikirler) ve uzaktan işbirliği ağlarının büyümesini teşvik eder.

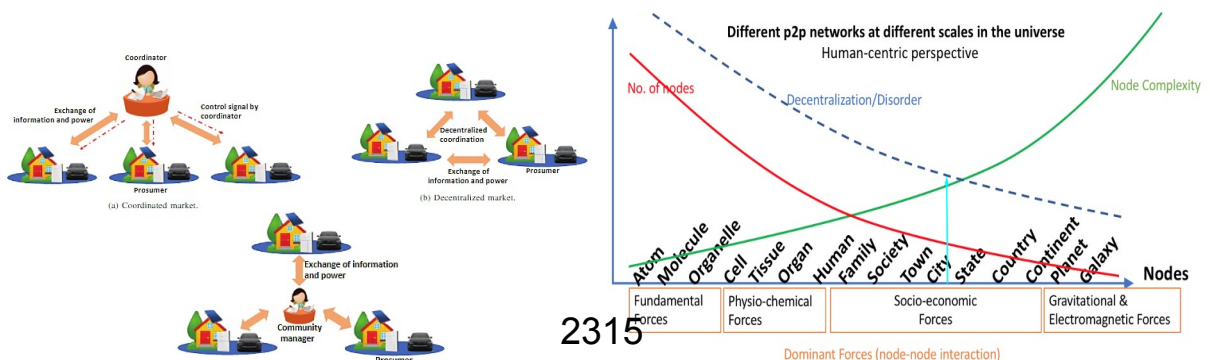
Algoritmalar, ilgili ancak farklılaştırılmış tasarım nesnelere türlerinin oluşturulmasını sağladığından, toplu özelleştirme standardizasyonun yerini alır. Grasshopper 3D, Generative Components, Revit ve Digital Project gibi parametrik tasarım araçları, yeni kullanıcı gruplarının sanal tasarımlarla etkileşime girmesine, gezinmesine ve değiştirmesine ve benzeri görülmemiş düşük maliyetle seçenek dizilerini test etmesine ve deneyimlemesine olanak tanıyor; sadece tüketiciler. Açık kaynak kodlar ve komut dosyaları, tasarım topluluklarının bilgileri paylaşmasına ve karşılaştırmasına ve modüler bileşenler aracılığıyla üretimi toplu olarak optimize etmesine olanak tanıyarak paylaşılan bilginin tarihsel birikimini hızlandırır. BIM(Bina Bilgi Modellemesi) ve ilgili işbirliği araçları ve uygulamaları, tasarım bilgilerinin disiplinler arası bir arada bulunmasını ve bir dizi platform ve zaman ölçeğinin entegrasyonunu sağlar. Hızlı prototipleme ve diğer 3B baskı teknolojileri, mimari ölçekte bile hem temsili hem de işlevsel fiziksel eserlerin daha geniş bir kitleye anında üretilmesini sağlar.



Bununla birlikte, gelecekteki sakinlerin ve kullanıcıların bunlara erişmesinin imkansızlığı nedeniyle, şu anda popüler olan tasarım yazılımının kullanımına yönelik ciddi eleştiriler var. P2P Şehircilik, geleneksel olarak türetilmiş tasarım bilgilerini toplayan ve bunu açık kaynaklı bir web platformunda kullanıma sunan düşük teknoloji tasarımlarını destekler. Bu

odak, bunun yerine geleneksel yerel malzemeleri ve yerel mimaride inşa tekniklerini teşvik eder ve son derece pahalı parametrik tasarıma odaklanan sanal tasarım gruplarından tamamen farklıdır. P2P Şehircilik savunucuları, sürdürülemez ürünlerle bağlantı, güçlü ticari çıkarlar ve yalnızca birkaç katılımcının toplam kontrolü nedeniyle "moda" olarak gördükleri tasarım yaklaşımlarına felsefi olarak karşı çıkıyorlar - ki bu, tasarımı tüm nüfusa açmanın tam tersidir. Onların görüşüne göre, açık kaynak tasarımının amacı, kullanıcıların kendi konutlarını tasarlamasını ve inşa etmesini kolaylaştırmak olmalı, mevcut yıldız mimarları içeren bir tasarım elitini teşvik etmeye devam etmek değil. (Tushar/Yuen/Saha ,2020)

Gelişen açık kaynaklı donanım hareketi, yazılım, donanım ve mekanizmaları sıkı bir şekilde bütünleştiren kinetik veya akıllı ortamların tasarlanmasında yer alan donanımın paylaşılmasına ve bu donanım üzerinde işbirliğine olanak tanır. Sensör verileriyle bilgilendirilen bu çeşitli araçlar sayesinde tasarım, geleneksel tasarımın tek seferlik, ayrık ateşle ve unut yönteminin aksine devam eden, evrimsel bir süreç haline gelir. Bu, tasarımın her zaman bitmeyen bir süreç olduğu ve aynı zamanda kullanıcılar ve tasarımcılar arasında bir işbirliği olduğu gerçeğinin bir kabulüdür. Tasarım, inşaat ve kullanım aşamaları için işletim sistemleri, zengin bir 'uygulamalar' ekosistemini harekete geçiren açık platformlar olarak yaratılır. Linux olmak için çeşitli uygulamalar itişip kakıyor mimari yazılımlar, planların ve kesitlerin tesliminden ziyade farklı ölçeklerde 'platform oyunları' yapmak. Yerleşik algılamaya ve bilgi işlem, Bruce Sterling 'in bir Spimes dünyası vizyonuna daha da yaklaşarak, daha büyük " Nesnelerin İnterneti " içindeki tüm materyalleri giderek daha fazla birbirine bağlamaktadır. Malzemeler, imalat ve yapım sırasında konumlarını ve durumlarını iletir, konumlandırmaya, sabitlemeye ve doğrulamaya yardımcı olur ve kullanım ömrü boyunca dağıtılmış veri tabanlarıyla iletişim kurmaya devam eder.



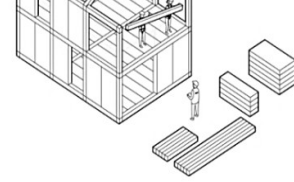
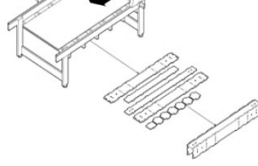
**Şekil 3-** P2P/Peer to Peer (Eşler arası) Bağlantı Sisteminin Karmaşık Düğüm Çözme Grafiği ve Prosumer Bağlamı(hem tüketici hem üretici)(Tushar/Yuen/Saha ,2020)

P2P/Peer to Peer (Eşler arası) bağlantı sistemi esasında söz konusu makalenin yoğunlaştığı noktadır. Bu sistemin mantıklı bir şekilde anlaşılması Linus'un aklındaki sistemi anlamamızı sağlayacaktır. Çünkü temel olarak Açık Kaynak Mimarisinin temelinde yatan odak noktasıdır. Daha çok yazılım dilinde kullanılan bir terimdir. Eşler arası paylaşım demek aslında bir veriyi/bilgiyi/üretimi birden fazla eşle paylaştırarak çözmektir.

### **6.AÇIK KAYNAK KODLU TASARIM VE UYGULAMA/WIKIHOUSE UYGULAMASI**

WikiHouse, evleri tasarlamak ve inşa etmek için açık kaynaklı bir projedir. Tıpkı Linus'un öne sürdüğü gibi işleyen sistem herkese açık bir haldedir. Telif haklarını içermez ve özgürce kullanılabilir. Sürdürülebilir bir sistem olan Wikihouse, sunduğu kaynaklar ışığında konutların inşasını demokratikleştirmeye ve basitleştirmeye çalışır. Proje, 2011 yazında Alastair Parvin ve Londra merkezli bir strateji ve tasarım uygulaması olan Nick Ierodionou tarafından Tav of Espians, James ile işbirliği içinde başlatıldı. Arthur şimdi 0(zero/sıfır) ve Momentum Engineering'den Steve Fisher ile beraber yürütmektedir. Wikihouse projesine Gwangju Tasarım Bienali içinde Gwangju , Güney Kore gibi ülke ve birimler çeşitli katkılar oluşturdu .Projeye o zamandan beri dünya çapında bir katkıda bulunanlar topluluğu haline geldi.

WikiHouse yapılarının inşası özel bir parça gerektirmez çünkü kesilen ahşap parçalar, klasik Kore mimarisinden esinlenerek kama ve dübel bağlantıları ile birbirine geçer. WikiHouse' un çerçevesi, inşaat konusunda resmi eğitim almamış kişiler tarafından bir günden kısa bir sürede kurulabilir. Çerçeve daha sonra kaplamayla bitirilmelidir, Yalıtım, kablo ve tesisat bu yaşadığı önce. WikiHouse projesi Open Systems Lab.(Açık Sistem Laboratuvarı) tarafından sürdürülmektedir. WikiHouse'a medyanın tepkisi, büyük ölçüde projenin deneysel doğasına, IKEA mobilyaları ile karşılaştırmalara ve CNC yönlendiricilerini bulmanın ve kullanmanın olası maliyetlerine odaklanmıştır. Amerikalı bilim kurgu yazarı Bruce Sterling de WikiHouse tasarımının bir incelemesini yaptı ve bunu olumlu bir şekilde "şahsen büyük olasılıkla inşa edip oturabilirim" olarak tanımlamıştır.



1 Digital design

2 Local fabrication

3 Rapid assembly

## 7. AÇIK KAYNAK KODLU MİMARİNİN UYGULANABİLİRLİĞİ

Uygulanabilirlik arařtırmaları; ekonomik, teknik, finansal, yasal ve örgütsel arařtırmalar olarak beře ayrılabilir. (Batuk,2018)Söz konusu çalışmada, teknik yönden ‘‘Linus Torvalds‘ın Açık Kaynaklı Evlerinin Anadolu‘daki Uygulanabilirliđi’’ deđerlendirilecektir. Teknik arařtırmalar; üretim süreci ařamalarının tanımlanması, üretimde kullanılacak teknolojinin belirlenmesi, fabrika(üretim modeli) tasarımı ve iç yerleşimi, bakım-onarım olanakları gibi konuları kapsar. Bu dođrultuda çalışmada kullanılacak yöntemde, işletme ve yapı kuruluşlarında teknik arařtırma deđerleme ařamalarıyla deđerlendirilecektir.

### AÇIK KAYNAK KODLU MİMARİNİN UYGULANABİLİRLİĞİ DEĐERLENDİRME METODOLOJİSİ



Şekil 5- Çalışma Metodolojisi /Yapıların(ve İşletmelerin) Kuruluşunda Teknik Arařtırma Deđerleme Ařamaları(Batuk,2018)

### 7.1. Açık Kaynak Evlerinde Kuruluş Yerinin İnşaatı Uygunluđunun Deđerlendirilmesi

Açık kaynak evleri kuruluş ařamasında özel bir alan veya bölge içermez.(A. Parvin 2011) Yapılar kurulmak istenildiđi ortama uygun iklimsel(kimyasal) ve fiziksel şartlara dirençli olarak tasarlanıp üretilir. Bu alan sulak bir alanda olabilir veya karlı bir bölgede olabilir. Sistem tüm bu dirençleri içeren 3.parti bulut sistemlerine uygun olarak dizayn edilmiştir. Açık kaynak mimarisinde temel işleyiş mantıđı P2P sistem üzerinden kurulduđundan, aslında sistem bütün kullanıcılar üretici konumuna da getirmektedir. Bu sistem sayesinde istenilen yapı elemanı siparişi verilip sistem üzerindeki bir kullanıcıya üretilebilir. Özelleştirilebilir üretim sistemi sayesinde, çeşitli şartlara ve sıcaklıklara dayanıklı materyaller yardımıyla



yeryüzünde bir çok yerde uygulanabilir. Dolayısıyla uygulanmak istenildiği ortam şartlarına uygun materyalin kullanımı ile Anadolu'da ,coğrafi ve iklimsel durumu ne olursa olsun uygulanabilir olduğu ortadadır. Bu sistemin kurulumu için tek şart CNC(Computer Numerical Control) Makineleri ve materyalleri , veya 3d yazıcıya yakınlık olarak belirlenebilir. Söz konusu bu şartın durumu, değişken olarak "zaman" ibaresini etkiler.



**Şekil 6-** Farklı Bölgelerde Uygulanmış Açık Kaynak Evleri,(Arcdaily,2019)

Açık kaynak sistemi ile kuruluş yeri fark etmeksizin istenilen üretim elde edilebilir. Halihazırda gelişmekte olan "Açık Kaynak Tasarım" artan nüfusa bağlı olarak hızlı talep karşılanması açısından da günümüzde de yaygınlaşmasını hızlandırmaktadır. İzlenebilir yapı kavramı ile beraber daha kompakt bir yaşam sunan ve Le Corbusier'in dediği "yaşam makineleri" ana fikri ile örtüşen sistemde her arazi şartlarına elverişlidir. Dilenirse taşınabilen kompakt modüler yapı sistemleri halinde üretimi esas alır. Bu doğrultuda modüler parçalardan, parçadan bütüne gidilmek suretiyle, bir araya gelir. Arazi şartlarının değişmesi durumunda araziden kaldırılabilir şekilde de tasarlanabilir.

Açık kaynak mimarisi mobilite esas alır. Özellikle küçük yapılarda bu kompaktlık çok önemli bir boyuta ulaşır. Ayrıca kompaktlıkla beraber teknolojiyi de destekleyen modülerliğe de sahiptir. Bu sistemle herhangi bir yerde akıllı çiftlikler, evler, sanayi veya ticari birimler

uygulama ağı doğrultusunda oluşturula bilinir. Arazi şartları ne olursa olsun bu sistemle yapılan yapılar çevresel şartlara uygun tasarlanabilir.



Şekil 7- Açık Kaynak Sistemleri İle İnşa Edilebilen, Yüksek Verimliğe Sahip Önemli Fonksiyona Sahip Bazı Yapılar

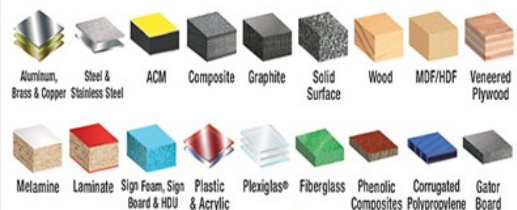
## 7.2. Açık Kaynak Evlerinde Ürün Niteliklerinin Analizi

Açık kaynak mimari uygulamasında çeşitli materyaller kullanılabilir. Genellikle bu üretim modelinde CNC makineleri tarafından kesilebilen materyaller (MDF, Alüminyum, Metal, Akrilik, Alçıpan vb.) ile 3D yazıcıları tarafından üretilen materyaller benimsenir. Ayrıca CNC kesim yöntemiyle üretilmiş ara ve detay yapı malzemeleri de üretilmektedir. (A. Parvin 2011) Bu materyallerin tümü Anadolu'da temin edilebilir. Bu sistemde uygulanan yapı malzemelerin tamamı geri dönüştürülebilir.

Açık kaynak mimari uygulamasında kulağa karmaşık gelse de, temel fikir çok basit: Ya diğer birçok ürünü yapmak için kullandığımız aynı türden fabrika üretim yöntemlerini kullanarak binalar yapacak olsaydık? Bariz bir örnek vermek gerekirse, araba yapma şeklimize bakabiliriz. Ürünün bu şekilde modüler bileşenlere bölünmesi, işin aşamalı olarak yapılmasına, daha karmaşık, standartlaştırılmış, hassas işlerin, ürünün kalite açısından kontrol edilebildiği fabrika koşullarında önceden makine ve montaj ekipleri tarafından yapılmasına olanak tanır. Parçalar daha sonra hızla birleştirilebilir. Diğer, daha basit bir örnek IKEA düz paket mobilya olacaktır. Bu, olağanüstü beceri gerektiren geleneksel mobilya yapımının aksine, son montaj o kadar basit ki, belirli bir beceri veya bilgi olmadan bile hemen hemen herkes tarafından yapılabilir.

	Technical Part	Aesthetic Part	Applications	Engraving
Aluminum	Yes	No	Lightweight gears and technical parts	No
Stainless Steel	Yes	No	Long-lasting technical parts (i.e.: high strain, outdoor use)	No
Steel	Yes	No	Structural parts	No
POM	Yes	No	Lightweight gears and technical parts	No
Acrylic	No	Yes	Decorative objects (i.e.: company logos...)	Yes
MDF	Yes	Yes	Structure for furniture and decorative objects	Yes
Plywood	No	Yes	Decorative objects (i.e.: engraved supports)	Yes
Cardboard	No	Yes	Unexpensive decorative objects (i.e.: cards, signs...)	Yes

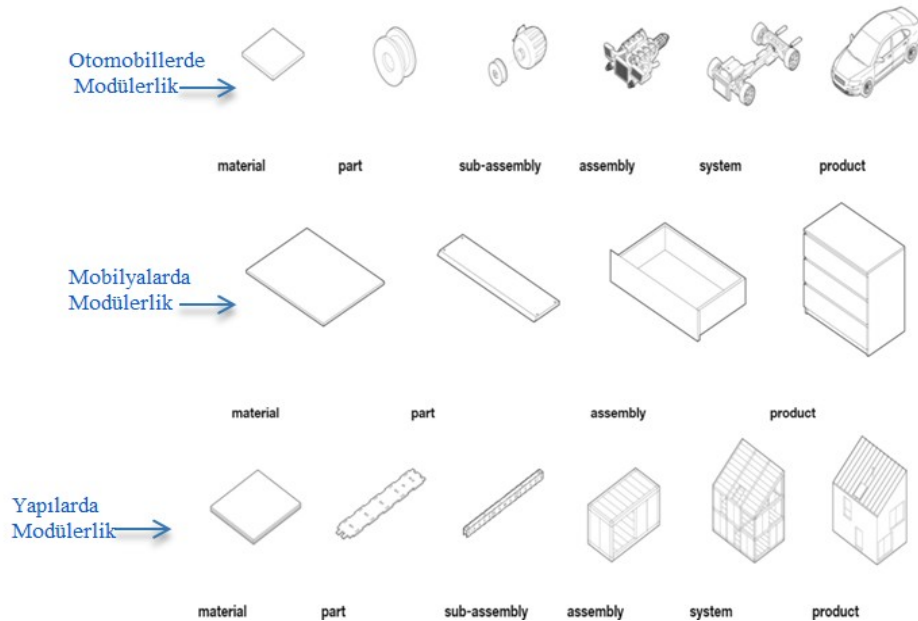
Designed for the following materials:



Şekil 8- CNC ve 3D Yazıcılar Tarafından İşlenebilen Bazı Yapı Materyalleri

Ürünün bu şekilde modüler bileşenlere bölünmesi, işin aşamalı olarak yapılmasına, daha karmaşık, standartlaştırılmış, hassas işlerin, ürünün kalite açısından kontrol edilebildiği fabrika koşullarında önceden makine ve montaj ekipleri tarafından yapılmasına olanak tanır. Parçalar daha sonra hızla birleştirilebilir. Diğer, daha basit bir örnek IKEA düz paket mobilya olacaktır. Bu, olağanüstü beceri gerektiren geleneksel mobilya yapımının aksine, son montaj o kadar basit ki, belirli bir beceri veya bilgi olmadan bile hemen hemen herkes tarafından yapılabilir. Elbette, arabalardan veya bir dizi çekmecedan farklı olarak, binalar "herkese uyan tek beden" ürünler değildir. Farklı evlerin farklı sitelere ve farklı kişilere yanıt vermesi gerekir. Bununla birlikte, standartlaştırılmış, LEGO benzeri sistemler geliştirerek, bir binanın tüm bileşenlerini "ürünleştirmek" ve genelleştirmek mümkün hale gelirken, yine de her bir binanın bu bileşenlerin benzersiz bir montajı olmasına izin verilir.

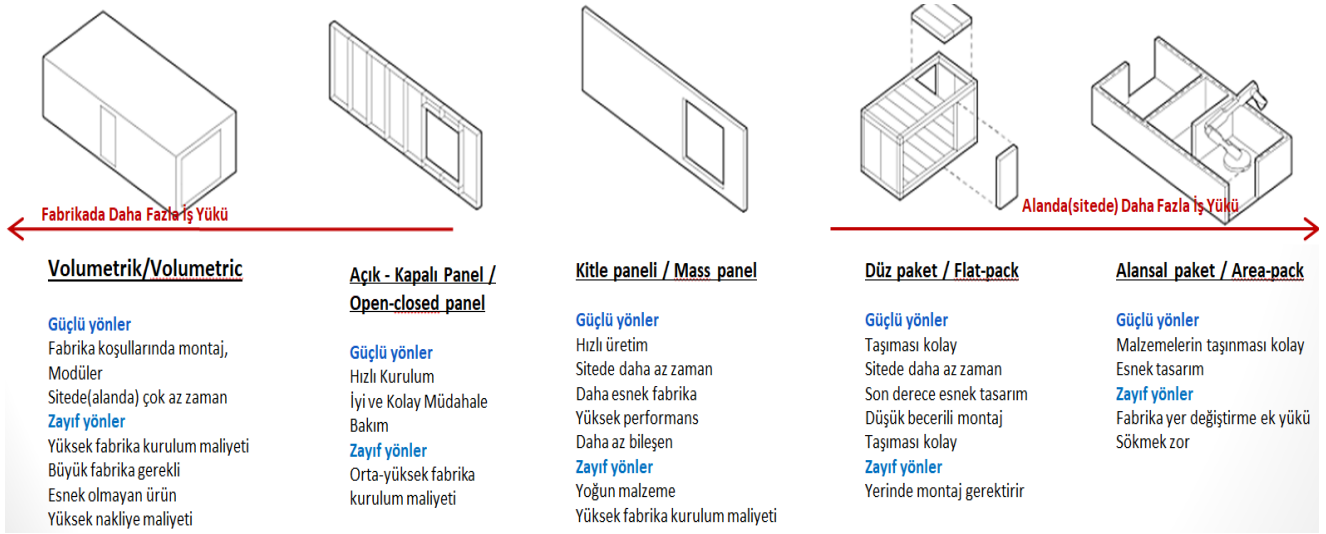
Genel olarak değerlendirilirse, bu bileşenler ve sistemler birbirinden ne kadar bağımsız olursa, o kadar kolaylaşır. Bu sadece evi yaparken değil, yıllar sonra, binayı ömrü boyunca korumaya gelince de geçerlidir. Binalar, çoğu üründen daha uzun ömürlü olma eğilimindedir ve içlerindeki farklı sistemler, farklı hızlarda değişme veya değiştirilmeye ihtiyaç duyma eğilimindedir. Frank Duffy ve Stewart Brand, binaları farklı sistemlere veya katmanlara böldüler. Linus durumu yapılar için farklılaştırmıştır. Yeni kurduğu sistemin önemli bir yönü, bu katmanları, birbirinden mümkün olduğunca bağımsız bir ev içinde ayrı, birlikte çalışabilir sistemler olarak ele almaktır. Geleneksel olarak, mimarlar binalarını akılda tutarak tasarlama eğilimindedirler, ancak tasarımlarını nasıl inşa edeceklerini başkalarına bırakırlar. Linus'un bu fikri, özellikle üretim süreci olmak üzere ürünün yaşamının tüm aşamalarını optimize etmek için yenilik ve tasarım düşüncesini uygulamaktır.



**Şekil 9- Farklı Alanlarda Modülerlik**

Bununla birlikte, açık kaynak mimarisinin en önemli yönü "Tasarım " bölümüdür. Geleneksel olarak, mimarlar binalarını akılda tutarak tasarlama eğilimindedirler, ancak tasarımlarını nasıl inşa edeceklerini başkalarına bırakırlar. Açık kaynak mimarisinin fikri, özellikle üretim süreci olmak üzere ürünün yaşamının tüm aşamalarını optimize etmek için yenilik ve tasarım düşüncesini uygulamaktır. Yani üretim için tasarım regülasyonu ana dayanak noktasında yer alır. Tasarım üretim sırasında maliyeti, zamanı ve malzeme tüketimini en aza indirecektir. Bu aynı zamanda fabrika kurulum maliyetini, verimlilik ve hassasiyete göre optimize etmeyi ve fabrika zemin süreçlerini veya nakliyeyi basitleştirmeyi de içermektedir. Sistem montaj sırasında zaman, maliyet, beceri ve karmaşıklık eşiklerini düşürmek için tasarlanmıştır. Bu, bileşenlerin mümkün olduğu kadar "tak ve çalıştır" yapmasının yanı sıra, tam zamanında teslimat, saha ekipmanının maliyeti ve farklı ekiplerin birbirinden bağımsız olarak çalışmasına izin verme gibi diğer faktörleri de içerir. Ayrıca, sağlık ve güvenlik tehlikelerini olabildiğince tasarlama çalışmaya da içerir.

Açık kaynak uygulamasında binanın ömrü boyunca bileşenlerin bakımı, onarımı ve değiştirilmesinin maliyetini ve zorluğunu azaltacak tasarım eksenine uygulama, hizmetlere kolay erişim sağlar. Binayı mümkün olduğunca basit ve güvenli bir şekilde sökülüp takıla bilinir, böylece mümkün olduğunca çok sayıda bileşen yeniden kullanılabilir .Elbette, "optimizasyon" hedefinin arkasında "ne için optimize etme" sorusu yatıyor. Tasarımlar, malzeme maliyeti, işçilik maliyeti, hız, enerji performansı, ağırlık, yerleşik karbon, beceri eşikleri, uyum engelleri, sağlık, refah, yerel işler, kültürel benimseme vb. Gibi sonsuz sayıda olası faktör için optimize edilebilir. Mükemmel veya "doğru" bir çözüm yoktur, her zaman bir sonucu diğeriyle değiş tokuş etmeniz gerekir. Farklı durumlar ve farklı öncelikler, farklı çözümler gerektirmektedir. Günümüzde kullanımda olan bir dizi yaygın yöntemi vardır ve daha pek çoğu geliştirilmekte veya henüz keşfedilmemiştir. Geniş bir spektrumla eşleştirilebilirler:



Şekil 10- Yapı Tasarım Ve Uygulama Yönteminde Alan Ve Fabrikasyon Kullanımı Analizi(Wikihouse,2019)

### 7.3.Açık Kaynak Evlerinde Üretim Planı, Gerekli Makine ve Teçhizat Türü

Geçen yüzyılda ev inşa etme şeklimizin çok az değiştiği bir sır değildir. Sadece fiziksel yapı yöntemleri (tuğla, beton, marangozluk vb.) açısından değil, aynı zamanda arkasındaki tasarım ve tedarik zincirleri ve dolayısıyla bu tedarik zincirlerinin arkasındaki iş modelleri açısından da bu durum geçerlidir. Ayrıca 21. yüzyılın sistemik zorlukları karşısında - iklim değişikliği, kaynakların tükenmesi, değişen işgücü piyasaları, artan nüfus, yaşlanan toplumlar, artan sağlık maliyetleri ve arazi piyasası başarısızlığı gibi - bu inşa yöntemlerinin artık amaca uygun olmadığı kabul edilmektedir.

Açık kaynak mimari uygulamasında CNC makineleri tarafından kesilebilen materyaller(MDF, Alüminyum, Metal, Akriik, Alçıpan vb.) ile 3D yazıcıları tarafından üretilen materyaller benimsenir. (A. Parvin 2011) Bu materyallerin tümü Anadolu'da temin edilebilir. Ayrıca CNC kesim yöntemiyle üretilmiş ara ve detay yapı malzemeleri de üretilmektedir.2021 yılıyla beraber ülkemizde CNC kesim makineleri neredeyse her şehirde mevcuttur. Açık kaynak mimari uygulamasında kullanılan uygun modeller mevcuttur. Kullanılan materyaller de temin edilebilinirdir.

Açık kaynak mimari tasarımda P2P sistemi benimsenir. Her kullanıcı herhangi bir yapının herhangi bir bileşenini üretebilir. Prosumer Bağlamı(hem tüketici hem üretici) olarak adlandırılan bu sistemdeki bileşen tasarımları sadece konunun uzmanına açıktır. Aynı zamanda yerel ekonomileri destekleyen bu sistemde dileyen kurumsallaşabilir. Ancak

projelendirme sistemindeki projeler ,ulusal yönetimler tarafın yetki verilmiş kişiler(mimar,mühendis) tarafından üretilmektedir. Sistem yeni projelendirme ve siparişleri alınarak veya mevcutta açık paylaşım bulutuna dahil edilmiş projeler kullanılır. Sistem tarafından kullanılan ulus yönetimler Yapıya ait proje dilenirse sistemdeki diğer kullanıcılar ile paylaşıla bilinir.

Açık kaynak evlerinde üretim planlanmasında dijital tasarım faydaları sonuna kadar kullanılabilir. Aslında bu alan Parametrik Dijital tasarım için önemli bir platform olacaktır, ancak bunlar resmin yalnızca bir parçasıdır. Gelecekte tasarım, aşağıdakiler dahil olmak üzere tüm geliştirme ve yaşam döngüsü boyunca binayı destekleyecek bir dizi dijital teknolojiye ve hizmete sorunsuz bir şekilde bağlanmalıdır:

- **Dijital ikizler**

Her binanın ayrıntılı 3B dijital modelleri ve veri kümeleri olarak tanımlanır. Bunlar gelecekteki işletim, bakım ve modifikasyon için referans noktaları olarak kullanılır. Bunların bina sahibine ait olması gerekecektir. Özellikle 3D çalışmalar bulutlarda saklanmalıdır ki gelecekte ekleme çıkarma veya dönüşümde kesin bir şekilde kullanılabilsin. Günümüzde geleneksel metotlar ile yapılan yapılar bu mümkün değildir. Çünkü yapılar yerinde bire bir tatbik edilmeye biliniyor. Ayrıca bir yeri değiştirmek için yıkım işlemi gerekmektedir.

- **Sensörler**

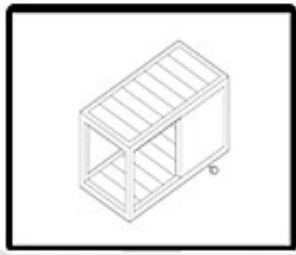
Kullanımdaki verileri toplayan ve sahibini (veya bu tür verilerin mahremiyetlerini tehlikeye atabileceği durumlarda kullanıma) performans verilerini tasarımcılara ve ürün şirketlerine geri paylaşmaya davet eden herşey olarak tanımlanabilir.

- **"Akıllı ev" işletim sistemleri**

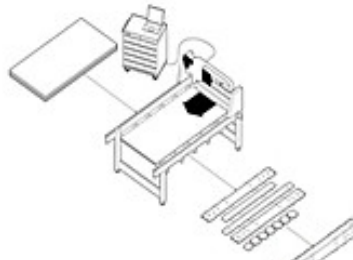
Bu, evin sakinlerinin evi izlemesine ve kontrol etmesine izin verir.

- **Akıllı sözleşmeler**

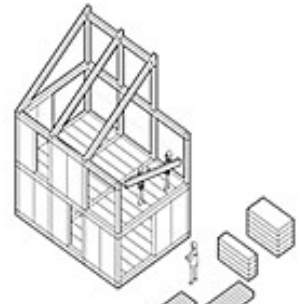
Yeni finans, arazi kullanım hakkı ve performansa dayalı (veya "önleyici") yatırım türleri.



1.Proje seçimi veya yeni proje üretimi



2.Yapı Malz. Üretim



3.Kurulum/Montaj

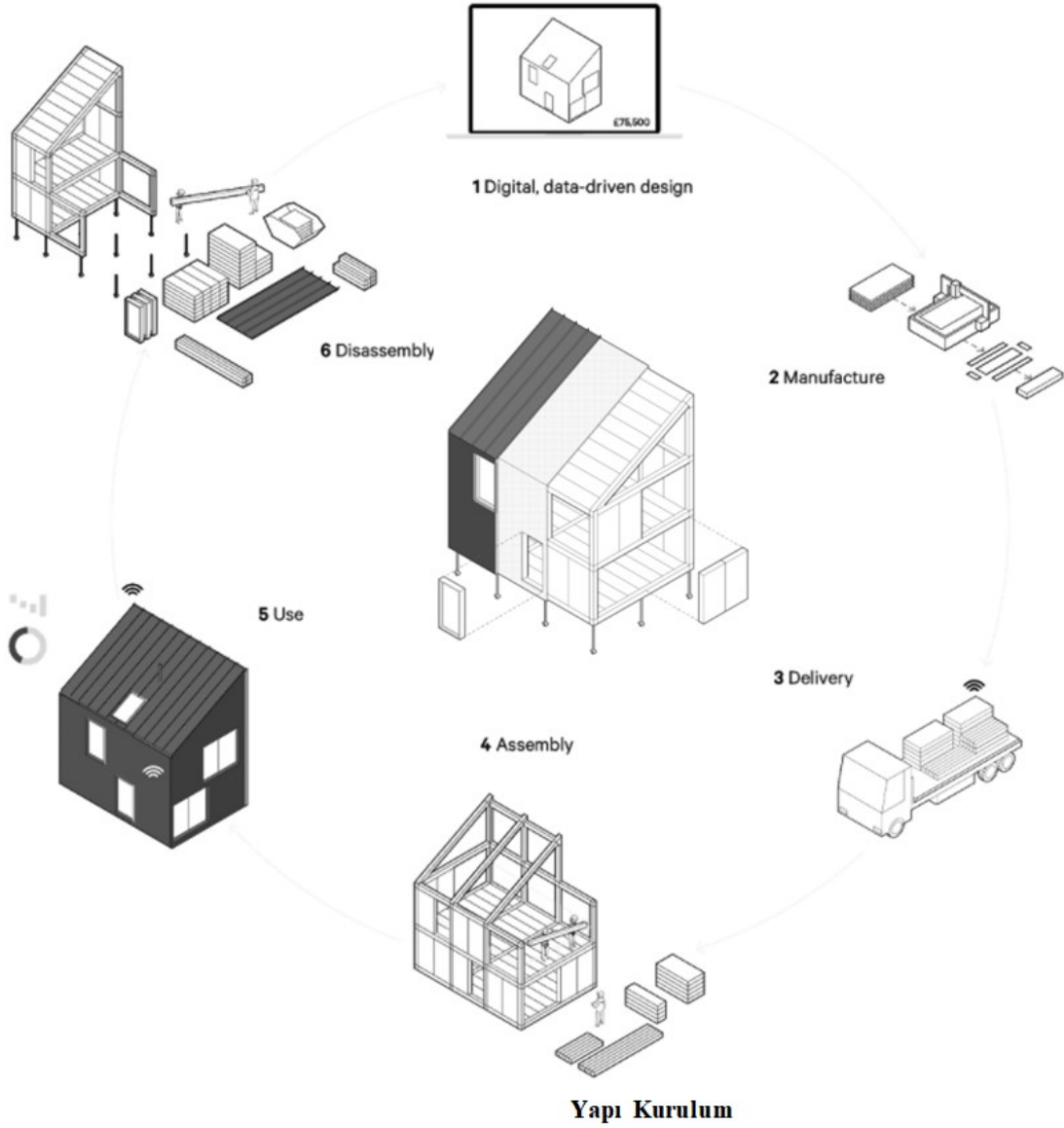


Açık Kaynak Mimarisi Model Alternatifleri Tasarımı





**CNC Kesim Ve Yapı Bileşeni Üretimi/Montajı**



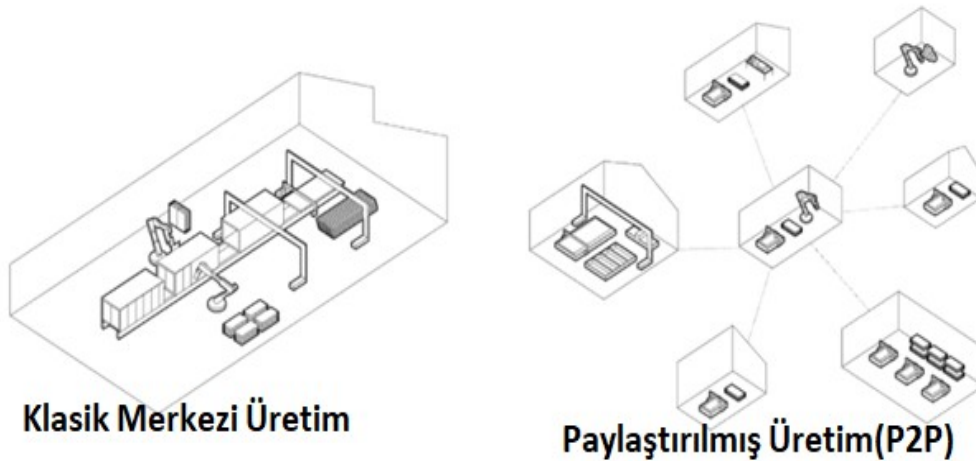
**Şekil 12- Açık Kaynak Mimarisi Yapı Üretim Şeması (WikiHouse,2019)**

#### **7.4. Açık Kaynak Evlerinde Üretimde Çalışan Sayısı ve Niteliği**

Bu modelde, çeşitli yapılarda çıkan kurulum maliyetleri ve yüksek günlük işletme maliyetleri olan büyük, merkezi fabrikalar yerine, küçük ölçekli, yerel' mikro fabrikalar ', uçan fabrikalar 've ondan oluşan dağıtılmış ağlarda üretimi lisanslamak mümkün hale gelmektedir. Bunlar genellikle esnek fabrikalardır (birden fazla türde ürün üretebilmeleri açısından). Bu kadar küçük, esnek fabrikalar büyük olanlara göre kesinlikle daha az verimli olsalar da, daha esnek olmaları, küçük işletmeler için daha ticari olarak erişilebilir olmaları bakımından daha etkili olabilirler, nakliye masraflarından tasarruf edebilirler ve hatta müşterilerin maliyetleri düşürmelerine izin verebilirler. Kendi bünyesinde imal etmek için kendi mikro fabrikalarını

kurarak. Ayrıca, evlerin yakınında imalat işleri yaratmaları bakımından 'yerel ekonomik çarpan' etkisine sahip olabilirler, böylece her pound / euro / dolar/ tl vb.gibi yerel ekonomi içinde geri dönüştürülür.

Görüldüğü üzere sistemde iş gücü olarak 4 alan mevcuttur. Birincisi tasarım ve projelendirme aşamasıdır. İkincisini, alanda fabrikasyon süresince gerekli ekipmanların üretiminde çalışan iş gücü olarak tanımlayabiliriz. Üçüncü olarak üretilen parçaların nakliyesi işlemi sırasında iş gücü ve son olarak üretilen ve inşaat alanına getirilen yapı elemanların montaj/kurumu sırasında ki iş gücüdür. Klasik inşaat yöntemlerine göre çok daha az iş gücü gerektirdiği ortadadır. Mevcut birçok inşaat firması, eski inşaat yöntemlerinin mirası olan zihniyetini, alışkanlıklarını ve kültürünü sarsmakta zorlanacaktır. Tedarikleri, sağlık + güvenlik konusunda yetkin, ancak hızlı bir montaj ve / veya açık işbirliği zihniyetiyle gelen ve aynı sonuçlarla motive olan diğer sektörlerden firmalarla (teçhizat veya etkinlik kurucuları gibi) planlayan sistem ismi gibi açık uçlu geliştirilebilir bir sistemdir.



Şekil 13- Klasik ve Paylaştırılmış P2P Fabrikasyon(Wikihouse,2019)





IKEA ve Skanska, Hacimsel Yöntem,(BoKlok İsveç)



L&G Homes Çapraz Lamine Ahşap + Volumetric, İngiltere



Urban Splash / SIG Tarafından Ev Volumetric, İngiltere

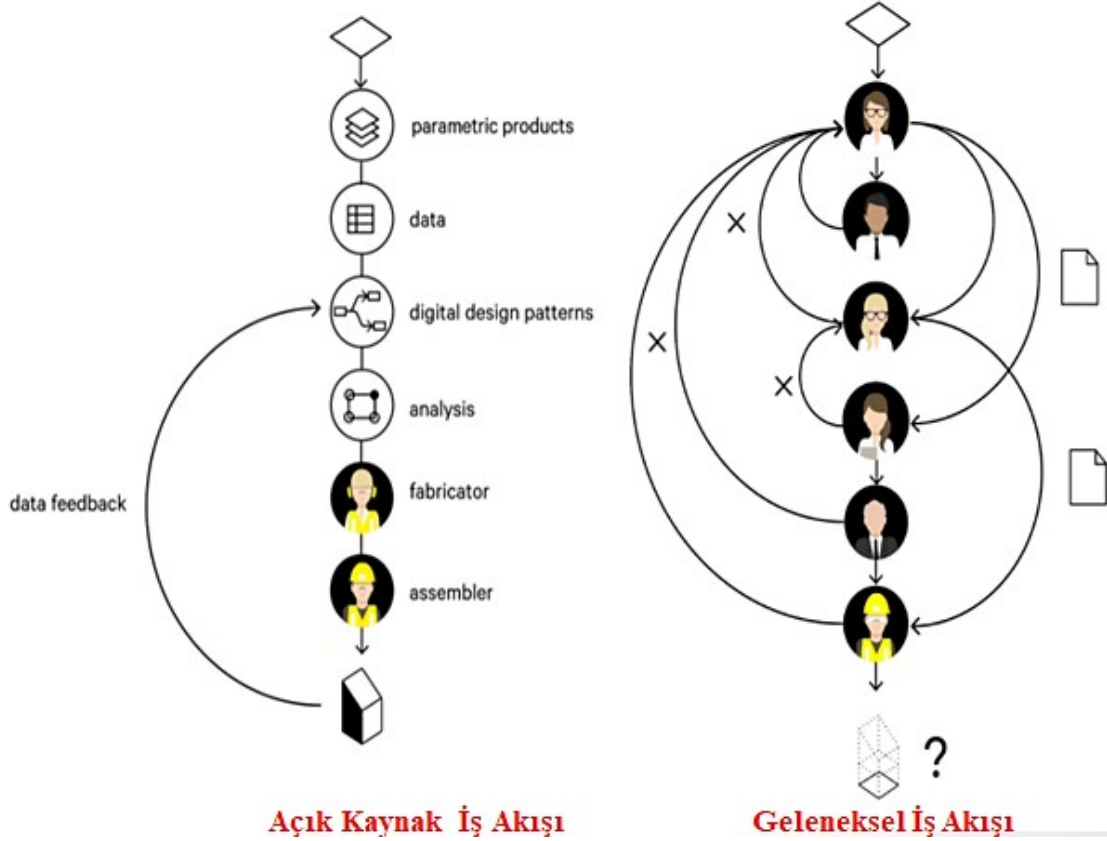


Çapraz Lamine Ahşap (Birden Fazla Üretici)

**Şekil 14-** Paylaştırılmış Fabrikasyon(Wikihouse,2019)

Açık kaynak mimari uygulamasında ,fiziksel olarak yüksek performanslı evler inşa etmeyi önemli ölçüde kolaylaştırır ve hızlandırır. Ancak bu, hikayenin sadece bir kısmı olarak görülmez. Genel giderlerin, gecikmelerin ve belirsizliğin çoğu, daha geniş tasarım sürecinden ve proje yönetimi işinden kaynaklanmaktadır. Bu, her projenin, her projeyi sıfırdan tasarlaması ve teslim etmesi, çizimler yapması, maliyetleri tahmin etmesi ve düzenlemelere uygunluğunu kontrol etmesi gereken bir dizi danışmana bağlı olduğu anlamına gelir. Aslında bundan daha kötüsü, çünkü müşterinin tasarımda her değişiklik yapması gerektiğinde, danışmanların projeyi yeniden çizmesi, yeniden kontrol etmesi ve yeniden maliyetlendirmesi gerekiyor. Böylece her proje, duruma göre sıfırdan tasarlanır. Aslında, her proje e-postalarda, toplantılarda ve telefon görüşmelerinde birkaç kez tasarlanır. Mühendislik veya maliyet bilgisi olmadan bir tasarım üretmek yerine, her proje özelleştirilebilir bir ürün haline getirilmiş Ar-Ge bilgisiyle başlar. Bu, bir tasarımın bu parametreler dahilinde üretilmesine ve tüm değişkenlerin aynı anda hesaplanmasına olanak tanır ve tasarımcı

kararlarının maliyet ve performans üzerindeki etkisini anında görebilir. Amaç, şeffaflığı ve üretkenliği önemli ölçüde artırmak ve ev üretmenin marjinal maliyetini düşürmektir.



Şekil 15- İş Akış Şeması(Wikihouse,2018)

Açık kaynak mimari uygulamasında, fiziksel olarak yüksek performanslı yapılar inşa etmeyi önemli ölçüde kolaylaştırır ve hızlandırır. Ancak bu, hikâyenin sadece çok küçük bir kısmı olarak görülmez. Genel maliyetin, gecikmelerin, stresin ve belirsizliğin çoğu, daha geniş tasarım sürecinden ve proje yönetimi işinden kaynaklanmaktadır. Bu, her projenin, her projeyi sıfırdan tasarlaması ve teslim etmesi, çizimler yapması, maliyetleri tahmin etmesi ve düzenlemelere uygunluğunu kontrol etmesi gereken bir dizi danışmana bağlı olduğu anlamına gelir. Aslında bundan daha kötüsü, çünkü müşterinin tasarımda her değişiklik yapması gerektiğinde, danışmanların projeyi yeniden çizmesi, yeniden kontrol etmesi ve yeniden maliyetlendirmesi gerekiyor. Böylece her proje, duruma göre sıfırdan tasarlanır. Aslında, her proje e-postalarda, toplantılarda ve telefon görüşmelerinde birkaç kez tasarlanır. Mühendislik veya maliyet bilgisi olmadan bir tasarım üretmek yerine, her proje özelleştirilebilir bir ürün haline getirilmiş Ar-Ge bilgisiyle başlar. Bu, bir tasarımın bu parametreler dâhilinde

kararlarının maliyet ve performans üzerindeki etkisini anında görebilir. Amaç, şeffaflığı ve üretkenliği önemli ölçüde artırmak ve ev üretiminin marjinal maliyetini düşürmektir.



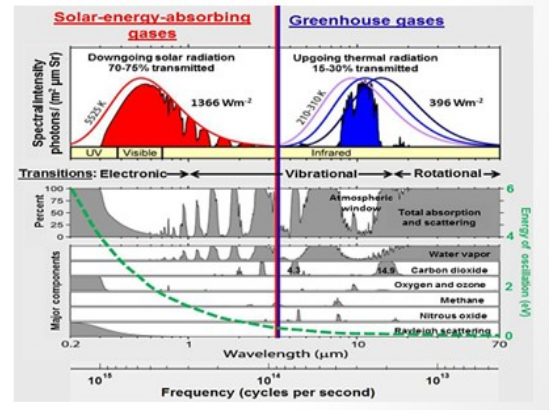
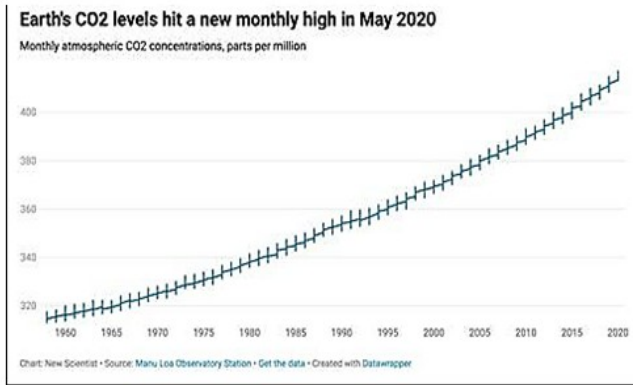
Şekil 16- Açık Kaynak Evlerinde Yerinde Montaj Uygulamaları

### 7.5. Açık Kaynak Evlerinde Çevre ve Güvenlik Araştırmaları

Geleneksel metotlarla yapılar çok yavaş inşa edilirler ve bu süreç en az 1-2 aylık bir tasarım/onay dönemi ile beraber toplamda en az yaklaşık 6-9 ay sürer. Düşük enerji performansına sahipler. AB'de binalar enerji tüketiminin% 40'ını ve CO2 emisyonlarının% 36'sını oluşturmaktadır.(Wikihouse,2019) Evler bu tüketimin çoğunluğunu (yaklaşık% 30) oluşturmaktadır. Yüksek somutlaşmış karbona sahiptirler. Üretimlerinde yer alan ekstraksiyon süreçleri nedeniyle, bu özellikle tuğla ve beton için geçerlidir. Genellikle 600kgCO<sub>2</sub> / m<sup>2</sup>'nin üzerindedir. Doğrusaldırlar yani, dünyadan çıkarılan malzemeleri kullanırlar, sonra "yıkılırlar" ve ömürlerinin sonunda çöplüklere gönderilirler. Binalar, en büyük hammadde tüketicisi (yaklaşık% 60) ve çöplük atığına en büyük katkıda bulunan (yaklaşık% 32). Doğrusaldırlar yani, dünyadan çıkarılan malzemeleri kullanırlar, sonra "yıkılırlar" ve ömürlerinin sonunda çöplüklere gönderilirler. Binalar, en büyük hammadde tüketicisi (yaklaşık% 60) ve çöplük atığına en büyük katkıda bulunan (yaklaşık% 32). Yerinde malzeme israf oranları yüksektir, tipik olarak% 10-20 arasındadır. Kesin değildirler. Kesin olmayan bina, hatalara, kusurlara neden olabilir veya projenin ilerleyen bölümlerinde ikincil etkilere neden olabilir. Örneğin, pencerelerin sıralanmasını pencere açıklıkları inşa edilene kadar geciktirmek alışılmadık bir durum değildir. Beceri ve yoğun emek gerektirirler. Karmaşıklıkları, yüksek bir maliyetle gelen deneyim ve beceri gerektirir. Örneğin, İngiltere'de tuğla örmenin maliyeti her yıl yaklaşık% 6 artıyor. (The DfMA Housing Manual, Wikihouse,2019) Çok sayıda malzeme,

yöntem ve ticaret bilgisi ve bu faktörleri birbirine karşı tartmak için deneyim gerektirdiklerinden karmaşıktırlar. Genellikle kusurludurlar .Hata yapmak çok kolay olduğu için kusur oranı yüksektir. Örneğin; Birleşik Krallık 'ta yeni ev sakinlerinin% 98'i bir tür kusur bildiriyor ve genellikle onarılması

zor. (Wikihouse,2019) Tasarım ve inşaat sırasındaki hataların, yapım maliyetlerinin% 7'sine kadar katkıda bulunduğu tahmin edilmektedir. Güvensiz İnşaat halen en yüksek ölüm oranlarından birine sahiptir ve tüm ölümcül işyeri kazalarının%32'sinden sorumludur. Hava kalitesi, yalıtım, gün ışığı, havalandırma ve yeşil alanla görsel temas açısından sağlıksızdırlar. Birleşik Krallık'ta kalitesiz konutların NHS'ye yılda 760 milyon sterlin ve genel olarak toplum için 1,9 milyar sterline mal olduğu tahmin edilmektedir. (The DfMA Housing Manual, Wikihouse,2019)

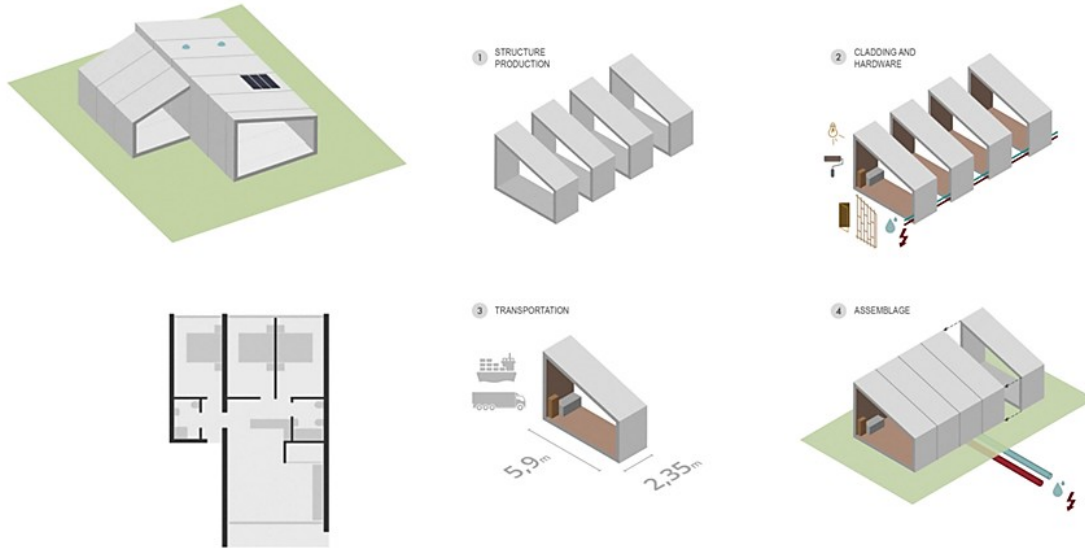


Şekil 17- 1960-2020 Yılları Arası Konutlarda Yıllara Göre Co2 Salınımı  
(Manu Los Gözlem İstasyonu,Datawrapper)

Geleneksel yöntemlerle inşa edilen yapılar risklidirler, çünkü maliyetleri önceden tahmin etmek zordur, bu nedenle diğer ürünlerden farklı olarak, bir binayı satın almadan önce ne kadar mal olacağını bilmenin kesin bir yolu yoktur. Bir binanın üretilmesinde birden fazla ticaret ve kritik yol bulunduğundan, küçük sorunlar bile büyük sorunlara dönüşme eğilimindedir. Sonuç olarak, inşaat projelerinin çoğu bütçeyi aşıyor. Tipik olarak, parçaları veya hizmetleri (iskele gibi) beklerken gecikmeler yaşar. Bu risk, birçok küçük ve kendi kendini inşa edenleri tamamen yasaklar ve aynı zamanda "kötü" tedarik modellerini zorunlu kılar. Dayanıklılık, kullanım, sağlık ve enerji performansı ile ilgili kullanım sırasında herhangi bir performans verisi kaydetmedikleri için 'aptaldırlar'. Herkese uyan tek beden ısmarlama, üst düzey konut piyasasının dışında, farklı sitelere ve kişilere özelleştirme için genellikle çok az yer vardır veya hiç yer yoktur. Bu, birçok grubu dışlar ve kalitesiz yerlere katkıda bulunur.

Manueldirler. Her proje, çok az otomasyon veya tekrarlanabilirlik ve çok sayıda müzakere / tartışma ile her seferinde sıfırdan tasarlanmalı ve yapılmalıdır. Bu, her ürünün "marjinal maliyetini" çok yüksek kılar. Bu yüksek tasarım genel giderlerinin her bir binanın maliyetine %20–30 arasında katkı yaptığı tahmin edilmektedir. Demokratik değillerdir. Bütün bunlar, ev inşa etme eyleminin büyük ölçüde zenginler tarafından kontrol edildiği ve az sayıda büyük şirket tarafından

yürütüldüğü anlamına gelir. Özellikle, bunu doğrudan ikinci el pazar için evler inşa eden spekülatif geliştiricilere bırakma eğilimindeyiz ve bu nedenle kaliteli, sürdürülebilir evler inşa etmek için çok az teşvikimiz var. Günümüzde inşaat, son kullanıcıların istekleri veya ihtiyaçları değil, arz yönlü kâr tarafından yönlendirilen yukarıdan aşağıya bir faaliyettir. Barınmanın insanlar tarafından değil, insanlara yapılan bir şey olduğu fikrine alıştık. Bu bir problem olarak görülmektedir. Çünkü nihayetinde, yapabilecekleri en iyi, en sağlıklı, en sürdürülebilir evleri inşa etmek için doğrudan teşviki olan insanlar, içinde yaşayacak, çocuklarını burada büyütecek ve ısınma faturasını ödeyecek kişilerdir. (The DfMA Housing Manual, **Wikihouse,2019**)



Şekil 18- Modüller Halinde Tasarlanan Açık Kaynak Evi

### 7.6. Açık Kaynak Evlerinde Lisans İşlemleri

Açık kaynak mimarisinde tüm yapılar; amaca yönelik yapısal uygunluk, yangın güvenliği, enerji performansı, erişilebilirlik vb. konularını kapsayan mevcut yerel bina kurallarını her zaman karşılamalı veya aşmalıdır. Bazı yerlerde bir tipe göre onay kullanmak da mümkün olabilir. Her binanın denetlenmesini ve imzalanmasını zorunlu kılmak yerine, kalite kontrol

standartları ve prosedürleri eşliğinde tip 'mekanizmasına göre onay almak projenin esas gayesidir. Klasik sistemde olduğu yine burada da yapılar açık pazarda satılacaksa, alıcıların muhtemelen ipotek finansmanı ile finanse edilmesi gerekecektir.

Bazı ülkelerde (İngiltere gibi) bu, açık kaynak mimari sistemlerinin ürün sertifikalı olmasını ve farklı projeler için bir garanti verilmesini gerektirecektir. (Birleşik Krallık 'ta bir "garanti", genellikle yeni bir evde 10 yıllık kusur sorumluluk sigortasıdır). Garanti sigortacıları, herkesin bildiği gibi muhafazakârdır ve bina yöntemlerinde yeniliklere yanıt vermekte yavaş

davranabilirler, ancak bu sorunu çözmek için bir dizi yeni sigorta ürünü piyasaya sürülüyor. Bu, müşterilerin, tasarımcıların ve yenilikçilerin farkında olması gereken bir şeydir: Yeni açık kaynak mimarisindeki sistemlerinin, birçok projenin devam edebilmesi için muhtemelen yerinde bir garanti sigortasına sahip olması gerekecektir. (Wikihouse,2021)

Açık kaynak mimarisinde yapılar klasik lisanslama veya ruhsatlandırmadan ayrı düşünülmemelidir. Sistem esnek tasarım fikriyle yola çıktığı için güncel bütün yasal düzenlemelerine uydurulabilir. İmar kanunları doğrultusundaki düzenlemelere uygundur. Hâlihazırda asıl araçlarından biri olan bulut sertifikasyon sistemiyle tasarımları oluşturulduğundan diğer sertifikasyon işlemlerinde de (yangın,enerji v.b. gibi) geleneksel yöntemlerle inşa edilen yapılara göre avantajlıdır. Dolayısıyla ülkemizde lisans işlemleri için kullanılabilir durumdadır. Ayrıca Avrupa birliği, ISO gibi uluslararası sertifikasyon sistemini desteklemektedir. Ayrıca açık kaynak yapıları herhangi bir ahşap çerçeve yapısı gibi davranacaktır. İlerleyen süreçte teknolojinin gelişimi ile çelik veya daha güçlü materyaller kullanılarak daha ileri uçlu yapılar yapmakta mümkündür. Bununla birlikte, tasarımı imzalamak için bir yapısal mühendise ihtiyaç duyulması her zaman geçerlidir. Düzenlemelerin esasında ülkeden ülkeye değiştiğini unutmamak gerek. (Wikihouse,2021)

## 8. TARTIŞMA

Uluslararası düzlemde zaman zaman yaşanan konut krizleri akademiden, endüstriden ve politika yapıcılardan her zaman ilgi çekmektedir. Bugün ile 2050 arasında, bir toplum olarak, büyük bir inşaat zorluğuyla karşı karşıyayız: yalnızca milyonlarca ev, okul ve diğer binalar inşa etmemiz gerekmiyor, aynı zamanda bu binaların düşük enerjili, düşük karbonlu olması ve bizim esenlik olduğu ortadadır. Mevcut yapım yöntemlerimiz bu amaca uygun değildir. Yavaş, öngörülemez, savurgan, enerji ve karbon yoğun ve çok büyük miktarlarda kalifiye işgücü gerektiriyorlar. Bu yöntemlerin alternatiflerini düşündüğümüzde, büyük, pahalı,

merkezi üretim tesisleri gerektiren ve her duruma uyan tek boyutlu modüler evler üreten çözümler düşünme eğilimindeyiz. 'Endüstri 3.0' olarak anılan şey. Bunlar, büyük şirketlerin büyük projeleri için harikadır, ancak küçük, özel projeler için o kadar iyi değildir.

Peki ya maliyetin bir veya büyük kısmına dijital mikro fabrikalar kurabilseydik: web'i kullanarak ortak çözümleri paylaşan yerel üreticilerden oluşan bir ağ? Dağıtılmış, esnek bir tedarik zinciri. 'Endüstri 4.0' Söz konusu krize ilişkin çeşitli çözümler ortaya konulmuştur. Açık kaynak inşaat sistemleri, uzun vadeli sosyal, ekonomik ve çevresel sürdürülebilirliği sağlamak için umut verici bir çözüm olarak ortaya çıkartmıştır. Araştırma çerçevesi, iki ana kavramın

birleşik bir görünümüne dayanmaktadır: "şenlik" ve "açıklık". Amaç, bu iki yön arasındaki ilişkinin derinlemesine anlaşılmasını sağlamak ve "Yerel Tasarım Global Üretim Yerel" ile ilgili literatür sağlamaktır. Analiz, şenlik ve açıklığın karmaşık ve bağlama özgü faktörler olduğunu gösterdi. Açık kaynak mimarisi genel olarak şeffaflığı hedefler. Sistem P2P (Peer To Peer) mobilitesi ile taşınmaktadır. 'Tilki gibi tembel olun' - Linus Torvalds. Başkalarının özgürce adapte olması ve iyileştirmesi için ortak çözümleri paylaşmayı önermektedir. Bu şekilde, hiçbir sorunun iki kez çözülmesinin gerekmediği büyük bir Ar-Ge topluluğundan hepimiz faydalanılır.

Tipik performans karşılaştırması	
<b>Beton, tuğla ve blok</b>	<b>WikiHouse</b>
yapım maliyeti £ 1100-1600 / m <sup>2</sup>	yapım maliyeti £ 1100-1600 / m <sup>2</sup>
proje maliyeti kesinliği düşük	proje maliyeti kesinliği orta-yüksek
inşaat süresi 6-9 ay	inşaat süresi 8-12 hafta
inşaat beceri seviyesi yüksek	inşaat beceri seviyesi düşük
U değeri 0,3 W / m <sup>2</sup> K	U değeri 0,15 W / m <sup>2</sup> K
Kaçak hava 8-10 m <sup>3</sup> / ha <sup>2</sup>	Hava sızdırmazlık 1-3 m <sup>3</sup> / ha <sup>2</sup>
Karbon ayak izi 350-500 kgCO <sub>2</sub> / m <sup>2</sup>	Karbon ayak izi 150-250 kgCO <sub>2</sub> / m <sup>2</sup>
Yeniden kullanılabilir bileşenler % 0-10	Yeniden kullanılabilir bileşenler % 80-90

Şekil 19- Geleneksel Yöntemler ile Açık Kaynak Ev Tipik Performans Karşılaştırması (İngiltere, Wikihouse, 2021)

Türkiye’de, kentlerdeki sosyo-ekonomik değişimlerle birlikte hızlı bir nüfus artışı ve kentleşme olgusu yaşanmaktadır ve kentleşme sorunu giderek büyüyen boyutuyla çözüm beklemektedir. 1950’li yıllardan beri kırsal alandan kentsel alanlara çok yoğun bir göç başlamıştır. Bunun sonucunda zaman içinde kentleşme sorunu ve konut açığı ortaya çıkmıştır. Ancak, konut sektörüne yapılan yatırımların üretken yatırımlar olarak kabul edilmemesi nedeniyle gereken önlemlerin alınmaması, kamu kaynaklarının dağınık ve yetersiz oluşu, konut yapımında, konut sahibi olmada, yeterli ve etkin bir sistemin oluşmasını engellemiştir.

Boylece günümüzde konut sorunu önemli boyutlara ulaşmıştır. Türkiye’de konut sektörünün, ekonomik gelişme bakımından taşıdığı önemin anlaşılması sonucu, kamu otoriteleri soruna çözüm bulmak için bir takım arayışlara başlamış ve çeşitli dönemlerde farklı politikalar izleyerek sorunu çözmek istemişlerdir. Ancak sorunları tespit etmekteki başarılarını çözmekte gösteremeyip yetersiz kalmışlardır.

Alastair Parvin: Konut kriziyle ilgilenmemin nedenlerinden biri Amerika veya İngiltere gibi ülkelerde de meydana gelmesidir. Onlar dünyadaki en zengin ülkelerden bazılarıdır ve yine de Britanya'da Avrupa'nın en küçük evlerinden bazılarını ya da ikinci en küçük evlerini inşa

ediyoruz. Zengin olmamız gerekirken neden konut krizi yaşıyoruz? Sanayi Devrimi'nden bu yana, temelde, kaliteli malları etkili bir şekilde üretebilecek tek insanların, ister piyasa ister devlet olsun, büyük organizasyonlar ve şirketler olduğu varsayılmıştır. Birleşik Krallık 'ta öncelikle büyük bir enflasyona yol açan bir arazi ve altyapı krizi olduğunu bildiğimiz konut krizinden bahsettiğimizde, hükümetler hala "Ah, ev inşa şirketleri için daha fazla arazi alalım, geliştiriciler. " Ve kullanmayacaklar çünkü iş modellerini temelden yanlış anladılar. Bir geliştirici, yalnızca bunu yapmak karlı olduğunda inşa eder, bu yüzden onlara bir sürü arazi vermiş olsak bile, yine de evleri sadece fiyatları yüksek tutacak hızda piyasaya sürerler. Özel inşaatçılar yalnızca karlı olduğunda inşa etmezler. Her zaman bir ev istedikleri zaman inşa ederler. Öyleyse, tüm bu işin özü şu soru: Evlerimizi kim inşa ediyor? Varsayım, bu büyük veya kuruluşlar olması gerektiğidir ve tartıştığımız şey, bu yeni teknolojilerin artık geçerli olmadığıdır.



**Şekil 20-** Açık Mimaride Konut Uygulaması Yapı Mobilirite Analizi(Janelle Zara/Archizer,2021)

## **9 .SONUÇ ve ÖNERİLER**

Açık kaynak mimarisinde tüm yapılar; amaca yönelik yapısal uygunluk, yangın güvenliği, enerji performansı, erişilebilirlik vb. konularını kapsayan mevcut yerel bina kurallarını her zaman karşılamalı veya aşmalıdır. Açık kaynak mimarisi aslında mimariyi kitleler için demokratikleştirme misyonu gibi görünmektedir. Ancak mimarları genel denklemden



çıkardığımızda, insanlar sadece *binalarla* kalmıyor mu? Sistem esasında insanları mimariden, dışavurumundan mahrum mu bırakıyor? Esasında bu soruların cevabı zaten apaçık ortadadır. Açık bir şekilde görülmektedir ki açık kaynak sistemleri tatbik edildiği ülkelerde daha çok mimar ve mühendis müdahalelerine ihtiyaç duymaktadır. Bunun sebebi sıradan yapı bilgisine sahip bir bireyin sistemde geleceğe dönük kompaktlık, mobilirite, modülerlik vs. gibi çözümlerden uzak olmasıdır. Bu sistemde yapı üzerinden çeşitli formasyonlar kullanılarak yapı hızlı üretilecek hale getirilir. Bunun içinde ileriye yönelik projeksiyonlarda yapıya uzman tasarımcının yol haritası çıkarması gerekmektedir. Dolayısıyla uzman bir bireyin kendi yükümlülüklerini yerine getirmesi sistemin işleyişi açısından elzem bir haldedir. Şuan için sistem “Açık” ibaresini üretimde efektif bir şekilde sergilemektedir. İleride gelişen teknolojik enformasyon ve mobilizasyon ile bu durumun değişeceği de ortadadır. Ülkemizde konut ihtiyacı ve performans verilerine bakıldığında sektörel daralma ve arz-talep dengesizliği(balonlaşması) gün yüzündedir. Artan nüfus ile beraber konut ihtiyacı da paralel olarak artmaktadır. Konut ihtiyacı buna mukabil hızlı bir şekilde karşılanmak durumundadır. Bunun için geleneksel konut inşaat uygulamalarından farklı bir çözüm arayışına gidilmelidir. Açık kaynak mimarisi, bulut tabanlı sistem ile hem üretici hem tüketici modülü ile yeni olan sistem kaçırılmamalıdır. Yerel ekonomiye de katkı verecek Linus Torvalds’ın modeli modern yapılaşma tanımlarına da uymaktadır. Ülkemizde ekonomik durumu güçlü olanın sadece yapı yapabildiği de gözden kaçırılmamalıdır. Dolayısıyla konut veya yapı üretim modelinde demokratikleşme olarak tanımlanan açık kaynaklı mimari kavramı hızlı bir şekilde benimsenerek ,alternatif sistemler denenmelidir. Sonuç olarak ‘LİNUS TORVALDS’IN AÇIK KAYNAKLI MİMARİSİ VE UYGULANABİLİRLİĞİNİN ARAŞTIRILMASI’ ’adlı söz konusu bu çalışma da açık kaynak sisteminin Anadolu başta olmak üzere konut çözümüne iyi bir alternatif yaklaşım olduğu ortadadır. İlgili kurumsal teşvikler ile kısa projeksiyonda kırsal alanlarda uzun projeksiyonda kentsel alanda ve ölçekte büyük getirisi var olduğu çalışma boyunca ifade edilmiştir. Bu doğrultuda söz konusu sistem ile özellikle kırsal, iş gücünden yoksun, ekonomik olarak şartların elverişsiz olduğu ve yapım maliyet ve şartlarının zor olduğu bölgelerde açık kaynak mimarisi ile yapı inşaatının ülkemizce de uygun olduğu ortaya konulmuştur. Kısa vadede yerelleşme sağlayarak modern yapı yapım çözümü sunmakla beraber açık kaynaklı mimari geleceğin mimari uygulama alanı olacağı yabancı uzman çevrelerce de kabul edilmiştir.



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**KENTSEL DÖNÜŞÜM YAPILARINDA MİMARİ KİMLİK ÜZERİNE  
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**ÖZET**

Kentsel dönüşüm, şehrin bir bölümünün veya ciddi anlamda büyük bir kısmının proje kapsamında, sistematik bir şekilde mevcut yapı stoklarının olası depremlere karşı toprak zeminin ve üzerindeki yapının risk değerleri belirlenerek, yapılan kamusal çalışmalardan biridir. Sağlıksız kent dokularının iyileştirilmesinde ve kentsel sorunların çözümünde ekonomik, mekânsal, toplumsal koşulları dikkate alan kapsamlı bir projelendirme ve uygulama süreci olarak da tanımlanabilir.

Son yıllarda dünyanın birçok ülkesinde olduğu kadar, Türkiye'deki planlama/mimarlık ortamında da kentsel dönüşüm kavramı üzerinde çeşitli tartışmalar yapılmaktadır. Bu konuda uluslararası manada söz sahibi uzmanlar kentsel dönüşümü, kentsel sorunlara çözüm üretmek amacıyla, değişime uğrayan bir bölgenin ekonomik, fiziksel, sosyal ve çevresel koşullarına kalıcı bir çözüm sağlamaya çalışan kapsamlı bir vizyon ve eylem olarak tanımlamaktadır. Günümüzde kentsel dönüşüm sonucunda, kentlerin kimliklerini yitirerek gittikçe birbirini andıran dokuların ortaya çıkması kültürel anlamda bir sorun olmakla kalmayıp, ekonomik, sosyal ve psikolojik sonuçlar doğurmaktadır. Kentlerin kimliklerini koruyabilmesi ve kimliklerine uygun gelişebilmesi, gelişimin ekolojik, sosyal ve kültürel boyutlarının ihmal edilmemesine bağlıdır. Gelişme yolundaki kentlerin büyümesi kent kimliği gözetilerek gerçekleştirilmelidir. Bu da kent kimliğinin, önemli bir planlama parametresi olarak ele alınmasını gerektirmektedir. Ayrıca, bir kentin kimliğinin oluşumunda son derece etkin olan kent sakinleri ile kentin doğal değerleri, kentin planlama stratejilerine de yön verebilmelidir. Kentin kimliğine sahip çıkmak başta o kentte yaşayanlara düşen görevlerdendir. Bu doğrultuda söz konusu çalışmada ele alınan konu; Depremler sonrasında yapılan kentsel dönüşüm ve onun mimari ortaya çıkardığı mimari kimlik sorunsallarıdır.

**Anahtar Kelimeler:** Mimari ve Kimlik, Kentsel Dönüşüm, Kent Kimliği

## IN URBAN TRANSFORMATION STRUCTURES ASSESSMENT ON ARCHITECTURAL IDENTITY

### ABSTRACT

Urban transformation is one of the public works carried out by systematically determining the risk values of the existing building stocks against possible earthquakes, the soil ground and the structure on it, within the scope of the project of a part of the city or a significant part of the city. It can also be defined as a comprehensive project design and implementation process that takes into account economic, spatial and social conditions in the improvement of unhealthy urban textures and the solution of urban problems. In recent years, there have been various discussions on the concept of urban transformation in the planning/architecture environment in Turkey as well as in many countries of the world. Experts who have a voice on this subject in the international sense define urban transformation as a comprehensive vision and action that tries to provide a permanent solution to the economic, physical, social and environmental conditions of a region that has undergone changes in order to find solutions to urban problems. Today, as a result of urban transformation, the emergence of cities that resemble each other by losing their identities is not only a cultural problem, but also has economic, social and psychological consequences. The ability of cities to protect their identities and develop in accordance with their identities depends on not neglecting the ecological, social and cultural dimensions of development. The growth of cities on the way of development should be realized by considering the identity of the city. This requires the urban identity to be considered as an important planning parameter. In addition, the inhabitants of the city, which are extremely active in the formation of a city's identity, and the natural values of the city should be able to direct the planning strategies of the city. Protecting the identity of the city is one of the duties of the people living in that city. In this direction, the subject discussed in this study; Urban transformation after earthquakes and its architectural identity are the problems of architectural identity.

**Keywords:** Architecture and Identity, Urban Transformation, Urban Identity

## 2.GİRİŞ

Kentsel dönüşüm, şehrin çok küçük bir bölümünün veya ciddi anlamda büyük bir kısmının proje kapsamında, sistematik bir şekilde mevcut yapı stoklarının olası depremlere karşı toprak zeminin ve üzerindeki yapının risk değerleri belirlenerek, yapılan kamusal çalışmalardan biridir. Sağlıksız kent dokularının iyileştirilmesinde ve kentsel sorunların çözümünde ekonomik, mekânsal, toplumsal koşulları dikkate alan kapsamlı bir projelendirme ve uygulama süreci olarak da tanımlanabilir. Son dönemlerde dünyanın birçok ülkesinde olduğu kadar, Türkiye’deki planlama/mimarlık ortamında da kentsel dönüşüm kavramı üzerinde çeşitli tartışmalar yapılmaktadır. Bu konuda uluslararası manada söz sahibi uzmanlar kentsel dönüşümü, kentsel sorunlara çözüm üretmek amacıyla, değişime uğrayan bir bölgenin ekonomik, fiziksel, sosyal ve çevresel koşullarına kalıcı bir çözüm sağlamaya çalışan kapsamlı bir vizyon ve eylem olarak tanımlamaktadır.(Thomas, 2003). Günümüzde kentsel dönüşüm sonucunda, kentlerin kimliklerini kaybederek gittikçe birbirini andıran dokuların ortaya çıkması kültürel anlamda bir sorun olmakla kalmayıp, ekonomik, sosyal ve psikolojik sonuçlar doğurmaktadır. Kentlerin esas kimliklerini koruyabilmesi ve kimliklerine uygun gelişebilmesi, gelişimin ekolojik, sosyal ve kültürel boyutlarının ihmal edilmemesine bağlıdır. Gelişme yolundaki kentlerin büyümesi kent kimliği gözetilerek gerçekleştirilmelidir. Bu da kent kimliğinin, önemli bir planlama göstergesi olarak ele alınmasını gerektirmektedir. Ayrıca, bir kentin kimliğinin oluşumunda son derece etkin olan kent sakinleri ile kentin doğal değerleri, kentin planlama stratejilerine de yön verebilmelidir. Kentin kimliğine sahip çıkmak başta o kentte yaşayanlara düşen görevlerdendir. Çalışmanın özel olarak yoğunlaştığı konu kentsel dönüşümün getirdiği kimlik sorunlarıdır. Bu durumun iyi bir şekilde değerlendirilebilmek için en yakın tarihte sonuçların gözlemlenebileceği 2011 yılındaki Van Deprem’i referans alınmıştır. Ayrıca çalışmanın konusuna uygun bir değerlendirme yapmak içinde seçilen yerde deprem sonrası kentsel dönüşüm yapılarının olması gerekmektedir. Bu bağlamda çalışmaya en iyi referans yeri Erciş olarak seçilmiştir. Bu depremin en çok tahribata yol açtığı yerlerden biri Erciş’tir. Ayrıca kente devlet eliyle yeni bir yapılaşma-kentsel dönüşüm yapıları yapılmıştır. Çalışmada cevap aranan temel problem; 2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapıların, kentin tarihi geçmişi ve planlaması açısından, Erciş kent kimliğine zararının

ne olduğudur. Çalışmanın amacı ise; bu problemin çözümüne katkı sağlayıp, Erciş’te yapılan kentsel dönüşümü irdeleyerek söz konusu kente ait mimari kimlik sorunlarını gün yüzüne çıkarmaktır. Çalışmada, Erciş kentini geçmiş planlama ve mimari kimliğini ifade eden görsel

kayıtlardan yararlanılacaktır. Yapılan kentsel dönüşümün mimari kimliği ortaya konulup Erciş kentine uygunluğu ifade edilecektir.

### 3.ÇALIŞMANIN PROBLEMİ ve HİPOTEZLERİ

Bu araştırmada temel olarak ele alınan problem; *2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapıların, kentin tarihi geçmişi ve planlaması açısından, Erciş kent kimliğine zararının ne olduğudur.* Çalışma, Erciş kent merkezinde yapılan kentsel dönüşümün ilk etabı olarak planlanan ve uygulanan proje ve yapıları kapsamaktadır.

**H0:** 2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapılar, tarihsel mimari bütünlük gözetildiğinde, Erciş kent kimliğine aykırıdır.

**H1-a:** 2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapılar, tarihsel mimari bütünlük gözetildiğinde, Erciş kent kimliğiyle örtüşmektedir.

**H1-b:** Erciş'te kentsel dönüşüm çerçevesinde yeni yapılara ihtiyaç yoktur.

**H1-c:**2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapılar, Erciş kent kimliğine yeni bir vizyon katmaktadır.

### 4. ÇALIŞMANIN AMACI ve ÖNEMİ

Söz konusu bu çalışmanın amacı; *2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapıların, kentin tarihi geçmişi ve planlaması açısından, Erciş kent kimliğine zararının ne olduğudur* çalışmanın problemi olarak ifade edilen, Erciş'teki kentsel dönüşüm sonucu değişen kentsel kimlik probleminin çözümüne katkı sağlayarak, kentin mimari kimlik sorunlarını gün yüzüne çıkarmaktır. Çalışma, Erciş kentindeki yapılan söz konusu yapılaşmanın, kentin gelecek projeksiyonuna etkisinin ortaya koyacak olması suretiyle önem arz etmektedir.

### 5. ÇALIŞMANIN MATERYAL ve YÖNTEMİ

Çalışmada, Erciş kentine ait geçmiş planlama ve mimari kimliği ifade eden, görsel kayıtları alınmış yapıların mimari kimliğinden yararlanılacaktır. Yapılan kentsel

dönüşümün mimari kimliği irdelenip Erciş kentine uygunluğu çalışma doğrultusunda ortaya konulacaktır.

Bu bağlamda öncelikle; Erciş için modern kimlik yapıları olarak kabul edilen erken cumhuriyet dönemi yapılarından günümüzde ayakta duranları işlenecektir. Çeşitli dönemlerde

tahrip olan, kent için son derece önemli kimlik değerleri olarak kabul edilen bu yapıların mimari özellikleri belirtilerek kimliksel yönleri değerlendirilecektir. Daha sonra aynı değerlendirme kentsel dönüşüm ile yapılan yapılar üzerinde olacaktır. Çalışmanın sonuç kısmında ise iki kimliksel değer karşılaştırılıp çalışma sonuçlandırılacaktır.

## 6. ERCİŞ KISA TARİHÇESİ

Erciş'in de içinde bulunduğu Van Gölü havzasının geçmişi tarih öncesi dönemlere kadar gitmektedir. Bölgede Neolitik(eski çağ) yerleşmeler hakkında bilgi olmamasına rağmen Tilkitepe Höyüğü, Kalecik, Dilkaya ve Ernis mezarlarındaki buluntularda Kalkolitik yerleşim izlerine rastlanılmaktadır. Dilkaya Höyüğü buluntularında Erken Hurri kültürünün (M.Ö 3000) bölgede etkili olduğu bilinmektedir.

Erciş'in genel olarak bilinen ilk resmi tarihi Urartularla (MÖ 900-600) başlar. Ortadoğu kaynaklarında geçen "Arciş" adının Urartu Kralı Arğişti'den geldiği ve dolayısı ile Erciş'in Urartular döneminde yaşayan halkı ile kurulduğu belirtilmektedir. Urartu Krallığı'nın batı tarafı yolu olan ve Erciş'ten başlayıp Muş-Bingöl üzerinden Malatya'ya uzanan yol Erciş'in Urartu geçmişinde önemini artırmıştır. Hatta yolu elinde tutmak, güvenliğini sağlamak için yol boyunca birçok güvenlik ve konaklama istasyonları yapılmıştır. Erciş'in çeşitli yerlerinde bulunan çivi yazılı kitabelerden anlaşıldığı kadarıyla Urartu Kralları Arğişti ve Menua döneminde Erciş'in imar edildiği, Tetuma adında bir şehir kurulduğu ve imar edilen bu şehirde tarıma büyük önem verilerek tarımsal sulama kanallarının yapıldığı bilinmektedir. (Bingöl,Çetin,2019)





**Şekil 1-** Urartu Döneminden Kalma Tarihi Erciş Kalesi Kalıntıları

Urartu devletinden sonra sırasıyla Medler, Pers, Roma ve Bizans hakimiyetine giren bölge 640 yılında Hz. Ömer'in komutanlarından İyaz Bin Gonem tarafından İslam'a katılır. Daha sonra tekrar Bizans İmparatorluğunun eline geçen Erciş, bir müddet Emevi ve Abbasilerin hâkimiyetinde kalır. IX. yüzyıldan itibaren Vasburakan ve Bağretlı gibi mahalli krallıkların hâkimiyetine girer. Yöreye ilk Türk akınları 1054 yılında bizzat Tuğrul Bey 'in kumanda ettiği büyük ordu ile başlar ve Muradiye ( Bargiri ) ile Erciş feth edilir. Daha sonra Erciş, 1071 Malazgirt Zaferi ile Selçuklu topraklarına katılır. (Wikipedia). Erciş asıl önemine XIV. Yüzyılda Karakoyunlularla (1365-1469) kavuşur. Erciş merkez olmak üzere kurulan devletin kurucusu Bayram Hoca'dır.

Karakoyunlu Devleti (1351–1469); İlhanlılar Devleti'nin (İran Moğolları) yıkılmasından sonra Türk boy ve aşiretler bir araya gelerek oluşturduğu siyasî birliğin ve bunların XIV. yüzyılın ikinci yarısında Doğu Anadolu ve Azerbaycan'da kurdukları devletin adıdır, Karakoyunlular'ın Moğol istilâsı ve İlhanlılar devrinden önceki durumları hakkında hiçbir bilgi mevcut değildir. Kaynakların rivayetinden, Koyunlular devletini teşkil eden boy ve oymakların Moğol istilâsı (1220–1221 ve takip eden yıllar) neticesinde Türkistan'dan İran'a ve sonra Doğu Anadolu'ya geldikleri,

Musul-Van Gölü çevresi ile Erzurum bölgelerinde geleneksel yaylak-kışlak hayatlarına devam ettikleri anlaşılmaktadır. (Bingöl, Çetin,2019)



Şekil 2- Karakoyunlu Döneminden Kalma Tarihi Erciş Kadempaşa Hatun Kümbeti(Miladi 1458)

Karakoyunlu Türkmenleri Reisi Bayram Hoca, İlhanlı Devleti'nin yıkılmasından (1336) sonra Azerbaycan ve Doğu Anadolu'daki siyasî otorite boşluğundan faydalanarak faaliyetlerini artırır.(778/1376). Musul'dan başka, Sürmeli-Çukuru (bugünkü Iğdır vilâyeti arazisi) ve Nahçıvan havalisini ele geçirir. Erzurum, Avnik, Hasan-Kalesi de, Sutaylılar'ın ortadan kalkması ve Erzurum'a kadar hâkim bulunan Orta Anadolu Beyliği Eratnalılar'ın zayıf düşmesi üzerine, buraları da hâkimiyeti altına alır. Bütün bu gelişmeler yaşanırken Karakoyunluların merkezi Erciş'tir. Karakoyunlular daha sonra yıkılır ve bölge Osmanlı Devleti'nin egemenliğine girer.



**Şekil 3-** Karakoyunlu Döneminden Kalma Erciş Karakoyunlu Mezarlıkları

1632’de Van, Erciş, Adilcevaz ve Muş’un Osmanlı tarafından yönetildiği bilinmektedir. Akabinde 1653 de Van Beylerbeyliğine bağlı Erciş sancak olur. 1840 daki deprem ve 1841 de göl sularının yükselmesi ile halk kaleyi terk eder. Erciş; Örene, Çelebibağı, Kasımbağı, Gölağzı ve Yukarı Çınarlı gibi yerleşim yerlerine taşınarak burada yeni yerleşim birimi oluşturulur. 1899 tarihli Van Vilayet salnamesinde “Erciş’te 500 hane çok sayıda iş yeri, iki han, iki camii bir ortaokul ve hükümet konağı yer almaktadır” ibaresi geçmektedir. Osmanlı devletinde 1864’de Meslis-i Vala’dan çıkarılan Vilayet nizamnâmesi taşra örgütlenmesini yeni baştan düzenlemiştir. Bu gelişmeler ışığında Erciş 1910 yılında kaza ( ilçe) olmuştur.

1914 de I. Dünya savaşının başlamasından sonra, 1915 tarihinde Ermenilerin ile birlikte Erciş ve çevresi Ruslar güçleri tarafından işgal edilir. Rusların işgali sırasında Ermenilerin yerli halka karşı isyanı başlar ve bu isyan çevreye yayılır. İsyana karşısında zamanın kolluk teşkilatı etkisiz kalarak halkın güvenliğini sağlayamaz. Bu durum karşısında halk bölgeden göç etmeye başlar. Ancak buraya göç oldukça zordur. Fakir ve hasta olan halkın bir kısmı yolda ölür. Bir kısmı da yollarda Ermeni çeteleri tarafından öldürülür. Göç edemeyen halk (bu göç edemeyenlerin büyük bir kısmı hasta

ve yaşlılardır) da yıllardır birlikte yaşadıkları ekmeklerini paylaştıkları Ermeniler tarafından katliama maruz kalır. Halkın evleri iş yerleri yağmalanır, insanlar bir araya toplanıp yakılır, bazen köprüden atılır, hamile bayanların karnı delinir ve vahşi bir şekilde katledilir.



Şekil 3- Geç Osmanlı Dönemi Erciş Yapıları ve Erciş Halkı(1918,erciş.gov)

1917 'de Rusya'nın I. Dünya Savaşından çekilmesiyle birlikte silahlarının bir kısmını Ermenilere bırakır. Ermeniler de katliamlarına devam ederler. Katliamların zirveye çıktığı noktada silahlı kuvvetlerimiz doğu illerini düşman işgalinden kurtarmak için harekete geçer. Ali İhsan Paşa yönetiminde 4. Kolordu birlikleri 1 Nisan 1918'de Erciş, Ermeni işgalinden kurtarılır. İlçede sayıca az kalan perişan haldeki Ercişlilerin yaraları sarılır ve göç edenler de yavaş yavaş memleketlerine dönerler. 29 Ekim 1923'te Cumhuriyetin ilan edilmesiyle rahat bir nefes alan Erciş'te imar ve iskan faaliyetlerine başlanır. 1923 de Erciş'te Belediye kurulur. Eğitim-Öğretim sorunlarını çözmek için 1925 de bu günkü Atatürk İlköğretim Okulunun Tarihi binası Atatürk İlkokulu olarak açılır.

## 7. ERCİŞ'TE KENT KİMLİĞİ ve ERKEN CUMHURİYET DÖNEMİ MİMARİSİ

Osmanlı tarihine baktığımızda, geleneksel mimarisinde 19. yüzyıl bitişinden itibaren Batı sanat akımlarının giderek daha fazla etkin olduğu ve Osmanlı geleneksel kimliğini yansıtan sanat unsurların sürekli azaldığı bir sanatsal anlayış başlamıştır.

İmparatorluğun geleneksel mimarisinin içinde bulunduğu bu çıkmazdan kurtararak öz kimliğine kavuşturmayı amaçlayan Birinci ve İkinci Milli Mimarlık Hareketleri ile bir mimari değişim başlamış, bu değişim bütün Avrupa, Anadolu'da olduğu gibi bir Anadolu kenti olan

Erciş'te etkilemiştir. Van Gölü Havzası'nın önemli kültürel-sanat merkezlerinden birisi olan ve yaklaşık 3000 yıllık bir tarihe sahip olan Erciş'te 20. yüzyılın başlarından sonra bu anlayış doğrultusunda başta konut ve kamu binaları olmak üzere birçok sivil mimari eser inşa edilmiştir. Deprem bölgesinde bulunduğu için geçmişte çok büyük yıkımlar yaşayan ilçede bu mimari anlayışla yapılan sadece 4 kültürel yapı günümüze ulaşabilmiştir. 23 Ekim 2011 depremi esnasında çeşitli zararlar gören bu yapılar kentin estetiğe ve kimliğe katkılarıyla beraber temel Cumhuriyet döneminin sosyo-kültürel, ekonomik faaliyetlerini günümüze taşıyan birer tarihi belge niteliğindedir.(Bingöl, Çetin,2019)

### 7. 1. Erciş Erken Cumhuriyet Dönemi Mimarisi Ve Kimliği

Günümüzde insanların esas olarak yaşadığı Yeni Erciş'te ve etrafında çok az da olsa bazı tarihi mimari eserler varlığını sürdürmektedir. Söz konusu eserler içerisinde Erciş kentinin tarihsel kesitlerinin bir parçasını oluşturan 20. yüzyıl başlarına ait 4 yapı bölge insanı için sembol ve anı değeri olan birer tarihi kült-belge niteliğindedir. Aynı zamanda bu söz konusu eserler Kurtuluş Savaşı ve Cihan harbi sonrası tamamen tahrip olan Erciş kentine yönelik esaslı yeni bir mimari kimlik olarak kabul edilmiştir.

#### 7.1.1.Erciş Atatürk İlkokulu

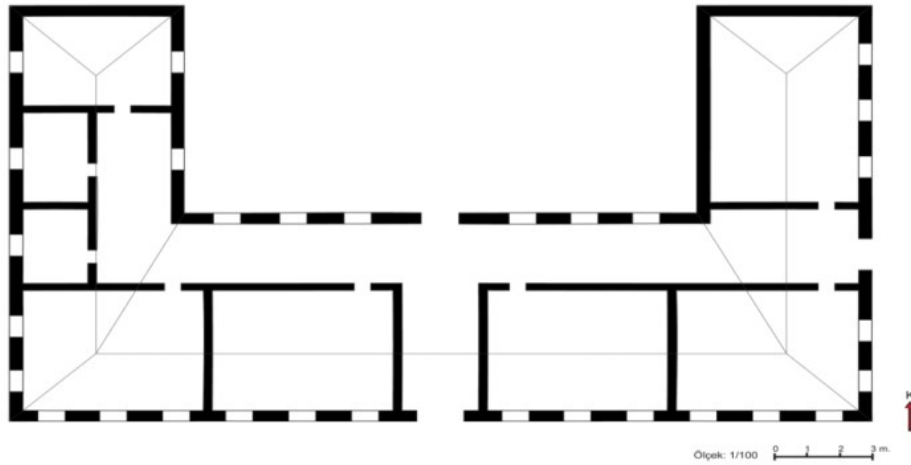


Şekil 4- Erken Dönem Cumhuriyet Mimarisi, Erciş Atatürk İlkokulu(E. Bingöl,2019)

Konumu: Vanyolu Mahallesi, Alkoçlar Caddesi'nde günümüzde Tenzile Ana İlk ve Ortaokulu'nun arkasında yer almaktadır. Yapım Tarihi: Okulun üstünde ve çevresinde bir kitabesi tespit edilemediğinden, tarihlendirilmesi için okulun arşiv kayıtları temel alınmıştır. Yıl olarak 1925 tarihlendirebileceğimiz bina 1996 yılına kadar Atatürk İlkokulu ismiyle

egitim öğretime devam ederken bu tarihten sonra Anadolu Lisesi'ne devredilmiştir. Kent halkı arasında halen Atatürk İlkokulu olarak bilinen bina, 2011 depreminde hasar gördüğü için eğitime bir süre ara verilmiş, 2015'te Erciş Kaymakamlığı çalışmalarıyla onarılarak Şehit Jandarma Astsubay Ahmet Çelik İmam Hatip Ortaokulu ismiyle tekrar açılmıştı. Günümüzde de, bu isimle eğitim-öğretime devam etmektedir. (Bingöl, Çetin,2019)

Mimari Üslup Özellikleri: Plansal olarak; doğu-batı boyunca uzanan yapının 34,5 m. uzunluğundaki güney cephesi doğu ve batı köşelerden 21 m. kuzeye doğru devam ederek U şeklini oluşturmaktadır. Avluyla bakan kuzey cephe ise yaklaşık 20 metre uzunluğundadır. Okulun dış cephelerinde toplamda 28 adet dış pencere açılarak çok ferah bir iç alan sağlanmıştır. Pencerelerin birçoğu mimari form olarak birbirine yakın olarak gözükmektedir. Ayrıca batı cephedeki 3. pencere diğerlerinden biraz daha küçük iken, kuzey taraftaki bahçeye bakan pencereler çok fazla basit bir şekildedir. Bu pencerelerin sonraki dönemlerde yapılan onarımlar sonrasında orijinalinden ayrı yapıldığı anlaşılmaktadır. Esas orijin pencereleri düşeyde basık dairesel formda kemerli ve kemerler cepheden dışa doğru çıkmalı bir şekilde yapılmıştır. (Bingöl, Çetin,2019)



Şekil 5- Erken Dönem Cumhuriyet Mimarisi, Erciş Atatürk İlkokulu Planı

Dış Süsleme Özellikleri: Süsleme karakterleri bakımından basit olan yapıda sadece antre kapısındaki bir taşta bitki motifli süsleme öne çıkmaktadır. Oldukça basit plastik formda işlenmiş kıvrık ağaç dalı ve rumi-palmet motiflerinden oluşan süslemeli taş büyük bir ihtimalle çevredeki Ortaçağ Dönemi Türk-İslam mezar baş taşlarından alınmış olmalıdır. Renkli kesme taş malzemeye sahip yapının iç kısımları bir restorasyon ile tamamen yenilenmiştir. Yapının çatısı dıştan beşik çatı ile örtülüdür.

7.1.2.Erciş Haydarbey Okulu

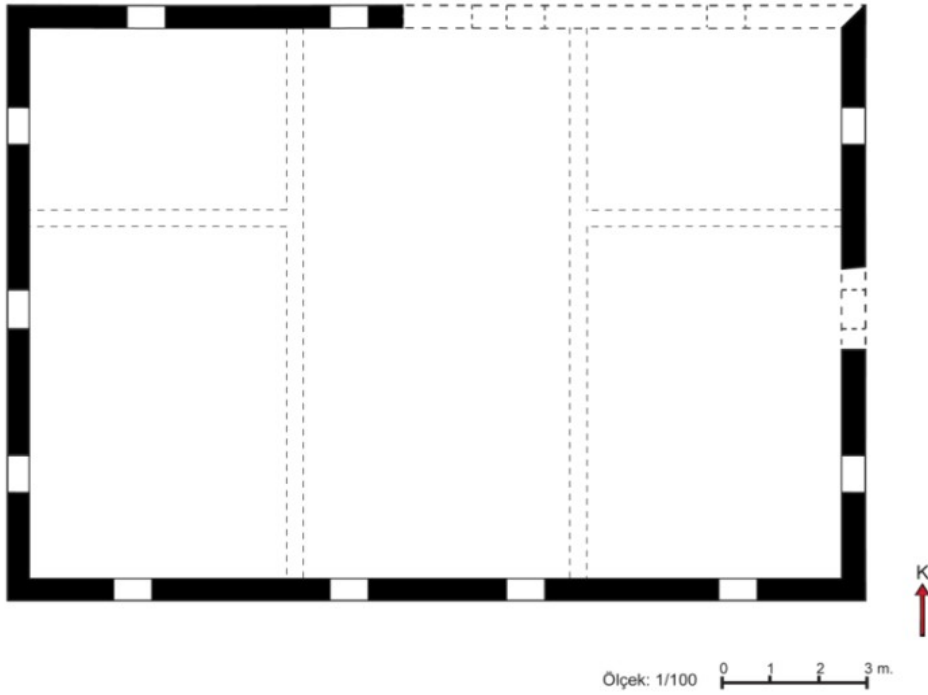
Konumu: Kentin Haydarbey Mahallesi'nde varlığına devam etmektedir. İnşa Tarihi: Binanın üzerinde yapılışına dair herhangi bir kitabesi bulunmadığı için ne zaman yaptırıldığı kesin olarak bilinmemektedir. Mevcudatta dış beden duvarları ayakta olan çatı örtü sistemi ve iç taşıyıcı duvarları büyük oranda tahrip vaziyette bulunan okulun tarihlendirilmesi ile ilgili okulun arşiv belgelerinde çok önemli bilgiler elde edilmiştir. Söz konusu kayıtlardan anlaşıldığı itibariyle, burada daha önce var olan ve eğitim medresesi olarak kullanılan bina 1947-1948 senelerinde okula tali edilerek kullanılmış ve ilk mezununun da 1952 yılında 01 numara ile 1937'lu Mehmet BAY olduğu ortaya çıkmıştır. (Bingöl, Çetin,2019)



Şekil 6- Erken Dönem Cumhuriyet Mimarisi, Erciş Haydarbey Okulu(E. Bingöl,2019)

Ayrıca söz konusu kayıtlardan yapının 1947 senesi öncesinde de var olduğu gün yüzüne çıkmaktadır. Okulun yer aldığı mahallede 107 yaşında olduğunu bilinen Sülhattin Akıncı'dan elde edilen bilgiler ve binanın yapısal-mimari özellikleri göz önüne alındığında 20. yüzyılın başlarında inşa edilmiş olma olasılığı ortaya çıkmaktadır. 1976 Depremi'nde çatı-üst örtüsü, 2011 Van Depremi'nde de doğu ve kuzey cephesinin büyük bir bölümü tahrip olmuş olan yapı çok ciddi bir şekilde harap haldedir. Ayrıca restorasyona çok muhtaç halde olduğu da ortadadır. (Bingöl, Çetin,2019)

Genel Mimari Özellikleri: 13x18 metre ebatlarında doğu-batı hattı boyunca dikdörtgen planlı olan okulun, 4'er adet güney ve kuzey dış bedenlerinde, 3'er adet de doğu ve batı cephelerinde toplamda 14 tane dış penceresi bulunmaktadır. Söz konusu pencereler biçim itibariyle birbirleriyle çok benzer yapısal özellikler göstermektedir. 80x200 cm. ebatlarında dış pencereler yuvarlak formlu kemerli olup beden duvarlarından dışa doğru taşırılmıştır. Üzengi(denge) taşları ile kilit taşları bütün pencerelere çok sıradışı bir form katarken kilit taşlarında birer adet altı kollu yıldız süslemesine de yer verilmiştir. Yapının esas girişi kuzey taraftan sağlanmaktadır. Dairesel kemerli, kemerinde altı kollu yıldız tarzında madalyonu bulunan ve dış bedenden dışa doğru taşırılmış olan bu kapı, ne yazık ki 2011 Van Depremi'nde tahrip olarak varlığını yitirmiştir. Ayrıca kapının şekli hakkında çok fazla bilgi bulunmamaktadır.(Bingöl,Çetin,2019)



Şekil 7- Erken Dönem Cumhuriyet Mimarisi, Erciş Haydarbey Okulu Planı

Aşırı yoğun tonda kırmızı ve sis-gri renkli düzgün kesme taş yapı malzemelerinin görüldüğü yapı, esas olarak tip renk taş işçiliğinin uygulandığı Erciş kenti ve etrafındaki mimari yapılardan bu özelliğiyle bir tarafa ayrılmaktadır. 1976 yılı zelzelesinden sonra çöken çatı örtüsünün dökümleri henüz kaldırılmamış olup, yapı günümüzde perişan bir haldedir. (Bingöl, Çetin,2019) Motif-Süs Özellikleri: Yapı ana girişin ve pencerelerin dışa çıkmalı, dairesele kemerleri üstünde yer alan altı kollu yıldız madalyonları haricinde başka motif ve süslemesi bulunmamaktadır.

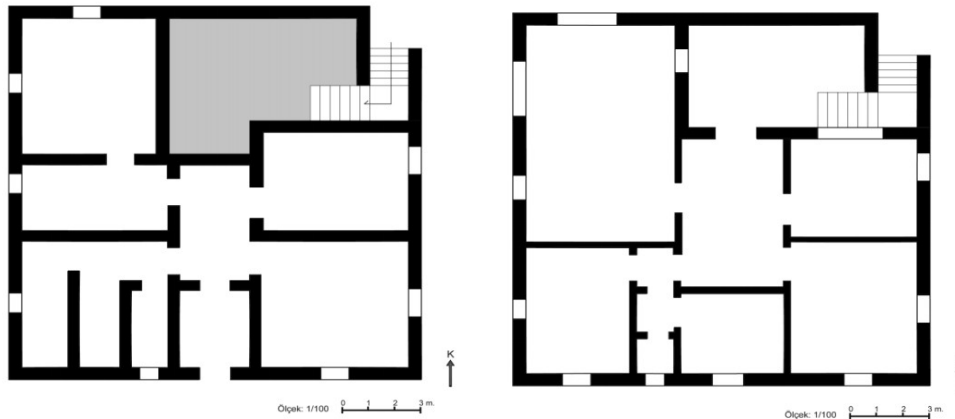


7.1.3.Erciş Şevket Bey Köşkü

Konumu: Erciş kentinin Vanyolu Mahallesi, Vanyolu Caddesi içinde varlığını sürdüren köşk, Erciş Belediyesi'ne ait Emrah ile Selvi Parkı bünyesinde yer almaktadır. Genel Tarihi: Etrafında ve duvarlarında inşa kitabesine rastlanılmadığı için hangi tarihte yapıldığı kesin olarak bilinmeyen 2 katlı köşkün, giriş zemin bölümü Ercişli Âşık Emrah'ı Koruma ve Yaşatma Derneği tarafından kullanılmaktadır. 2. katı ise; 23 Ekim 2011 Van Depremi'nde tahribat gördüğü için onarım görmek için günümüzde kapatılmıştır. Erciş kentinde sivil mimari anlamında en önemli binalardan biri olan köşk, 20. yüzyıl girişinde ilçenin önde gelen kişilerinden Vanlı Şevket Bey'e ait olduğu bilinmektedir. Mimari özellikleri esas alınarak, yine çevresinde bulunan

Nezir Ergöl Köşkü'ne yapısal olarak benzerliği de göz önünde bulundurularak binanın 1930'lu senelerinde inşa edildiği bilinmektedir. (Bingöl, Çetin,2019)

Genel Mimari Özellikleri: 16x16 metre boyutlarında karesel planlı ve 2 katlı yapılan köşkün zemin katın güney cephesinde ve zemin katın kuzeydoğu köşesinden merdivenlerle ikinci kata çıkışı sağlamak amacıyla iki adet ana girişi vardır. Binada 8 tanesi zemin katta 12 tanesi 2.normal katta olmak üzere ebatları farklı 20 adet dış pencere yer almaktadır.Ayrıca büyük kısmı düz atkı taşlı kapı ve pencereler mimari biçim ve motif açısından çok basit bir düzende olup, herhangi bir motif veya kabartma biçimi yoktur. Ancak dikkat çeken bir özellik olarak kapı ve pencere kenarlıkları ile köşkün 4 bir köşesinde dışa doğru çıkartılmış olan kesme taşlar vardır. Köşkün önemli bir bölümünde moloz taş kullanılmış ve üstü değişik bir şekilde sıvanarak bitirilmiştir. Esas iç bölümünde herhangi bir motif unsuru olmayıp binanın üst örtüsü dıştan çatı ile örtülüdür. (Bingöl, Çetin,2019)





Şekil 9- Erken Dönem Cumhuriyet Mimarisi, Erciş Şevket Bey Köşkü (E. Bingöl,2019)

## 8. ERCİŞ KENTSEL DÖNÜŞÜM YAPILARINDA MİMARİ ve KİMLİK

Çok uzun bir geçmişi olan tarihi kentlerin de tarih boyunca farklı dönemlerde sahip olduğu önceki- sonraki veya eski- yeni kimliklerin üst üste birikmesiyle oluşmuş özel bir kimliği olduğu ve bu kimliğin büyük ölçüde öncekileri ve önceki dönemleri de yansıttığı/temsil ettiğini bilmekteyiz. Sorun esasında değişim değil, değişimin plansız ve kontrol dışı cereyan

etmesidir. Kentin kendisi için yapılacak her çeşit planlamanın amacına uygun, fiziki olarak yeterli ve isabetli olup olmadığından haber veren mihenk taşı ise kentin kimliğidir. Ancak kentsel kimlik birikimi deprem, afet, savaş gibi olay ve olgular geçiren kentler için geçerli olmayabiliyor. İşte Erciş'te bu duruma uyan kentlerden biridir. Özellikle geçmiş kimliğini savaş sırasında kaybetmiş ve 2011'de de kentteki geriye kalmış önemli kimliksel yapılarını kaybederek mimari kimlik açısından zayıflamıştır. 2011 Van Depremi'nden sonra Erciş'te yeniden şehirleşme gündeme gelerek hızlı kentsel dönüşüm önerilmiştir. Çeşitli proje ve etap önerileri sonucunda 2012 yılında projelendirmeye başlandı. İlk proje önerisi sunulduktan sonra önerilen projenin maliyetli olacağı gerekçesiyle proje iptal edildi. 2013 yılında

tekrardan projelendirme yapılmış olup ilgili kurumdan onay alınarak uygulama çizimlerine başlanılmıştır.

Uzun tartışmaların gölgesinde etaplara ayrılarak, Başbakanlık Toplu Konut İdaresi Başkanlığı (TOKİ) tarafından; Van'ın Erciş İlçesi'nde "Kentsel Dönüşüm ve Gelişim Projesi" kapsamında, 407 dükkân ve 48 ofis planlanarak kısa sürede inşa edilmiştir. Projelendiricileri tarafından proje; Selçuklu ve Osmanlı'dan günümüze şehirlerin kalbi konumunda olan çarşılar, alım-satım başta olmak üzere çeşitli ekonomik etkinliklerin yürütüldüğü mekânlar olmanın ötesine geçerek her kesimden kent sakinini buluşturan birer kamusal alan, çıkış noktası olarak benimsendiği belirtilmiştir.



Şekil 10- Erciş Kentsel Dönüşüm İnşaat Görünümü (Hekimyaşı,2018)

Bu bakış açısıyla geliştirilen projede, dükkân ve ofis cephelerinde tarihi Türk çarşı mimarisi örnek alınmıştır. Yeni bir yaşam merkezine dönüşen cami merkezli ticaret alanında, cephe tasarımlarının tamamında ahşap ve taş görünümlü levhalarla birlikte, cumbalar, çatılarda çıkmalar ve payandaların tamamında fibercement (doğal çimento levhalar) kullanılarak 2018 yılında inşası tamamlanmıştır. (Hekimyaşı,2018)



Şekil 11- Erciş Kentsel Dönüşüm Cephe Görünümü (Hekimyaşı,2018)



Şekil 12- Erciş Kentsel Dönüşüm Genel Görünümü (Hekimyaşı,2018)

### **8.1. Erciş Kentsel Dönüşüm Yapılarında Mimari Kimlik Değerlendirilmesi**

Şekil 10, 11 ve 12 de görüldüğü üzere planlanan ve inşa edilen kentsel dönüşüm yapıları için, cami veya külliye merkezli bir yerleşim seçilmiştir. Erciş'in geçmiş dönem kent yapısı incelendiğinde seçimin doğruluğu görülür. Geçmiş görsel kayıtlara bakıldığında Erciş, depremde ağır hasar alıp yıkılan Kara Yusuf Paşa Camii etrafında

şekillenmiş olup esasında cami-merkezli bir şehirleşmeye dayanan kentsel plan yerleşimine sahipti. Kentsel dönüşüm kapsamında seçilen plan yerleşiminin de bu şekilde olması kentsel kimliğe aykırı olarak görülmemelidir. Sonuçta kentsel planlama fonksiyonu aynıdır. Kentsel dönüşümde yapılan uygulama, yeni yapılan cami ve avlu etrafında yapılaşma, doğru bir seçimdir.



Şekil 13- Deprem Öncesi, Erciş Kara Yusuf Paşa Camii

Ancak Erciş'in kent görünümü açısından seçilen mimari tasarım Erciş kent kimliğine uygun değildir. Şekil 14 te görüldüğü üzere geleneksel Karadeniz evleri tasarımsal olarak Erciş kentsel dönüşüm yapılarına benzemektedir. Daha çok ahşap yapı malzemelerinin kullanıldığı geleneksel Karadeniz evleri tamamen kendine has bir dış cepheye sahiptir. Söz konusu Erciş'teki günümüze ulaşan tarihi yapılarına bakıldığında, yapıların dış cephesinde taşın veya taş kaplamanın kullanıldığı görünür. 2011 sonrası yapılan kentsel dönüşüm yapılarının pencere detayları da yine Geleneksel Karadeniz Evleri'ne benzemektedir. Pencere kayıt detaylarının da yine birebir taklit edilmiş olduğu görülmektedir. Dolayısıyla burada Karadeniz Bölgesi'ne ait bir kimlik getirilip Erciş'in kentsel dönüşümünde işlenmiş ve uygulanmıştır. Bölgesel kentsel kimlik göçü olarak da adlandırabileceğimiz bu durum Erciş kent kimliği açısından son derece endişe vericidir.

Şekil 14- Örnek Geleneksel Karadeniz Evleri Görünümleri





Hareketi olarak bilinen, 1938-1950 senelerini içine alan dönemde globalde ve Türkiye’de oldukça farklı sosyo-ekonomik, politik, siyasal ve etkileşimlerin etkileri ile gelişerek Cumhuriyet dönemi kent mimarisinde kendi biçimini-kimlikliliğini oluşturma adına ilk büyük adımını teşkil etmiştir. Başta Ankara, İstanbul ve büyük kentlerde daha çok Anadolu geleneksel halk mimarlığının mimari objeleri ve malzemelerinin ele alınmıştır. Söz konusu akımı, Ankara’dan ırak diğer Anadolu kentlerinde İkinci Milli Mimarlık binalarına ait bazı unsurların yerel mimarlık akımları ile devinimselleşerek bir akım-mod fikrine dönüştürülmesi ile 1970’te kadar uygulanmıştır.

Doğu Bölgesi’nde Erzurum, Kars, Van şehirleri başta olmak üzere Anadolu’nun diğer kentsel bölgelerinde çoğunluk olarak önümüze çıkan düzgün kesme taş uygulamacığı görüldüğü bu yapılarda dış kapı ve dış pencere yapısal kemerleri ile kemer kilit taşlarının dışarı çıkarıldığı, zaman zaman kemer kilit taşları üzerinde bitkisel motiflere veya madalyonların yapıldığı ortadadır. Günümüz tarihi bölge kent kimliklerini ve tarihsel yapı-dokularını tamamlamayan anıtsal yapılar, Cumhuriyet dönemi mimarlık tarihi içerisinde çok orijinal yere sahiptirler. Basit ve heykelsel biçimleri ile dikkat çeken bu binalardan Atatürk Okulu ve Haydarbey Okulu, birçok Erciş ‘linin eğitim gördüğü mektepler olması hasebiyle kent halkı içinde de hatıra değerleri bulunmaktadır. Kentte sivil mimarının ilçedeki en lokomotif örnekleri olan Şevket Bey Yapısı ve Nezir Ergöl Yapısı, mimari biçemleriyle kentin Erken Cumhuriyet dönemi mimarlık geçmişine pencere olmaktadır. Düzgün kesme taş işçiliği, dışa doğru çıkarılmış kapı ve pencere dairesel kemerleri ile kemer kilit taşları üzerinde yer alan süsleme ve dekorları ile dikkat çeken 80-90 senelik tarihi olan bu binalar, maalesef yok olma tehditiyle yüzyüze kalmıştır. Ayrıca bu yapıların kentsel-varlık olarak korunmasının yanı sıra kimliksel-varlık olarak da korunması önem arz etmektedir. Bu durumda kentte yapılan en büyük ölçekli

projede de bu husus göz önünde bulundurulması gerekirdi. Ancak işlenen durum bunun tam tersi olarak gözlemlenmiştir.

Erciş kentinde yapılan kentsel dönüşüm açık bir şekilde bir kentin geçmiş kimliğini başka bir kente dönüştürme projesi olarak görülmektedir. Yapılan tasarım ve uygulama neticesinde Geleneksel Karadeniz Evleri'nin tasarım girdileri Erciş'te

işlenmiş olup, söz konusu kente Karadeniz kenti görünümü ve kimliği kazandırmıştır. Kentsel dönüşüm kapsamında yapılan yapıların Erciş kent kimliğini yansıtmamasının yanı sıra kentin ana arterlerinin de kapatılması kenti kapalı bir havzaya dönüştürmüştür. Özellikle cami etrafında konumlanan ofislerin kent merkezine erişimi sorun teşkil etmektedir. Kentsel dönüşümün plan fonksiyonu Erciş'in eski kentsel fonksiyonuna uygun olmasına rağmen burada sirkülasyon alanlarının zayıf bırakıldığı gözlemlenmiştir.

## 10.SONUÇ VE ÖNERİLER

Günümüz kentlerinde ise çoğu zaman gözden kaçan, hâlbuki hayli önemli bir sorun; kentin kendine ait bir kimlikten yoksun olmasıdır. Kimlik konusuna duyarsız olan hemen her ülkede, kimliksiz kentler başıboş biçimde ve sorunlarıyla birlikte büyümeye devam etmektedir. Son yıllarda modern kentlerin kimliklerini hızla veya yavaş yavaş kaybederek birbirine benzer hale gelmeye başladıkları dikkat çekmektedir.

Her kentte kendine özgü nitelikler taşıyan; fiziksel, kültürel, sosyoekonomik, tarihî ve biçimsel faktörlerle şekillenen ve başlı başına bir tarihî olgu olan kent kimliğinin zamanla oluştuğu gibi yine zaman içinde bir dereceye kadar değişmesi doğaldır. Ancak, arzu edilen ve olması gereken; değişimin mevcut kimlik ekseninde ve mevcut kimliği yok etmeden gerçekleşmesidir. Çünkü hiç değişmeyip bize hep aynı kalıyormuş gibi görünen kentler bile aslında yavaş da olsa büyümekte veya değişmektedir. Bizde bu algıyı/hissi uyandıran şey; bu kentlerin öz kimliklerine uygun gelişmesidir.

Osmanlı dönemine bakıldığında, topografyanın elverdiği yönde ve organik düzlemde gelişim gösteren Osmanlı kentlerinin çevresiyle bütünleşmiş, doğa ile barışık, anıtsal yapıları ve külliyeleriyle kendine has bir kentsel görünüm ve imaja sahip oldukları görülmektedir. Bugün ise Ülkemizde geleneksel yapıdaki kentler günümüzde sürekli büyüyen sosyo-ekonomik yapılarıyla geleneksel olmaktan hızla uzaklaşan bir kimliğe bürünmektedir. Birçok örneğinde olduğu gibi, değişim süreçlerinde kentlerin kimliklerini kaybettiği veya mevcut kimliğinin farklılaştığını ve kentin başka kentlerle benzeştiğini görmekteyiz. Hatta kimliğin özellikle önemli olduğu kentlerde, düzensiz yapılaşma o yerin kimliğini tamamen alıp



götürebilmektedir. Kimlik hakkında buraya kadar sözü edilenler dikkate alınacak olursa takdirde: kentlerin kimliklerinin korunması için söylenenlerin hayata geçirilmesi nasıl olacaktır; bunun başarmanın

şartları nelerdir ve bunu kim yapacaktır soruları cevaplanabilecek ve bu konuda kime ne görev düştüğü anlaşılacaktır.

Sonuç olarak kentlerin kimlikleri kent kullanıcılarını için son derece önemlidir. Kent kimliği ve mimarisini teşkil eden ne olursa olsun kentlerin mimari kimliği özgün ve geçmişine dayalı olması özellikle Anadolu da yer alan tüm kentler için önemlidir. Çünkü Anadolu'dan sayısız medeniyetler çıkmıştır. Onların mirası korunmalı ve çağdaş yapılara ilham kaynağı olmalıdır. Söz konusu çalışmaya konu olan Erciş'te çeşitli medeniyetlere ev sahipliği yapmış olup, korunması gereken mimari kimliğe sahip kentlerden biridir. 2011 Van Depremi sonrası Erciş için yapılan kentsel dönüşüm projesinde görülen yapılara gelirse, bunların daha çok Karadeniz yöresine ait yapılara mimari kimlik benzerliği dikkat çekmektedir. Projelendirme sürecinde yapı yerleşimleri geleneksel Osmanlı çarşı mimari yönelimine benzese de Erciş'in mevcutta sahip olduğu tek mimari kimlik yapıları olan Erken Dönem Cumhuriyet yapılarına benzememektedir. Kentsel dönüşüm kapsamında yapılan yapıların açık bir şekilde "Tarihi Karadeniz-Kastamonu Evleri"nden ilham alındığı ortadadır. Erciş erken cumhuriyet dönemi yapılarına bakıldığında kentteki yapılarda dış cephelerin taş veya taş kaplamaya rastlanılmaktadır. Dolayısıyla yapılan yapıların Erciş kent kimliğine zarar verdiği ve kentin tarihsel değerlerini gözetmediği ortadadır. Bu durumda öne sürülen "H0: 2011 Van Depremi sonrasında kentsel dönüşüm kapsamında yapılan yapılar, tarihsel mimari bütünlük gözetildiğinde, Erciş kent kimliğine aykırıdır." hipotezinin doğruluğu ortaya çıkmaktadır.

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## ÇOKLU SU ALMA AĞIZLARINA AİT KRİTİK BATIKLIĞIN SAYISAL OLARAK BULUNMASI

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### ÖZET

Akım ortamlarından veya durgun sulardan su temini için çeşitli büyüklük ve şekillerde su alma ağızları kullanılmaktadır. Tek bir su alma ağzının debisinin yeterli olmaması durumunda ikili veya üçlü su alma ağızları kullanılabilir. Yatay veya düşey olarak düzenlenebilen bu yapılardan su alınırken hava girişi olmamasına dikkat edilmesi gerekir. Ağız veya ağızlara hava girişinin deneysel olarak incelenmesi bazı projeler için maliyet ve zaman açısından uygun olamayabilmektedir. Bu çalışmada, açık kanal akımı içerisinde bulunan ve düşey aşağı su alan ikili ve üçlü dairesel su alma ağzına hava çekirdekli çevrintinin ulaştığı, su yüzeyi ve ağız arasındaki düşey mesafe olan kritik batıklık, bir hesaplamalı akışkanlar dinamiği yazılımı ile bulunmuştur. Model sonuçları literatürdeki deneysel neticelerle karşılaştırılmıştır. Modellerde, türbülans modeli olarak büyük girdapları çözen, küçük girdapları da modelleyen LES (large eddy simulation) modeli seçilmiştir. Sayısal analizler sonucunda, kritik durumda hava çekirdekli çevrintinin ağza ulaştığının simülasyonlarda tam olarak gözlemlenmesi için oldukça küçük çözüm ağı aralığı seçilmesi gerektiği görülmüştür. Bu yüzden kritik batıklığın tahmini için akım alanı içerisindeki vortisite dağılımından da yararlanılmıştır. Gerek ikili gerekse üçlü ağız durumunda, ağız merkezlerini birleştiren doğru ile ağızlara yaklaşan akım doğrultusundaki açının büyümesi halinde hata oranının düştüğü, bu açı sıfıra doğru yaklaştıkça ise hata oranının arttığı görülmüştür. Bunun sebebinin membada bulunan su alma ağzı akımlarından kaynaklanan ve mansaba doğru taşınması beklenen çevrintili akımın simülasyonlarda tam olarak yakalanamaması olduğu sonucuna varılmıştır. Sonuç olarak incelenen hesaplamalı akışkanlar dinamiği yazılımının, kanal akımı içerisinde yerleştirilmiş ve düşey aşağı su alan çoklu su alma ağızlarına ait kritik batıklığı bulma konusunda, belirli akım ve geometri şartlarında kabul edilebilir doğrulukta sonuçlar verebildiği anlaşılmıştır.

**Anahtar kelimeler:** Çevrinti, hesaplamalı akışkanlar dinamiği, kritik batıklık, su alma ağzı

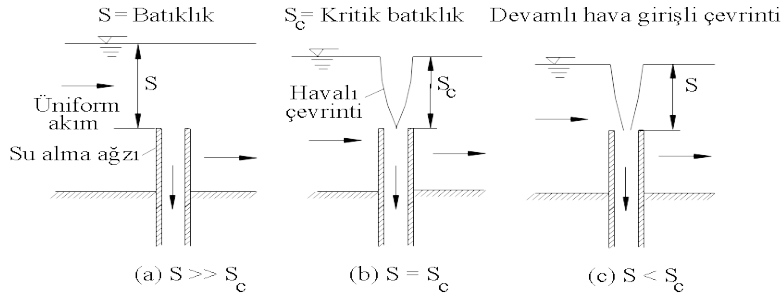
**NUMERICAL SIMULATION OF CRITICAL SUBMERGENCE FOR MULTIPLE INTAKES****ABSTRACT**

Various sizes and shapes of intakes are used for taking water from flow environments or stagnant waters. If the discharge of a single intake is not sufficient, dual or triple intakes can be used. While taking water from these structures, which can be arranged horizontally or vertically, attention should be paid to avoid air-entrainment to intakes. Experimental examination of the air entrainment to intakes may not be suitable in terms of cost and time for some projects. In this study, the critical submergence which is the vertical distance between the water surface and the intakes at which the air-core vortex just reaches the intakes was investigated with a computational fluid dynamics software for the dual and triple vertically downward flowing intakes located in an open channel flow. The model results were compared with the available experimental results. In the models, the LES (large eddy simulation) turbulence model, which solves large eddies and models small eddies, was chosen. As a result of the numerical analysis, it has been seen that a very small mesh sizes should be selected in the simulations in order to fully observe the air-core vortex in the critical condition. Therefore, the vorticity distribution within the flow field was also used for the estimation of critical submergence of both dual and triple intakes. It has been observed that if the angle between the direction of the approaching flow and the line connecting the intake centers increases, the error decreases, and as this angle approaches zero error increases. The reason for this is that the separation vortices originating from the flow of the upstream intake and expected to be carried towards the downstream could not be fully captured in the simulations. It has been deduced that the examined computational fluid dynamics software can give acceptable results for the prediction of critical submergence for multiple intakes located in the channel flow under certain flow and geometrical conditions.

**Keywords:** Vortex, computational fluid dynamics, critical submergence, intake

## 1. GİRİŞ

Su alma ağızları durgun sulardan veya akım ortamlarından su temini için kullanılan yapılardır. Su alma yapıları tasarlanırken temin edilmek istenen su debisinin sağlanmasının yanında, yapıya sediment veya hava girişi olup olmayacağı da dikkate alınmalıdır. Su alma yapılarından alınan sudaki belli bir çap ve miktarın üzerindeki sediment türbinlerde ve diğer yapılarda aşınma gibi sorunlara neden olur ve çökeltim havuzlarının verimini azaltır. Bununla birlikte su alma ağızı üzerinde oluşan serbest çevrıntiler sonucu hava girişi de önemli bir sorundur. Eğer ağza hava girişi olursa istenilen debinin altında su temin edilir. Buna ek olarak pompa ve türbinlerin verimliliğinin düşmesine, gürültü, titreşim ve kavitasyona neden olur. Oluşan bu çevrıntiler sistemin çalışmasının askıya alınmasına bile sebep olabilir. Su alma ağızına hava girişini önlemek için su yüzeyi ile ağız arasında belli bir düşey mesafe farkı olması gerekir. Ağız merkezinden su yüzeyine kadar olan düşey mesafe o su alma ağızına ait “batıklık (S)” değerini gösterir. Su alma ağızı üzerinde tam bir çevrinti oluşumu sonrası hava girişinin başladığı su derinliği ise “kritik batıklık ( $S_c$ )” olarak tanımlanmaktadır. Şekil 1’de düşey bir su alma ağızına ait batıklık ve akım durumları görünmektedir.



Şekil 1. Su alma ağızına ait batıklık, kritik batıklık ve hava girişi (Arslan, 2006)

Durgun sulardan veya akım ortamlarından alınmak istenilen su için tekli su alma ağızları yetmeyebilir. Bu durumda çoklu (ikili veya üçlü gibi) su alma ağızları kullanılabilir. Bu çalışmada bir Hesaplamalı Akışkanlar Dinamiği (HAD) programı olan Flow-3D aracılığı ile tabandan belli bir seviye yüksekte olacak şekilde konumlanmış çoklu (ikili veya üçlü) su alma ağızlarına ait kritik batıklık araştırılmıştır. Çoklu su alma ağızlarına ait kritik batıklık ile ilgili mevcut sınırlı sayıdaki çalışmalardan aşağıda bahsedilmiştir.

Yıldırım ve Taştan (2009) üniform akım ortamına farklı konumlarda yerleştirilmiş çoklu su alma ağızlarına ait kritik batıklığı süperpozisyon yöntemiyle bulmuşlardır. Süperpozisyon yönteminde her bir ağza ait küresel kuyu yüzeyleri toplanarak ağızların birbirleri üzerindeki akım engel etkileri göz önüne alınmıştır. Yıldırım vd. (2009) kanal akımı içerisine yerleştirilmiş düşey aşağı su alan ikili dairesel su alma ağızlarına ait kritik batıklığı potansiyel akım yaklaşımını kullanarak bulmuştur. Yıldırım ve Taştan (2017) ikili ağız durumunda ağız akımlarının birbirleri üzerinde akım engel etkilerinin ihmal edilebileceği mesafeyi araştırmışlardır. Yıldırım vd. (2011) kanal içerisine farklı konumlarda yerleştirilmiş çoklu su alma ağızlarına ait kritik batıklığı potansiyel akım çözümüyle analitik olarak elde etmişlerdir. Yıldırım vd. (2012) kanal akımı içerisine farklı konumlarda yerleştirdikleri ikili dikdörtgen su alma ağızı için kritik batıklığı süperpozisyon yöntemiyle elde etmişlerdir. Dikdörtgen ağızlara ait kuyu yüzeylerinin toplamı yapılırken bu kuyu yüzeylerinin şekli, iki ucu yarım küresel kuyu yüzeyi ile kapalı silindirik bir kuyu yüzeyi olduğunu kabul etmişlerdir.

Su alma yapıları ve bu yapılarda oluşabilecek çevrintili akımların HAD kullanılarak çözümleriyle ilgili yapılan çalışmalar aşağıda özetlenmiştir.

Kadhim ve Thamiry (2020), ANSYS Fluent kullanarak kritik batıklık incelemesi yapmışlardır. 3 farklı ağız tipi, 5 farklı batıklık, 3 farklı boru arası mesafe ve 5 farklı emiş hızı kullanıp 225 farklı kombinasyon için kritik batıklık değerini bulmuşlardır. Jain, Ahmad ve Singh (2013), Reynolds Ortalamalı Navier Stokes denklemlerini kullanan ANSYS Fluent 14.0 programında k-ε türbülans modeliyle çoklu su alma ağızlarının bulunduğu serbest su yüzeyli bir rezervuarda oluşan çevrintilerle alakalı sayısal bir çalışma yapmıştır. Sonuç olarak çevrinti oluşumunun Froude sayısı ile doğru orantılı olduğunu, çevrintinin yok olmasının, yukarı yönlü su alan düşey su alma ağzının batıklık miktarı ile üstel olarak orantılı olduğunu ifade etmişlerdir. Guyot vd. (2014), sonlu hacimler yöntemi kullanan Flow-3D programının verdiği sonuçların kararlılık ve uygunluğunu test etmek amaçlı, hidrolik olarak kompleks bir olay olan, serbest yüzeyli akımlarda çevrinti oluşumu üzerine çalışma yapmışlardır. Tataroğlu (2014), hazne ve yatay su alma ağzından oluşan bir sistemdeki çevrinti oluşumunu Flow-3D yazılımı ile sayısal olarak incelemiştir. Sayısal modellemeler öncesi debi, ağız çapı, hazneye ait yan duvarların birbirine olan uzaklığı gibi değerleri değiştirmiş ve her düzenek için kritik batıklık değerini bulmuştur. Lucino vd. (2010), bir hazneden pompa ile düşey yukarı yönlü bir ağız aracılığı ile su

çekilmesi sonucu oluşan çevrintilerin deneysel sonuçlarını, Flow-3D programının verdiği nümerik sonuçlar ile kıyaslayıp doğrulamayı amaçlayan bir çalışma yapmışlardır. Sungur

(2018), asimetrik konumlu yatay bir su alma ağzına ait kritik batıklığı Flow-3D aracılığı ile incelemiş ve elde ettiği nümerik sonuçları, Haspolat (2015)'in deneysel sonuçları ile karşılaştırmıştır. Nümerik ve deneysel sonuçlar arasında %3,21 ila %16,76 hata payı olduğunu, bu sebeple programın asimetrik konumlu ağızlar için çevrinti oluşumunu araştırmada oldukça başarılı olduğunu belirtmiştir.

Yapılan çalışmalar göz önüne alındığında, kanal akımı ortamında düşey aşağı su alan çoklu (ikili veya üçlü) su alma ağızlarına ait kritik batıklığın bir HAD programıyla bulunması ile ilgili benzer sayısal bir çalışma olmadığı görülmüştür. Bu çalışmada dikdörtgen bir kanal akımı ortamında farklı pozisyonlarda konumlandırılmış ikili veya üçlü düşey aşağı su alan dairesel su alma ağızlarına ait kritik batıklık Flow-3D yazılımıyla bulunmaya çalışılmıştır. Böylece, kullanılan yazılımın bu tip bir problemi hangi ölçüde ve hangi şartlar altında tahmin edebildiği mevcut çalışmalardaki deneysel sonuçlarla karşılaştırılarak ortaya konacaktır.

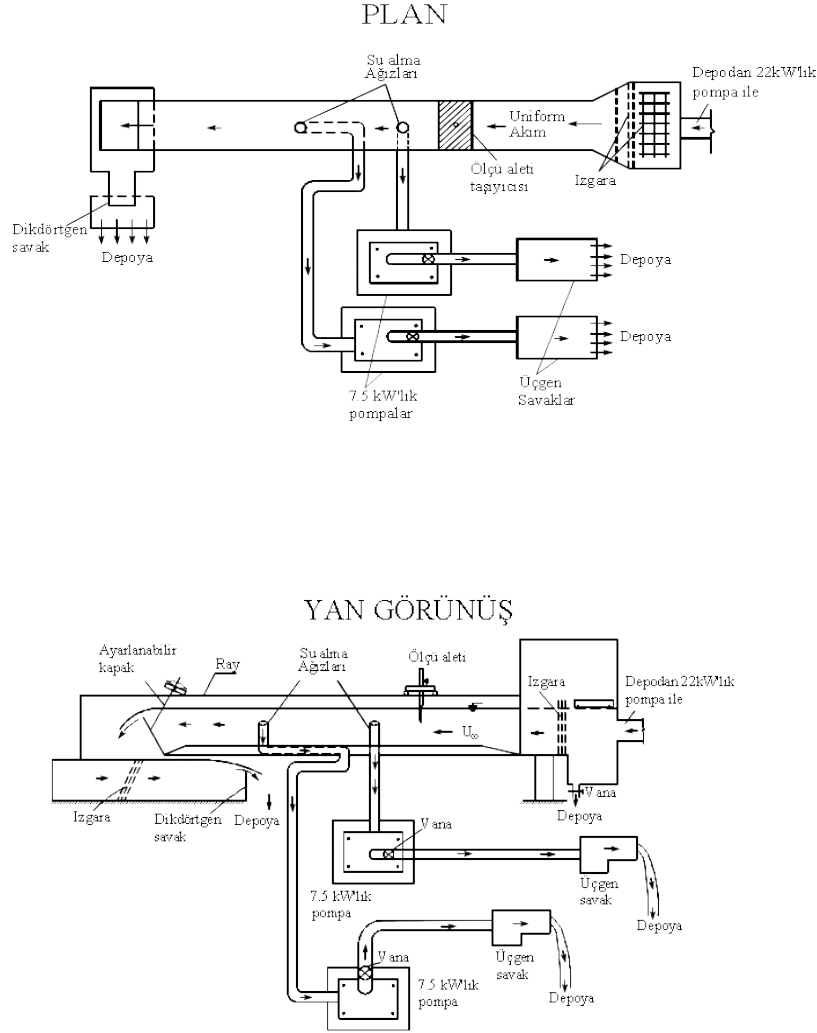
## 2. DENEYSEL ÇALIŞMA

Bu çalışmada, dikdörtgen kesitli kanal akımı içerisinde düşey aşağı yönlü su alan çoklu su alma ağızlarına ait kritik batıklık değerinin sayısal olarak bulunması amaçlanmıştır. Bulunan sonuçların doğruluğunun kıyaslanması için deneysel verilere ihtiyaç olduğundan çoklu su alma ağızlarına ait kritik batıklığın deneysel olarak incelendiği Taştan (2007)'nin çalışmasından faydalanılmıştır. Laboratuvar ortamında su alma ağızlarına ait kritik batıklık araştırılırken Taştan (2007)'nin çalışmasında yatay, dikdörtgen geometriye sahip açık bir kanal kullanılmıştır. Kanal uzunluğu 10 m, genişliği ve yüksekliği ise 50 cm'dir. Akım, kanal başlangıcındaki 22 kW gücünde bir pompayla kanala verilmiştir. Kanala verilen akımı uniform ve dönmesiz bir hale getirmek amacıyla kanal başlangıcından 2,5 m mesafede ızgara kullanılmıştır. Deney düzeneği Şekil 2'de gösterilmektedir.

Kanal ortasında iç çapı  $D=5.32$  cm, dış çapı  $D=5.92$  cm boru tipi düşey aşağıya doğru su alan su alma ağızları kullanılmıştır. Boruların cidar kalınlığı 0.3 cm'dir. Kanal ortasında konumlandırılmış su alma ağızlarının sayısı ise 2 veya 3 olmak üzere deney setine göre değişmektedir.

Deney setlerinde ağız arası mesafeler  $a$ , ağızların birbirine göre açıları ise  $\alpha$  ile gösterilmiştir. Çalışmada kritik batıklık üzerindeki yan duvar ve kanal tabanı etkilerinin ihmal edilebilmesi için ağızların belirtilen katı sınırlardan en büyük kritik batıklık değerinden daha fazla olacak şekilde konumlandırıldığı ifade edilmiştir. Çalışmadaki temel amacın ağızların birbirlerine ait

akım etkilerini araştırmak olduğu belirtilmiştir. Bu sebeple su alma ağızlarının merkezleri ile kanal tabanı arasındaki düşey mesafe 4D olarak (21.28 cm) seçilmiştir.



Şekil 2. Deneysel düzeneği (ölçeksiz) (Taştan, 2007)

Ağızlardan alınan debiler kanal dışında 7.5 kW gücünde pompalar aracılığıyla çekilmiştir. Kanala su verilirken de 22 kW gücünde bir pompanın kullanılmıştır.

Pompa çıkışındaki vanalar sayesinde ağızlardan çekilen debiler ve kanala verilen debi ayarlanabilmiştir. Bununla birlikte debi ölçümü için ağızlardan çıkan akımın geçtiği pompalardan sonra üçgen savak, kanal sonunda su alma ağızlarından artan suyun geçtiği dikdörtgen savak kullanılmıştır. Kanal sonundaki bulunan ayarlanabilir kapak yardımıyla da kanaldaki seviye ayarlanabilmiştir. Deneysel yapılar yapılırken pompalar aracılığıyla kanala su



verilmiş ve ağızlardan su alınmıştır. Tam bir çevrinti (hava girişli çevrinti) oluşuncaya kadar beklenilmiş eğer oluşum yoksa kanal sonundaki kapak aracılığıyla seviye belli bir miktar düşürülmüştür. Çevrinti oluşunca ise debi ve kanaldaki su seviyesi ölçümleri yapılmıştır.

### 3. SAYISAL ÇÖZÜMLEME YÖNTEMİ

Mevcut çalışmada da çoklu su alma ağızları için kritik batıklık değeri sayısal olarak araştırılırken Flow-3D programı kullanılmıştır. Flow-3D özellikle serbest yüzeyli akımlarla alakalı çözümler üretme ve inceleme yapmak için kullanılan bir HAD (Hesaplamalı Akışkanlar Dinamiği) programıdır (Yıldırım, 2021).

Flow-3D, dikdörtgen çözüm ağı için VOF (Volume of Fluid) metodu kullanan ticari bir hesaplamalı akışkanlar dinamiği kodlamasıdır (Guyot vd., 2014). Bu program Hesaplamalı Akışkanlar Dinamiği (HAD) – (Computational Fluid Dynamics, CFD) alanında kullanılan etkili bir modeldir. Flow-3D türbülans, viskozite, sıg sular, kavitasyon, gözenekli ortamlar gibi farklı fiziki durumları modelleyebilmektedir Bu program, akış alanının üç boyutlu analizini yapabilir ve akışkanlarla ilgili konuları içeren geniş bir pratik aralığa sahiptir. Bu yazılım döküm, hidrolik, havacılık, deniz bilimleri, petrol, gaz vb. konularla ilgili problemlerin çözümünde kullanılmaktadır.

Programda çözümlenmesi istenen model oluşturulduktan veya hazır bir model, program ortamına aktarıldıktan sonra akım alanının hesaplanması için ağ sisteminin belirlenmesi ve daha sonra ağ bloklarının oluşturulması gerekmektedir. Bir model için tek bir ağ bloğu kullanılabildiği gibi daha detaylı inceleme için iç içe geçmiş (yuvalanmış - nested) ağ blokları da kullanılabilmektedir. Ağ sistemini ve ağ bloklarını modele uygun seçtikten sonra ağ aralıklarının belirlenmesi gerekmektedir.

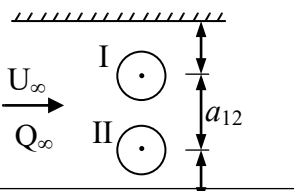
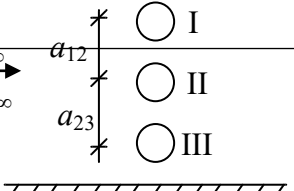
Modele ait ağ aralıkları belirlenir veya istenilen sayıda hücre sayısı bir ağ bloğu için tanımlanır. Bu kontrol hücrelerinin merkezlerinde (kontrol hacmi olarak da tanımlanmaktadır) o hücreye ait skaler büyüklükler yer almaktadır (Yıldırım, 2021). Programda analiz yapılırken hücrelerin yüzeylerinde ise hız gibi vektörel büyüklükler

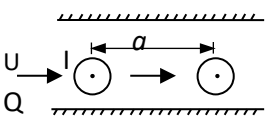
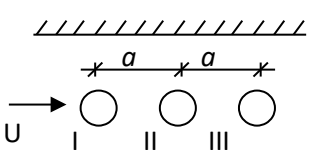
bulunur. Bu aşamadan sonra ise başlangıç koşulları, ağ bloklarına ait sınır koşulları ve türbülans modeli belirlenmelidir. Programda FAVOR (Fractional Area / Volume Obstacle Representation) isminde, incelenecek hücrelere ait hacmin ne kadarının hesaplanabilir, ne kadarının da katı ile dolu olduğunu gösteren bir yöntem bulunmaktadır. Bu sayede kullanıcı, modelin simülasyonuna başlamadan önce ağ blokları içerisindeki katı alanı ve akışkan hareketinin gerçekleşebileceği alanı inceleyebilmektedir.

#### 4. SAYISAL ÇALIŞMA: DÜŞEY BORU TİPİ ÇOKLU AĞIZLARININ MODELLENMESİ

Bu bölümde anlatılan sayısal modellemelerde, 2. bölümde bahsedilen Taştan (2007)'nin deneysel çalışması esas alınmıştır. Bu çalışmada sayısal olarak modellenen deney setlerine ait tablo aşağıda verilmiştir (Bu tabloda  $Q_\infty$  ve  $U_\infty$  ağız grubuna yaklaşan akımın debisini ve ortalama hızını, c ağızların tabana mesafesini, Q ise ağızların debisini göstermektedir)

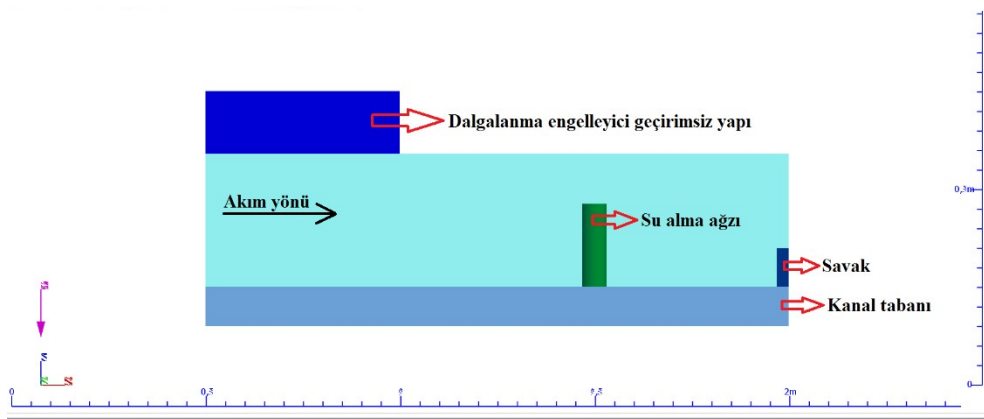
**Tablo 1.** Modellenen deney setleri

Şekil	Deney No	a/D	c/D	$Q_\infty$ (lt/sn)	$Q_1$ (lt/sn)	$Q_2$ (lt/sn)	$Q_3$ (lt/sn)
	1.1	2	4	15.83	6	6	-
	1.2			15.48	6	2	-
	1.3			15.66	4	8	
	1.4			15.1	2	8	
	1.5			15.1	3	6	
	2.1	2	4	17.58	4	2	6

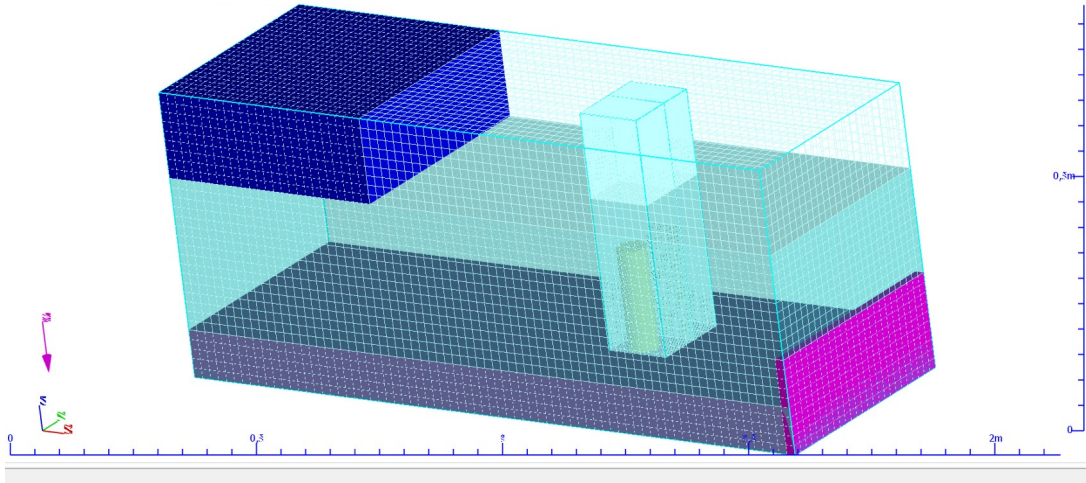
	2.2			22.8	5	5	5
	3.1	2	4	20.22	6	6	-
	3.2			21	7	7	-
	3.3	4	4	22.94	10	5	-
	4.1	2	4	21.7	5	5	5
	4.2	2	4	18.16	1	7.5	0.75

Sayısal modelin kurulmasının ilk aşaması deneydeki fiziksel modelin şeklinin yazılıma tanıtılmasıdır. Bu bağlamda, 1.5 m uzunluğunda dikdörtgen kesitli, yatay tabanlı bir açık kanal düzeneği ve akışkan olarak 20° sıcaklıkta bulunan su kullanılmıştır. Deneylerde kullanılan kanalın boyu 7.5 m olmasına rağmen, 1.5 m'lik kanal uzunluğunun daha uzun kanal uzunluklarına kıyasla simülasyonlarda ciddi bir fark oluşturmadığı görüldüğünden çözüm süresinden tasarruf etmek adına bu kanal uzunluğunun seçilmesi yeterli görülmüştür (Şekil 3).

Yukarıda anlatılan fiziksel model yazılımda oluşturulduktan sonra çözüm ağlarının yazılıma tanıtılması gerekir. Modelde, tüm kanalı kapsayacak bir ana ağ bloğu ve her bir su alma ağzını ve civarındaki akımı tanımlayacak ana ağ bloğu içine tanımlanmış ağ blokları (nested mesh blocks) kullanılmıştır. Dolayısıyla örneğin ikili ağız durumunda toplam 3 adet çözüm ağı bloğu bulunmaktadır. Çözüm ağı bloklarının oluşturulmasından sonra ağ aralıklarının belirlenmesi gerekmektedir.



Bu açıklamalar ışığında, programın akışkan hareketini hesaplaması için oluşturulan ana ağ bloğu 0.02 m aralıklı, çevrıntilerin daha detaylı gözlemi ve ağızlardan su temini için kullanılan ağız boruları etrafındaki ağ blokları 0.0025 m aralıklı belirlenmiştir. Ana ağ bloğu ve su alma ağızları çevresinde kullanılan ağ blokları Şekil 4.'de görülmektedir.

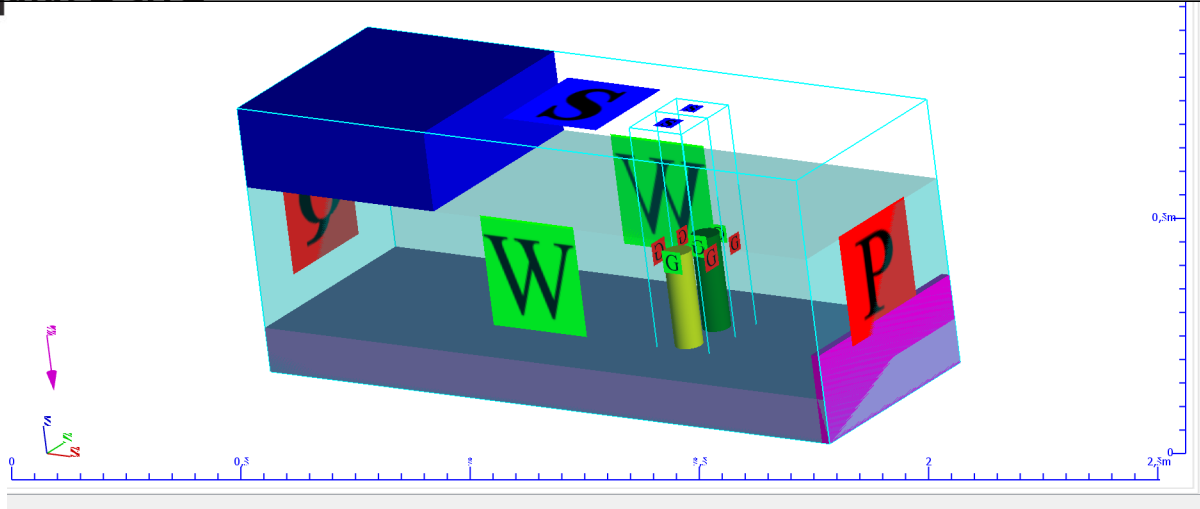


Şekil 4. Modele ait ağ blokları

Ağ blokları oluşturulduktan sonra bloklara ait sınır koşulları belirlemiştir. Buna göre temel çözüm ağı bloğunun X yönünde minimum değeri için “Debi (Volume flow rate)” seçilip kanala verilecek su değeri deneylere ait verilerle aynı olarak yazılmıştır. Temel ağ bloğuna ait X maksimum değeri “Basınç (Specified pressure)” seçilip ilgili simülasyon için seçilen su yükseklik değeri girilmiştir. Temel ağ bloğunun sınırları y minimum, y maksimum, z minimum “Wall” olarak seçilmiştir. İlgili çözüm ağı bloğunun z maksimum değeri “Simetri (Symmetry)” olarak belirlenmiştir.

Su alma ağızı etrafındaki ince aralıklı çözüm ağı bloklarının sınır şartları z minimum hariç “Grid overlay” olarak belirlenmiştir. z minimum için  $-z$  yönünde su çekilmesi amacıyla “Debi (Volume flow rate)” seçilmiştir. Başlangıç koşulu olarak da, simülasyon başlangıcında kanalın seçilen su yüksekliği ile dolu olduğu kabul edilmiştir.

Ağ bloklarına ait sınır şartı seçimleri model üzerinde Şekil 5’de görülmektedir.



Şekil 5. Model ağ bloklarının sınır koşulları

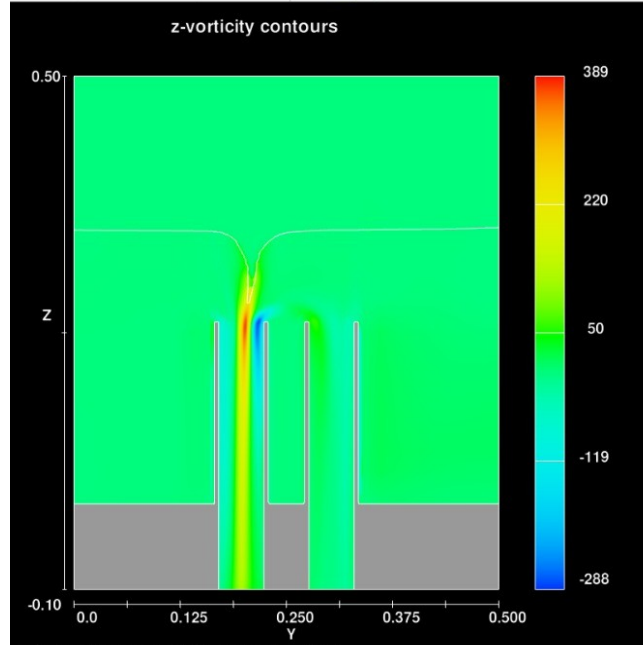
Su alma yapılarında hava çekirdekli çevrinti oluşumunu inceleyen benzer çalışmaların çoğunda da LES modeli kullanıldığından (Evranoş 2019, Sungur 2018, Yıldırım 2020) bu çalışmada da türbülans modeli olarak LES seçilmiştir.

İncelenen sayısal modellerde genel çözüm ağ aralığı 2 cm, su alma ağızlarına ait çözüm ağlarına ait ağ aralığının 0.25 cm belirlendiği daha önce belirtilmişti. Bu ağ aralıkları için hava girişim olarak her modelde gözlemlenmemektedir. Su yüzeyinde bir çöküntü ve hava çekirdekli çevrintinin su alma ağzına doğru düşey aşağı yönde bir miktar uzaması görülebiliyorken hava çekirdekli çevrintinin ağza tamamıyla ulaşması simülasyonların çoğunda, seçilen çözüm ağ aralıklarında mümkün olmamıştır. Hava girişli çevrintinin tam olarak ağza girişinin gözlemlenmesi için su alma ağızlarını çevreleyen çözüm ağ bloklarının çok daha küçük ağ aralıklarına sahip olması gerekmektedir (örneğin  $< 0.1$  cm). Bu çalışmada genel çözüm ağ bloğu 2 cm aralıklı, ince çözüm ağ blokları 0.25 cm aralıklı seçilmiş ve bunun sonucu çözümlerin alındığı bilgisayar için 50 sn'lik simülasyon, yaklaşık 5 gün sürmüştür. Biraz ileride de

anlatılacağı gibi bir deney verisine ait kritik batıklığın bulunması için en az iki veya daha fazla sayıda deneme yapılması gerekmektedir. Bu durum da bir deney verisine ait çözümün seçilen çözüm aralığında bile yaklaşık 15 gün sürmesi anlamına gelmektedir. Daha ince bir çözüm ağ kullanılması bir simülasyon için harcanacak zamanı ay mertebesine getireceği için bu noktada yatay tekli bir su alma ağzında kritik batıklığın araştırıldığı Sungur (2018)'in çalışmasında izlenen yöntemden faydalanmıştır.

Sungur (2018), ölü sonlu dikdörtgen bir kanalda yatay tekli bir su alma ağzına ait kritik

batıklığın sayısal olarak incelediği çalışmada, bu çalışmadakine benzer olarak ağ aralıklarının hava çekirdekli çevrintinin ağza girişini tam olarak yakalayabilecek kadar çok küçültülmesinin uygulamadaki zorluğuna değinirken sirkülasyon ve vortisite değerlerini kritik batıklığın tahmini için kullanmıştır. Hava girişli çevrinti durumunda, su yüzeyinde başlayan vortisite, büyüklüğünde azalma olmadan ağza kadar ulaşmalıdır. Dolayısıyla simülasyonlarda, hava çekirdekli çevrintiye ait çöküntü ve bir miktar düşey uzamanın gözlemlenmesinin ardından vortisite konturları takip edilerek ağza kadar vortisitenin taşınıp taşınmadığı kontrol edilmiştir (Şekil 6).



Şekil 6. Akım alanında oluşan eş vortisite konturları

Bu çalışmada kritik batıklığın tahmini için ise deneme-yanılma yöntemi izlenmiştir. Seçilen deney verisi için deneyde gözlemlenen kritik batıklık değerine yakın bir su

seviyesinde simülasyon çalıştırılmıştır. Eğer ağza hava girişi simülasyon süresi boyunca gözlemlenmezse su yüzeyi 1 cm düşürülerek simülasyon tekrar edilmiştir. Bu işlem hava girişi elde edilene kadar devam ettirilmiştir. Eğer ilk denemede hava girişi gözlemlenirse de, bu sefer su yüzeyi 1 cm artırılarak hava girişinin devam edip etmediği kontrol edilir. Bu durumda da hava girişi olmayıncaya kadar su seviyesi arttırılmaya devam edilir. Dolayısıyla bir deney verisinin simülasyonu için en az 2 deneme yapılması gerekir ki, bu çalışmada kritik batıklığın bulunabilmesi için genelde 3-4 simülasyon yapılmıştır.

Yukarıdaki tüm açıklamalar ışığında simülasyonlar sonucunda elde edilen kritik batıklık değerleri ile deney neticelerinin karşılaştırılması aşağıdaki tabloda verilmiştir.

**Tablo 2.** Simülasyon sonuçları ile deney sonuçlarının karşılaştırılması

Deney No	a/D	c/D	$Q_{\infty}$ (lt/sn)	$Q_1$ (lt/sn)	$Q_2$ (lt/sn)	$Q_3$ (lt/sn)	$S_c$ (cm) (deney)	$S_c$ (cm) (sim.)	Hata (%)	Ort. Hata (%)
1.1	2	4	15,83	6	6	-	11,9	8,72	27	20,1
1.2			15,48	6	2	-	10,97	9,72	11,3	
1.3			15,66	4	8	-	12,72	11,72	7,9	
1.4			15,1	2	8	-	11,48	8,72	24	
1.5			15,1	3	6	-	10,85	8,72	19,6	
2.1	2	4	17,58	4	2	6	9,65	7,02	27	20,1
2.2			22,8	5	5	5	10,13	7,72	23,8	
3.1	2	4	20,22	6	6	-	13,1	8,72	33,4	38,6
3.2			21	7	7	-	18,35	10,72	41,5	
3.3	4	4	22,94	10	5	-	12,65	6,72	46,9	
4.1	2	4	21,7	5	5	5	11,88	7,72	35	
4.2	2	4	18,16	1	7,5	0,75	10,53	6,72	36	

Yapılan simülasyonlarda 1 cm lik deneme yanılma payı olduğu ve simülasyon sonuçlarının 1 cm kadar da arttırılabileceği de göz önünde bulundurulmasında fayda vardır.

## 7. SONUÇLAR VE ÖNERİLER

Su alma ağızları tasarlanırken su yüzeyinde oluşan hava çekirdekli çevrıntiler yoluyla ağza hava girişinin engellenmesi gerekmektedir. Çünkü bu durum su alma ağzının verimli çalışmamasına, istenilen debinin alınamamasına ve su iletim hattında kavitasyon ve titreşimlere neden olur. Bu durum için alınabilecek en kolay tedbir, ağız merkezleri ile su

yüzeyi arasındaki düşey mesafe olan batıklığı su alma ağzına hava girişinin başlayacağı kritik batıklık değerinden yüksek tutmaktır. Bu çalışmada dikdörtgen kesitli bir açık kanal akımı içerisine yerleştirilmiş ve düşey aşağı su alan dairesel kesitli çoklu su alma ağzlarına ait kritik batıklık hesaplamalı akışkanlar dinamiği ilkelerini kullanan bir yazılım ile sayısal olarak elde edilmeye çalışılmıştır. Bu çalışmada elde edilen sonuçlar ve öneriler aşağıda sıralanmıştır.

- Çoklu su alma ağzı akımları aralarındaki mesafeye, açığa ve debi oranlarına bağlı olarak birbirleri üzerinde akım engel etkileri uygularlar.
- Bir ağız grubu içerisindeki bir ağız üzerinde oluşan hava çekirdekli çevrintinin ağza kadar ulaşıp ulaşmadığının bilgisayar modellemelerinde tam olarak gözlemlenebilmesi için çok küçük çözüm ağı aralıkları gerekmektedir. Çünkü hava çekirdekli çevrintinin yarıçapı çevrintinin alt ucu ağza doğru yaklaştığında oldukça küçülmektedir. Dolayısıyla tam bir çözüm alınabilmesi için çok yüksek kapasiteli bilgisayar imkanlarına ihtiyaç vardır.
- Kritik batıklık veya hava çekirdekli çevrintinin oluşumu üzerinde bilgisayar modellerinde seçilen türbülans modelinin de önemi büyüktür. Bu çalışma kapsamında yapılan simülasyonlar LES (large eddy simulation) türbülans modelinin hava çekirdekli çevrinti için daha başarılı olduğunu göstermiştir.
- Hava çekirdekli çevrintinin tam olarak ağza girişinin görülemediği durumlarda kritik batıklığın tahmini için ağız yüzeyindeki çöküntü ile belirginleşen ve ağza doğru ilerledikçe şiddeti artan vortisitienin takibi yapılmıştır. Ancak belirtilen durumun oluşması halinde bile ağza hava girişinin kesin olarak gerçekleştiğini söylemenin mümkün olmadığı bilinmelidir.
- Gerek ikili gerekse üçlü ağız durumunda, kanal akımı doğrultusu ile ağız merkezlerini birleştiren doğru arasındaki açının  $90^\circ$ 'ye yaklaşması durumunda deneysel kritik batıklık ile sayısal arasındaki yaklaşık ortalama hata debi durumlarına bağlı olmak kaydıyla %20 civarı iken bu hata açının  $0^\circ$ 'ye yaklaşması durumunda %40'lara çıkmaktadır.
- Simülasyonlarda hata oranının en büyük olduğu durum, kanal akımı doğrultusu ile ağız merkezleri arasındaki açı  $0^\circ$  olduğu ve membada bulunan ağız debisi ile mansapta bulunan ağız debisi arasında ciddi bir farkın olmadığı durumdur. Böyle bir durumda mansaptaki ağzın debisi mabadaki ağzın debisinden küçük olsa dahi kritik batıklık mansaptaki ağzda oluşmaktadır. Mabadaki ağza ait Rankine şeklinin etrafında oluşan ayrılma çevrintileri kanal akımı ile birlikte mansaba taşınmakta ve mansaptaki ağzın üzerinde su yüzeyinde rahatsızlıklara sebebiyet vererek mansaptaki ağzın kritik duruma ulaşmasını sağlamaktadır. Fakat bilgisayar modellemelerinde mabadaki ağız üzerinde oluşan ayrılma çevrintilerinin



mansaba doğru taşınması tam olarak görüntülenmesi için çözüm ağı aralığının çok küçültülmesi gerektiğinden simülasyonlarda bu durum tam olarak yansıtılamamış ve kritik batıklık, olması gerektiğinden çok daha az bulunmuştur.

- Kanal akımı doğrultusu ile ağız merkezleri arasındaki açı  $90^\circ$  olması durumunda ağızlara ait Rankine şekillerinin etrafındaki ayrılma çevrintileri yüzeyde ağız akımları üzerinde çok etkili olmadığından bu durum içinde yazılım nispeten daha düşük hata oranları ile sonuç verebilmektedir.
- Tüm bilgisayar simülasyonlarında kritik batıklık değeri deneysel kritik batıklıktan daha küçük bulunmuştur.

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## TÜRKİYE'DE KADINA YÖNELİK PARTNER DIŞI EKONOMİK ŞİDDETİN SOSYO-DEMOGRAFİK VE EKONOMİK BELİRLEYİCİLERİ

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### ÖZET

Şiddet, Dünya Sağlık Örgütü (WHO) tarafından, “fiziksel güç veya iktidarın kasıtlı bir tehdit veya gerçeklik biçiminde bir başkasına uygulanması sonucunda maruz kalan kişide yaralanma, ölüm ve psikolojik zarara yol açması ya da açma olasılığı bulunması” durumu olarak tanımlanmaktadır. Şiddet türlerinin en önemlisi ve belki de en az dikkat çeken ekonomik şiddettir. Kadına yönelik ekonomik şiddet sayılabilecek birçok durum vardır. Kamusal alanda çalışmasına rağmen kadının kazancına el koyarak onu ekonomik anlamda kendisine bağımlı kılmak, bazı şeylerden kadını mahrum etmek bunlardan bazılarıdır. Bu çalışmanın amacı, Türkiye İstatistik Kurumu tarafından 2014 yılında yapılan Kadına Yönelik Aile İçi Şiddet Araştırması mikro veri setini kullanarak Türkiye’deki 15 yaş ve üzeri kadınların eş/partner dışı ekonomik şiddete maruz kalmasını etkileyen faktörleri tespit etmektir. Bu çalışmada Binary lojistik regresyon analizi kullanılmıştır. Çalışmada yer alan bağımsız değişkenler literatür araştırması yapılarak tespit edilmiştir. kadının ikamet ettiği bölge (batı, güney, orta, kuzey, doğu), yaşı (15-24, 25-34, 35-44, 45-54, 55 ve üzeri), eğitim düzeyi (okuma yazma bilmiyor/diploması yok, ilkokul, ortaokul, lise, üniversite), medeni durumu (bekar, evli), sağlık durumu (mükemmel/iyi, idare eder, kötü/çok kötü) ve oda sayısı (2 ve altı, 3, 4, 5 ve üstü), çalışma durumu (hayır, evet), eş/partner dışında başka birisinin fiziksel şiddetine maruz kalma durumu (hayır, evet), eş/partnerin dışında başka birisinin duygusal şiddetine maruz kalma durumu (hayır, evet), eş/partner dışında başka birisinin cinsel şiddetine maruz kalma durumu (hayır, evet) dur. Bu çalışmada elde edilen sonuçlar, kadına yönelik şiddetin önüne geçilmesi konusunda politika ve programların oluşturulması için bilgi kaynağı olabileceği açısından önemlidir.

**Anahtar Kelimeler:** Ekonomik şiddet, Türkiye, Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması

## **ABSTRACT**

Violence is defined by the World Health Organization (WHO) as the state "causing injury or the possibility of injury, death and psychological harm on the exposed person as a result of the application of physical power or potency to another in the form of a deliberate threat or reality". Economic violence is the most important and perhaps the least remarkable form of violence. There are many situations that can be considered as economic violence against women. Despite working in the public sphere, confiscating women's earnings, making her economically dependent on her, depriving women of certain things are some of them. The aim of this study is to determine the factors affecting the exposure of women aged 15 and over in Turkey to economic violence, by using the Microdataset of the Research on Domestic Violence against Women conducted by the Turkish Statistical Institute in 2014. Binary logistic regression analysis was used in this study. The independent variables in the study were determined by literature research. region of residence (west, south, middle, north, east), age (15-24, 25-34, 35-44, 45-54, 55 and above), education level (illiterate/no diploma, primary school), middle school, high school, university), marital status (single, married), health status (excellent/good, manageable, bad/very bad), and number of rooms (2 and below, 3, 4, 5 and above), employment status (no, yes), exposure to physical violence by someone other than the spouse/partner (no, yes), exposure to emotional violence by someone other than the spouse/partner (no, yes), sexual violence by someone other than the spouse/partner exposure status (no, yes). The results obtained in this study are important in that they can be a source of information for establishing policies and programs to prevent violence against women.

**Key words:** Economic violence against women, Turkey, National Research on Domestic Violence Against Women in Turkey

## **1.GİRİŞ**

Şiddet, insan yaşamının her alanında ortaya çıkan ve dünyada giderek artan önemli bir toplum sağlığı sorunudur (Alkan, Oktay & Ünver, 2020). Şiddet, Dünya Sağlık Örgütü (WHO) tarafından, “fiziksel güç veya iktidarın kasıtlı bir tehdit veya gerçeklik biçiminde bir başkasına uygulanması sonucunda maruz kalan kişide yaralanma, ölüm ve psikolojik zarara yol açması ya da açma olasılığı bulunması” durumu olarak tanımlanmıştır (Alkan & Ünver, 2020). Kadınlara karşı şiddet genellikle duygusal, fiziksel, psikolojik, ekonomik ve cinsel şiddet olarak sınıflandırılmaktadır (Watts & Zimmerman, 2002). Şiddet türlerinin en önemlisi ve belki de en az dikkat çeken de ekonomik şiddettir. En önemli şiddet türü olan ekonomik şiddet, kadınların hayatını ve geçimini etkileyen bir aile içi şiddet biçimi olarak kabul edilir (Lencha, Ameya, Baresa, Minda & Ganfure, 2019). Kadına yönelik ekonomik şiddet sayılabilecek birçok durum vardır. Kamusal alanda çalışmasına rağmen kadının kazancına el koyarak onu ekonomik anlamda kendisine bağımlı kılmak, bazı şeylerden kadını mahrum etmek, kadının evde ürettiği ürünlere el koyarak kadını ‘ücretsiz aile işçisi’ olarak görmek, kadını sadece çocuklara, yardıma muhtaç hasta ve sakatlara ya da diğer aile bireylerine bakmakla mükellef biri olarak görmek bunlardan bazılarıdır. Ayrıca, evlenirken ya da evlendikten sonra kadının sahip olduğu takı ve parasına el koymak, kadına çalışmak istemesine rağmen izin vermemek ya da kadını zorla çalıştırmak, mirastan yoksun bırakmak, boşandıktan sonra nafaka ödemeyerek onu mağdur etmek gibi toplumun kabul etmemesi gereken yaptırımlar da ekonomik şiddeti geniş anlamda açıklamaktadır (Grigaitė, Karalius & Jankauskaitė, 2019). Kadınların toplumsal yapı içerisinde görmüş olduğu ekonomik şiddet psikolojik ve fiziksel sağlığını önemli derecede etkilemektedir. Kişisel karakterin ötesinde oluşan şiddet, aile geçmişleri, mevcut durum veya şiddetin olduğu durumlar ve sosyo-kültürel faktörler ile bağlantılıdır (Alkan, Özar & Ünver, 2021).

Yapılan araştırmaların sonuçları, Türkiye’de ve dünyada şiddete maruz kalan kadınların prevalansının yüksek olduğunu göstermektedir (García-Moreno et al., 2005; WHO, 2014). Bu çalışmanın amacı, Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması mikro veri setini kullanarak Türkiye’deki 15 yaş ve üzeri kadınların eş/partner dışı ekonomik şiddete maruz kalmasını etkileyen faktörleri tespit etmektir. Çalışmada kadınların sosyo-demografik ve ekonomik özelliklerinin kadınların ekonomik şiddet görmesinde ne derece etkili olduğunun belirlenmesi de

amaçlanmıştır. Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması verilerinin kullanılmasının nedeni, ülke genelini yansıtmaları ve hem uluslararası karşılaştırmalara imkân veren hem de ulusal ihtiyaçlara ışık tutan bir çalışma olmasıdır.

## 2. MATERYAL VE METOT

### 2.1. Veri

Bu çalışmada, Türkiye İstatistik Kurumu tarafından 2014 yılında yapılan Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması mikro veri seti kullanılmıştır. Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması, kadınların yaşadığı aile içi şiddetin büyüklüğü, içeriği, neden ve sonuçları ile risk faktörlerinin anlaşılması amacıyla ülke çapında yürütülmüş en geniş kapsamlı araştırmalardan biridir. Araştırmanın kapsamı, Türkiye sınırları dahilinde bulunan tüm yerleşim yerlerindeki hane halklarıdır. Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması’nın örneklem tasarımında ağırlıklı, tabakalı ve çok aşamalı küme örnekleme yaklaşımı kullanılmıştır. Araştırma, hanede bulunan 15-59 yaş arası kadınlarla gerçekleştirilmiştir (TÜİK, 2014).

Bu çalışmada Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması anketine 2014 yılında katılan 15 yaş ve üzeri 7070 kadının verileri kullanılmıştır.

### 2.2. Değişkenler

Türkiye’de Kadına Yönelik Aile İçi Şiddet Araştırması’nda kadınlara, “15 yaşınızdan sonra ailenizden, akrabalarınızdan ya da tanıdıklarınızdan biri siz çalışmak istediğiniz halde çalışmanıza engel oldu mu ya da işten ayrılmanıza neden oldu mu? Ailenizden, akrabalarınızdan ya da tanıdıklarınızdan biri siz okumak istediğiniz halde okula devam etmenize engel oldu mu ya da okuldan ayrılmanıza neden oldu mu” soruları sorulmuştur. Bu sorularla ölçülen şiddete maruz kalma durumu bağımlı değişkenin oluşturulmasında kullanılmıştır. Araştırmaya katılan kadınlar yukarıda belirtilen durumlardan en az birini yaşadıysa eşi/partneri dışında başka birisinden ekonomik şiddete maruz kalmıştır ve hiçbirini yaşamadıysa ekonomik şiddete maruz kalmamıştır. Sonuç olarak çalışmanın bağımlı değişkeni, kadınlar ekonomik şiddet gördüyse 1 ve görmediyse 0 kodunu alan kadınların ekonomik şiddet görme durumudur.

### 2.3. Bağımsız Değişkenler

Çalışmada yer alan bağımsız değişkenler literatür araştırması yapılarak tespit edilmiştir. Kadınların sosyo demografik ve ekonomik özelliklerine ilişkin değişkenler, kadının ikamet ettiği bölge (batı, güney, orta, kuzey, doğu), yaşı (15-24, 25-34, 35-44, 45-54, 55 ve üzeri), eğitim düzeyi (okuma yazma bilmiyor/diploması yok, ilkokul, ortaokul, lise, üniversite), medeni durumu (bekar, evli), sağlık durumu (mükemmel/iyi, idare eder, kötü/çok kötü) ve oda sayısı (2 ve altı, 3, 4, 5 ve üstü), çalışma durumu (hayır, evet), eş/partner dışında başka birisinin fiziksel şiddetine maruz kalma durumu (hayır, evet), eş/partnerin dışında başka birisinin duygusal şiddetine maruz kalma durumu (hayır, evet), eş/partner dışında başka birisinin cinsel şiddetine maruz kalma durumu (hayır, evet) dur.

Ordinal ve nominal değişkenler, modele alınacak tüm değişkenlere ait kategorilerin etkilerini gözlemlemek amacıyla kukla değişken olarak tanımlanmıştır (Alkan & Ünver, 2022; Alkan & Ünver, 2022; Alkan & Ünver, 2020).

### 2.4. İstatistiksel Analiz

İstatistiksel çıkarımın temel alanlarından biri, istatistiksel hipotezlerin test edilmesidir (Alkan & Ünver, 2021). Verilerin analizinde SPSS 20 ve Stata 15 programlarından yararlanılmıştır. Öncelikle araştırmaya katılan kadınların eş/partnerleri dışında başka birisinden ekonomik şiddete maruz kalma durumuna göre frekans ve yüzdeleri elde edilmiştir. Ekonomik şiddet görme durumu ve bağımsız değişkenler arasındaki ilişkiyi incelemek için ki-kare bağımsızlık testi yapılmıştır. Daha sonra binary lojistik regresyon analizi kullanılarak kadınların eş/partner dışı ekonomik şiddete maruz kalmasında etkili olan riskli faktörler belirlenmiştir.

Binary lojistik regresyon, bağımlı değişkeninin iki durumlu seçenekli olduğu durumlarda bağımlı değişken ile bağımsız değişken(ler) arasındaki nedensel ilişkinin incelenmesinde kullanılan bir istatistik analiz yöntemidir (Alkan & Ünver, 2020).

## 3. TARTIŞMA

### 3.1. Çalışmaya Katılan Bireylerin Tanımlayıcı İstatistikleri

Türkiye’de kadınların eş/partner dışı ekonomik şiddet görme durumunda etkili olabilecek faktörlere ilişkin bulgular Tablo 1’de gösterilmiştir. Çalışmaya en fazla katılımın %32 ile batı bölgesinden olduğu görülmektedir. Kadınların %29’unun 25-34 yaş aralığında olduğu Tablo 1’de görülmektedir. Kadınların %42,4’ü ilkokul mezunu



iken, %78,6 sı evlidir. Ayrıca kadınların %70,4'ünün çalışmadığı ve %47,9'unun sağlık durumunun mükemmel/iyi olduğu görülmektedir. Çalışmaya katılanların %42,9'unun 4 odalı hanede yaşadığı tespit edilmiştir. Ayrıca tablo 1 de kadınların eş/partner dışı fiziksel şiddet görme durumunun %12,9, eş/partner dışı cinsel şiddet görme durumunun %6 ve eş/partner dışı duygusal şiddet görme durumunun %20,4 olduğu tespit edilmiştir.

Çalışmada binary lojistik regresyon modeline alınacak olan bağımsız değişkenler arasında çoklu doğrusal bağlantı olup olmadığı test edilmiştir. Varyans enflasyon faktör (VIF) değerleri 5 ve üzerinde olanların orta derecede, 10 ve üzeri olanların ise yüksek derecede çoklu doğrusal bağlantıya sebep olduğu düşünülmektedir (Alkan, Oktay, Ünver, & Gerni, 2020; Ünver & Alkan, 2020; Ünver & Alkan, 2021). Bu çalışmada, değişkenler arasında çoklu doğrusal bağlantı sorununa sebep olan herhangi bir değişken bulunmamaktadır.

**Tablo 1.** Kadınların partner dışı ekonomik şiddet görme durumunda etkili olan sosyo-demografik ve ekonomik faktörlere ait bulgular

Değişkenler		Sayı	Yüzde	VIF
<b>Bölge</b>	Batı	2264	32,0	ref.
	Güney	564	8,0	1,16
	Orta	1445	20,4	1,34
	Kuzey	1009	14,3	1,29
	Doğu	1788	25,3	1,55
<b>Yaş</b>	15-24	1277	18,1	ref.
	25-34	2049	29,0	2,69
	35-44	1787	25,3	2,80
	45-54	1443	20,4	2,68
	55+	514	7,3	1,76
<b>Eğitim durumu</b>	Okuma yazma bilmiyor	1288	18,2	ref.
	İlkokul	2998	42,4	2,15
	Ortaokul	1171	16,6	2,13
	Lise	1047	14,8	1,90
	Üniversite	566	8,0	1,62
<b>Çalışma durumu</b>	Hayır	4977	70,4	ref.
	Evet	2093	29,6	1,10
<b>Medeni durum</b>	Bekar	1516	21,4	ref.
	Evli	5554	78,6	1,39
<b>Sağlık durumu</b>	Mükemmel/İyi	3384	47,9	2,93
	İdare eder	2813	39,8	2,63
	Kötü/Çok kötü	873	12,3	ref.
<b>Oda sayısı</b>	2 ve altı	628	8,9	ref.
	3	2716	38,4	3,35
	4	3030	42,9	3,51
	5 ve üstü	696	9,8	1,97
<b>Eş/partner dışı fiziksel şiddet görme durumu</b>	Hayır	6160	87,1	ref.
	Evet	910	12,9	1,19
<b>Eş/partner dışı cinsel şiddet görme durumu</b>	Hayır	6645	94,0	ref.
	Evet	425	6,0	1,08
<b>Eş/partner dışı duygusal şiddet görme durumu</b>	Hayır	5627	79,6	ref.
	Evet	1443	20,4	1,21

### 3.2. Model Tahmini

Çalışmada yer alan kadınların eşi/partneri dışında başka birisinden ekonomik şiddet görme durumunu etkileyen faktörleri belirlemek için binary lojistik regresyon modeli kullanılmıştır. Tahmin edilen model ve marjinal etki sonuçları Tablo 3'te verilmiştir. Tablo 3 incelendiğinde; kadınların ikamet ettiği bölge, yaş, eğitim (ilkokul, ortaokul, lise, üniversite), medeni durum, sağlık durumu (mükemmel/iyi), oda sayısı (dört), eş/partner dışı fiziksel şiddet görme durumu, eş/partner dışı cinsel şiddet görme durumu ve eş/partner dışı duygusal şiddet görme durumu değişkenlerinin anlamlı olduğu görülmektedir.

**Tablo 3.** Kadınların partner dışı ekonomik şiddet görme durumunda etkili olan sosyo-demografik ve ekonomik faktörlere ilişkin tahmin edilen model ve marjinal etki sonuçları

Değişkenler		Binary Lojistik Regresyon			
		B	S.H	M.E	S.H
<b>Bölge (referans kategorisi: batı)</b>					
	Güney	0,229 <sup>b</sup>	0,108	0,146 <sup>b</sup>	0,067
	Orta	0,268 <sup>a</sup>	0,085	0,170 <sup>a</sup>	0,053
	Kuzey	0,161 <sup>c</sup>	0,092	0,104 <sup>c</sup>	0,059
	Doğu	0,277 <sup>a</sup>	0,085	0,175 <sup>a</sup>	0,054
<b>Yaş (referans kategorisi:15-24)</b>					
	25-34	0,467 <sup>a</sup>	0,120	0,314 <sup>a</sup>	0,083
	35-44	0,480 <sup>a</sup>	0,126	0,321 <sup>a</sup>	0,087
	45-54	0,622 <sup>a</sup>	0,131	0,408 <sup>a</sup>	0,088
	55+	0,457 <sup>a</sup>	0,158	0,307 <sup>a</sup>	0,106
<b>Eğitim Durumu (referans kategorisi: okuma yazma bilmiyor)</b>					
	İlkokul	-0,565 <sup>a</sup>	0,086	-0,296 <sup>a</sup>	0,043
	Ortaokul	-0,605 <sup>a</sup>	0,117	-0,320 <sup>a</sup>	0,063
	Lise	-1,579 <sup>a</sup>	0,125	-1,003 <sup>a</sup>	0,084
	Üniversite	-2,705 <sup>a</sup>	0,202	-1,973 <sup>a</sup>	0,173
<b>Çalışma Durumu (referans kategorisi: hayır)</b>					
	Evet	0,024	0,072	0,015	0,045
<b>Medeni Durum (referans kategorisi: bekâr)</b>					
	Evli	0,222 <sup>b</sup>	0,094	0,143 <sup>b</sup>	0,062
<b>Sağlık Durumu (referans kategorisi: kötü/çok kötü)</b>					
	Mükemmel/iyi	-0,397 <sup>a</sup>	0,102	-0,250 <sup>a</sup>	0,062
	İdare eder	-0,077	0,098	-0,046	0,058
<b>Oda Sayısı (referans kategorisi: 2 ve altı)</b>					
	3	0,152	0,115	0,099	0,076
	4	0,230 <sup>b</sup>	0,116	0,148 <sup>c</sup>	0,076
	5 ve üstü	0,159	0,145	0,104	0,095
<b>Eş/partner dışı fiziksel şiddet görme durumu (referans kategorisi: hayır)</b>					
	Evet	0,448 <sup>a</sup>	0,099	0,268 <sup>a</sup>	0,056
<b>Eş/partner dışı cinsel şiddet görme durumu (referans kategorisi: hayır)</b>					
	Evet	0,460 <sup>a</sup>	0,133	0,272 <sup>a</sup>	0,073
<b>Eş/partner dışı duygusal şiddet görme durumu (referans kategorisi: hayır)</b>					
	Evet	0,496 <sup>a</sup>	0,083	0,300 <sup>a</sup>	0,048

<sup>a</sup>p <.01; <sup>b</sup>p <.05; <sup>c</sup>p <.10

Tablo 3'e göre, güney, orta, kuzey ve doğu bölgesinde yaşayan kadınların batı bölgesinde yaşayanlara göre ekonomik şiddete maruz kalma olasılığı sırasıyla %14,6 %17, %10,4 ve %17,5 daha fazladır. Kadınların 25-34 yaş grubunda olması referans gruba göre ekonomik şiddete maruz kalma olasılığını %31,4 arttırmaktadır. Benzer şekilde kadınların 55+ yaş grubunda olması referans gruba göre ekonomik şiddete maruz kalma olasılığını %30,7 arttırmaktadır İlkokul, ortaokul, lise ve üniversite mezunu kadınların hiç okul bitirmemiş (okuma yazma bilmeyen) kadınlara göre ekonomik şiddete maruz kalma olasılıkları sırasıyla %29,6, %32, %100 ve %197 daha azdır. Medeni durumu evli olan kadınların, medeni durumu bekar olan kadınlara göre ekonomik şiddete maruz kalma olasılığı %14,3 daha fazladır. Sağlık durumu mükemmel/iyi olan kadınların referans gruba göre ekonomik şiddete maruz kalma

olasılığı %25 daha azdır. Hanesinde oda sayısı 4 olan kadınların, referans gruba göre ekonomik şiddete maruz kalma olasılığı %14,8 daha fazladır. Eş/partner dışında fiziksel şiddet gören bir kadının referans gruba göre ekonomik şiddete maruz kalma olasılığı %26,8 daha fazladır. Eş/partner dışında cinsel şiddet gören bir kadının referans gruba göre ekonomik şiddete maruz kalma olasılığı %27,2 daha fazladır. Eş/partner dışında duygusal şiddet gören bir kadının referans gruba göre ekonomik şiddete maruz kalma olasılığı %30 daha fazladır.

#### 4. SONUÇ

Bu çalışmada Türkiye'deki 15 yaş ve üzeri kadınların eş/partnerleri dışında başka birisi tarafından ekonomik şiddete maruz kalmasını etkileyen faktörler tespit edilmiştir. Çalışmada kadınların eğitim durumunun ekonomik şiddet görmeye etkili olduğu belirlenmiştir. Çalışmada eğitim seviyesi arttıkça ekonomik şiddet görme olasılığının azaldığı sonucuna ulaşılmıştır. Kadına yönelik şiddet için en önemli risk faktörlerinden biri, kadınların düşük eğitim düzeyidir (Hossain & Khan, 2015). Kadınların eğitim düzeyi düştükçe, şiddete maruz kalma oranları da artmaktadır (Sen & Bolsoy, 2017). Yüksek öğrenim gören her beş kadından biri şiddete maruz kalırken, daha düşük eğitim seviyesine sahip her iki kadından biri şiddete maruz kalmaktadır. Eğitimli kadınların kötü niyetli bir ilişkiyi tanımak ve bitirmek için daha fazla kaynağı olduğu görülmektedir (Flake, 2005). Kadınların genel olarak eğitim düzeylerini artırmak, kişisel becerilerini, istihdam edilebilirliklerini ve dolayısıyla sosyo-ekonomik düzeylerini geliştirecektir. Böylece şiddete maruz kalma risklerini azaltacaktır (Boyle, Georgiades, Cullen, & Racine, 2009; Lee et al., 2015).

Çalışmada kadınların ikamet ettiği bölgenin ekonomik şiddet görmeye etkili olduğu belirlenmiştir. Türkiye'de yapılan çalışmalarda, kadınlara yönelik şiddetin sıklığının, kadınların yaşadığı coğrafi bölgelere göre değiştiği de ortaya koyulmuştur (Abramsky et al., 2011; Kocacık & Çağlayandereli, 2009; Alkan & Ünver, 2020; Alkan, Özar & Ünver, 2021). Çalışmada, güney, orta, kuzey ve doğu bölgesinde yaşayan kadınların batı bölgesinde yaşayan kadınlara göre ekonomik şiddet görme olasılığının daha fazla olduğu tespit edilmiştir. Kadınların ekonomik şiddet görmesinde etkili olan değişkenlerden birisi de sağlık durumudur. Kadınların sağlık durumu iyileştikçe ekonomik şiddet görme olasılıklarının azaldığı sonucuna ulaşılmıştır. Yapılan çalışmalarda da benzer sonuçlar elde edilmiştir (Mathur et al., 2018; Nduna, Jewkes, Dunkle, Shai, & Colman, 2010; Okafor et al., 2018). Çalışmanın dikkat çekici sonuçlarından birisi de medeni durum değişkeninin kadınların ekonomik şiddet görmesinde etkili olmasıdır (Alkan, Özar & Ünver, 2021; Alkan & Ünver, 2020). Ayrıca çalışmada yaş arttıkça ekonomik şiddet görme olasılığının arttığı sonucuna ulaşılmıştır.

Çalışmada eş/partner dışındaki birisi tarafından fiziksel şiddete maruz kalan kadınların, eş/partner dışındaki birisi tarafından fiziksel şiddete maruz kalmayan kadınlara göre daha fazla ekonomik şiddete maruz kaldıkları tespit edilmiştir.

Çalışmada eş/partner dışındaki birisi tarafından cinsel şiddete maruz kalan kadınların, eş/partner dışındaki birisi tarafından cinsel şiddete maruz kalmayan kadınlara göre daha fazla

ekonomik şiddete maruz kaldıkları tespit edilmiştir. Çalışmada eş/partner dışındaki birisi tarafından duygusal şiddete maruz kalan kadınların, eş/partner dışındaki birisi tarafından fiziksel şiddete maruz kalmayan kadınlara göre daha fazla ekonomik şiddete maruz kaldıkları tespit edilmiştir.

Çok boyutlu ve karmaşık bir olgu olarak kabul edilen kadına karşı eş/partner dışı ekonomik şiddetin önlenmesinde bu konuda faaliyet gösteren kurum ve kuruluşların ortak hareket etmeleri büyük önem taşımaktadır. Kadına yönelik eş/partner dışı ekonomik şiddetin çözümlenmesinde faaliyet gösteren politika belirleyiciler, mahkemeler, sağlık kuruluşları, polis ve sivil toplum örgütleri uyum içinde çalıştığında hem sorunun tespit edilmesine hem de soruna ilişkin daha organize ve bilinçli yaklaşımlar geliştirilmesine imkân sağlanacaktır. Bu çalışmada elde edilen sonuçlar kadına yönelik şiddetin önlenmesinde politika ve programların oluşturulması için bilgi kaynağı olabilmesi açısından önemlidir. Aynı zamanda bu çalışma planlanan girişimlerde öncelikli grupların belirlenmesinde önemli bir yol gösterici olabilir. Kadına yönelik şiddet kavramının insan onuruna yapılan bir saldırı ve temel insan hakları ihlali olarak kabul edildiği gerçeği göz önüne alındığında, kadınların maruz kaldıkları şiddet türleri ve şiddete maruz kaldıkları zaman yapmaları gerekenler ve yasal düzenlemeler konusunda bilinçlendirilmeleri büyük önem taşımaktadır.

Bu çalışma birkaç sınırlamaya sahiptir. Birincisi, çalışmadaki veriler ikincil verilerdir. İstatistik analiz için gerekli olan değişkenler veri setinde var olan değişkenlerden oluşmaktadır. İkincisi, veriler kesitsel olduğundan, kadınlara yönelik ekonomik şiddet ile ilgili kesin nedensel ilişki çıkarılamamaktadır. Üçüncüsü, çalışmada elde edilen veriler kadınların kendi cevaplarıdır. Bundan dolayı bu veri toplama yönteminde elde edilen veriler yanlış olabilir.

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## ETİN MYOFİBRİLER PROTEİN PROFİLİ ÜZERİNE MÜHÜRLEME İŞLEMİNİN ETKİSİ



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## ÖZET

Mevcut bu araştırmada, mühürleme işleminin pişmiş etin myofibriler protein profili üzerine etkisinin belirlenmesi amaçlanmıştır. Bu amaçla et örnekleri, yüzey sıcaklığı önceden 250 °C'ye getirilen ızgara tavaında 20, 30 ve 40 °C iç sıcaklıklarda mühürlenmiştir. Mühürleme işleminden sonra numuneler, sıcaklığı önceden 180 °C'ye ayarlanmış bir fırında iç sıcaklıkları 71 °C'ye ulaşmaya kadar pişirilmiştir. Mühürleme işlemi uygulanmayan örnekler doğrudan fırında (71 °C iç sıcaklık) pişirme işlemine tabi tutulmuş ve kontrol grubu olarak değerlendirilmiştir. Örneklerin myofibriler protein profilinde meydana gelen değişiklikler Sodyum Dodesil Sülfat Poliakrilamid Jel Elektroforezi (SDS-PAGE) tekniği ile incelenmiştir. Mühürleme işlemi yapılmadan fırında pişirilen örneklerde, hammaddede tespit edilen 200 kDa ağırlığındaki myosin ağır zincirinin bant yoğunluğu azalmıştır (negatif kontrol, F); farklı iç sıcaklıklarda (20 °C, 30 °C ve 40 °C) mühürlenmiş ve fırında pişirilmiş (M20+F, M30+F, M40+F) örneklerde ise bu protein bandı kaybolmuştur. Ayrıca hammaddede tespit edilen 153 ve 104 kDa ağırlığındaki protein bantlarının pişirme işlemi sonucunda tüm muamele grubu örneklerinde kaybolduğu gözlemlenmiştir. Aktin proteininin bant yoğunluğu, muamele grupları arasında farklılık göstermiştir. Muamele grupları arasında en yüksek aktin bant yoğunluğu, mühürlenmemiş F grubu örneklerinde tespit edilirken, mühürleme derecesinin artması nedeniyle aktin molekülünün bant yoğunluğu azalmıştır. Ayrıca 30 °C ve 40 °C iç sıcaklığa kadar mühürlenmiş M30+F ve M40+F grubu örneklerinde 33 kDa ağırlığında yeni bir protein bandı gözlemlenmiştir.

**Anahtar kelimeler:** Et, Myofibriler Protein, Mühürleme, SDS-PAGE

## THE EFFECT OF SEALING PROCESS ON MYOFIBRILLAR PROTEIN PROFILE OF MEAT

## ABSTRACT

In the present research, it was aimed to determine the effect of sealing process on myofibrillar protein profile of cooked meat. For this aim, the meat samples were sealed at internal temperatures of 20, 30, and 40 °C in the griddle pan, the surface temperature of which was brought to 250 °C in advance. After the sealing process, the samples were baked in an oven whose temperature was pre-set to 180 °C until their internal temperature reached 71 °C. Samples that did not apply the sealing process were directly subjected to baking in the oven (internal temperature of 71 °C), and evaluated as control group samples. The changes in the myofibrillar protein profile of the samples were examined by Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis (SDS-PAGE) technique. The band density of myosin heavy chain of 200 kDa detected in the raw material decreased in the meat samples cooked in the oven without the sealing process (negative control, F); and this protein band was lost in the samples sealed at different internal temperatures (20 °C, 30 °C, and 40 °C) and baked (M20+F, M30+F, M40+F). In addition, it was observed that protein bands weighing 153 and 104 kDa detected in the raw material disappeared in all treatment group samples as a result of the cooking process. The band intensity of actin protein differed between the treatment groups. While the highest actin band density among the treatment groups was detected in group F samples that sealing was not applied, the band density of the actin molecule decreased due to the increase in the degree of sealing. Moreover, a new protein band with a weight of 33 kDa was observed in M30+F and M40+F group samples sealed up to 30 °C and 40 °C internal temperature.

**Keywords:** Meat, Myofibrillar Protein, Sealing, SDS-PAGE.

## 1. INTRODUCTION

Meat has an important place in nutrition due to its high amount and quality of protein, minerals such as zinc and iron as well as the main source of B group vitamins (Gökalp et al. 2010). Except for meat products that are consumed as especially raw, meat and meat products are generally consumed after the cooking process. By cooking, both pathogenic

microorganisms are inactivated and the sensory properties of the product are improved (Sante-Lhoutellier et al. 2008). Many structural changes are seen in the meat, including protein denaturation and shrinkage, with heat application, the water holding capacity of meat is reduced so that the quality of meat changes with cooking (Tornberg 2005; Barbera and Tassone 2006).

Myofibrillar proteins are salt-soluble proteins that include contractile, regulatory, and cytoskeletal proteins (Toldra 2010; Marino et al. 2014). These proteins constitute approximately 50-55% of total muscle proteins (Tornberg 2005). Myofibrillar proteins are responsible for the formation of sticky structure and hard texture in meat as a result of applied heat processes (Han et al. 2014). Changes in these major components, which have a significant effect on the formation of meat texture, also play an important role in the sensory characteristics of meat products (Larrea et al. 2006).

Sealing can be defined as the formation of crust on the surface of meat by high-temperature application. Sealing is based on the principle that the proteins on the meat's surface form a denatured layer as a result of the rapid application of high heat to the meat (Erdogan 2005). This process is usually performed on surfaces heated up to 160-250 °C (Babür and Gürbüz 2015). Visually more attractive and delicious meat products are obtained due to the Maillard reaction that occurs during the sealing process (Barber and Broz 2011). It is not yet known how the sealing process and degree of sealing, which have started to be widely applied in the fast-food industry in recent years, affect the myofibrillar protein profile of the meat. Therefore, in the present study, the effects of the sealing process and the degree of sealing on the myofibrillar protein profile of cooked meats were investigated.

## **2. MATERIAL AND METHOD**

### **2.1. Material**

In the present study, beef (*M. Longissimus thoracis et lumborum*) removed from three different beef carcasses obtained from Erzurum Meat Combine was used as material.

#### **Cooking conditions**

The sealing process was carried out using a griddle pan (Karaca, Turkey). For this process, the meat samples were sealed at internal temperatures of 20, 30, and 40 °C in the griddle pan, the surface temperature of which was brought to 250 °C in advance. After the sealing process, the samples were baked in an oven (Arçelik, Turkey) whose temperature was pre-set to 180 °C until their internal temperature reached 71 °C to ensure food safety. Samples that did not apply the sealing process were directly subjected to baking in the oven (internal temperature of 71 °C), and evaluated as control group. Cooking surface and internal temperatures were determined using a laboratory-type thermometer (Testo, Lenzkirch, Germany).-

#### **Determination of SDS-PAGE profile of myofibrillar proteins**

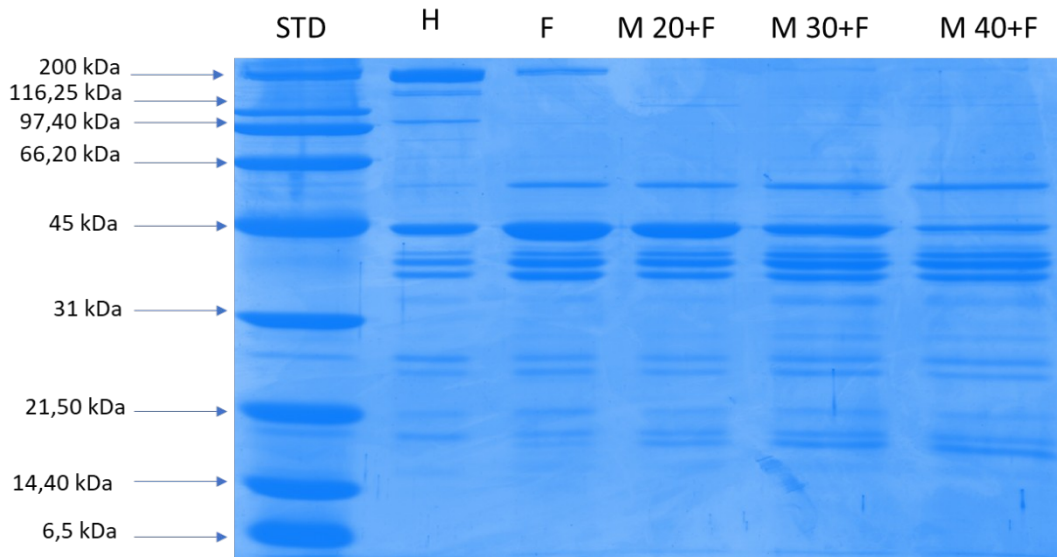
The method reported by Oz and Kaya (2019) was used to determine the effect of sealing and cooking processes on myofibrillar proteins. In this context, the changes occurring in myofibrillar proteins were examined by Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis (SDS-PAGE) technique. Briefly, the samples were homogenized in a 30 mM phosphate buffer (pH 7.4). The homogenate was centrifuged at 10,000×g for 20 min at 4°C. The supernatant was collected by filtration through glass wool. This procedure was repeated twice for the pellets. Afterward, the pellet was homogenized with 100 mM phosphate buffer (pH 7.4). The homogenate was then centrifuged at 10,000×g for 20 min at 4°C. The supernatant was collected as the myofibrillar protein fraction. The concentration of the extracts was determined by the Bradford method and the samples mixed with 50 mM Tris buffer (pH 6.8), in a ratio of 1:1 (v/v). The mixture was kept at 100 °C for 5 minutes and then stored at -20 °C until use. For the separation of myofibrillar proteins, 5% loading gel were used. 10 µL of the sample was loaded into each gel well and the samples were run at 100 V until the paint trail reached the end of the gel. The gel was then stained with a staining solution containing Coomassie Brilliant Blue R-250 After staining, the dye was removed with a wash solution until the gel background became clear. The molecular

weights of the protein bands were determined using the protein standard mixture (Bio-Rad, Broad Range, USA) in the Image Lab 6.0 (Bio-Rad) program.

### **3. RESULTS AND DISCUSSION**

The SDS-PAGE electrophoretogram of myofibrillar proteins of meat samples sealed until they reach different internal temperatures and baked is presented in Figure 1. Myosin protein constitutes an important part of myofibrillar proteins, known as proteins that dissolve in

solutions with high ionic strength (Marino et al. 2014). In the present study, it was determined that the band density of myosin heavy chain of 200 kDa detected in the raw material decreased in the meat samples cooked in the oven without the sealing process (negative control, F); and this protein band was lost in the samples sealed at different internal temperatures (20 °C, 30 °C, and 40 °C) and baked (M20+F, M30+F, M40+F). Similarly, it was observed that protein bands weighing 153 and 104 kDa ( $\alpha$ -actinin) detected in the raw material disappeared in all treatment group samples as a result of the cooking process. Similarly, it has been reported that the thermal stability of myosin heavy chain and  $\alpha$ -actin is low and that serious decreases in band densities are observed as a result of temperature application of 60 °C (Kajak-Siemaszko et al. 2011; Wen et al. 2015; Taşkıran et al. 2020).



**Figure 1.** The SDS-PAGE electrophoretogram belonged to myofibrillar proteins of the samples

**Notes:** STD: Protein standard, H: Raw material, F: Samples cooked in the oven without the sealing process, M20+F: Samples cooked in the oven after sealing up to 20 °C internal temperature, M 30+F: Samples cooked in the oven after sealing up to 30 °C internal temperature, M40+F: Samples cooked in the oven after sealing up to 40 °C internal temperature

Another important myofibrillar protein, actin which constitutes approximately 25% of myofibrillar proteins, was detected in all treatment group samples. However, the band intensity of this protein differed between the treatment groups. While the highest actin band density among the treatment groups was detected in group F samples that sealing was not applied, the band density of the actin molecule decreased due to the increase in the degree of sealing. In the current study, it is thought that the low band density observed, especially in the M30+F and M40+F groups, is associated with the high sealing internal temperature in these groups, in other words, the longer the time required to reach the relevant internal temperatures

in these samples. As a matter of fact, it is known that cooking temperature and duration affect protein denaturation. In the present study, a new protein band with a weight of 33 kDa was observed in M30+F and M40+F group samples sealed up to 30 °C and 40 °C internal temperature. A new protein band with a molecular weight of 18 kDa was detected in M20+F, M30+F, and M40+F group samples sealed at different internal temperatures (20, 30, and 40 °C). It has been reported that new low molecular weight protein bands may emerge as a result of the degradation of high molecular weight proteins by cooking (Dai et al. 2013).

#### **4. CONCLUSION**

It was determined that the sealing process affects the myofibrillar protein profile, especially depending on the degree of sealing. It was observed that the SDS-PAGE profile of the samples baked in the oven after sealing up to 20 °C internal temperature was generally similar with the control group samples that were not sealed. In the light of the data obtained, it can be said that the M30+F and M40+F group samples differed from the F and M20+F group samples and the rate of protein denaturation in M30+F and M40+F group samples was slightly higher.

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TELEVİZYON DİZİLERİNİN ALIMLANMASINDA SİYASAL ORTAM VE  
İZLEYİCİ ARASINDAKİ İLİŞKİ

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### ÖZET

İzleyici araştırmalarında televizyondaki medya içeriğini alımlamanın üç temel biçimi vardır: 1) Hakim okuma, 2) müzakereli okuma ve 3) muhalif okuma ve bir toplumdaki siyaset kurumu bu üç alımlama tarzına etkilemektedir. Bu çalışma, Türkiye gibi siyasi ve kültürel kutuplaşmanın yoğun olduğu bağlamlarda, bu üç okuma tarzının televizyon metnine mi içkin yoksa izleyicilerin sosyo-kültürel arkaplanları tarafından mı daha çok belirlendiğine dair literatürdeki klasik tartışmayı yeniden ele alacaktır. Böylece, izleyici araştırmaları literatürüne sosyolojik perspektiften farklı bir teorik yaklaşım getirmek hedeflenmektedir. Bu çalışma, benim de yürütücüsü olduğum Diriliş: Ertuğrul dizisi üzerine yapılan bir izleyici araştırmasına dayanmaktadır. Bu çalışma kapsamında 38 düzenli dizi izleyicisi ile derinlemesine mülakatlar gerçekleştirilmiş ve araştırmanın sonuçları, dizinin metinsel incelemesi ile birlikte analize tabi tutulmuştur. Bu verilerden hareketle ampirik analiz iki aşamadan oluşacaktır. İlk aşamada siyasi ideolojilerin, söylem ve politikaların oluşturduğu siyasal çevrenin izleyicinin dizileri alımlama sürecine olası etkilerine bakılacaktır. Kutuplaşmanın tarafı olan siyasal iktidar, televizyon programının üretimi sürecine doğrudan müdahale edebildiği gibi programın izleyicilerinin etkisi altında olduğu siyasal çevreyi de manipüle edebilmektedir. İkinci aşamada ise bir metin olarak dizilerdeki senaryonun, karakterlerin, diyaloglar ve mesajların farklı sosyo-kültürel arkaplana sahip izleyiciler tarafından nasıl alımlandığına bakılacaktır. Bu aşamada ilk bakılacak şey, metinsel çok anlamlılıktır. Önceki çalışmalar kanıtlamıştır ki, bir toplumdaki egemen bir siyasi ideolojinin, düşünce ya da söylemin bir televizyon dizisi metnini tamamen şekillendirmesi mümkün değildir. Çünkü hem toplumsal bağlamin hem de üretim aşamasının çok katmanlı ve aktörlü komplike yapısından dolayı bir televizyon metnine birden fazla siyasi söylem ve ideoloji etki edebilir. Ayrıca, popüler televizyon dizilerinin toplumdaki herkesi cezbedebilmesi için farklı ve hatta birbiriyle çatışan siyasi ve kültürel öğeleri metinde barındırması gerekir. Benim bu çalışmada yapmak istediğim metinlerdeki çok anlamlılığa bakmak; ardından bu çok anlamlılığın özellikle üç okuma tarzından müzakereli okumaya nasıl yol açtığını incelemektir. Analizin sonucunda bu çalışmanın temel iddiası şudur: Sosyolinguistik açıdan bir metin olarak televizyon dizisi içeriği, siyasetin izleyici alımlaması üzerine etkisini iki seviyeli bir süreç ile dolaylılamaktadır. İlk seviye, siyasi ortam ile metin arasındaki ilişkiye bakarken ikinci seviye, metin ile izleyici arasındaki ilişkiye odaklanmaktadır.

**Anahtar Kelimeler:** Medya Sosyolojisi, İzleyici Araştırmaları, Siyaset, Televizyon Dizisi

**THE RELATIONSHIP BETWEEN POLITICAL ENVIRONMENT AND AUDIENCES  
IN THE RECEPTION OF TELEVISION SERIES**

## ABSTRACT

There are three main modes of reception of televisual media content in audiences studies: 1) dominant reading, 2) negotiated reading, 3) oppositional reading, and the political institution in a society impacts these three modes of reception. The present study brings a new perspective to the classical debate in the relevant academic literature about whether the socio-cultural backgrounds of viewers determine the three modes of reading or these modes are immanent to the televisual text within Turkey's highly polarized political and cultural climate. Therefore, the study aims to bring a fresh theoretical approach to the literature on audience studies from a sociological perspective. The paper is based on audience research, in which I was involved as a co-investigator, on the television series Resurrection: Ertuğrul. For the research, we conducted in-depth interviews with 38 regular viewers of the television drama, and the results were analyzed in combination with the textual examination of the drama. Based on the data, the empirical analysis consists of two levels. At the first level, I look into the potential effects of the political environment that consists of political ideologies, discourse and policies on the process of the reception of the series. Political power that takes a side in the bifurcation of society manipulates the political environment that influences the viewers of television programs, as well as it can directly intervene into the production process of the television program. At the second level, I examine how the plot, characters, dialogues and messages are received and interpreted by the viewers of different socio-cultural backgrounds. At this level, the first phenomenon to analyze is textual polysemy. Previous studies have proven that it is not possible for a dominant political ideology, thought or discourse in a society to completely shape the text of a television series. This is because, due to the multi-layered and complex structure of both social context and a production stage, more than one political discourse and ideology can affect the televisual text. Also, in order for popular television series to appeal to everyone in the society, they must contain different and even conflicting political and cultural elements in the text. What I want to do in this study is to look at the textual polysemy; and then examine how the textual polysemy opens up the way for the negotiated among the three modes of reading. As a result of the analysis, the main claim of this study is as follows: in terms of sociolinguistics, the content of television series as a text mediates the effect of politics on audience reception through a two-level process. The first level focuses on the relationship between the political environment and the text, while the second level focuses on the relationship between the text and the audience.

**Keywords:** Media Sociology, Audience Studies, Politics, Television Series

## 1. GİRİŞ

Bu çalışma, medya ve iletişim çalışmalarının iki alt disiplini olan siyasal iletişim ve izleyici araştırmalarının kesişimini sosyolojik bir perspektiften incelemektedir. Bu amaçla, çalışmada bir yandan siyaset kurumu ile televizyon dizisi izleyicileri arasındaki ilişkiye bakılacak ve

siyasi ideolojilerin, söylem ve politikaların oluşturduğu siyasal çevrenin izleyicinin dizileri alımlama sürecine olası etkileri incelenecektir. Diğer yandan, metin ile izleyici arasındaki ilişkiye bakılacak ve bir metin olarak dizilerdeki senaryonun, karakterlerin, diyaloglar ve mesajların farklı sosyo-kültürel arkaplana sahip izleyiciler tarafından nasıl alımlandığı incelenecektir. Siyaset kurumu ile dizi izleyicileri arasındaki sosyolojik ilişkiyi devlet-birey ilişkisi açısından açıklamak mümkündür. Toplumsal kutuplaşmanın olduğu bir sosyal bağlamda siyasal iktidar, siyasal-kültürel bir kampın parçası olarak televizyon programının üretimi sürecine doğrudan müdahale edebildiği gibi programın izleyicilerinin etkisi altında olduğu siyasal çevreyi de manipüle edebilmektedir. Toplumsal bir aktör olarak bireyin sosyolinguistik bir metin olan televizyon dizisi ile olan sosyolojik ilişkisi de, hem metnin farklı ve hatta birbiriyle çatışan siyasi ve kültürel öğeleri metinde barındırmasından hem de bireyin içine doğdu ve sosyalleştiği sosyo-kültürel ortamın okuduğu metni algılamasına ve yorumlamasına, yani alımlamasına, etki etmesinden kaynaklanmaktadır.

İzleyici araştırmalarında Hall'un çalışmasına (Hall, 2005) dayanarak, bir televizyon metnine yönelik üç ana izleyici tepkisi olduğunu varsayıyoruz. Bunlardan ilki, tercih edilen okumayı sorgulamadan kabul eden “baskın okuma”dır. Tercih edilen okuma “metnin bir özelliğidir” (Morley, 1991) ve metnin üretim sürecinde metne yazılır, ancak mesajları ve temsilleri yorumlamanın sadece belirli bir yolunu ifade eder – metnin üreticileri tarafından amaçlanan ve istenen yolu (Kim, 2004). Siyasi söylemler ve ideolojiler de medya süreç ve uygulamalarının dışından tercih edilen okumayı şekillendirebilir. İkincisi, izleyicilerin egemen ideolojik çerçeveyi reddetmeden metindeki bazı mesajları ve temsilleri sorguladığı “müzakereli okuma”dır. Üçüncüsü ise, izleyicilerin metni aktif ve bilinçli olarak karşı çıktıkları bir ideolojinin ya da sosyo-politik düzenin ürünü olarak algıladıkları için temelde tüm içeriğin eleştirmeni haline geldikleri “muhalif okuma”dır.

Bu üç okuma ya da alımlama tarzından hareketle bu çalışmanın temel araştırma sorusu şudur: Türkiye gibi siyasi ve kültürel kutuplaşmanın yoğun olduğu bağlamlarda

müzakereli okuma televizyon metni ile ortak bir kültürel ve siyasal bir arkaplana paylaşan izleyicilerin bulunduğu noktada nasıl ortaya çıkmaktadır? Bu soruya yanıt aramak için bu çalışma, benim de yürütücüsü olduğum Diriliş: Ertuğrul dizisi üzerine yapılan bir izleyici araştırmasına dayanmaktadır. Tekden Şirketler Grubu'nun üstlendiği Diriliş Ertuğrul dizisi, 10 Aralık 2014 tarihinden 29 Mayıs 2019 tarihine kadar kamu kuruluşu olan TRT'de çarşamba akşamları yayınlanmıştır. Diriliş Ertuğrul dizisi yayınlandığı dönemde hem AB reyting sıralamasında hem de toplamda genellikle birinci sırada yer almıştır. Türkiye'nin

siyasal konjonktüründen etkilendiğini saha çalışmamız boyunca deneyimlediğimiz dizi, 71 ülkeye ihraç edilmiş ve dijital mecrada da kendisine yer bulmuştur. Dizinin bölümleri tekrar Beyaz TV ve 360 TV’de yayınlanmaktadır.

Popüler bir kültür anlatısı olarak Diriliş Ertuğrul dizisinde Kayı Boyu’nun mücadeleleri ve devletleşme girişimlerinin başladığı dönem sergilenmektedir. Bunun da ötesinde Diriliş, AKP tarafından eğlence kisvesi altında sürekli siyasileştirilen bir dramadır (Carney, 2018). Drama, Türk-İslam Sentezi ve yeni-Osmanlı canlanmacılığının bir bileşimi olan bir ideolojiden beslenen erken dönem Osmanlı-Türk toplumunun tarihinin kurgusal ve teleolojik bir okumasını sunmaktadır. Dizi, 13. yüzyılda Osmanlı İmparatorluğu'nun ilk temellerini atan şanlı Türk komutanı Ertuğrul Gazi'nin önderliğinde, yeni ortaya çıktığı varsayılan Türk ulusunun düşmanlarına karşı savaşçılarıyla birlikte mücadele eden bir destana dayanan tarihi bir kurgudur. Bu çalışma kapsamında Diriliş dizisini düzenli izleyen 38 izleyicisi ile derinlemesine mülakatlar gerçekleştirilmiş ve araştırmanın sonuçları, dizinin metinsel incelemesi ile birlikte analize tabi tutulmuştur.

Bu araştırmada kullanılan alımlama analizi, televizyon programlarının ürettiği anlam ile izleyicilerin ürettiği anlam arasındaki ilişkiyi ortaya koymayı amaçlayan bir yöntemdir (Şeker, 2009). Alımlama analizinin amacı ise alımlamayla ilgili süreçleri inceleyip, medya içeriğinin kullanım ve etkileriyle ilgili bir tavır geliştirebilmektir (Jensen ve Rosengren, 2005). Hall’a göre toplumsal ve kültürel inşa olarak anlam, metnin sadece üretim anında değil aynı zamanda metnin tüketicisi/okuyucusuyla bulunduğu anda kurulmaktadır (Oğuz, 2014). Medya mesajlarının çoğunlukla polisemik olması sebebiyle bu mesajları anlamlandırma girişimi, izleyici/okuyucunun sosyal, kültürel ve politik tavrıyla da yakından ilişkilidir. Yani, bir toplumdaki egemen bir siyasi ideolojinin, düşünce ya da söylemin bir televizyon dizisi metnini tamamen

şekillendirmesi mümkün değildir. Çünkü hem toplumsal bağlamın hem de üretim aşamasının çok katmanlı ve aktörlü komplike yapısından dolayı bir televizyon metnine birden fazla siyasi söylem ve ideoloji etki edebilir. Ayrıca, popüler televizyon dizilerinin toplumdaki herkesi cezbedebilmesi için farklı ve hatta birbiriyle çatışan siyasi ve kültürel öğeleri metinde barındırması gerekir. Diriliş dizisi de çokanlamlı bir metinsel yapıya sahiptir ve bu araştırmanın da analizi, dizideki meta-anlatı olarak Türk-İslam sentezinin mesajlarını egemen okumaya tabii tutan, siyasi olarak görece homojen bir izlerkitlenin çok anlamlılığı nasıl yorumladığı üzerine odaklanmaktadır.

## 2. ARAŞTIRMA VE BULGULAR

Bu çalışmada, televizyon metninin siyasetin izleyici alımlaması üzerindeki etkisine nasıl aracılık ettiğini anlamak için iki seviyeli bir açıklama sunuyorum.

Seviye 1: Metin-seyirci ilişkisi vazgeçilmez bir şekilde daha geniş kültürle bağlantılıdır (Bird, 2003) ve televizyon programları “hatırı sayılır bir ideolojik güç kaynağı” (Lewis, 1991) olduğu için diziler, siyasi iktidarın tercih edilen okumayı yaptığı (Wren-Lewis, 1983) bir dizi paylaşılan kültürel varsayımı dile getirir ve manipüle eder. Siyasi iktidarın bu kaynağı iki şekilde kullanması muhtemeldir. Birincisi, iktidar metnin doğrudan ideolojik manipülasyonu yoluyla egemen okumayı güvence altına almaya çalışır. İkinci olarak iktidar, kamuoyunu metnin tercih edilen anlayışına ve daha büyük siyasi önemine doğru toplamak için televizyon metni etrafında dönen siyasi söylemler ve uygulamalardan oluşan siyasi bir ortamı da manipüle edebilir.

Seviye 2: İkinci seviyede, metnin izleyici alımlaması üzerindeki siyasi etkilere iki şekilde aracılık etmesi muhtemeldir. Her şeyden önce, bir televizyon dizisinin metnindeki yazılı siyasi mesajlar, izleyicileri siyaset hakkında bilgi edinmeye, siyaset üzerine düşünmeye ve yargılamaya ve ideal siyasi durumları ve uygulamaları tahayyül etmeye sevk edebilir (van Zoonen ve Wring, 2012). İkinci olarak, metnin kendisi de kamusal alandaki siyasi tartışmaları tetikleyerek siyasi ortamı etkileyebilir; bu da izleyicileri kamusal meseleleri anlama, siyasi pozisyonlarını ifade etme ve siyasi süreçleri açıklama konusunda bilgilendirir (Tenenboim-Weinblatt, 2009).

Televizyon dizilerinde siyaset, metin ve izleyiciler arasındaki karmaşık ilişki, AKP'li siyasetçilerin konuşmalarının, kendi siyasi fikir ve meselelerinin *Diriliş*'i etkilemesinde kendini gösterir. Dizinin yapımcıları (bunlardan biri bir dönem AKP

Milletvekili olan Kemal Tekden'dir) AKP politikalarının ideolojik ve siyasi temalarını olumlu bir şekilde olay örgüsüne dahil etmişlerdir (Carney, 2018). *Diriliş*, devlete ait yayın kuruluşu Türkiye Radyo Televizyon Kurumu'nda (TRT) yayınlanmış ve prodüksiyonu AKP'nin kontrolü altındaki kamu fonları tarafından cömertçe desteklenmiştir. Cumhurbaşkanı Recep Tayyip Erdoğan, diziyi çok sevdiğini ve düzenli olarak izlediğini açıkça ifade etmiştir. Azerbaycan Cumhurbaşkanı İlham Aliyev, Erdoğan'ı Ankara'daki Cumhurbaşkanlığı Sarayı'nda ziyaret ettiğinde, Cumhurbaşkanı'nın bandosu *Diriliş*'in tema şarkısını çalmış ve bu şarkı “*Diriliş Marşı*” olarak adlandırılmıştır (Carney, 2018). Erdoğan, dramının yapım setini bile ziyaret etmiş, ana savaşçı karakterlerle selfie çektirmiş ve yönetmen koltuğuna oturmuş. Halka hitaben yaptığı konuşmalarda, *Diriliş* gibi televizyon programlarının “milliyetçi bir

gençlik” yetiştirmek ve “milli ve kültürel değerlerimizi yeniden keşfetmek” için hayati önem taşıdığını vurgulayarak dizinin tanıtımını yapmıştır.

Televizyon dizilerinin üretimine yapılan siyasi ve ideolojik müdahalelere rağmen, televizyon metninin tek bir anlamı yoktur (Morley, 1991), dolayısıyla egemen ideolojilerle ilişkisi muğlaktır (Lewis, 1991). Yapım süreci, yazar ile yapımcı, yapımcı ile televizyon ağı, ağ ile siyasi güç ve potansiyel izleyici arasındaki dinamik ilişki diyalojik bir etkileşim yaratmaktadır (Newcomb, 1984). İşbirliğine dayalı üretim sürecindeki bu etkileşimler, kaçınılmaz olarak metni çoklu müzakere perspektiflerini yoğun bir şekilde bir araya getirir ve metni bu perspektiflerle doldurur (Newcomb, 1984). Metnin kendisi, çeşitli alternatif sosyal gerçeklikleri ve pratikleri bünyesinde barındırır (Newcomb, 1984); bu da televizyonu yapılandırılmış bir çokanlamlılık haline getirir (Morley, 1999). Siyaset ve ideoloji açısından, metinsel çok anlamlılık, çeşitli siyasi partiler ve örgütler tarafından üretilen ve metne sızan ideolojilerin çokluğu ile pekiştirilir (Morley, 1999). İzleyici söz konusu olduğunda, bir televizyon programının popüler olabilmesi için geniş bir izleyici kitlesine ulaşması gerekir (Fiske, 1986). Dolayısıyla metin, politik ve sosyo-kültürel açıdan farklı izleyici grupları tarafından metnin alımlanması ve çözümlenmesinde kullanılacak farklı söylemsel pratiklere ve ideolojik çerçevelere izin verecek şekilde açık olmalıdır (Fiske, 1986).

İngiliz kültürel çalışmalar yaklaşımı, temelde medya metinlerinin hegemonik ve muhalif okumaları arasındaki güç ilişkilerini çözmekle ilgilendiğinden, egemen medyaya direniş olasılıklarını göstermek için izleyicilerin farklı geçmişleri ve tek bir metinsel malzemeyi çözenin farklı yolları arasındaki ilişkinin araştırılmasıyla çok

meşgul olmuştur (Hall, 2005; Morley, 1999). Ancak bu çalışma, egemen ideolojik çerçeveyi paylaşan bir grup izleyiciye odaklanmaktadır. Bu vaka çalışmasında, dizinin sadık izleyicilerinin çoğu AKP destekçileridir. Diriliş dizisi onlara Türk siyaseti ve Osmanlı tarihi hakkında sahip oldukları fikirlerden oluşan bir repertuar sunmaktadır ve izleyiciler de bu medya içeriğini keyifle tüketmektedir. Hepsi baskın Türk-İslam ideolojik çerçevesini tanımakta ve bunu medya içeriğini sahiplenmek ve yorumlamak için kullanmaktadır. Ancak bu araştırmanın metin analizinin göstereceği gibi, Diriliş dizisi çokanlamlı bir metinsel yapıya sahiptir. Bu çalışmada da, izleyicinin bu çok anlamlılığın açtığı “metinsel çatlağı” izleyicilerin nasıl anlamlandırdığına bakmaktadır. Çalışmanın katılımcıları, siyasi görüşleri ve toplumsal konumları üreticilerin ve yönetici elitlerinkinden farklı olduğu için değil, metindeki çok anlamlılıktan dolayı eninde sonunda kendilerini dizideki belirli temsil mekanizmalarını müzakere ederken bulmaktadırlar.

Metindeki çok anlamlılığın kaynağı, Türk-İslam ideolojik mesajları ile kadın cinsiyetinin alternatif temsili arasındaki çelişkidir. Türkiye bağlamında, televizyon dizilerindeki kadınlar genellikle erkeklere tabi olan ve kadınların korunmaya ihtiyaç duyduğu zayıf karakterler olarak temsil edilmiştir (Saktanber, 1995). Türk medyasında kadınlar geleneksel olarak üç rolde stereotipleştirilmektedir: 1) iyi/sadık/fedakar anne ve eş, 2) cinsel obje ve 3) dayak yiyen, tecavüze uğrayan ve ihanete uğrayan kurban (Gencel Bek ve Binark, 2000; Saktanber, 1995). Diriliş'in metinsel çerçevesini şekillendiren Türk-İslam ideolojisi kadın cinsiyetini ağırlıklı olarak annelikle ve anneliğin aile hanesi sınırları içindeki performansı ile ilişkilendirilmektedir (Göle, 2019). Kadınlar özel alana indirgenmiştir ve doğum yapmaları, yemek yapmaları, beslemeleri, çocuk yetiştirmeleri, evde temizlik yapmaları beklenmektedir. Bununla birlikte, iki kadın kahramanın temsili, metinde radikal bir çok anlamlılık yaratarak egemen ideolojik görüşle doğrudan ve açık bir şekilde çelişir. Ertuğrul'un annesi Hayme Ana ve eşi Halime Sultan dramada “anne” stereotipinin özelliklerini taşır. Ancak, Hayme Ana ve Halime Sultan, anne rollerine rağmen güçlü, cesur ve savaşçıdırlar. Bunlar, Türk tarihi dramalarında genellikle erkek kahramanlara atfedilen özelliklerdir. Hem Hayme Ana hem de Halime Sultan kılıç taşır ve bir kadın olarak birkaç erkek savaşçıya karşı savaşarak kendilerini tehlikeye atmaktan çekinmezler. Her iki kadın da, Osmanlı İmparatorluğu'nun temellerini atacak olan Türk boyunun

kadın ve erkek üyelerine emirler vererek, kamusal alanda yönetici bir otoriteye sahip siyasi bir konum işgal etmektedir.

Toplumsal cinsiyet temsilleri akışkan ve değişkendir, yerleşik toplumsal pratiklere ve algılara itiraz eder, dolayısıyla farklı medya biçimlerinde veya farklı siyasi, ekonomik ve kültürel bağlamlarda farklı anlamlar kazanır (Lemish, 2012). Hiyerarşik kadınsı ve erkeksi stereotiplere meydan okuyan, giderek çeşitlenen kadınsı imge ve rol biçimleri artık birçok dizide mevcuttur. Fakat, günümüz televizyon filmlerinde yer alan fiziksel olarak güçlü ve hükmedici, şiddet unsuru araç ve gereçleri kullanabilen kadın imgeleri, güçlü ve seksi olmak gibi geleneksel kadınlık kavramlarına uydıkları için ataerkilliğe bir tehdit oluşturmamaktadır (Inness, 2004). Diriliş'te de, karakterlerin tercih edilen okuması, her iki kadını da bir dereceye kadar bağımsız, iddialı ve güçlü kadın kahramanlar olarak kodlar, ancak bu özelliklerini olumlu kadınlıklarının bir parçası olarak ataerkil kültüre uygun “tercih edilen” aşk ve evlilik tanımlarına dahil ederler. Bununla birlikte, yapımcıların çabalarına rağmen, bu izleyici araştırması Hayme ve Halime imgelerinin tercih edilen okumayı ikircikli ve çelişkili hale

getirdiğini, Türk televizyon dizilerindeki cinsiyetçi kalıpları yıktığını ve izleyicileri kadınların yalnızca geleneksel kadın rollerine uygun olmadığına inanmaya teşvik ettiğini ortaya koymaktadır.

Buraya kadar, Türk-İslam dramasının, Türk-İslam siyasi söylem ve pratiklerinin hakim olduğu siyasi ortam tarafından reddedilen alternatif toplumsal cinsiyet temsiline “ontolojik açıklığı” inceledik. Çalışmanın kalan kısmında, aşağıdaki soruyu ele alarak katılımcıların bu ontolojik açıklığı nasıl yorumladıklarına bakılacak: izleyiciler bu alternatif toplumsal cinsiyet temsili, dizinin siyasi iktidar tarafından onaylanan baskın Türk-İslam ideolojik çerçevesine nasıl uydurmaktadır?

İzleyici araştırmasının katılımcılarıyla yapılan derinlemesine görüşmelerde, toplumsal cinsiyet eşitliği konusundaki görüşlerin Türk-İslam kültürel bakış açısını onayladığını görülmüştür. 38 katılımcının 26’sı “kadın her alanda olmalı” demiştir, fakat bu katılımcıların büyük bir kısmı da kadının yerini bilerek ve ailedeki görevlerini aksatmayarak bunu yapması gerektiğini vurgulamıştır.

K1: Bence [kadınlar] her yerde yer almalıdır. Kadın eli her şeye değmelidir. Ama herkes yerini de bilmelidir. Çünkü kadınsın; yani derler ya hani burnunu sokma herşeye; siyasete gir, şunu da bunu da yap ama yerini bil (Erkek, 45 yaş, Memur).

K2: Şu anki döneme baktığımızda kadın artık bayağı ön plana çıkmaya başladı. Kendine özgüveni arttı. Bu kesinlikle iyi bir şey. Ama kadının rolü arttıkça aile yapıları bozulmaya başladı. Çünkü kadın sürekli dışarda, anne olma iç güdülerini çoğunda kaybolmaya başladı (Kadın, yaş 38, Ağız-Diş Sağlığı Teknikeri).

Her ne kadar kadının toplumdaki etkin konumundan veya milleti, ailesi için önemli oluşundan bahsedilse de mülakatlarda kadınla erkeğin görevlerinin ayrı olduğu fikri birçok katılımcıda görülmektedir.

K3: Kadınların yapacağı iş vardır, erkeklerin yapacağı iş vardır. Ben buraya kadar gidebilirim, ondan sonrasını sen yapabilirsin diyerek eşim söyler mesela... Herkesin bir çizgisi olması lazım yani aile hayatında. Bu çizgiyi aşınca sorunlar çıkıyor. Eskiden o çizgiyi aşmıyorlarmı (Erkek, yaş 47, İşletmeci).

K4: [Dizide] Herkes yerini biliyor orda. Hani olması gerektiği gibi. Bey olarak ona saygı duyup emirlerine uyuyor. Konmuş kurallar var (Kadın, yaş 57, Kuaför).

Ancak, katılımcılara, dizideki kadın karakterler hakkında görüşleri sorulduğunda “ev işi yapan, obanın işini yapan, aile düzenini sağlayan” olarak nitelendiren katılımcılar 19 kişi olup



sayıca en fazladır. “Savaşçı kadınlar” ifadesi 17, “yönetimde etkili, beylik yapan kadınlar” ifadesi ise 14 katılımcı tarafından dile getirilmiştir. Hayme Ana ve Halime Sultan’ın Türk kadınına yansıtma konusundaki görüşleri sorulduğunda bir yandan “güçlü kadın”, “savaşçı”, “yönetimde etkili olan kadın” gibi kodlar, öte yandan da “eşine saygılı, bağlı ve sadık”, “geleneklerine bağlı”, “hamarat”, “çok iyi anne”, “fedakâr”, “cefakâr” gibi ifadeler öne çıkmıştır. Katılımcıların tanımladığı Türk kadınına doğasına uygun olan “savaşçı kadınlar” ve “beylik yapan kadınlar” kodları toplumsal cinsiyet rolleri düşünüldüğünde aslında erkeğe atfedilen roller arasında yer almaktadır. Buradaki çelişkili çok anlamlılığın alımlanmasında özellikle erkek katılımcıların ifadelerinde bir muğlaklık yorumu göze çarpmaktadır.

K5: Kadının yeri obada yemek yapmak, çocuk bakmak. Ama kadınlar orda erkeklerle savaşıyor. Bakıyorsun bir iki kişiyi öldürüyor aynı anda. Düşünüyorsun, Allah Allah bu nasıl kadın mesela?... Hayme Ana vardı. Tam bir Osmanlı kadınıymış o zaman. Dört dörtlük kadınımış. Ertuğrul Gazi’nin onun sayesinde bir yerlere geldiği belli... (Erkek, yaş 52, Tekstilci).

K6: [Kadınların] Kadınlık rolünün dışında erkeklerin de rolünü üstlendiği, sadece dişi kuş değil savaşçı da olduğu bir dönem. Erkek de oluyorlar yani. Acizlik yok kadınlarda. Kadın olarak her şeyin üstesinden geliyorlar (Erkek, 25, Polis).

### 3. SONUÇ

Diriliş'teki güçlü ve sert kadınlar ataerkil hegemonyanın bir eleştirisini sunmazlar, ancak kadınlık ve erkeklik arasındaki hiyerarşik cinsiyet ayrımlarını daraltarak kadınlar için güçlendirilmiş bir cinsiyet kimliği sunarlar. Bu tür bir güçlendirme, Diriliş'in kapsayıcı ideolojik çerçevesini ve metinsel bağlamının dışındaki izleyici yansımaları şekillendiren siyasi ortamla da çatışır. Dizideki ideoloji ile toplumsal cinsiyet temsili arasındaki çelişki, bizi siyasi iktidar ile metin arasındaki karmaşık ilişkiye dair klasik tartışma üzerine düşünmeye sevk etmektedir. Diriliş'teki güçlü, kudretli, otoriter, savaşçı kadın temsili, muhalif ya da çelişkili olan; ideolojik egemen okuma yapıldıktan sonra iktidarın kontrolünden kaçan semiyotik bir anlam fazlasıdır. Diriliş'teki semiyotik anlam fazlalığı çatışmayı değil, dramının mümkün olduğunca çok sayıda izleyiciyi memnun edebilmesi ve sonuç olarak maksimum gelir elde edebilmesi için çoklu yorumlara izin veren bir tür çelişkili müphemliği ortaya çıkarmaktadır. Bu müphemlik, katılımcılar tarafından baskın ataerkil kültür içinde eritilmektedir, ancak katılımcılar bunu yaparken dizideki temsil edilen kadın imajını cinsiyetsizleştirmekte ve ne eril ne de dişil olan bir toplumsal cinsiyet yorumu ortaya koymaktadırlar.

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**BÜYÜKBAŞ HAYVANCILIK İŞLETMELERİNDE STRATEJİK ANALİZ:  
KARAMAN İLİ ÖRNEĞİ**

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**ÖZET**

Bu çalışmada Karaman ili büyükbaş hayvancılık işletmelerinin stratejik analizleri yapılarak literatüre katkı sağlamak amaçlanmıştır. Bu amaç doğrultusunda Karaman ilinde 25 büyükbaş hayvancılık işletmesi üzerinde yarı yapılandırılmış sözlü mülakat tekniği kullanılarak araştırma yapılmıştır. Yapılan araştırma ile hayvancılık işletmelerinin güçlü ve zayıf yönleri ile işletmelere yönelik fırsat ve tehditlerin belirlenmesi amaçlanmıştır. Bu doğrultuda SWOT analizi tekniği kullanılmıştır. Yapılan SWOT analizi bulgularına göre elde edilen veriler SWOT matrisi üzerinde tablo haline getirilmiştir. Karaman ilinin büyükbaş hayvancılık işletmelerinin güçlü ve zayıf yönleri ile fırsat ve tehditleri maddeler haline getirilerek yazılmıştır ve tekrarlanma sayıları tablo üzerinde derecelenmiştir. Sonuç kısmında SWOT matrisi üzerinde tekrarlanma sayılarına göre büyükbaş hayvan yetiştiriciliğinde güçlü yönler ağırlıklı olarak işletmelerin kendi kaba yemlerini kendisi üretmesi şeklindedir. En yaygın zayıf yönler ise yetersiz teknoloji oluşudur. Fırsatların çoğunu ise bakanlıkların sağladığı teşvik ve destekler olarak sıralanmıştır. En büyük tehdit yüksek girdi maliyetleri ve enflasyon-fiyat istikrarsızlığının olduğu görülmüştür. Sonuç olarak bu çalışma, bölgesel bir araştırma niteliği taşıyor olsa da ülke çapında ki büyükbaş hayvan yetiştiriciliği içinde önem taşımaktadır.

**Anahtar Kelimeler:** Stratejik analiz, SWOT analizi, Büyükbaş hayvancılık işletmeleri

**STRETEGIC ANALYSIS IN CATTLE FARMING BUSINESSES: EXAMPLE OF  
KARAMAN PROVINCE**

### **ABSTRACT**

In this research, it is aimed to contribute to the litterateur by making strategic analyzes of cattle farming business administration in Karaman province. For this purpose, this research is conducted on 25 cattle farmin business administration in Karaman by using semi-structured oral interview technique. The aim of the research is both to determine the strengths and weaknesses of the livestock sector, and the opportunities and threats to the enterprises. In this direction, the SWOT analysis technique was used. The data which was obtained according to the SWOT analysis ascertainments were tabulated on the SWOT matrix. The strengths, weaknesses, opportunities and threats of the cattle farming business administration in the Karaman province were specified on items and the number of their repetitions was graded on the table. In the conclusion part, according to the number of repetitions on the SWOT matrix, the strengths in cattle breeding are mainly that the enterprises produce their own roughage, and the most common weakness is poor technology. Most of the opportunities are listed as incentives and supports provided by the ministries. The biggest threat was found to be high input costs and inflation-price instability. As a result, although this study is a regional research, it is important in cattle breeding throughout the country.

**Keywords:** Strategic Analysis, SWOT analysis, Cattle breeding enterprises

## **GİRİŞ**

İnsanoğlunun en eski beşeri faaliyetlerinden biri olan hayvancılık; en genel anlamıyla evcil hayvan yetiştirmek ve bunlardan belli faydaları elde etme faaliyetidir (Doğanay, 2021). Türkiye'de hayvancılık genel ekonomi ve tarım sektörü içinde büyük ölçüde önem taşıyan bir yere ve potansiyele sahiptir. Hayvansal üretim faaliyetlerinin kimi bitkisel ve bitkisel yan ürünlerin değerlendirilmesi, işgücü başına düşen verimliliğin artırılması, işletme kar payının arttırılması, iklimsel ve ekonomik nedenlerden kaynaklanacak olan risk faktörünün azaltılması gibi bazı faktörler işletmelere olumlu şekilde etkiler sağlamaktadır. Ayrıca dengeli ve bilinçli beslenme açısından toplum sağlığı için büyük önem taşımaktadır.

Türkiye doğal kaynakları ve çevreyle ilgili koşulları bakımından hayvancılık için oldukça elverişli bir bölgede bulunmaktadır. Ancak, izlenen yanlış politikalar hayvancılığın gelişimini büyük ölçüde baskılamış, sektörde bazı gerilemeler meydana getirmiştir(Vural ve Fidan,2007;2). Bunun sonucu hayvan sayısı düşüş gösterirken, ürünlerin fiyatları giderek yükselmiş, insanlar daha az miktarda hayvansal ürün tüketmek zorunda kalmışlardır.

Geçmişten günümüze süregelen, sahip olduğu coğrafi ve doğal özelliklerinden dolayı Anadolu'daki en önemli tarım ve hayvancılık bölgelerinden biri olarak bilinen Karaman ilinde ekonomi adı geçen doğal kaynaklarından dolayı büyük ölçüde tarım ve hayvancılığa dayanmaktadır.

İç Anadolu bölgesinin tahıl ambarı olarak bilinen Konya ovasıyla olan coğrafi ilişkisinden dolayı Karaman ili hayvancılığı özellikle kaba yem üretiminde büyük ölçüde fırsat sağlamaktadır. Özellikle büyükbaş sığır yetiştiriciliği ve bu anlamda süt sığır yetiştiriciliğinde ilerleme kaydetmiş olan Karaman ilinde 64.419 adet sığır bulunmaktadır(www.tarimorman.gov.tr/2022). Bölgede geleneksel anlamda süt sığırcılığı ne kadar devam ettirilse de bölgesel, ulusal ve küresel rekabetin sürekli arttığı ve değiştiği 21.yüzyılda söz konusu işletmelerin varlığını sürdürebilmeleri stratejik yönetim ile mümkün olabilmektedir(Aktan, 2008).

İşletmelerin giderek değişen şartlar ve rekabet ortamında ayakta durabilmeleri için stratejiler geliştirmeleri gereklidir buda stratejik analizler yapabilmelerine bağlıdır. Stratejik analiz, işletmelerin hedef ve bu hedeflere bağlı amaçlarının belirlenerek bunlara en uygun stratejilerin geliştirilmesi, söz konusu işletmenin iç ve dış çerçevesinin birlikte incelenmesini kapsayan bir süreçtir(Bozkıran, 2018).

Hayvancılık işletmelerinin bulunduğu durumu ve dışarıdan bakınca görülecekleri konumu belirlemek için stratejik analizlere tabi tutulmaları gerekir. Bu analizler sürecinde birçok yöntem kullanılmaktadır, bu kullanılan yöntemlerin başında ise SWOT analizi yöntemi gelmektedir. SWOT analizi, bir proje veya iş faaliyetlerinde yer alan güçlü ve zayıf yönler ile fırsat ve tehditleri anlamaya yardımcı olabilecek kolay fakat çok sıklıkla kullanılan bir araçtır(Downey,2007). Hayvancılık sektöründe farklı alanlar için yapılan stratejik alanlarda SWOT analizinin kullanıldığı birçok farklı çalışmanın olduğu görülmektedir.

Hayvancılık işletmelerinin bulunduğu durumu ve dışarıdan bakınca görülecekleri konumu belirlemek için stratejik analizlere tabi tutulmaları gerekir. Bu analizler sürecinde birçok yöntem kullanılmaktadır, bu yöntemlerin başında ise SWOT analizi gelmektedir. SWOT analizi, bir proje veya iş faaliyetlerinde yer alan güçlü ve zayıf yanlar ile fırsat ve tehditleri anlamaya yardımcı olan basit fakat çok yaygın kullanılan bir araçtır(Downey,2007).

Hayvancılık sektöründe farklı alanlar için yapılan stratejik alanlarda SWOT analizinin kullanıldığı birçok farklı çalışmanın olduğu görülmektedir.

Bu çalışmada Karaman ili hayvancılık işletmelerinin stratejik analizleri yapılarak literatüre katkı sağlamak amaçlanmıştır. Bu doğrultuda Karaman ilinde bulunan 25 hayvancılık işletmesi üzerinde gerekli araştırmalar yapılmıştır. Hayvancılık işletmelerinin güçlü ve zayıf yönleri ile fırsat ve tehditleri belirlemek için SWOT analizi tekniği kullanılmıştır.

## 1.LİTERATÜR

Stratejik analiz; işletmenin amaçlarının yeniden tanımlanması, bu amaçlara yönelik stratejilerin belirlenmesi ve hem işletmenin hem de işletme dış çevresinin araştırılmasına yönelik çabaları; yani örgüt-çevre ilişkisinin değerlendirilmesini kapsamaktadır(Dinçer, 2004).

### 1.1.Strateji

Strateji genele tabirle plandır, çünkü stratejide esas olarak alınan istediğimiz ve arzuladığımız sonuçlara ulaşabilmektir. Strateji aynı planda olduğu gibi belirli bir bilgi birikimine sahip olarak veya yetersiz denecek kadar az bilgilerin olduğu ileri derecede belirsizlik altında yapılır.

Stratejide; işletme ve işletmenin içinde mevcut olarak bulunduğu çevre dikkate alınarak yapılır. Strateji dinamiktir, işletmenin erişmek istediği sonuçları etkileyecek rakiplerin olası faaliyetlerinin de önceden hesaplamak gerekir. Aslında stratejiyi kısaca; rakiplerin



faaliyetlerini analiz ederek amaçlara ulaşmak için belirlenen, sonuç odaklı, uzun dönemler içeren, dinamik kararlar topluluğu olarak açıklanabilir.

Strateji kelimesi işletme alanına ve diğer mevcut bilim dallarının literatürlerine askeri literatürden dâhil olmuştur. Askeri strateji kavramı bir savaşta ordunun girişeceği hareketlerin ve faaliyetlerin tasarlanıp yönetilmesi sanatı şeklinde açıklanabilir. Kelime anlamı olarak da bir amaca ulaşabilmek için izlenen yollar ve uygulanan yöntemlerin tamamı şeklinde de tanımlanabilir. Stratejiyi satranç oyununa da benzetebiliriz. Tek bir hamle ile yetinilmez, birkaç adım sonrasını da hesaplamamız gerekmektedir.

Strateji kavramı bir işletmenin hedeflerine ulaşmasında yardımcı olan, mevcut kaynak kullanımını gibi faaliyetlerin uygulanmasında kullanılan aksiyon planıdır.

Değişik aktiviteler uygulanması ya da mevcut aktivitelerin rakiplerden farklı bir biçimde uygulamaktan ibarettir. Mevcut her işletme strateji terimiyle yakından ilgili olmak durumundadır. Rakiplerine zamanında karşılık verebilmek, ortam değişiklikleriyle zamanında mücadele edebilmek, değişken müşteri beklentilerini karşılayabilmek ve hazırda bulunan mevcut kaynaklarını verimli bir şekilde kullanabilmek için işletmeler sürekli yeni yöntemler geliştirmelidir.

Stratejiler belirlenirken bireysel değil, işletmenin geneliyle toplu bir şekilde gerçekleştirilmelidir. Geniş araştırmalar ve bilgilerin ışığı altında oluşturulmalıdır. Strateji uzun süreli rekabeti temin etmenin yanında işletmenin yeterince esnek kalmasını sağlamalıdır. Stratejik planlama ise bir işletmenin mevcut içinde bulunduğu durumunu tespit etme, gelecekteki olması beklenen hedeflerini belirleme ve bu belirlenen hedeflere ulaşmak amacıyla strateji geliştirme ile ölçümlene sürecini ihtiva eden iş disiplini. Geniş alanlarda yapılan araştırmalar ve bilgilerle geliştirilmelidir. Günümüzde çok yoğun olan rekabet ortamları rekabet etmek için işletmeler sürekli olarak pazar, rekabet ve diğer faktörler ile ilgili çok fazla bilgi toplama ve bilgileri topladıktan sonra analiz etmeleri gerekir.

### 1.1.1.Stratejinin Özellikleri

- Analiz etme aracıdır.
- Amaçlarla ilgilidir.
- Kurum ve çevresiyle karşılıklı ilişkileri düzenler.
- Gelecek için yol haritası sunar.
- Karmaşık ve dinamik çevrede faaliyet alanını belirler.
- Monoton kararların dışına çıkar.

- Örgütlerin var oluş amaçlarının belirlenmesine olanak sağlar.
- Analiz sürecini kapsar.
- Amaçlara bağlı bir unsurdur.

### 1.1.2. Stratejik Analiz

İşletmenin amaçlarının yeniden tanımlanması, bu amaçlara uygun stratejilerin belirlenmesi yani örgüt ve çevre ilişkisinin değerlendirilmesini kapsar. Örgütler ya da işletmeler, stratejik analizlerle elde ettikleri bilgilerden harekete geçerek, rekabet edebilecek güçte bir avantaja sahip olmak ya da mevcut olan avantajlarını korumak için uzun vadede ki planlarını, stratejilerini geliştirebilecek, geliştirdikleri bu stratejileri program, bütçe ve prosedürler sayesinde faaliyete geçirerek değerlendirip kontrol edebilecekleri sonuçlara dönüşüreceklerdir( Efil, 2004).

Diğer bir deyişle stratejik sürecinde, var olma sebeplerini ortaya koyan görevlerini ve ilerledikleri noktayı netleştirebilen vizyonları ile beraber esas değerlerini birleştiren işletmeler, uygulayıp izleyecekleri stratejiler doğrultusunda harekete geçecektir( Kaplan ve Norton, 2006). Bu nedenlerden dolayı işletmelerdeki stratejik analiz sürecinin oldukça önemli bir yeri vardır.

Stratejik analiz sürecinde ilk önce işletmeye ait dış çevre daha sonra işletmenin kendisi incelebilmektedir. Dış çevrenin analizi örgütün eylemleri çevresindeki tehdit ve fırsatları, iç çevre analiziyse örgüt içindeki zayıf ve güçlü yönleri açıklamayı amaçlar(Bernroider, 2002).

Stratejik analiz yöntemi olarak farklı yöntemler bulunmaktadır. İç çevre analizleri için; temel yetkinlikler analizi, değer zinciri analizi için ise, PEST-PESTE-PESTLE( Political, Economic, Social, Teknological, Legal, Environmental) ve senaryo planlamaları gibi analiz yöntemleri kullanılabilir( Prahalad ve Hamel, 1990).

### 1.2. SWOT ANALİZİ

Swot, güçlü (strenghts), zayıf (weaknesses), fırsat (opportinuties) ve tehdit (threats) kelimelerinin İngilizce kelime olan karşılıklarının ilk harflerinden oluşmaktadır. SWOT dış çevre analizi sayesinde meydana gelen, tespit edilen fırsatlar ve tehditlerin içinde buldukları çevre analizinde örgütün güçlü ve iyileştirilmeye açık yönleri ile karşılaştırmasının yapılmasıdır(Yıldırım,2008; Küçüksüleymanoğlu:2008).

SWOT analizi stratejinin ve örgütün yol haritasının oluşturulmasında yardımcı olmak amacıyla meydana getirilen bir yöntem şekli olarak da değerlendirilebilir. Bu yöntem örgütlerin güçlü ve zayıf yönleriyle örgütün mevcut dış çevresinde oluşan fırsat ve tehditleri

belirlemek doğrultusunda uygulanır. Bu temel unsurların tanımlanmasıyla örgütlerin güçlü taraflarını temele alan, zayıf yönlerini minimal düzeye indirerek örgütün çevresindeki fırsatlardan faydalanırken ya da tehditlere karşı da önlem olarak stratejiler geliştirilmeye olanak sağlar. (Arıöz ve Yıldırım,2012)

Lumpkin ve Dess'in deyişlerine göre örgütler devamlılığını sağlayabilmek ve geliştirebilmek için içinde buldukları çevrelerin beklentilerini ve emellerini karşılamak durumundadırlar. Örgütlerin iç ve dış çevrelerinde ortaya çıkan değişimler kimi zaman örgütleri bir fırsatla, kimi zamanda ise bir tehdit unsuruyla karşılaştırabilmektedirler. SWOT analizi ise tam da bu durumda örgüte ait iç ve dış çevre analizlerini yaparak mevcut durumun saptanması, güçlü-zayıf yönleri, fırsat ve tehditleri ortaya çıkararak örgütü içinde bulunduğu çevre koşullarına daha yatkın hale getirir (Ağaoğlu, Şimşek ve Altınkurt,2006).

Eğitim yöneticileri bu analiz yöntemi ile kendi toplumlarının ihtiyaçlarına odaklanarak daha iyi bir hizmet için sınırlarını oluştururlar( Balamuralikrishna Dugger,1995). Yani güç çözümlenmesiyle strateji geliştirenler için iç; yani güçlü-zayıf ve dış; fırsat ve tehdit faktörlerini sınıflandırarak daha da derin ve detaylı olarak stratejiler belirlenmesine olanak sağlar( Peng Wang ve Gao,2014).

SWOT analizi sayesinde örgütlerin güçlü yanlarının etkinliği artırılarak, zayıf yönleri azaltılabilirken; oluşturulan bu fırsatlardan yararlanılarak ve ortaya çıkan tehdit unsurlarını en az seviyeye indirerek başarılı ve etkin bir strateji yöntemi oluşturulmasına sağlam bir zemin hazırlayabilir(Çelik ve Murat,2010).

SWOT analizi yardımıyla örgütün içinde bulunduğu durum, güçlü-zayıf yönler, fırsat ve tehditler belirlenip örgütün ihtiyaçları ortaya konur(Şahin ve Arslan,2000).

Bunların yanı sıra güç çözümlenmesi zayıf yönleri güçlüye dönüştürmek ve tehditleri fırsata çevirebilmek için de yararlı olan bir analiz tekniğidir ( Birel,2008).

### **1.2.1 SWOT Analizinin Amacı**

SWOT analizi; Örgütlerin güçlü ve zayıf yanlarını belirlemek, fırsat ve tehditlerin ne olduğunu algılamak amacıyla kullanılan temel unsurlardan biridir. Aynı zamanda örgütün mevcut durumunu görmeye olanak sağlar. Mevcut örgütler SWOT analizi yöntemiyle buldukları konumu görüp gelecekteki hedeflerini belirleyebilir. Bu analiz örgütün güçlü yönlerine odaklanarak, tehditleri en aza indirmek ve uygun fırsatları değerlendirebilmek açısından fayda sağlar.

SWOT analizi, stratejik planlama sürecinde hem yaklaşım tarzı, hem de bir analiz tekniği olarak, örgüt yöneticilerine düşünme modeli oluşturur. Oluşturulan bu model hem bilgi toplama, hem bu bilgileri yorumlama, gündemi sınırlandırma ve kararların dayanacağı temelleri oluşturur. SWOT analizi metodu alınacak stratejik kararlar için, oldukça önemli bir temel özelliği taşımaktadır( Dinçer,2002).

Değişen çevre koşulları sebebiyle örgütleri tehdit veya fırsatlarla karşı karşıya getirebilmektedir. Oluşan bu sorunların yanı sıra örgütlerin mevcutta buldukları kaynak ve becerilere bağlı olarak ortaya çıkan güçlü ve zayıf yönleri mevcuttur.

Stratejik analizlerin temel odak noktası ögeler arasındaki ilişkileri inceleyerek bu ilişkilerden örgüt için maksimum seviyede fayda sağlamaktır. Stratejik kararların verilmesinde, bilgi toplama ve tasnif etmede aracı olan SWOT analizi ile toparlanılan bilgilerin doğruluğu, ileriye yönelik bilgilerin netliği, bu bilgilerin doğru bir şekilde kullanımı, karar veren kişilerin zihin modelleri ve niyetleri çıkan sonuçlar üzerinde etkili olur( Dinçer,2002).

### **1.3. HAYVANCILIK**

İnsanoğlunun en eski beşeri faaliyetlerinden biri olarak bilinen hayvancılık; genel bir tabirle evcil hayvan yetiştirmek ve bunlardan fayda elde etmektir. Toplumların refah düzeylerini artırma yolunda ki ekonomik olarak büyüme ve kalkınmasının sağlanması, toplumlar tarafından hedeflenen temel olgulardan biridir. Bu ekonomi olgusu da hayvancılık sektöründe stratejik olarak önemli bir yere sahiptir. Küresel ısınma, iklim değişiklikleri, talep ve arz durumlarındaki değişimler bu sektöre olan ilgi ve alakayı arttırmaktadır. Yaşanan ve hala yaşanmakta olan arz talep dengesizlikleri, hızla değişen fiyatlar, gıda tedariki ve üretimin sürdürülebilirliği noktasındaki yaşanan

aksaklıklar hayvancılığın ekonomi açısından kritik önemini ortaya çıkarmıştır( Türkiye Ziraat Odaları Birliği, 2019).

Hayvancılık sektörü et, süt ve ürünleri sanayi, dericilik, tekstil, veteriner ilaçları ve ekipman sanayi ve yem sanayi vb. bileşenleri ile yeni iş ve geçim alanları ortaya çıkarmaktadır. Bunun yanı sıra hayvansal ürünlerin işlenmesi ile birlikte katma değer de oluşmaktadır( TİGEM, 2017).

#### **1.3.1. Türkiye’de Hayvancılık**

Türkiye’de hayvancılık mevcut bulunduğu iklim yapısı ve çevreyle ilgili durumu sebebi ile tarımsal ürün üretiminde miktar ve ürün çeşitliliği yönünden çok büyük miktarda potansiyele sahip olan ülkemizde tarım sektörü ekonomik ve sosyal alanda önemli yer tutmaktadır. Tarım

sektörüne ait bir dal olan hayvancılıkta ülke ekonomisi açısından önemli bir yere sahiptir. Hayvancılık sektörü, sanayi hammaddesi, beslenme, işsizliği ve köyden kente göçü önlemede ve istihdam yaratmada önemli yer tutar. Aynı zamanda bu sektör ülke ekonomisine önemli ölçüde destek sağlayan, birim miktar yatırıma en yüksek katma değeri sağlayan ve en düşük seviyede maliyetle istihdam oluşturan bir sektördür( Şahin ve Ulutaş, 2010).

Ülkede hayvansal ürünler ilk önce çocuklar olmak üzere, genellikle her yaşta ki nüfusun beslenmesinde önemli yer tutmaktadır. Ülke halkının sağlıklı ve dengeli beslenmesinin sağlanması için gerekli önlemlerin alınması, refah düzeyinin artırılmasıyla birlikte hayvansal ürün miktarı ve kalitesinin artırılması gerekir.

Süt hayvancılığı üretim hareketleri bazı bitkisel ve bitkisel yan ürünlerin değerlendirilip işlenmesi, iş gücü verimliliğinin artması, işletme kar oranının artması vb. faktörler işletmeler için olumlu katkılar sağlamakta, dengeli ve düzenli beslenme açısından toplum sağlığı için büyük önem taşımaktadır( Vural ve Fidan, 2007).

Türkiye nüfusu her geçen yıl artmaktadır. Fakat hayvan sayıları bu oranda artış göstermemektedir. TÜİK'ten edinilen bilgilere göre 1981 yılında 15.981.000' de en yüksek sayıya erişen hayvan sayısı ilerleyen yıllarda ise düşüşe geçmiş ve 2003 yılında 9.788.102' ye kadar gerilemiştir. 2014 yılına kadar tekrar artma eğiliminde olan sığır sayısı 2014 yılında 14.122.847' ye kadar çıkmıştır. 2021 yılı verilerine göre ülkemizde bulunan mevcut hayvan sayısı 17.850.543 baş sığır, 185.574 baş manda olmak üzere toplamda 18.036.117 baş büyükbaş hayvan bulunmaktadır (TÜİK, 2021). Bu bağlamda halen daha dünyanın gelişmekte olan ülkeleri arasında olan ve gelişmişlik sıralamasında ilk 20 ülke arasında olan ülkemizde, dünyanın önemli hayvancılık

ülkeleri arasında olup, bu alanda yapılan yenilikler ile son yıllarda hayvancılık üretimini arttırmaktadır(Doğanay, 2011). Ülkemiz dünya ülkeleri arasında süt üretiminde 7. , sığır eti üretiminde ise 16. sırada yer almaktadır.

Ülkemizde bulunan büyükbaş ve küçükbaş hayvanlardan toplamda 23.200.306 ton süt elde edilmektedir. 2021 yılında yapılan bu ölçümlerden elde edilen sonucun 21.307.116 tonluk kısmını sığır sütleri oluşturmaktadır, ülkemizde süt ihtiyacının büyük bir kısmını sığır sütleri karşılamaktadır(TÜİK, 2021).

Türkiye hayvancılığında 2021 yılında toplam büyükbaş ve küçükbaş hayvanlardan 1.952.098 ton kırmızı et üretilmektedir. Üretilen toplam et miktarının 1.460.719 tonluk kısmını sığır eti oluştururken bunu; 385.993 tonla koyun, 94.555 tonla keçi, 10.831 tonla ise manda eti takip etmektedir. Üretilen sığır eti miktarı yıllar içerisinde değişiklik gösterse de en yüksek üretim

2021 yılında (1.460.719 ton), en düşük değerini ise 2003 yılında (290.454 ton) almıştır(TUİK, 2021).

Hayvancılık işletmelerinin yapısı; ülkemizde hayvancılık birbirinden farklı olan birçok biçimde yapılmaktadır. Bunlardan ilki köy yani aile tipi hayvancılık olup, her bir işletmede ortalama 1 ya da 2 adet hayvan bulunmaktadır. 2. tip ise arazisi olmayıp dışarda günlük hesabı çalışan ve ailenin tüketimini karşılayacak 1-2 adet hayvanı bulunan tarım işçilerine ait faaliyetlerdir. Yaygın olarak bulunan bir diğer işletme tipi ise bitkisel üretimin yan ürünleri ile yapılan hayvancılık faaliyetidir. Bunları pazar için üretimde bulunan işletmeler ile modern olarak hayvancılık yapan işletmeler takip eder( Talim ve Saner,1995).

Modern işletmelerde kaba yem üretiminin büyük bir kısmı işletmenin kendisi tarafından karşılanmakta, kesif yeminse tamamına yakın kısmı dışarıdan tedarik edilmektedir. Ülkemizde bulunan tarım işletmelerinin sadece %3' lük dilimi hayvancılık, kalan yüzdelik kısmı ise tarım ve hayvancılık üzerine kurulmuştur. Büyük ve modern işletmelerin teknik ve ekonomik etkinliği, küçük aile işletmelerine oranla daha da fazladır.

Türkiye doğal kaynakları ve iklim koşulları yönüyle hayvancılık için oldukça elverişlidir. Fakat izlenen hatalı ve yanlış politikalar hayvancılığın gelişiminin önüne geçmiş, sektörde gerilemelere neden olmuştur. Bu durumların neticesinde hayvan sayıları giderek azalmış olup, hayvansal ürünlerin fiyatları giderek artış göstermiş, insanlarımız daha az miktarda hayvansal ürün tüketir hale gelmiştir.

Türkiye' de 2000 Genel Tarım Sayımına göre 3.967.000 tarım işletmesi bulunmaktadır. Bu sayının ise yalnızca %3,6'sını hayvancılık işletmeleri oluşturmaktadır( TUİK, 2007).

### **1.3.2. Karaman İli Hayvancılığı**

Karaman ili hayvancılığı, geçmişten günümüze dek süre gelmiş, sahip olduğu konum ve doğal kaynaklarından dolayı Anadolu'da ki en önemli tarım ve hayvancılık bölgelerinden biri olarak bilinen Karaman ilinde ekonomi bahsi geçen doğal kaynak ve coğrafi bakımından dolayı önemli ölçüde tarım ve hayvancılığa dayanmaktadır. İç Anadolu bölgesinin tahıl ambarı olarak bilinen Konya ovasıyla olan coğrafi yakınlığından dolayı Karaman ili hayvancılığı özellikle kaba yem üretiminde büyük ölçüde fırsat sağlamaktadır. Özellikle büyükbaş sığır yetiştiriciliği ve bu anlamda süt sığır yetiştiriciliğinde önemli derecede ilerleme kaydetmiş olan Karaman ilinde 67.174 baş sığır bulunmaktadır. Karaman ilinin merkezi de dâhil olmak üzere toplam işletme sayısının %38,02'sini büyükbaş hayvan işletmesi oluşturmaktadır (TUİK, 2021).

Karaman ilinde bulunan toplam sığır sayısının 49.084'ünü kültür ırkları, 17.588'ini kültür melezleri, kalan 502 tanesi ise yerli ırklar oluşturmaktadır(TUİK, 2021).

Karasal iklimin hâkim olduğu Karaman ilinde hayvancılık işletmeleri incelendiğinde genellikle küçük ve orta ölçekli işletmelerin olduğu; verimliliğin, kaba yem ulaşımının yüksek fakat kişi başına düşen gelirin tatmin edici olmadığı, ancak hayvancılık işletmelerinin il ekonomisine büyük ölçüde katkı sağladığı görülmektedir.

## 5.YÖNTEM

Bu çalışmanın amacı Karaman ili büyükbaş hayvancılık işletmelerinin güçlü ve zayıf yanlarıyla fırsat ve tehditlerinin belirlenmesidir. Bu amaç doğrultusunda Karaman ilinde 25 büyükbaş hayvancılık işletmeleri üzerinde araştırma yapılmıştır. Karaman İl Gıda Tarım Hayvancılık Müdürlüğü'nün en son verilerine göre 9.493 hayvancılık işletmesi bulunmaktadır. Zaman ve maliyet kısıtları nedeniyle bütün işletmelere ulaşamadığımdan dolayı kolayda örnekleme yöntemiyle seçilen 25 büyükbaş hayvancılık işletmesi üzerinde görüşme-sözlü mülakat şeklinde veri toplanmıştır.

Veri toplama kısmında ise işletmelerin türü, gösterdikleri çalışma alanları, hayvan sayıları, güçlü ve zayıf yönler ile fırsat ve tehditlerin sorulduğu açık uçlu bir soru

formu kullanılmıştır. Bu soru formları işletmelerin sahipleri veya yöneticileri tarafından doldurulup cevaplanmıştır.

Araştırma yarı yapılandırılmış mülakatlar içeren nitel bir çalışmadır. İhtisas araştırma alan yazın taraması içeren bir çalışmadır.

**Tablo 1.** Karaman İl Gıda Tarım Ve Orman Müdürlüğü İşletme Sayısı Raporu

**Table 1.** Karaman Provincial Directorate of Food, Agriculture and Forestry Number of Businesses Report

İLÇE	BÜYÜKBAŞ BULUNAN	KÜÇÜKBAŞ BULUNAN	TEK TIRNAKLI BULUNAN	DİĞER	TOPLAM İŞLETME SAYISI
AYRANCI	246	1908	8	112	1382
BAŞYAYLA	157	66	1	53	252
ERMENEK	867	530	0	160	1455
KÂZIMKARABEKİR	74	214	13	16	292
MERKEZ	1652	2870	14	726	4944
SARIVELLİLER	866	223	0	193	1168
<b>TOPLAM</b>	<b>3862</b>	<b>5001</b>	<b>36</b>	<b>1260</b>	<b>9493</b>
<b>YÜZDE</b>	<b>%38.02</b>	<b>%49.23</b>	<b>%0.35</b>	<b>%12.4</b>	<b>%100</b>

Bu çalışmanın amacı Karaman ili büyükbaş hayvancılık işletmelerinin güçlü ve zayıf yönleri ile fırsat ve tehditleri belirlemektir. Bu çalışmada nitel araştırma metodu kullanılmıştır. Büyükbaş hayvancılık işletmeleri sahipleri ya da yöneticileri veya uzmanlar ile yapılan yarı yapılandırılmış mülakatlar içeren nitel bir araştırmadır.

Hayvancılık işletmelerinin güçlü ve zayıf yönleri ile fırsat ve tehditlerin belirlenmesinde SWOT analizi tekniği kullanılmıştır, kullanılan sorular şu şekilde sıralanmıştır;

➤ **Fırsatlar:** Günümüz koşullarında hayvancılık sektöründe hangi fırsatlar değerlendirilmeye müsaittir?

- Karaman açısından
- Türkiye açısından
- Dünya açısından

➤ **Tehditler:** Günümüz koşullarında hayvancılık sektöründe hangi fırsatlar değerlendirilmeye müsaittir?

-Karaman açısından

- Türkiye açısından
- Dünya açısından

➤ **Güçlü Yönler:**

-Karamandaki işletmelerin güçlü yönleri nelerdir?

-İşletme olarak sizi rakiplerden ve diğer işletmelerden üstün kılan yönler nelerdir?

-Rakiplerin ve diğer işletmelerin sizde yakalayamadığı yönler nelerdir?

➤ **Zayıf Yönler:**

- İşletme olarak sizi rakiplerden ve diğer işletmelerden ayıran zayıf yönler nelerdir?
- Güçlendirmeyi düşündüğünüz zayıf yönleriniz nelerdir?
- Keşke işletmemiz sahip olsaydı dediğiniz hususlar var mı?

Toplamda 12 soru kullanılarak yarı yapılandırılmış sözlü görüşme - mülakat şeklinde sorular sorulmuştur.

## 6.BULGULAR

Bu bölümde büyükbaş hayvancılık işletmeleriyle alakalı sayısal bulgular, görüşlerine ulaştığımız işletme sahipleri veya yöneticilerinin demografik bilgileri, SWOT analizi bulgularına açıklanmıştır.

**Tablo 2.** Tarımsal işletmelerle ilgili sayısal bulgular  
**Table 2.** Numerical findings on agricultural holdings



İşletmenin türü	Süt İşletmesi	Besi İşletmesi	Süt-Besi İşletmesi
Sayı	17	1	7
Faaliyet Alanı	Yiyecek ve İçecek	Yiyecek	Yiyecek ve İçecek

Tablo 2’de araştırma yapılan 25 büyükbaş hayvancılık işletmesinin 17 tanesi sadece süt üretiminde, yiyecek ve içecek alanında faaliyet göstermektedir. Kalan işletmelerden sadece 1 tanesi besi işletmesi olup sadece yiyecek alanında faaliyet göstermektedir. Diğer 7 işletme ise hem süt hem de besi işletmesi olarak, yiyecek ve içecek alanında hizmet vermektedir.

**Tablo 3. Uzmanların Demografik Bilgileri**  
**Table 3. Demographic Information of Experts**

MESLEK	SAYI
Esnaf	2
Yönetici	2
Çiftçi	10
Veteriner Hekim	4
Ziraat Mühendisi	3
Birlik Başkanı	4

Tablo 3 incelendiğinde görüşüne başvurulmuş kişilerin meslekleri bu şekildedir, görüşüne başvurulmuş kişilerden 2 esnaf, 2 kişi yönetici, 4 kişi veteriner hekim, 3 kişi ziraat mühendisi, 4 kişi birlik başkanı ve çoğunluk olarak ise 10 kişinin çiftçi olduğu görülmektedir. Toplamda 25 kişinin verileri ele alınarak SWOT matrisi oluşturulmuştur.

## SWOT ANALİZİ BULGULARI

**Tablo 4. SWOT Matrisi**  
**Table 4. SWOT Matrix**

İÇ ÇEVRE FAKTÖRLERİ (İÇ DURUM ANALİZİ)	
GÜÇLÜ YÖNLER	ZAYIF YÖNLER
G1.Çoğu işletme kendi yemini kendisi üretiyor.(13)	Z1. Hayvan refahı yetersizdir.(3)
G2.Doğru besleme yapmayı biliyoruz.(1)	Z2. Robotik sağım sistemine ihtiyaç vardır.(3)
G3.Karamanlı ili hammaddeye yakınlık açısından elverişlidir.(4)	Z3. Teknoloji yetersizdir.(10)
G4.Likidide sorunun olmaması.(3)	Z4. İşçi yönetiminin eksik yapılması.(3)
G5.Sürekli yenilenebilir olması.(2)	Z5. İnsanlarla etik bağlantı kuramamak.(1)
G6.Bölge halkının bilinçli olması,tecrübeli olması.(1)	Z6. Bakım maliyetlerin yüksek olması.(1)
G7.Aile işletmesi olması,hayvan takibinin düzgün yapılması.(5)	Z7. Finansman-sermaye yetersizliği.(5)
G8.Yemin lojistik kısmı az maliyetlidir.(2)	Z8. Daha ucuz enerjiye ihtiyacımız var.(2)
G9.Cıvardaki bütün illere et-süt sevkiyatının kolay yapılması.(3)	Z9. Sürü takip sisteminin olmaması.(1)
G10.Aynı tarım arazisinde 1 yıl içinde 2 kez ürün elde etmek.(3)	Z10. Teknik eleman yetersizliği.(4)
G11.Et işleme tesislerinin fazla olması.(2)	Z11. Aile işletmelerinin fazla olması.(3)
G12.İş seveerek yapmak.(3)	Z12. Kesif yem maliyetlerinin fazla olması.(2)
G13.Karaman ili Kaba yem üretim merkezidir.(4)	Z13. Hayvancılığın ek iş olarak yapılması.(1)
G14.Pazara ve fabrikalara yakın olması.(4)	Z14. Hayvanlar için yetersiz barınma alanı.(2)
G15.Teknolojiyi verimli kullanmak.(3)	Z15. Makine-ekipman yetersizliği.(4)
G16.Mesleki tecrübemin olması.(4)	Z16. Eğitim seviyesinin düşük olması.(2)
G17.Ekilebilir arazinin geniş olması.(1)	Z17. Ekim için kullanılan arazilerin kiralık olması.(2)
G18.Pazarın geniş olması.(4)	Z18. Damızlık niteliğindeki hayvanların kesime yönlendirilmesi.(2)
G19.Bilgili tecrübeli ve eğitilmiş yetiştiriciler olması.(4)	Z19. Dış pzara ulaşımın istenilen şekilde olmaması.(2)
G20.İklim koşulları hayvancılık için uygundur.(2)	Z20. Toprak yapısından dolayı mera bitkilerinin verimsiz olması.(4)
G21.Doğru besleme çok önemlidir.(4)	Z21. Girdi maliyetlerinin çıktı maliyetlerinden fazla olması.(2)
G22.Bilgiye ve öğrenmeye her zaman açık haldeyiz.(2)	Z22. Sulama maliyetlerinin fazla olması.(3)
G23.Hayvan kayıt sistemi ile otokontrol sistemin olması.(1)	Z23. Kışın çok soğuk iklim şartlarına hayvanların dayanamaması.(1)
G24.İşgücü maliyetinin düşük olması.(2)	Z24. Bilgisiz hayvan yetiştiriciliği ve yerel yönetim ilgisizliği.(1)
DIŞ ÇEVRE FAKTÖRLERİ(DIŞ DURUM ANALİZİ)	
FIRSATLAR	TEHDİTLER
F1.Likidite sorunun olmaması.(2)	T1.Yanlış uygulanan tarım politikaları.(1)
F2.Bölgesel birliklerin hayvan alımında önder olması.(3)	T2.Verimli arazilerin imara açılması.(1)
F3.Geniş ve bereketli mera alanlarının olması.(3)	T3.Azalan arz talep oranı.(10)
F4.Hayvancılığa dayalı işgücünün yaratılması.(2)	T4.İşgücünün yetersiz olması.(3)
F5.Küçük aile işletmelerinin fazla olması.(2)	T5.Bölgeye uygun hayvan ırkının tercih edilmemesi.(2)
F6.Bakanlıkların sağladığı uzun vadeli kredi destekleri.(8)	T6.Yüksek girdi maliyetleri.(13)
F7.Kurban bayramı için hayvan üretiminin yapılması.(1)	T7.Siyasi belirsizlikler.(2)
F8.Et fiyatlarının artması hayvan sahiplerine katkı sağlar.(3)	T8.Giderek azalan yer altı su kaynakları.(3)
F9.Hayvansal atıkların verimli değerlendirilmesi.(2)	T9.Bilinçsiz kullanılına teşvik ve krediler.(1)
F10.Birim alandan elde edilen yem miktarının fazla olması.(2)	T10.Eflasyon-Fiyat istikrarsızlığı.(14)
F11.Ucuz yeme kolay ulaşabilmek.(3)	T11.Önüne geçilemeyen hayvan hastalıkları.
F12.Sürdürülebilir bir sektör olması.(6)	T12.Suni et üretiminin giderek yaygınlaşması(hayvansal gıdaların yapılaşması).(5)
F13.4 mevsim yaşanan bir ülke olduğundan hayvan ırklarının refahı.	T13.Yüksek sera gazının hayvancılık sektörünü olumsuz etkilemesi.(2)
F14.Ortadoğu pazarına yakınlık.(3)	T14.İthalat kısıtlamaları.(1)
F15.Temel tüketim maddesi üretimi.(11)	T15.Aşı-ilaç maliyetinin yüksek olması.(4)
F16.3.Dünya ülkelerine hayvan ihracatı yapmak.(1)	T16.Damızlık hayvan temininde yaşanan zorluklar.(1)
F17.Süt ve et pazarının geniş olması.(1)	T17.Hayvancılığa gereken önemin verilmemesi.(1)
F18.Süt ve et işleme tesislerine yakınlık.(1)	T18.İşletme çalışanlarının yeterli teknik bilgiye sahip olmamaları.(2)
F19.Protein ihtiyacının çoğunu etten karşılamak.(3)	T19.Denetimlerin yetersiz olması.(1)
F20.Devletin ekipman desteği.(1)	T20.Hayvancılıkla ilgili bilimsel çalışmaların yetersiz olması.
F21.Sektörde bilinçli üreticilerin çalışması.(1)	T21.Bilinçsizce yapılan hayvancılık uygulamaları.
F22.İklim koşullarının yem bitkisi üretiminde verimli olması.(1)	T22.Tüketiminin alım gücünün düşmesi.(3)
F23.Bölgede üretilen ürünlerin fiyatının uygun olması.(2)	T23.Büyük işletmelerin küçük aile işletmelerine tehdit içermesi.(2)
F24.İşletmelerin kaba yemini kendisi üretmesi.(8)	T24.Karbon salınımının giderek artması.(3)

Karaman ili büyükbaş hayvancılık işletmelerinde yapılan SWOT analizi bulguları tablo 4'de verilmiştir.

## 7.SONUÇ VE ÖNERİLER

Özellikle son yıllarda meydana gelen ekonomide ki küresel anlamdaki değişimler aynı oranda ülke ve bölgesel hayvancılığı da etkilemektedir. Bu etki olumlu ya da olumsuz yönlerde değişiklik göstermektedir. Oluşan bu ekonomik dalgalanmalardan minimal düzeyde etkilenmek için işletmelerin belirli stratejiler geliştirmeleri ya da mevcut bulunan stratejilerini güncellemeleri ve değişikliklerden en az düzeyde etkilenmeleri gerekmektedir. Geliştirilecek

bu stratejiler işletmelerin yararına olacağından dolayı en az maliyetle en çok kar edilmesi amaçlanmalıdır. Bu nedenle geliştirilecek stratejiler hayali ya da kurgusal değil tamamıyla işletme için en fazla avantajı sağlayacak şekilde olmalıdır.

Yapılan bu çalışmada Karaman ili büyükbaş hayvancılığı işletmeleri için SWOT analizi yapılmıştır. SWOT analizi yöntemi ile işletmelerin zayıf ve güçlü yönleri ile işletmelerin içinde buldukları fırsat ve tehditler belirlenmeye çalışılmıştır.

Analizin sonucunda ortaya çıkan güçlü yönler ağırlıklı olarak ‘ çoğu işletmenin kendi kaba yemini kendi ürettiği olması’ iken en yaygın zayıf yönleri ise ‘yetersiz teknoloji’ oluşudur. Bununla beraber ‘bakanlıkların sağladığı teşvik ve destekler ile hayvancılık için gerekli temel tüketim maddelerinin üretimi’ fırsatların çoğunluğunu oluştururken; en büyük tehditler ise ‘yüksek girdi maliyetleri ve enflasyon-fiyat iktidarsızlığıdır. Sonuç olarak bu çalışma, bölgesel bir araştırma niteliği taşıyor olsa da ülke çapında ki büyükbaş hayvan yetiştiriciliği içinde önem taşımaktadır.

- Büyükbaş hayvan yetiştiriciliğinde en büyük tehdit yüksek girdi maliyetleridir. Bu maliyetlerin önüne geçmek oldukça zor olsa da, işletmelerin kaba yem ihtiyacını kendileri karşılamaları oldukça büyük yarar sağlayacaktır.

- İş gücü maliyeti en aza indirilmesi için gereken ekipmanlar sağlanılmaya çalışılmalıdır. Maddi imkânlar boyutunda teknolojiden yararlanılmalıdır.

- Fazla çeşit, çok maliyetli rasyonlar yerine mevcut hammaddelerle birlikte gereken rasyon dengesini sağlayacak en uygun fiyatlı hammaddeler kullanılmaya çalışılmalıdır.

- Tarımsal hibe ve teşviklerden mümkün olduğu derecede en yüksek oranda faydalanılmalıdır. Bu sayede işletme için gerekli alet ve ekipmanlara daha kolay ve en uygun şekilde ulaşılabilir.

- Fiziksel anlamda işçi bulması, bulunan mevcut işçinin sürdürülebilir düzeyde çalışması için ne kadar zor olsa da gereken imkânlar sağlanılmaya özen gösterilmelidir.

- İşletmeler için veteriner maliyetleri oldukça yüksek gider kısmını oluşturmaktadır. Bunun için işletme herhangi bir hastalığın ortaya çıkmasını beklemek yerine mutlaka koruyucu hekimliğe başvurmalıdır. Bu sayede bireysel tedavi masrafı yerine sürü bazında daha az maliyet çıkarılır ve işletme genelinde çoğu hastalığın önüne geçilmiş olur.

- Genellikle çoğu süt işletmesi sütü verdiği firmadan yem almak zorunda tutulmaktadır.

Bunun önüne geçebilmek için bireysel hareket etmeyi en aza indirmeli ve mümkün olduğu kadar kooperatif düzeyinde çalışılmalıdır.

- Ürün pazarlama kısmında ülkemiz pazarının hemen hemen hepsini büyük şirketler ve aracılar oluşturmaktadırlar. Bu durum ise üretici boyutunda ciddi sorunlar yaratmaktadır. Bunun için de birlikler ya da kooperatifler kurulup toplu bir şekilde hareket edilmeli, Pazar oluşturulan bu tekelden kurtarılmaya çalışılmalıdır.

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## **ON SMALL LEBESGUE SPACES**

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### **ABSTRACT**

In the first part of this presentation we will briefly discuss the Banach function spaces and grand Lebesgue spaces which is introduced by Iwaniec and Sbordone when dealing with integrability of jacobian. In the second part we discuss small Lebesgue spaces which is introduced by Fiorenza. Then we discuss the role of small Lebesgue spaces with grand Lebesgue spaces.

**Keywords:** grand Lebesgue spaces, Banach function spaces, Hölder inequality



## 1. INTRODUCTION

Given a measurable set  $\Omega \subset \mathbb{R}^n$  we denote its Lebesgue measure by  $|\Omega|$ . Let  $M_0$  denote the set of all real, scalar-valued measurable functions, finite a.e. in  $\Omega$  and  $M_0^{+i}$  be the set of all measurable functions, whose values lie in  $[0, \infty]$  finite a.e. in  $\Omega$ .

**Definition 1.1.** [1] A mapping  $\rho: M_0^{+i} \rightarrow [0, \infty]^i$  is called a Banach function norm if, for all  $u, v, u_k \in M_0^{+i}$ , ( $k=1,2,3,\dots$ ) and for all measurable subsets  $E$  of  $\Omega$ , the following properties hold:

$$(i) \rho(u) = 0 \iff u = 0 - i.a.e.$$

$$(ii) \rho(\beta u) = \beta \rho(u), \text{ for all scalars } \beta \geq 0$$

$$(iii) \rho(u+v) \leq \rho(u) + \rho(v)$$

$$(iv) 0 \leq v \leq u \text{ a.e.} \implies \rho(v) \leq \rho(u)$$

$$(v) 0 \leq u_n \uparrow u \text{ a.e.} \implies \rho(u_n) \uparrow \rho(u)$$

$$(vi) |E| < \infty \implies \rho(\chi_E) < \infty$$

$$(vii) |E| < \infty \implies \int_E u(x) dx \leq \alpha \rho(u) \text{ for some constant } \alpha = \alpha(E, \rho) < \infty.$$

**Definition 1.2.** [1] Let  $\rho$  be a Banach function norm. Then the space

$$X(\rho) = \{u \in M_0 : \rho(|u|) < \infty\}$$

is called a Banach function space. For every  $u \in X(\rho)$  define

$$\|u\|_{X(\rho)} = \rho(|u|).$$

Under standard vector space operations  $(X(\rho), \|u\|_{X(\rho)})$  is a normed linear space.

**Definition 1.3.** [1] If  $\rho$  is a Banach function norm then its associate norm  $\rho'$  is defined on  $M_0^{+i}$  by

$$\rho'(v) = i \int v \rho$$

Given a Banach function space  $X(\rho)$ , the Banach function space  $X(\rho')$  determined by  $\rho'$  is called the associate space of Banach functions space  $X(\rho)$ .

**Definition 1.4.** [1] Let  $X(\rho)$  be a Banach function space. A given function  $u \in X(\rho)$  is said to have absolutely continuous norm if

$$\lim_{k \rightarrow \infty} \|u \chi_{E_k}\|_{X(\rho)} = 0$$

whenever any sequence subsets  $E_k \subset \Omega$  satisfy  $\chi_{E_k} \rightarrow 0$ , a.e. If all functions in  $X(\rho)$  have this property,  $X(\rho)$  is said to have absolutely continuous norm.

**Theorem 1.5.** [1] A Banach function space  $X(\rho)$  is reflexive  $\iff X(\rho)$  and its associate space  $X(\rho')$  have absolutely continuous norm.

## 2. RESEARCH AND FINDINGS

In 1992 Iwaniec and Sbordone [6], when dealing with the problem of the integrability of the Jacobian under minimal hypothesis, introduced the grand Lebesgue space. Starting from this moment we always assume the Lebesgue measure of  $\Omega$  is finite. The grand Lebesgue space  $L^{p, \lambda}(\Omega)$  is defined as the set of measurable functions  $u$  on  $\Omega$  for which

$$\|u\|_{p, \lambda} < \infty \iff 0 < \varepsilon < p - 1 \left( \frac{\varepsilon}{|\Omega|} \int_{\Omega} |u|^{p-\varepsilon} dx \right)^{\frac{1}{p-\varepsilon}} < \infty.$$

For  $p > 1$  and  $0 < \varepsilon < p - 1$  the following continuous embeddings hold

$$L^p(\Omega) \subset L^{p, \lambda}(\Omega) \subset L^{p-\varepsilon}(\Omega).$$

Also function  $u(x) = \frac{1}{x^{1/p}}$  is an example of  $u \in L^{p, \lambda}(0,1) / L^p(0,1)$ .

An important fact is that the set of  $C_0^\infty(\Omega)$  functions is not dense in grand Lebesgue space.

**Theorem 2.1.** [3,4] The closure  $\overline{C_0^\infty(\Omega)}_{L^{p, \lambda}(\Omega)}$  consists of functions  $u \in L^{p, \lambda}(\Omega)$  which satisfy

$$\lim_{\varepsilon \rightarrow 0} \varepsilon \int_{\Omega} |u|^{p-\varepsilon} dx = 0.$$

**Theorem 2.2.** [3]  $L^{p, \lambda}(\Omega)$  is not reflexive

*Proof.* Let define a function by

$$u: (0,1) \rightarrow \mathbb{R}, \quad u(x) = \frac{1}{x^{1/p}}.$$

Since  $u \in L^{p, \lambda}(0,1)$  and

$$\lim_{\delta \rightarrow 0^+} \left( \int_0^\delta \frac{1}{x^{1/p}} dx \right)^{\frac{1}{p-\varepsilon}} = \lim_{\delta \rightarrow 0^+} \left( \int_0^\delta \frac{1}{x^{1/p}} dx \right)^{\frac{1}{p}}$$

we conclude that the space  $L^{p, \lambda}(0,1)$  has not absolutely continuous norm.

Given  $1 < p < \infty$  and  $\frac{1}{p} + \frac{1}{p'} = 1$ ,  $L^{p, \lambda}$  is consist of functions  $v \in M_0$  defined on  $\Omega$  which satisfy the following norm condition

$$\|v\|_{p, \lambda}$$

**Theorem 2.3.** [5] For every  $u \in L^{p, \lambda}(\Omega)$ ,  $v \in L^{p', \lambda}$

$$\frac{1}{|\Omega|} \int_{\Omega} uv dx \leq \|u\|_{p, \lambda} \|v\|_{p', \lambda}$$

Now the small Lebesgue space defined as the set

$$L^{p, \lambda}(\Omega) = \{v \in M_0 : \|v\|_{p, \lambda} < \infty\}$$

$L^{p, \lambda}(\Omega)$  small Lebesgue space is a Banach function space [5].

**Theorem 2.4.** [5] For every  $u \in L^{p, \lambda}(\Omega)$ ,  $v \in L^{p', \lambda}(\Omega)$  the following Hölder inequality holds

$$\frac{1}{|\Omega|} \int_{\Omega} uv dx \leq \|u\|_{p, \lambda} \|v\|_{p', \lambda}$$

*Proof.* Given  $u \in L^{p, \lambda}(\Omega)$  and  $v \in M_0$  from Theorem 2.3.

$$\begin{aligned} \frac{1}{|\Omega|} \int_{\Omega} |u||v| dx &= \int_{\Omega} |u||v| dx \leq \int_{\Omega} |u| \psi dx \leq \int_{\Omega} |u| \psi dx \leq \int_{\Omega} |u| \psi dx \\ &\leq \int_{\Omega} |u| \psi dx \leq \int_{\Omega} |u| \psi dx \leq \int_{\Omega} |u| \psi dx \\ &\leq \int_{\Omega} |u| \psi dx \leq \int_{\Omega} |u| \psi dx \leq \int_{\Omega} |u| \psi dx \end{aligned}$$

### 3. CONCLUSION

Grand Lebesgue and small Lebesgue spaces are an active area of research and have many applications. Grand Lebesgue spaces have some generalization. There are still open questions in this spaces. As a example, it is not known whether continuous functions dense in grand Lebesgue spaces.

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## **TÜRKİYE’NİN EĞİTİM SİSTEMİNDEKİ İKİLİKLER SORUNU**

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### **ÖZET**

Türkiye’de milli eğitimin son derece kapsamlı amaçları vardır. Bu amaçların gerçekleştirilmesi için milli eğitim sistemi kurulmuştur. Bu sistemden öncelikli olarak, toplumu oluşturan tüm fertlere belirlenen davranışları kazandırması ve böylece hedeflenen ideal toplumu oluşturması beklenmektedir. Günümüzde ülkenin her tarafına yayılmış eğitim kurumları aracılığıyla işleyen bu sistemde zaman içinde çeşitli sorunlar ortaya çıkmakta ve eğitim kurumu kendisinden beklenenleri verememektedir. Ortaya çıkan bu sorunların çözümü için çeşitli değişiklikler yapılmaktadır. Ancak eğitim alanında süregelen bazı uygulamalar çeşitli sorunlara neden oldukları halde dikkatlerden kaçabilmekte, bu uygulamaların değiştirilmesi veya gözden geçirilmesi hususu ihmal edilmektedir. Türkiye’de eğitimle ilgili araştırmacıların ve karar vericilerin gerektiği kadar üzerinde durmadığı sorunlardan biri de eğitim alanında yaşanan ikilikler sorunudur. Günümüzde Türkiye’nin eğitim sisteminde sorunlar yaratan, eğitim sisteminin birçok amacının gerçekleşmesini engelleyen ve gelecekte olumsuz toplumsal sonuçlar doğurabilecek çok sayıda ikilik bulunmaktadır. Bu ikiliklerin en önemlileri ise resmi ve özel okul ikiliği, taşınmaz ve taşınmaz eğitim ikiliği ile müfredat ve sınav ikiliğidir. Yıllardan beri eğitim sisteminde devam eden bu ikiliklerin bütün boyutlarıyla tartışılması, bunlardan kaynaklı sorunların ortaya konulması ve buradan hareketle çözümlerin üretilmesi önemli ve gereklidir. Buradan hareketle bu çalışmanın amacı mevcut uygulamalardan hareketle bu ikiliklerin nasıl oluştuğunu ve hangi sorunlara yol açtığını ortaya koymaktır. Çalışma büyük ölçüde eğitim sistemi mevzuatı ile eğitim sistemindeki uygulamalar dikkate alınarak yapılmıştır. Bu ikiliklerin hem şu anda neden oldukları hem de gelecekte neden olabilecekleri sorunlar ortaya konulmaya çalışılmıştır.

**Anahtar kelimeler:** Eğitim, sistem, ikilik, toplum.

## **THE PROBLEM OF DUALITIES IN TURKEY'S EDUCATION SYSTEM**

### **ABSTRACT**

National education in Turkey has very comprehensive objectives. The national education system was established for the realization of these aims. From this system, it is expected that all members of the society will gain the determined behaviors and thus create the ideal society. Today, in this system, which operates through educational institutions spread all over the country, various problems arise over time and the educational institution cannot deliver what is expected from it. Various changes are made to solve these emerging problems. However, some ongoing practices in the field of education can be overlooked even though they cause various problems, and the issue of changing or reviewing these practices is neglected. One of the problems that education researchers and decision makers in Turkey do not pay enough attention to is the problem of dualities in the field of education. Today, there are many dualities that create problems in Turkey's education system, prevent the realization of many aims of the education system, and may have negative social consequences in the future. The most important of these dualities are the duality of public and private schools, duality of non-transported and transported education, and the duality of curriculum and examination. It is important and necessary to discuss these dualities, which have been going on in the education system for years, with all their dimensions, to reveal the problems arising from them and to produce solutions based on this. From this point of view, the aim of this study is to reveal how these dualities occur and what problems they cause, based on existing practices. The study has been carried out by taking into account the education system legislation and the practices in the education system. The problems that these dualities cause both now and may cause in the future have been tried to be revealed.

**Keywords:** Education, system, duality, society.

## GİRİŞ

Türkiye’ de hem devletin hem de toplumun eğitim sisteminden beklentileri oldukça çok ve yüksektir. Devlet beklentilerini Milli Eğitim Temel Kanunu başta olmak üzere, eğitimle ilgili diğer kanunlarda, yönetmeliklerde ve öğretim programlarında ortaya koyarken, vatandaşlar da çocuklarının eğitimi için büyük bir çaba göstererek beklentilerini ortaya koymaktadır. Hem devletin hem de vatandaşların eğitim sisteminden beklentilerini karşılamak için Türkiye’ de Millî Eğitim Bakanlığı adı altında devasa bir eğitim örgütü kurulmuştur. Millî Eğitim Bakanlığının verilerine göre, 2021/2022 öğretim yılında Millî Eğitim Bakanlığına bağlı olarak faaliyet gösteren resmi ve özel toplam okul sayısı 70380 olup bu okullarda 17589316 öğrenci eğitim almıştır (Millî Eğitim İstatistikleri, Örgün Eğitim 2021/'22, s.45). Bu rakamlar eğitim sisteminden yararlanan kişi sayısının ne kadar çok olduğunu ve aynı zamanda eğitim sisteminin ülke açısından önemini ortaya koymaktadır. Ancak Cumhuriyet tarihi boyunca kısa süreli başarılı bazı uygulamalar dışında, eğitim sistemi hiçbir zaman hedeflerine tam olarak ulaşamamış, dolayısıyla devletin ve toplumun beklentilerini karşılayamamıştır. Eğitim sisteminde ortaya çıkan sorunları çözmek için hemen hemen tüm siyasi iktidarlar döneminde çeşitli değişiklikler yapılmış, ancak günümüze kadar geçen sürede belirlenmiş olan amaçlarını tam olarak gerçekleştirebilen bir eğitim sistemi oluşturulamamıştır.

Eğitim sisteminde ortaya çıkan sorunları çözmek için yapılan değişikliklerin ve getirilen yeni uygulamaların bir kısmı da zaman içinde yeni sorunların oluşmasına neden olmuştur. Çünkü Türkiye’de eğitim alanında alınan kararlar ve yeni uygulamalar sadece gündemde olduğu ilk yıllarda araştırmacıların ilgisini çekmekte, çeşitli bilimsel çalışmalara konu edilmektedir. Ancak sonraki süreçte olağan hale gelen uygulamaların, meydana gelen toplumsal, ekonomik, teknolojik vb. durumlar karşısında nasıl sonuçlar doğurduğu hususu kimsenin ilgisini fazla çekmemektedir. Buradan hareketle bu çalışmada başlangıçta eğitim alanındaki bazı sorunların çözümü için getirilen, ancak zaman içinde eğitim sistemi içinde ikilik yaratan ve bu yönüyle yeni sorunların ortaya çıkmasına neden olan bazı uygulamalar ele alınacaktır.

Çalışmada Türkiye’nin eğitim sisteminde çeşitli sorunlar yaratan resmi-özel okul ikiliği, taşınmalı ve taşınmaz eğitim ikiliği, müfredat-sınav ikiliği tartışılacaktır. Bu ikilikler

tartışılırken, okul öncesi, ilköğretim ve ortaöğretim kademesi dikkate alınacak, bu kademedeki eğitimle ilgili yasal düzenlemeler ve mevcut uygulamalardan hareket

edilecektir. Bu ikiliklerin eğitim sisteminde ortaya çıkardığı sorunlar ortaya konulacak ve gelecekte yaratabilecekleri toplumsal sonuçların neler olabileceği hususları üzerinde durulacaktır.

### **1.Resmi-Özel Okul İkiliği**

Türkiye’de okul öncesi, ilköğretim ve ortaöğretim seviyesinde eğitim veren okulları resmi ve özel okul olmak üzere ikiye ayırmak mümkündür. Resmi okul kavramı ile binaları devlete ait olan, çalışanlarının devlet tarafından atandığı, ihtiyaçlarının devlet tarafından karşılandığı ve doğrudan Millî Eğitim Bakanlığı tarafından yönetilen okullar kastedilmektedir. Türkiye’deki okulların büyük bir kısmı resmi okullardır. Çalışmada bahsedilen özel okullar ise, “5580 sayılı Özel Öğretim Kurumları Kanunu hükümlerine göre açılan okul/kurumlardır”. (Millî Eğitim İstatistikleri, Örgün Eğitim 2021/22, s. XXII). Özel okulların sahibi devlet değil, kendilerine kurum açma izni verilen gerçek veya tüzel kişilerdir. Millî Eğitim Bakanlığının istatistiklerine göre 2021/22 öğretim yılında Türkiye’de 14179 özel okulda 1578233 öğrenci öğrenim görmüş ve 163975 öğretmen görev yapmıştır. Bu rakamlara göre özel okulların Türkiye’nin toplam okul sayısı içindeki payı yüzde 20,1, bu okullarda öğrenim gören öğrencilerin payı ise yüzde 9’ dur (Millî Eğitim İstatistikleri, Örgün Eğitim 2021/22, s.45). Bu okullardaki eğitim öğretim faaliyetlerinin, resmi okullarda olduğu gibi 1739 sayılı Milli Eğitim Temel Kanununa uygun olarak yürütülmesi gerekir. Resmi okullardan farklı bir öğretim programı uygulamak isteyen özel okulların ise Millî Eğitim Bakanlığından izin alması gerekir. Aynı zamanda özel okullar Millî Eğitim Bakanlığı tarafından denetlenen, gerektiği durumlarda çeşitli cezalar verilen ve yine kanunda yazılı hallerin gerçekleşmesi durumunda kapatılabilen okullardır (Özel Öğretim Kurumları Kanunu). Dolayısıyla yasal olarak hem resmi okullar hem özel okullar aslında aynı amaçları gerçekleştirmek üzere kurulan okullardır. Ancak halihazırda bu iki okulun çalışma prensiplerinin, önceliklerinin, olanaklarının, öğrenci ile veliye karşı olan tutumlarının, meydana gelen gelişme ve değişmelere ayak uydurma kapasitelerinin farklı olması eğitim sisteminde bir ikiliğin oluşmasına neden olmaktadır. Türkiye’de resmi ve özel



okulların aynı anda var olmasının eğitim sisteminde oluşturduğu ikiliği ve bu ikiliğin neden olduğu sorunları şu şekilde özetlemek mümkündür.

Birincisi, özel okullar paralı okullardır ve bu okullarda okuyabilmek için belli bir ekonomik güce sahip olmak gerekir. Dolayısıyla özel okullar büyük oranda ekonomik açıdan toplumun orta ve üst sınıflarına hitap eden okullardır. Bu okulların pahalı olması ve öğrencilerinin büyük bir kısmının zengin çocuklarından oluşması, buna karşılık toplumun yoksul kesimlerinin çocuklarının resmi okullarda okumak zorunda kalması bir ayrışmaya neden olmaktadır. Bu durum toplumu oluşturan farklı sınıflara mensup çocukların uzun süren okul hayatı boyunca birbirinden izole olmasına, birbirinden uzaklaşmasına neden olmakta ve nihayetinde okul yaşamından sonra başlayan toplumsal yaşamda birbirlerini anlamamasına neden olabilmektedir. Böylece toplumsal yaşamın belirli kurallar ve bir düzen içinde devam edebilmesi için gerekli olan sosyalizasyon süreci (Fichter, 2016: s.26-27) eksik kalmaktadır.

İkincisi, resmi okullar ile özel okullar arasında öğrenciye yönelik tutum arasında bazı farklar vardır. Sonuç olarak özel okula giden her öğrenci aynı zamanda, okulun para kazanmasını sağlayan bir müşteridir. Bu nedenle hem öğrencinin hem de okulun ücretini ödeyen velisinin okuldan memnun olması gerekir. Bu nedenle özel okullarda görevli öğretmen, yönetici ve diğer personel resmi okullara göre öğrenciye karşı daha dikkatli, daha nazik ve daha ilgili davranmaktadır. Bu durum özel okula devam eden öğrencilerin kendilerini daha iyi hissetmesine ve özgüvenlerinin yükselmesine neden olmaktadır.

Üçüncüsü, bazı resmi okullarda personel ve imkân yokluğu veya yetersizliği, bazılarında ise yönetim zafiyeti nedeniyle temizlik, bakım ve onarım konularında sorunlar yaşanırken, özel okullar bu konularda herhangi bir sorun yaşanmaması için daha dikkatli davranmaktadır. Bu nedenle özel okullara giden öğrenciler daha temiz ve bakımlı binalarda eğitim görürken, bazı resmi okullara devam eden öğrenciler bu imkanlardan mahrum kalmaktadır.

Dördüncüsü, resmi okullar her öğrenciyi kabul etmek ve her öğrenciye hizmet vermek zorunda iken, özel okullar öğrencisini seçme imkanına sahiptir. Birçok özel okul kabul sınavı veya bursluluk sınavı adı altında çeşitli sınavlar yaparak alacağı öğrencileri belirlemektedir. Bu durum özel okulların hem ekonomik imkânları hem de başarı

düzevi iyi olan öğrencileri resmi okullardan çekmesine neden olmakta, böylece özel okulların resmi okullara göre daha avantajlı hale gelmesini sağlamaktadır.

Beşincisi, özel okulların öğrenci bulabilmesi ve açık kalabilmesi için başarılı olmaları gerekir. Özellikle velilerin de dikkat ettiği ortaöğretime geçiş ve üniversiteye giriş sınavlarında mümkün olduğunca öğrencilerini iyi okullara veya bölümlere yerleştirmek zorundadırlar. Bu nedenle özel okullar yetenekli ve sınavlarda başarılı olabilecek bir öğrenci keşfettiklerinde, bu öğrencilerle daha fazla ilgilenmektedir. Bu duruma karşılık çoğu resmi okul, standart bir eğitim vermekle yetinmekte, bazen öğrenci sayısının fazlalığından, bazen imkân azlığından, bazen de ilgisizlikten dolayı resmi okullarda okuyan yetenekli öğrenciler hakkettikleri yerlere gelememektedir.

Altıncısı, özel okulların özellikle son yıllarda, resmi okullara nazaran yabancı dil eğitimine daha fazla önem verdikleri ve öğrencilerini yurt dışındaki eğitim olanakları konusunda daha fazla bilgilendirdikleri gözlenmektedir. Özel okullara devam eden öğrencilerin ekonomik durumları da dikkate alındığında, bu okullarda okuyan öğrencilerin yabancı dil öğrenme ve yurtdışındaki eğitim olanaklarından yararlanma konusunda resmi okullara devam eden öğrencilerden daha avantajlı oldukları söylenebilir.

Türkiye’de eğitim sistemi içinde resmi okullar ile özel okulların aynı anda var olmasının neden olduğu sorunlar listesini daha da uzatmak mümkündür. Genel olarak özel okulların daha iyi bir eğitim verdiği şeklinde oluşan manzaradan, resmi okulların başarısız olduğu veya resmi okullarda görev yapan yönetici, öğretmen ve diğer çalışanların özel okullarda çalışanlardan daha az başarılı oldukları şeklinde bir sonuca ulaşmak yanlış olacaktır. Çünkü resmi okullar ile özel okulların hizmet verdiği öğrenci sayısı, öğrenci profili, okulların bulunduğu yerleşim yerleri, sahip olunan olanaklar vb. birçok konuda aralarında önemli farklılıklar vardır. Resmi okullarda görevli yönetici ve öğretmenlerin karşılaştıkları birçok sorun, zorluk ve imkânsızlık özel okullarda hiç yaşanmamaktadır.

## **2. Taşınmaz ve Taşınmaz Eğitim İkiliği**

Millî Eğitim Bakanlığı tarafından “**Taşınmaz Eğitim**: Çeşitli nedenlerle birlikte okula erişimde sorunlar yaşayan ilkökul, ortaokul ve ortaöğretim öğrencilerinin belirlenen okullara günü birlik taşınarak eğitim ve öğretim görmelerini sağlamak amacıyla yapılan uygulama” (Millî Eğitim İstatistikleri, Örgün Eğitim 2021/’22, s.XXI) olarak

tanımlanmaktadır. Bu uygulamanın hayata geçebilmesi için, ‘‘İl ve ilçelerde, her eğitim ve öğretim yılında; taşıma yoluyla eğitimden faydalanacakları, taşıma kapsamına alınacak yerleşim birimlerini ve taşıma merkezi okul/kurumları belirlemek üzere ‘Planlama Komisyonu’ kurulur.’’ (Millî Eğitim Bakanlığı Taşıma Yoluyla Eğitime

Erişim Yönetmeliği, madde, 5/1). Bu komisyonun yaptığı planlama ve Millî Eğitim Bakanlığı Taşıma Yoluyla Eğitime Erişim Yönetmeliğinde belirlenen usul ve esaslar dahilinde taşınmalı eğitim yapılır (Millî Eğitim Bakanlığı Taşıma Yoluyla Eğitime Erişim Yönetmeliği). Dolayısıyla Türkiye’de ilköğretim ve ortaöğretim kurumlarında eğitim görmesi gereken öğrencilerin bir kısmı devletin sağlamış olduğu araçlarla sabah evlerinden alınarak eğitim ve öğretim görmeleri gereken okullara götürülmekte ve günün sonunda yine aynı araçlarla evlerine bırakılmaktadır. Buna karşılık bazı öğrenciler ise evlerine çok yakın okullara yürüyerek veya kendi imkanları ile eğitim ve öğretim gördükleri okullara gitmektedir. Böylece bazı okullarda taşınmalı eğitim yapılırken, bazılarında ise böyle bir durum yaşanmamaktadır. Bazı okullarda ise hem taşıma kapsamında olan hem de taşıma kapsamında olmayıp kendi imkanları ile okula gelen öğrencilere birlikte eğitim verilmektedir. Böylece uygulamada taşınmasız ve taşınmalı eğitim ikiliği ortaya çıkmaktadır.

Türkiye’de ilköğretim ve ortaöğretim zorunludur. İlköğretim kurumları ilkokul ve ortaokullardan, ortaöğretim kurumları ise liseler ve mesleki eğitim merkezlerinden oluşmaktadır (Millî Eğitim Temel Kanunu). Ancak Türkiye’nin coğrafi yapısı ve yerleşim durumu nedeniyle, her yerleşim biriminde bir ilkokul, ortaokul ve lise yapma olanağı bulunmamaktadır. Bu nedenle aslında taşınmalı eğitim bir ihtiyaçtan ortaya çıkmıştır. Ancak yıllar içinde taşınmalı eğitimden yararlanmak zorunda kalan öğrenci sayısı giderek sayısı artmış, buna paralel olarak taşınmalı öğrencilere hizmet veren okul, yönetici, öğretmen, servis ve yemek firması sayısı da artmıştır. Bu durum taşınmalı eğitimi, maliyeti yüksek, yönetilmesi zor ve eğitim sistemi açısından çeşitli sorunlar da üreten bir uygulamaya dönüştürmüştür.

Halihazırda bir yanda taşınmalı eğitimin yapıldığı, diğer yandan taşınmalı eğitimin yapılmadığı okulların aynı anda eğitim sistemi içinde yer alması bazı sorunların ortaya çıkmasına neden olmaktadır. Bu sorunları şu şekilde özetlemek mümkündür.

Birincisi, taşıma merkezi olan okullarda görev yapan yönetici ve öğretmenlerin iş yükü taşıma merkezi olmayan okullarda çalışanlara göre çok fazladır. Taşıma merkezi olan okullarda görev yapan yönetici ve öğretmenler standart görevlerine ek olarak, öğrencileri taşıyan servis araçlarını ve sürücülerini kontrol etmek, bunların günlük gidiş gelişlerini kayıt altına almak, taşıma kapsamındaki öğrencilere verilen yemeğin, teknik şartnameye

ve günlük menü listesine uygun olup olmadığını her gün kontrol etmek, bu alanlarda yaşanan sorunları çözmek ve ilgili yerlere bildirmek gibi görevleri de yapmaktadırlar. Aynı zamanda taşıma merkezi olan okulların büyük bir kısmı kırsal kesimde yer almakta, bu okullarda görev yapan yönetici ve öğretmenlerin okulun bulunduğu yerde ikamet etme imkânı bulunmamaktadır. Bu nedenle taşıma merkezi okullarda görev yapan öğretmen ve yöneticiler de kendi imkanlarıyla her gün kilometrelerce uzakta bulunan okullarına gidip gelmek zorunda kalmaktadır. Bu durum yönetici ve öğretmenler açısından bir eşitsizlik yaratmaktadır.

İkincisi, taşıma merkezi okullara devam eden öğrenciler her gün servis araçlarıyla kilometrelerce yol katetmektedir. Buna karşılık bazı öğrenciler ise evlerine çok yakın okullarda eğitim almaktadır. Bu durum taşıma kapsamındaki öğrenciler için bir dezavantaja dönüşmektedir. Çünkü bu öğrencilerin zamanının büyük bir kısmı okula gidiş ve dönüş esnasında geçmekte, evlerine vardıklarında ödevlerini yapmaya ve ders çalışmaya zamanları kalmamaktadır. Özellikle ilkökul çağındaki öğrencilerin servis araçlarına yetişebilmesi için her gün sabah çok erken saatlerde kalkması ve okula gitmesi kendileri açısından oldukça zordur.

Taşınmalı eğitim uygulamasının sorun yarattığı konulardan biri de bu okullarda öğrencilere verilen yemek konusudur. Taşıma kapsamındaki öğrencilere bedeli devlet tarafından karşılanmak üzere öğle yemeği verilmektedir. Ancak bazı okullarda taşıma kapsamında olan ve taşıma kapsamında olmayan öğrenciler birlikte eğitim görmektedir. Dolayısıyla bu okullarda taşıma kapsamındaki öğrencilere öğle yemeği verilirken, diğer öğrencilere yemek verilmemekte, bu öğrencilerin öğle arasında kendi imkanlarıyla yemek ihtiyacını gidermeleri beklenmektedir. Oysa özellikle kırsal kesimde birçok öğrenci bu imkana sahip değildir. Bu durumda aynı okulda okuyan bazı öğrenciler öğle yemeğini yerken, bazı öğrenciler bu imkândan yararlanamamaktadır. Bu durum hem

öğrencileri olumsuz etkilemekte hem de bu okullarda görev yapmakta olan yönetici ve öğretmenleri öğrencilerine karşı zor durumda bırakmaktadır.

Türkiye’deki ihtiyaçtan ortaya çıkan taşınmalı eğitim uygulamasının mevcut haliyle ürettiği sorunlar yukarıda sayılanlardan daha fazladır. Bu nedenle bu uygulamanın ürettiği sorunları tam olarak ortaya koyabilmek ve aynı zamanda bu uygulamayı daha iyi

hale getirebilmek için detaylı ve kapsamlı çalışmaların yapılmasına ihtiyaç bulunmaktadır.

### **3.Müfredat Sınav İkiliği**

Türkiye’de okul öncesi, ilköğretim ve ortaöğretim kademelerinde uygulanacak müfredat Millî Eğitim Bakanlığının bir birimi olan Talim ve Terbiye Kurulu Başkanlığı tarafından öğretim programı adı altında hazırlanmaktadır. Dolayısıyla tüm okullarda derslerin Talim Terbiye Kurulu tarafından o ders için hazırlanmış olan öğretim programına göre işlenmesi, programlarda belirlenen kazanımların elde edilmesi ve böylece milli eğitimin genel ve özel amaçlarına ulaşılması hedeflenmektedir (Öğretim Programları).

Yürürlükte bulunan mevzuata göre ‘‘Öğrenme-öğretme sürecinde resmî ve özel okul öncesi eğitim kurumlarında aylık plan ve günlük eğitim akışı, ilköğretim ve ortaöğretim kurumlarında yıllık plan ve ders planı yapılması zorunludur.’’ (Millî Eğitim Bakanlığı Eğitim ve Öğretim Çalışmalarının Planlı Yürütülmesine İlişkin Yönerge, Madde:5). Buna göre okul öncesi eğitim kurumlarında görev yapan öğretmenlerin aylık planlarını ve günlük eğitim akışlarını, Talim ve Terbiye Kurulu tarafından hazırlanmış olan okul öncesi eğitim programına uygun olarak hazırlamaları ve hazırladıkları bu plan doğrultusunda çalışmalarını yapmaları gerekmektedir. İlköğretim ve ortaöğretim kurumlarında görev yapan öğretmenlerin ise yine Talim ve Terbiye kurulu tarafından hazırlanmış olan öğretim programlarına uygun olarak eğitim öğretim yılının başında bir yıllık plan hazırlamaları, sonrasında ise ders planı yapmak suretiyle derslerini işlemeleri beklenmektedir (Millî Eğitim Bakanlığı Eğitim ve Öğretim Çalışmalarının Planlı Yürütülmesine İlişkin Yönerge). Normal şartlarda bir okulda dersler Millî Eğitim Bakanlığı tarafından hazırlanmış olan programa uygun olarak işlenmiş ve belirlenmiş

olan kazanımlar elde edilmiş ise, bu okulun öğrencilerinin girecekleri sınavlarda başarılı olmak için ilave bir eğitime ihtiyaç duymamaları gerekir. Ancak Türkiye’de gelinen noktada sadece okulda verilen eğitimle sınavlarda başarılı olmak neredeyse imkânsız hale gelmiştir. Öğrencilerin eğitim hayatları boyunca girmeleri gereken sınav sayısının çok olması, her yıl çok sayıda sınav yapılması, yapılacak sınavlar için yeni soruların üretilmesi vb. nedenlerle sınava hazırlık adı altında yeni bir eğitim alanı ve sektörü oluşmuştur. Günümüzde okulların yanında kurslar aracılığıyla verilen sınavlara hazırlık eğitimi, eğitim sisteminde müfredat ve sınav ikiliğinin oluşmasına neden olmuş, oluşan

bu ikilik de bazı sorunların yaşanmasına yol açmaktadır. Bu ikilik nedeniyle ortaya çıkan sorunları şu şekilde özetlemek mümkündür.

Birincisi, sınava hazırlık için harcanan çaba, okullarda verilen ve birden fazla alanda öğrencilere davranış ve beceri kazandırmayı amaçlayan normal eğitimi olumsuz etkilemektedir. Çünkü zamanla sınavda başarılı olmak, okuldaki derslerden başarılı olmaktan daha önemli hale gelmektedir. Bu durum özellikle girilecek sınavlarda soru sorulmayacak olan görsel sanatlar, beden eğitimi, müzik vb. derslere olan ilginin azalmasına neden olmaktadır. Aynı zamanda öğretmenlerin derslerin yanında öğrencilere kazandırmaya çalıştıkları diğer davranışlara karşı öğrencilerin duyarsızlaşmasına ve sınava yönelik olmayan çalışmalarını gereksiz görmelerine neden olmaktadır.

İkincisi, öğrencilerin girmeleri gereken sınavların çokluğu, eğitime dair beklentinin değişmesine ve farklılaşmasına neden olmaktadır. Devlet eğitimden, belirlediği genel ve özel amaçların gerçekleşmesini beklerken, öğrenci ve veliler için sınavda başarılı olmak daha önemli bir amaç haline gelmektedir. Özellikle öğretmenler bu iki beklenti arasında sıkışmakta, normal öğretim programını uyguladıkları ve devletin hazırlamış olduğu kitaplara göre dersleri işlediklerinde, öğrenci ve velilerin sınava hazırlık beklentisi nedeniyle zorluk yaşamaktadırlar. Derslerini sınav hazırlık kitaplarına göre işlediklerinde ise bu kez müfredattan uzaklaşmak suretiyle Millî Eğitim Bakanlığının denetim sistemiyle karşı karşıya gelmektedirler.

Üçüncüsü, Türkiye’de sınavların çok olması ve öğrencilerin okuldaki eğitime ek olarak bir de sınava hazırlık eğitimi alması, eğitimin maliyetini artırmaktadır. Veliler bir yandan çocuklarının okul ihtiyaçlarını karşılarlarken, diğer yandan çocuklarını özel

kurslara göndermek zorunda kalmakta, onlara ayrıca sınav hazırlık kitaplarını almaktadır. Bu durum aynı zamanda ekonomik imkanları iyi olmayan öğrencilerin aleyhine bir durum oluşturmaktadır. Çünkü okulun yanında özel bir kursa devam etmenin ve sınava hazırlık için ek kaynaklar almanın maliyeti oldukça yüksektir ve her öğrenci velisinin bunu karşılaması mümkün değildir.

Elbette sınava hazırlık amacıyla kurslarda verilen eğitimler Millî Eğitim Bakanlığının belirlemiş olduğu müfredattan tümüyle kopuk değildir. Örneğin bir ortaokulda matematik dersinde işlenen konular ile bir özel öğretim kursunda ortaokul seviyesindeki öğrencilere anlatılan matematik konuları büyük ölçüde aynıdır. Ancak arada yaklaşım ve amaç

farklılığı bulunmaktadır. Okulda matematik dersini anlatan bir öğretmen sadece öğrencinin gireceği sınavda başarılı olmasını değil, aynı zamanda öğrencinin anlatılan konuyu tam olarak kavramasını, ileride karşılaşacağı konular için temel bilgiler edinmesini, matematiksel formülleri ve bu formüllerin oluşmasını sağlayan mantığı da anlamasını hedeflemek zorundadır. Bu nedenle kestirme ve kısa yollar yerine uzun yollarla ve örneklerle dersini anlatması gerekir. Oysa sınava hazırlık amacıyla ders anlatan öğretmenler sadece öğrencinin sınavda başarılı olmasına odaklandıkları için, bir konuyu mümkün olan en kısa sürede anlatmaya ve kısa yollar öğretmeye çalışmaktadırlar. Bu nedenle sınava hazırlık amacıyla gerçekleşen öğrenmelerin büyük bir kısmı kalıcı olamamakta, sınavdan sonra unutulmaktadır.

## **SONUÇ**

Türkiye'nin eğitim sisteminin yukarıda sayılanlardan daha fazla sorunu ve sistem içinde daha fazla ikiliği vardır. Bu nedenle eğitim sistemin bir bütün olarak ele alınması, bireylerin ve toplumun ihtiyaçları ile çağın gerekleri dikkate alınmak suretiyle yeniden düzenlenmesi bir ihtiyaçtır. Bu çalışmaya konu edilen üç ikilikle ilgili ise şu sonuçlara ulaşmak mümkündür.

Türkiye'de özel okulların eğitim sistemi içinde edindikleri yer ve bu okullara yönelik talebin boyutu, eğitim sisteminde özel ve resmi okulların aynı anda var olmaya devam edeceklerini göstermektedir. Bu noktadan sonra yapılması gereken ilk iş eğitim alanında çalışan bilim insanlarının ve karar vericilerin, özel ve resmi okul ikiliğinin varlığı

nedeniyle oluşan sorunları daha detaylı bir şekilde ele alması ve bu sorunlara çözüm aramasıdır. Bu sorunlara çözüm aranırken özel okullar ve resmi okullar arasındaki uçurumun nereden kaynaklandığı sorusuna yanıt aranmalı, bu iki okul türünün varlığının öğrenciler arasında fırsat ve imkân eşitliğini bozucu taraflarının düzeltilmesi hedeflenmelidir.

Türkiye’de taşınmalı eğitim bir ihtiyaçtan doğmuştur. Bu nedenle bu uygulamadan tümüyle vazgeçilmesi mümkün görünmemektedir. Bu nedenle yapılması gereken bu uygulamanın belli aralıklarla gözden geçirilmesi ve bu uygulama nedeniyle ortaya çıkan sorunların ve eşitsizliklerin en aza indirilmesine çalışılmalıdır. Bu çerçevede özellikle köylerde bulunan ilkokulların tekrar açılması veya yeni ilkokulların yapılması sorunların

bir kısmını azaltabilir. Covid 19 pandemisi döneminde, kapatılan ve taşıma kapsamına alınan küçük köy okullarının yeniden açılmasının gündeme gelmesi ve son zamanlarda Milli Eğitim Bakanlığında köy okullarının yeniden açılması yönünde bir eğilimin oluşmuş olması önemlidir. Bu tavır sürdürülmelidir.

Türkiye’nin eğitim sisteminde müfredat sınav ikiliğinin yarattığı sorunlar yukarıda sayılanlardan çok daha fazladır. Bu nedenle Türkiye’nin eğitim ve sınav sistemini gözden geçirmesi, sınav sayısını azaltması, öğrencilerin okula ek olarak bir de sınava hazırlık eğitimi alma ihtiyacını ortadan kaldırması acil bir ihtiyaç olarak ortada durmaktadır.





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## SİNEMADA TEMSİL VE ÖTEKİ: “WONDER” FİLMİ ÖRNEĞİ

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### ÖZET

Sinemanın tarihsel süreci içerisinde kurulan hikâyelerde, temsil ve öteki kavramı önemli bir role sahip olmuştur. Sinemada öteki, karşıtlık/zıtlık oluşturduğundan filmlerin anlam ve ritmini yüksek tutmaktadır. Temsil ve öteki kavramı, “Wonder” filmi bağlamında değerlendirilmekte ve toplumun yarattığı öteki algısı analiz edilmektedir. Filmde öteki olarak temsil edilen karakterin yaşam biçimi, toplumun ötekiye olan bakışı, ötekinde oluşan sosyolojik etkiler ve ötekileştirmenin çocuk karakterde yarattığı travma anlatılmaktadır. Çocuk karakterlerin, toplumsal yapının oluşturduğu öteki konumunda nasıl davrandığı ve neler yaşadığı “Wonder” filmi üzerinden, fiziksel görüntünün ötekileştirilmesi bağlamında değerlendirilmektedir. Aynı zamanda diğer çocuk karakterlerin de bulunduğu sınıf farkı, ırk, kıyafet, karakter, sosyal statü ve yaşayış biçimlerinde var olan öteki normları aktarılmaktadır. Toplumun öteki gerçeği, filmin hikâyesinde de aynı gerçeklik ile yansıtılmaktadır. Toplu olarak yapılan davranışlar ile haklı ve doğru kabul edildiği düşüncesi oluşsa da, film bu haklılığı yıkarak farklılığın bir sorun ya da problem oluşturmadığını izleyicisine göstermektedir. Hikâyede kurulan öteki kodlamaları ile çocukların gözünden bu kodlamalara verilen tepkiler ve toplumun ötekine olan davranışı metinsel analiz yöntemi ile incelenmektedir. Filmde, toplumun oluşturduğu ‘ötekileştirme’ kavramı içerisinde karakterlerin kötü davranış biçimi, argo kelimeler, toplumdaki soyutlanma, sosyal aktiviteleri tek başına yapmak, şiddet, insanların bakışlarından kaçma, çoğunluğa karşı tek başına mücadele etme ve bunun sonucunda yaşam şeklinin nasıl bozulduğu temsiller üzerinden çözümlenmektedir. Yapılan metinsel analiz sonucunda toplumun çoğunluğu temsil etmesi ile dayatılan ötekileştirmenin, çocuk karakterin yaşamında sosyolojik ve psikolojik etki bıraktığı görülmektedir.

**Anahtar Kelimeler:** Temsil, Öteki, Çocuk, Toplumsal Yapı, Wonder Filmi

**REPRESENTATION AND THE OTHER IN CINEMA: THE CASE OF THE  
“WONDER” MOVIE**

**ABSTARCT**

The concept of representation and the other has played an important role in the stories established in the historical process of cinema. In cinema, the other keeps the meaning and rhythm of the films high, as they create opposition/contrast. The concept of representation and the other is evaluated in the context of the movie “Wonder” and the perception of the other created by the society is analyzed. In the movie, the life style of the character represented as the other, the society's view of the other, the sociological effects of the other and the trauma caused by the othering in the child character are told. How the child characters behave and what they experience in the other position formed by the social structure is evaluated in the context of the othering of the physical image through the movie “Wonder”. At the same time, the other norms that exist in the different class, race, dress, character, social status and lifestyles of the other child characters are conveyed. The other reality of society is reflected with the same reality in the story of the film. Although the thought that it is accepted as right and right with the collective behaviors, the film destroys this right and shows the audience that difference does not create a problem or a problem. The other codings established in the story, the reactions given to these codings from the eyes of the children and the behavior of the society towards the other are examined with the textual analysis method. In the movie, the bad behavior of the characters, slang words, isolation from society, doing social activities alone, violence, avoiding people's eyes, fighting alone against the majority, and how the way of life deteriorates as a result, are analyzed through representations within the concept of "othering" created by the society. As a result of the textual analysis, it is seen that the othering imposed by the representation of the majority of the society has a sociological and psychological effect on the life of the child character.

**Keywords:** Representation, Other, Child, Social Structure, Wonder Movie

## **1.GİRİŞ**

Sinemanın tarihsel gelişim sürecinde farklı bir mecra olduğu ve insanların ilgisini çekmesi üzerine bir sanat dalı haline gelmesi hem teknik hem hikâye olarak gelişmesine olanak sağlamıştır. Sinemanın temsil görenekleri ile bulunulan coğrafyanın yaşayış şeklinin, kültürünün, insanların vs. gibi birçok etmen ve bunların nasıl temsil edildiği, edinilen temsilin ne kadar gerçeklikle yansıtıldığı oldukça önemlidir. Karakterlerin, kameranın, kurgunun, sesin dahi artık bir temsil olarak bir ifade şekli vardır. Sinemada temsili kurmak filmin temel içeriğine şekil verdiği gibi kendine özgü bir dil oluşturmuştur. İzleyici üzerinde etki bırakmak veya bağlantı kurmak temsil ile olmaktadır. İzleyici kendisinden ve hayatından bir şeyler görmek ister ve bunu gördüğü zaman öykü ile bağlantısını oluşturur.

Toplumda öteki, kendisi gibi olmayan, dışta kalan, benzer olmayan, farklı ve değersiz olarak tanımlanır. Sinemada öteki ise, tıpkı toplumun ötekisine benzemektedir. İnsanlar gerçek hayatta öteki olarak kabul ettiklerini filmlerdeki karakterde de görmek istemektedirler. Bu tarihsel süreç içerisinde toplumun gördüğü savaşlar, ekonomik yapısı, siyasi hayatı, kültürü gibi birçok etken ötekinin algılanma biçimini etkiler ve şekillendirir. Ötekilerin popüler kültürde yer alma biçimleri, sıklıkları ve değişim çizgileri dikkatle incelendiğinde yaşanan dönemlerdeki egemen algının nasıl şekillendiği üzerine bir ipucu elde etmek olasıdır (Kırel, 2018, s. 398).

Gerçek hayatta var olan zıtlıklar sinemada da var olmalı, eğer bir karşıtlık yok ise hikâye içerisinde kendi ötekisini oluşturmalıdır. Karşıtlık yaratılarak öykünün gerçekliği temsil etmesi gerekmektedir. Karşıtlık olmazsa, hikâyenin akışının olamayacağı gibi anlamını da kaybedecektir. Ötekileştirmek, kişinin kendisi gibi olmayana nefreti olduğu ve bunun nedeni öteki gibi olamadığının sosyolojik ve psikolojik bir etkisi vardır. Bu etkinin en önemli temsilcileri ise toplumdur. Çoğunluk her zaman üstünlük kurar ve çoğunluğa ait olmayana ise görmek istemediği için dışlar. Kimlikler insanları tanımlar nereye ait olduklarını gösterir. İnsanlar bulunduğu toplumun veya grubun üyesi olmak ister fakat gurubun dışında kalmayı tercih edenler öteki konumuna itilebilirler.

Bireye ya da bir topluluğu kimliklendirme, sınıflandırma, toplumsal belleğin oluşmasına sebep olurken; ortaya çıkan toplumsal bellek, bireyler arası bağlılık ve dayanışma gibi duyguların yeşermesini sağlar (Aslan, 2018, s. 67). Topluluk ise kendisi gibi olanı

yanında ister kendisine düşünce, fiziksel vb. gibi durumlarda benzerliği yok ise ötekileştirir. Kendini bir gruba yâda topluluğa ait hissetmediğinde yâda kabul edilmeyen birey olduğunda bu durum karşısında travmalar oluşur. Sinemanın tarihsel süreci boyunca temsil ve öteki filmlerin yapı taşları olmuş ve etkin bir dil oluşturmuştur. Öteki, hikâyenin vazgeçilmez karakteri ve popüler kültür içerisinde yer alan, toplumun içinde ama dışta kalan, kendisine bir kimlik arayan, insanların görmesi gereken bir türdür.

## **2.YÖNTEM**

Çalışmanın amacı, (Wonder, 2017) filminin metinsel çözümlene yöntemiyle analizi ve öteki çocuk olarak tanımlanan karakterin yüzündeki deformasyondan dolayı farklı yaşam şeklini, farklılığa yaklaşmamızı, ötekinin getirdiği kötü davranış biçimini, ötekileştirmenin getirdiği sosyolojik ve psikolojik etkileri ve toplumsal yapısını incelemektir.

Dram ve çocuk türünde olan film, toplumun dayattığı ötekileştirmenin getirdiği psikolojik ve sosyolojik travmanın yansıması, karakterlerin temsile ve ötekiye bakışı ve ötekileştirilmiş karakterin yaşadığı hayat biçimi bağlamında analiz edilmektedir. Filmde temsilin önemi ve öteki olarak tasvir edilen karakterin yaşam biçiminin zorluluğunun aktarılması, ötekileştirmenin çocukta bıraktığı travma, toplumun öteki olana farklı bir bakış açısıyla bakması, ötekinin sosyolojik etkileri olarak anlatılması kapsamında sınırlandırılmıştır.

Ötekilik kavramının psikoanalitik yönden önemi, ötekinin yalnızca kültürün ve kişinin tümüyle dışında kalan şeyleri değil kişinin içinde bastırılan ve yadsınıp dışlanarak kişinin dışında bir şeymiş gibi nefret edilen şeyleri temsil etmesidir (Demir, 2008, s. 14). Kişi kendisinde görmek istemediğini öteki olana yakıştırır. Öteki olan ise bu baskılar yüzünden nefretini ve psikolojik durumunu başka şekillerle veya durumlarla anlatmaya çalışır. Ötekileştirmenin getirdiği bu dram hikâyesi ve bunun çocuk karakter üzerinde anlatımı, “Wonder” filmi ile çözümlenecektir. Sinemada öteki, filmlerin

vazgeçilmezi olmuştur, çünkü zıtlığa yani karşıtığa ihtiyaç vardır ki bu hikâyenin anlamını ve ritmini yüksek tutmaktadır.

Filmin hikâyesinde ötekileştirilen başkarakterimiz olup, ötekinin yaşadığı durumları özellikle çocuk üzerinden zorluğunu ve toplumun öteki olana bakışının değişmesi

gerektiğini, çocuk karakterin fiziksel görüntüsü üzerinden ötekileştirilmesinde yaşanan gerçekçiliğin incelenmesi amaçlanmıştır.

### **3.SİNEMADA TEMSİL**

Temsil kavramı, taklit etme ile eş değerdir. Temsil, var olanın yeniden üretilmesi ile sunulmaktadır. Taklit etme veya yansıtma durumu, öyküyü, karakterleri, olayları oluşturduğu gibi kendini yenileyerek gelişim göstermektedir. Tarihsel süreç içerisinde temsil kurmanın en önemli unsuru, fotoğraf ve sinema birlikteliğinin etkisi olmaktadır. Sinema, teknoloji ve fotoğraf birleşimi ile birlikte gelişerek, görsel, işitsel, içerik olarak anlatı kazanmaktadır. Bununla birlikte gerçeğin görüntüsünü vermek yeterli olmayıp, gerçeği yeniden üretip yeni bir anlatı dili yansıtılmaktadır. Teknik anlamda da verilen görüntü bize sunulan temsilleri göstermektedir. Sinemadaki haliyle temsil ise sinemasal araçlar kullanılarak referans alınan her ne ise onun yerini tutacak başka ifadeler oluşturmak şeklinde tanımlanabilir. Kurulan bu ifadeler aracılığıyla ortaya çıkan nihai söz ya da yargı ise söylem kavramı ile karşılık bulmaktadır (Cerrahoğlu, 2019, s. 522).

Filmlerde neyin temsil edildiği, konusu ve temasına bağlı olarak izleyiciye mesaj vermekle birlikte, biçim ve içeriğin nasıl kurulduğu, sinemasal anlatım araçlarının nasıl kullanıldığı, öykünün nasıl oluşturulduğu, filmin amacına uygun şekilde kullanıldığının önemi vardır. Tüm bunlar ile birlikte var olan bir diğer önemli unsur ise, izleyicinin varlığı olup, temsil edilen ile bağlantı kurmasıdır. Temsiller için kullanılan kodlamalar, izleyicinin kodlamaları ile ilişkili olması önemlidir. Yani temsiller öylesine kurulmamış, belli bir amacı ve anlamı bulunmaktadır. Temsil kavramının öncül bir biçimi gibi kullanılan ve temeli Platon ve Aristoteles'e dayanan mimesis, doğa ve insan eylemlerinin doğrudan taklidi olarak karşımıza çıkmaktadır (Cerrahoğlu, 2019, s. 521). Mimesis kavramının oluşturduğu temsil ve gerçeklik ilişkisinin konu bakımından bir anlamı vardır. Sinemasal gerçeklik ve kullanılan araçların temsili öyküde nasıl tasvir

edildiği ile ilgilidir. Gerçeklik bağı ancak izleyici ile ortak temsil kodları kullanıldığı sürece hikâye yâda öykü gerçekçi kabul edilmemektedir.

Gerçeklikten kopuşun olduğu ve bağlantı kuramadığı temsil kodları, izleyiciyi gerçeklik algısından koparmaktadır. Sinema, toplumsal gerçekliği oluşturan kültürel temsilleri sinemasal araçların aktardığı söylem ile oluşturulmaktadır. Kültürel temsiller, toplumsal

yaşamın şekillenmesi, toplumsal gerçeğin nasıl oluşması gerektiğini, neyin ön planda baskın olması gibi güçlü bir rolü vardır. Bundan dolayıdır ki, toplumsal iktidarın muhafazası için kültürel temsillerin üretimi üzerinde söz sahibi olmak önem taşıdığı gibi, “toplumsal dönüşümleri amaçlayan ilerici hareketler için de vazgeçilmez bir kaynak” oluşturmaktadır (Namaz, 2011, s. 43).

#### **4.SİNEMADA ÖTEKİ**

Sinema sanatında hikâye anlatımı karşıtlıklar üzerinden kurulmaktadır. Karşıtlıklardan oluşan çatışmayı kurabilmek için öteki olana ihtiyaç duyulur. Öteki kavramı ise, çoğunluğa göre benzer özellik göstermeyen, çoğunluğun dışında kalan, farklı olarak tanımlanan, dışta kalan olarak tanımlanabilir. Toplumda veya insanlar arasında öteki, kendisi gibi olmayan, fiziksel veya düşünce farklılığına sahip, toplumla aynı özelliği taşımayan, karşıtlık oluşturan ve değersiz olarak nitelendirilir. Sinema tarihinin başlangıcından, yani Lumiere Kardeşlerden günümüze kadar karşıtlıklar yani öteki hep var olmaktadır. Gerçek hayatta kopyalanan veya yeniden tasarlanan hikâyelerde var olan karşıtlık sinemanın da vazgeçilmezi olmaktadır. Eğer gerçek hayatta öteki yoksa hikâye kendi ötekisini oluşturmaktadır. Karşıtlıklar tıpkı gerçek hayatta olduğu gibi zıt olarak nitelendirilen, iyi ile kötü, zengin ile yoksul, özgürlük ile tutsak gibi birçok örnek ile verilmektedir. Bundan dolayı bir kimse kendini tanıtırken zıt olandan yani ne olmadığını söyleyerek açıklamaktadır.

Sinemada öteki inşa edilirken; sinema anlatısına etki eden iki temel unsurun iyi planlanması gerekmektedir. Bu iki temel unsurdan birisi, anlatı dili, diğeri de sinemasal estetikdir (Aslan, 2018, s. 69). Hikâyede kullanılan dil, karakterler arası ilişki ve yüklenilen anlam iken estetiksel olarak ise ışık, renk, kameranın nerede durduğu, müzik gibi birçok teknik araç öteki olanı inşa etmektedir. Mesajın doğru iletilmesi için doğru araçların kullanılması gerekmektedir. Bu mesajın nasıl veya ne kadar doğru iletildiği ise



yönetmene ve hikâyeye bağlıdır. Temsil ile kurulan kodlamalar ile hikâyeye tasarlanır ve öteki karakter izleyiciye aktarılır. İzleyici ise öteki olarak kodladığı karakteri tanır ve bağ kurarak hikâyeyi bütünleştirir. Hikâyenin öteki olana etkisi gibi izleyicinin de öteki karaktere etkisi büyüktür.

Bazen hikâyeye öteki karakterin zorlu yaşamını ve ötekinin gözünden bakılan dünyanın zorluğunu izleyiciye aktarmaktadır. İzleyicinin öteki karaktere her zaman değersiz olarak bakmaması ve farklılığa karşı anlayışlı veya duyarlı olması gerektiğinin mesajı iletilir. Ötekinin bir diğer önemli unsuru ise ön yargıdan türemesidir. Ön yargı, kişinin stereotipleşmiş görüşlerine göre tasarlanan, ötekinin olumsuz yönlerinin algılanması göre şekillenen kalıplaşmış yargılardır. Stereotip ise, bireyin özellikleri içerisinde birkaçını ele alarak basitleştirerek akılda kalıcı olarak kalmasını sağlayan düşüncedir. Ön yargılar ile kişiye bir kimlik verilmiş olur ve toplum tarafından sadece o kimliğe aittir. Bizim sahip olduğumuz özelliklere sahip olamayan varlığa karşılık gelen “öteki”, “var’ların” (ben-biz) ve “yok’ların” (sen-öteki) mekânına indirgenmektedir (Namaz, 2011, s. 35). Ön yargılar, ötekileştirme süreci içerisinde önemli bir role sahip olmaktadır.

Hollywood sinemasının ideolojik yapıya sahip olması, kitleleri yönlendirme gücüyle birlikte, dönemin popüler toplumsal sorunlarına yönelik film üretimi yapmaktadır. İstenilen düşünceyi filmler yoluyla kitleleri empoze etme ve neyin nasıl olması gerektiğinin mesajını verecek güce sahiptir. Bu gücün etkisiyle ortak kültür egemenliği oluşturarak ötekinin de rolünü ve verilecek değeri ortaya koymaktadır. Çoğunluğun savunduğu düşünce her zaman haklı ve güçlü durumunda olmaktadır. Tek yani bireyin yalnızlığını, farklılığını toplum kabul etmez çünkü kendisi bunu yapacak güce sahip değildir ve ötekiyi bastırmaya çalışmaktadır.

Öteki, “ben”in kendini gerçekleştirdiği, dolayımıldığı nesnedir. Kendini gerçekleyebilmesi için “öteki”nin varlığı zorunluluktur. Öteki ile uzamsal alana giren “ben”, kendi uzamsal alanını yaratır, kendini dış dünyanın nesnelere farklı olarak kurgular (Nurdoğan Rigel, 2005, s. 287). Bundan dolayı “ben”in var olabilmesi için öteki olana ihtiyaç vardır. Öteki toplum tarafından ne kadar dışlansa da farklı olarak görülse de, aslında o toplumun önemli bir rolüne sahip olduğu gibi toplumun da kendini

tanıtması ve var etmesinde güçlü bir etkisi vardır. Öteki olanı konuşur, onu anlatır ve ön planda tutar, kendini öteki ile tatmin ederek aslında öteki karakteri yaşamın gerçekliğinde başrol yapar. Tıpkı gerçek yaşamda olduğu gibi filmlerde de öteki en önemli role sahip bir karakter olur.

### **5.SİNEMADA ÇOCUK, TOPLUMSAL YAPI VE ÖTEKİ**

Sinemanın tarihsel süreci içerisinde çocuk karakterler sık sık filmlerde yer almaktadır. İlk başlarda önemsiz ve ilgi alanı olarak görülmeyen çocuk zaman içerisinde öykünün de önemli bir parçası haline gelmektedir. Çocuğun toplumsal yapının içinde ne kadar ve nasıl var olduğu önemli bir konu haline gelmiş ve çocuk sinema sektörü oluşmaya başlamıştır. Dünya sinemasındaki çocukluk imgesinin serüvenine bakıldığında, çocukluk kategorisinin tarihsel varlığına ilişkin tartışmaların, özellikle modernleşmeyle birlikte çocukluğun icadının bu görünümü doğrudan etkilediği görülmektedir (Düzcan, 2017, s. 415). Çocuk karakterin rolü, daha ciddi toplumsal problemlere yönelik veya şiddet, cinsel istismar, baskı, aşağılama, suçlama, tehdit gibi önemli konuların temsilcileri olmuşlardır. Çocukluk temsili, kendi alanında yaşayan görünmeyen veya topluma çok etkisi olmayan birey iken zamanla toplumun sorunlarının önemli bir parçası haline gelmiştir. Bu yüzden toplumun yarattığı sorunlara çocuğun gözüyle bakmak veya bu sorunların çocukta yarattığı etki çocuğun dili ile anlatılmaktadır.

Sinema ve toplum ilişkisi genellikle birlikte ilerlemiş olup, toplumsal yapı filmlerde çokça kullanılmaktadır. Çünkü toplumsal yapı kavramı baskıdan oluşmaktadır. Kendi otoritesini bireye kabul ettirmeye muktedir olan toplum, bu baskısıyla bireyi aşar. Bu halde kişinin kendisine egemen olma potansiyeline sahip bu güç karşısında boyun eğmesi, gücün meydana gelmesi için ana koşul olarak kabul edilebilir (Uçan, 2019, s. 9). Filmlerde oluşturulan karakterler arası güç ilişkisi, sosyal yaşam, değerler arası zıtlıklar, yaşanan zaman, ahlak ve görgü kuralları gibi birçok toplumsal yapılar sinema ile bağımlı koparmamış ve bir bütün olarak öykülerle bunu sürdürmüştür. Çok yönlü anlatıya sahip olan sinema sanatı, kültürel, psikolojik, sosyolojik, toplumsal konuları, sanatıyla bütünleştirerek kitlesel bir dil oluşturmaktadır. Bu dilin kullanımında film içerisinde toplumu ne kadar objektif bir gözle yansıttığı, konuya karşı olan tavrı, bakış açısı ile sanatçı kendi normlarını yansıtır. Bu yüzden film içerisinde toplumsal yapının ne kadar doğru veya yanlış anlatımı kullanıldığı dil ile belirtilmektedir.

Ayrıca, film sadece bölgesel değil, geniş bir açıyla evrensel bir dil oluşturarak mesajını bu yapıya göre belirtir. Filmler, izleyici ile yoğun bir iletişim halinde olup mesajını buna göre vermektedir. Toplumsal yapının önemli parçası olan çocuklar ise bu

iletişimin doğrudan temsilcileri olmaktadır. Çocuk, toplumda kendine dayatılan sorumlulukları

veya baskıyı, söylem ve hareket yolu ile izleyiciye aktarmaktadır. Toplumsal yapının oluşturduğu ötekileştirme ile çocuk, psikolojik ve sosyolojik olarak etkilenmekte ve bunun sonucunda büyük bir sarsıntı geçirmektedir. Kurulan baskının, sinemada anlatım biçimi ile nasıl temsil edildiği seyircinin de nasıl davranması gerektiği üzerinden mesaj vermektedir. Zamanla kişinin zihnini doğal düzende insanın ve toplumda bireyin yeri, dünyaya ilişkin soyut sorular meşgul etmeye başlamakta ve bu anlam sorununun çözümlenmesi için kişinin daha geniş bir toplumla ilişki kurması gerekmektedir (Uçan, 2019, s. 40). Ancak ötekileştirilen çocuk karakter, yaşadığı baskı ile toplumdan uzaklaşmaktadır.

Çocuğun fiziksel görüntüsü üzerinden ötekileştirilmesi ve bunun sonucunda yaşadığı sarsıntı ile çocuk toplumdan uzaklaştığı gibi insan ilişkilerinde de sorun yaşamaya başlamaktadır. Hem aile ile hem arkadaş çevresi veya toplumun geri kalan bireyleri ile iletişim problemi yaşamakta olup bu sorunun fiziksel ötekileştirmeden kaynaklandığını düşünmektedir. Bunun sonucunda kendi benliğini kaybettiği gibi öz güven problemi ve içe kapanıklık olarak tanımlanan psikolojik etkiler yaratmaktadır. Yaşadığı bu psikolojik etki ile kimlik sorgulaması yaptığı ve var olan kimliğini de kaybetmeye başladığı gözlenmektedir. Çünkü toplum içinde var olan kimlik, bireysel bir davranış veya toplumsal yapıya göre farklılık oluştuğu zaman, toplum tarafından cezalandırılarak, öteki kimliğine bürünmektedir.

Fiziki imgelerle oluşturulan damgalar, kişiyi toplumdan soyutlayarak geri dönülemez bir bedensel kusur yaratır. Antik Yunan'da uygulama bulan durum damgalanan bireyi sosyal alanda çöküntüye uğrattırırken, psikolojik tahribatın kapısını aralamaktaydı (Aslan, 2018, s. 67). Fiziki imgeler en dikkat çeken temsiller olduğu için kişi sürekli psikolojik olarak sözel şiddet görmektedir. Bununla birlikte sosyal alanda da bir birey olarak kabul edilmediği gibi neden istenmediğine dair kabaca tabirler de kullanılmaktadır. Toplum tarafından her alanda uygulanan baskıya kişi dayanamadığı gibi psikolojik problemler de yaşamaktadır. Kendini toplumdan soyutladığı için yalnız kalmakta veya çevresi ile yapması gerekenleri tek başına yapmaya başlamaktadır. Kişi, bu şekilde davranış göstererek toplumun dayattığı öteki kodlarını kabul eder ve mücadele etmeyi bırakır.

Fiziksel deformasyon aslında sadece bir hastalık olup, kişinin toplumdan soyutlanmasına sebebiyet vermemesi gerekmektedir.

Öteki, toplumun hâkim olduğu kültür temsilleri dışında kalan kimliği ile var olmaktadır. Bunun sonucu ise bu kimliğin getirdiği artık zorlu bir yaşam olması ve çocuğun kendini hiçbir yere ait olmama hissini sürekli hatırlatılmasına maruz kalmasıdır. Ötekileştirmenin alanı geniş olup sadece fiziksel değil, çocuk karakterlerin yaşadığı coğrafyanın, kültürünün, cinsiyet ayrımının, ırk farklılığının getirdiği ayrışma yüzünden yaşam biçimleri zorlaşmaktadır. Kimlik, kişilerin bir parçası, toplumsal yapı içerisinde var olan grupların temsili, kültürü yansıtan bir ayna ve öznel olarak yapılan şeyleri nesnellikle konumlandırır. Yani birey tekliği değil çoğunluğu kimliği ile temsil eder. Örneğin bir bireyi, dâhil olduğu varsayılan kategoriden farklı bir kategoride yeniden sınıflamamıza ve söz konusu kişiye ilişkin nitelermelerimizi değiştirmemize sebebiyet verebilecek türden uyuşmazlıkların söz konusu olabileceği hatırlanmalıdır (Goffman, 2014, s. 31).

Goffman'ın dediği gibi fiziksel deformasyon uyuşmazlığına sahip olan çocuk ise toplumun var ettiği kimlik içerisinde yer almayarak ötekileştirilmektedir. Ötekileştirilen çocuk ise, toplumun normal olarak kabul ettiği tipsele özelliklere uymamasından kaynaklanan sorun yaratır. Bu sorun çocuğa baskı uygulanarak gösterilmekte olup çocuğun toplumun kimliğine ve özelliklerine uymadığı yansıtılmaktadır. Ötekileştirilen çocuk kendi benliği ile bir mücadeleye girer ve toplumun kimliğine neden sahip olmadığını sorgulamasını yapar. Bunun dâhilinde ise kendi var olan öteki kimliği ile toplumun onu kabul etmesini sağlamaktadır.

Kimlikler, kültür, cinsiyet, ırk, dil, coğrafya gibi birçok etmene bağlı olarak değişmektedir. Her coğrafyanın veya her ırkın kendine göre oluşturduğu kimlikler bulunmaktadır. Bunun nedeni farklılığın, toplumun yapısına ve tarihsel gelişim sürecinde var olan yaşam tarzına bağlıdır. Bunun sonucu olarak, artık kimlik kategorisi, kendi içerisinde tutarlı, istikrarlı bir sabit olarak değil, “kendilik” ile “toplum” arasındaki karşılıklı “etkileşim” sonucu “kurulan” bir yapı olarak kavranır (Özdoyran, 2020, s. 476). Yani öteki kavramını oluşturan etmenler, toplumun kişiye olan bakış açısını, toplum içerisinde konumunu belirten kimliğe sahip olurlar. Toplum kendi

içerisinde de sınıf farkını ortaya koyduğu için, öteki olana bakış toplumun kendi içinde de değişiklik göstermektedir.

Öteki nitelmesi ya da terimi, belli bir konunun, durumun, varlığın tam karşısında yer alanı, karşıt ikiliğin hep değersiz görülen kanadını anlatır (Demir, 2008, s. 4). Ötekinin var olması demek toplumun var olması demektir aslında, çünkü farklılık ile toplum bir anlam kazanmaktadır. Bu yüzden kültür olarak simgelenen şeyler farklılık/karşıtlık ile oluşmaktadır. Zıtlıklardan bir güç ilişkisi yaratılır ve bu zıtlıklardan doğan farklılık ise simgelenen şeye anlam kazandırmaktadır. Hayatımızın, kültürümüzün, yaşanılan coğrafyanın, insanların, tenlerin, ırkların, dillerin veya daha birçok şeyin karşıtı muhakkak var olup kendini tanımlamak için ise karşıtlık kullanılmaktadır. Bu yüzden farklılık anlam kazanmaktadır.

Çocuk anlatıları aynı zamanda toplumların aile yaşamları, ekonomik ve sosyal konumları hakkında sosyolojik analizlere imkân veren bir potansiyel barındırmaktadır (Düzcan, 2017). Çocuk, toplumun normlarının temsili olmaktadır. Bu yüzden çocuk, toplumun yapısı içinde var olan öteki kodların yansıması niteliğindedir.

## **6. ÇOCUK KARAKTERİN FİZİKSEL GÖRÜNTÜSÜ ÜZERİNDEN ÖTEKİLEŞTİRİLMESİ BAĞLAMINDA WONDER FİLMİNİN ANALİZİ**

Wonder filminin, dram, çocuk teması üzerinde kurulan hikâyesi, toplumsal yapı ve öteki ile bağlantı kurulmaktadır. Film, 10 yaşındaki Auggie Pullman'ın, yüzündeki deformasyon ile uyum sağlamaya çalıştığı yaşamını konu almaktadır. Auggie'nin, bu yaşına kadar eğitimini evde annesi vermiş, artık okula başlaması gerektiği söylenmektedir. Evde eğitim almasının sebebi ise öteki kimliğinden kaçmasıdır. Filmin önemli tarafı öteki algısı üzerinden çocuğun belirli kodlarla öteki olmanın zorlu yaşamını göstermektir. Film, tüm bu zorlu yaşam içerisinde çocuğun öteki konumunu yıkıp kendini topluma kabul ettirmesini izleyiciye aktarmaktadır. Sadece filmin başkahramanı değil, hikâye içinde yer alan diğer çocuk karakterler de, sosyal sınıf farkından oluşan ötekileştirmeye maruz kalmaktadır. Her çocuğun yaşadığı farklılığın getirdiği yaşam biçimi aktarılmıştır.

Filmin giriş sahnesinde yıldızların var olduğu gökyüzü ve astronot kıyafetli biri görülmekte olup sesle desteklenerek uzayda yaşanan bir an simgelenmektedir. Aslında bu sahnenin Auggie'nin odası olduğu ve bir kask ile yatağın üzerinden zıpladığı görülmektedir. Uzay simgelerinin var olduğu oda aslında çocuğun hayal dünyası tasviri

olduğu anlatılmaktadır. Uzayın temsili, insan vücudunun görünmediği kıyafeti, sınırların dışına çıkan farklı bir evren ve uzakta kimsenin var olmadığı farklı bir dünya yaratmaktadır. Auggie burada sıradan yaptığı aktivitelerden bahseder, dondurma yemek, bisiklet sürmek, bilim sevmek, aile ile yapılan aktiviteler, uzaya çıkma hayali gibi sosyal aktiviteler sıradan ama görünümünün sıradan olmadığını söylemektedir. Auggie yaptığı veya sevdiği hobilerden bahsederken ve bunları yaparken kafasında hep kask görülmektedir. Cümlelerin sonunda onlarca ameliyat geçirdiği ama hiç birinin normal bir insan görünümüne sahip olmadığını söyler.

Auggie hayatını ve eğitimini evden devam ettirse de artık okula gitmesi gerektiğini bilmekte ama bunu normal bir insan gibi görünmediğinden yapmak istememektedir. Çünkü toplumla yüzleşmeye cesaret edememekte ve bunu anlatırken insanların ona dik baktığını ve yüzündeki deformasyondan dolayı çocukların ondan kaçtığını söylemektedir. Normal bir çocuktan kim kaçarsa ki mesajını da vermektedir. Bu ise öteki olmanın çocuk açısından en zor tarafı olup toplumun kendisini kabul etmediğinin farkında olmasıdır. Auggie'nin ailesi, yüzündeki deformasyondan kaynaklanan farklılığı ona yansıtmayan, hep destekçi olan aile olarak temsil edilmektedir. Bununla birlikte toplumla yüzleşmek için artık ilk adımı atar ve okula gitmeye karar verir. Bu cesaret adımının amacı ise bilim yani hayal dünyasında var olan uzay olduğu aktarılmaktadır.

Okulu tanıma sahnesinde üç arkadaşı ile tanışır ve onları ayakkabılarına göre sınıflandırır. Yani kıyafet veya giysinin karşısındaki kişi hakkında bilgi verdiğini ve kişinin kimliğinin ne olduğunu ve sosyal sınıfların temsilini simgelemektedir. Okulun ilk günü bahçedeki çocuklar Auggie gördüğü zaman ondan uzaklaşmaları ve kötü tabirleri, öteki olana bakışı simgelemektedir. Annesinin söylediğini düşünerek "bulunduğun yeri sevmiyorsan, olmak istediğin yeri hayal et" imgesinin içinde kendisini bulur. Auggie çocuklar arasında ötekileştirildiğinde ve yalnız hissettiğinde kendisini olmak istediği hayali dünyada düşünmektedir. Bu hayali dünya sevdiği film olan Star Wars kahramanlarını görmesi ve onların da sıradan olarak görülmemesi

kendisiyle bir bağ veya ortak duygu paylaşımı yaşamaktadır. Çocukların aileden veya toplumdan aldıkları kodlamalar ile Auggie'nin vebalı olduğunu düşünürler. Tıpkı toplumdaki bireyler gibi, çocuklar arasında da ötekiye bakışın kabaca bir tavrı veya daha anlaşılır davranışları da vardır. Bunun temeli aileden geldiği gibi toplumun içinde de şekillenmeye başlamaktadır.

İlk derste kendini tanıtmada konusunda, Auggie çekinerek ve özgüven eksikliği ile bunu yapmak istemese de yapmak zorunda kalır ve kendisini tanımlayan şeylerden bahseder. Burada tanımladığı şeyler kendisinin görünümü ile ilgili bir kimlik sunmaktadır. Çekinmesinin sebebi ise herkesin ona bakmasında ve farklılığının görünmesinden alay edileceğini düşünmesinden olmaktadır. Filmin içerisinde okulda verilen derslerde de farkındalığa ve ötekiye bakış mesajları iletilmektedir. Farklı olana nasıl davranılması gerektiği, farklılığın hissettiği duygu durumu veya kimliğinizin ne olduğu gibi birçok mesaj izleyiciye aktarılır. Auggie, öteki kimliğiyle sürekli yüzleşmeye maruz kalarak, yemeğini tek başına yemesi, sınıfta tek başına oturması ve arkadaşı olmaması gibi ötekileştirilen durumlarla karşılaşmaktadır.

Auggie'nin bahçede yürürken, yemek yerken, diğer çocukların ona bakıp kabaca sözler söylemesi ve gülmesi farklılığının gerçek yüzünü göstermektedir. Toplumda aktarılan kodlar ile bu hastalığa sahip olan bireylerin hastalığı bulaştırdığı, uzak durulması gerektiği gibi algı yaratılmıştır. Auggie'nin, kabaca davranışlar ile yüzleşmesi onun acı çekmesine ve farklılığının sorun olduğu düşüncesine neden olmuştur. O, kendisini normal bir birey olarak değil, öteki kimliğinde görmektedir. Sadece Auggie değil ailenin diğer bireyleri de bu farklılıktan oluşan problemler yaşamaktadır. Auggie'nin kız kardeşi Olivia ailesinin kardeşi ile çok ilgilenmesi ve kendisinin görünmemesi sonucunda kendini içine kapatır. En yakın arkadaşının, kardeşinden dolayı arkadaşlığının sonlandırıldığını düşünmesi üzerine yeni tanıştığı arkadaşına tek çocuk olduğunu, yani yalan söyler. Toplumdan soyutlanmak istemediği ve terk edilmek istemediği için yalan söylemektedir. Olivia, toplumun öteki olana karşı düşüncesinden dolayı böyle söylese de daha sonra empati kurarak yani kardeşinin yalnız kaldığını düşündüğü için kardeşinin de destekçisi olmaya çalışmaktadır. Çünkü tıpkı kardeşi gibi kendisi de toplum ile bağ kuramadığı gibi yalnız kalmaktadır.



Toplumda kadına biçilen rol ve erkeğe biçilen rol gibi filmde de rollerin farklılığı işlenmiştir. Kız çocuğunun ihmal edilmesi, erkek çocuğa daha fazla ilgi gösterilmesi yine toplumun gerçeklerini yansıtmaktadır. Oysaki erkek çocuğa hastalığı olduğu için daha fazla ilgi gösterilirken, kız çocuğun görülmemesi yine bir ötekileştirme durumu yaratmaktadır. Bu davranış ile çocuğun farklı olduğu ve sıradan olmadığı düşüncesi yansıtılmaktadır. Auggie artık bulunduğu ortama alışmaya ve arkadaşlık kurmaya başlar

ve her normal çocuk gibi toplumun dayattığı öteki algısını kırmaya başlar. Auggie'nin, Jack ile kurduğu arkadaşlık, sosyalleşmesine ve topluma ayak uydurmasına olanak sağlamıştır. Görsel örnekleme, çocukların davranışlarının farkında olmadan öğrenmelerine yardımcı olabilmektedir. Çocukların arkadaşlarıyla birlikte bu aktivitelerde bulunuyor olmaları model olma davranışı üzerinde etkili olabileceğini düşündürmektedir (Üstündağ, 2021, s. 627). Çünkü herkes gibi hareket etme, aynı davranışı gösterme, benzer aktiviteler ve mekânlarda bulunma, ortak bir paylaşım alanı sergilemek, toplumdan ve arkadaşlarından hiçbir farkının olmadığını göstermiştir. Çoğunluğun yaptıklarını taklit etmek, kişiyi öteki kimliğinden uzaklaştırdığı gibi toplumun içinde var etmiştir. Auggie, kendini toplumun içinden olduğunu ispatlamaya ve öteki kimliğini değiştirmenin çözümünü ancak bu şekilde elde etmeye çalışmıştır.

Jack'in, Auggie hakkında olumsuz düşüncelerini arkadaşlarına aktarması aslında ona burslu kimliğinin verilmesi, arkadaşları tarafından sürekli hatırlatılması, bursluluğunun zarar görmesi ve sınıfsal farkının oluşmaması korkusu ile söylendiği aktarılmaktadır. Toplumun öteki kodları çok fazla olduğu gibi, okuldaki diğer çocukların sınıfsal veya ırksal farklılığından kaynaklanan dışlanma da yaşanmaktadır. Çocuk karakterler ise toplumun dışlamasından korktukları için kendini savunma durumuna geçmektedirler. Jack, sözel şiddete maruz kalan Auggie'yi korumak için diğer çocuğa fiziksel şiddet uygular ve bu şiddetin haklılığını savunur. Jack bursluluğunu kaybetmemek için kibar bir dille okula özrünü iletir. Sosyal davranış veya aileden alınan ahlak kuralları gereği aslında bunun doğru olmadığını düşünerek yani empati kurarak Auggie ile arkadaşlıklarına devam ederler. Bu davranışı sergilemeleri, aileden geldiğinin gösterilmesi gibi toplumun baskısına da bir başkaldırı niteliğindedir. Filmi içerisinde, toplumun öteki olana farklı bakış açısından gelen dışlanma, ötekinin toplum ile sosyalleşmesine imkân tanınmadığı, öteki her zaman dikkat çeken ve farklı bir kimliğe

sahip olarak görüldüğü için, çocuklar Auggie'den uzak durmaktadırlar. Auggie, yeni arkadaşı ile sosyal aktiviteler yapmakta ve bununla mutlu olduğu gibi sıradan bir çocuk gibi kabul görmektedir. Auggie ve Jack bilim projelerinde birinci olmuş ve Auggie kendini diğer insanlara ispatlamış artık çevresi genişleyerek ön yargıları yıkmıştır. Filmde okul sorumlusunun verdiği önemli bir mesaj, Auggie'nin görüntüsünü değiştirmek yerine insanların onu görme şeklini değiştirmesi gerektiğini söylemesidir. Yani ötekileştirme

eleştirilmiş ve insanın artık bakış açılarını değiştirmesi gerektiği mesajı verilmiştir. Bir diğer karakter ise gerçek dünyada bunun olmayacağını ve kabul edilmeyeceğini vurgulamaktadır.

Auggie toplumun var ettiği normlara göre hareket ederek, kendisine öğretilen gibi davranış göstererek arkadaşlarına şiddet uygulamış ve bunun sonucunda şiddet uygulamak, çevre edinmek ve bununla mutlu bir yüze sahip olmak artık ön yargıların ve ön yargılarla oluşan ötekileştirmenin verdiği durumdan uzaklaşmış, toplumsal yapının içinde var olmuştur. Auggie, filmin başında yüzündeki deformasyon yüzünden çekindiği her şeyi yapmaya başlamış ve toplumun bir bireyi olarak kendini kabul ettirmiştir. Karşısında olan, alay eden ve farklılığını yüzüne söyleyen herkes artık onun yanında olmuştur. Auggie kendi öz benliğini kazanmış ve örnek öğrenci olarak ödül kazanmıştır. O, bu ödül ile tüm farklılıklarına rağmen toplumla mücadele ederek ön yargıları yıkmış, kendisini öteki konumundan çıkararak başarılı olması ile ispatlamıştır. Auggie, toplum tarafından verilen bütün tabuları yıkarak, toplumun önemli bir parçası olmuş ve farklılığın sadece fiziksel olduğunu izleyiciye göstermiştir.

## **7.SONUÇ**

Sinemanın başlangıcından günümüze kadar, kurulan hikâyenin temsilleri ve bu temsillerin neyi ifade ettiği önemli olmuştur. Temsiller, öteki olanı oluşturmakta çünkü zıtlığa ihtiyaç duymaktadır. Gerçek yaşamda olan zıtlıklar/karşıtlıklar, sinemaya da aktarılmakta, çünkü izleyici gerçek yaşamdan kopmak istememektedir. Öteki olanı oluşturan en önemli etmen ise toplumdur. Toplum, çoğunluğu temsil ettiği için kendisi gibi olmayanı, farklı olanı kabul etmeyerek içine almamaktadır. Yani öteki olan her zaman dışlanmakta ve çoğunluğun içinde bulunmamaktadır. Sinema, öteki olana karşı

oluşturulan kodlamaları kendi öykülerinde kullanır. Toplumun öteki olana bakışını, hikâyesinde temsil eder. Bazen eleştirel bir yaklaşım, bazen destekleyici bir yaklaşım sergilenmektedir.

Wonder filmi ile izleyiciye çocuk karakterin, fiziksel görüntüsü üzerinden öteki konumunda olması, ötekileştirmenin sonucunda yaşadığı sosyolojik ve psikolojik etkileri aktarılmıştır. Çocuk karakterler sinemanın başlangıcından beri var olsa da, ön planda yer almayıp daha sonra hikâyenin başkahramanı ve bununla birlikte öteki kodlamaların

temsilcileri olmuşlardır. Çocuk karakterlerin bazıları, toplumun ayrıştırmasını kabul etmemiş, bazıları ise çevresini ve ebeveynlerini taklit etmesi ile öteki konumunda nasıl bir davranış gösterdiği veya neler yaşadığı filmle aktarılmıştır. Toplumun ötekisi, kadın veya erkek, cinsiyet, ırk, kültür, çocuk gibi hangi alanda veya hangi anlamda olduğu fark etmediği gibi tepkisi de değişmemektedir.

Wonder filminin ana teması, başkahramanın fiziksel görüntü üzerinden bir ötekileştirme olsa da aslında filmde her karakterin bulunduğu sınıf farkı, kıyafeti, karakteri, yaşayış biçimi gibi birçok yönden ötekileştirme bulunmaktadır. Başkahramanımız Auggie'nin, yüzündeki deformasyondan dolayı ötekileştirilen hayat hikâyesi, farklılığın sebep verdiği zorluklar, bu zorluklarla nasıl mücadele edildiği ve diğer çocukların belirli farklılıklarla ötekileştirildiği yaşam şekilleri ve buna bağlı davranışları aktarılmıştır.

Buradan anlaşılan her toplumun veya her belirli sınıfın kendisine göre öteki temsileri bulunmakta ve öteki olana farklı bir davranış gösterilmektedir. Filmde toplum ile öteki arasında gerçeklik ve biçim, sosyal sorumluluk bilincinin hangi bireylerde var olduğu, olmayanların ise nedeni detaylı şekilde gösterilmiş ve açıklanmıştır. Ötekileştirmenin yarattığı problemler, çocukların öteki olana sert bakış açısı, kullanılan argo kelimelerin öteki olanda yarattığı psikolojik durum izleyicinin de empati kurması açısından doğrudan aktarılmıştır. İnsan ancak empati kurabildiği takdirde karşısındaki anlayabilir ve hissedebilir, bu yüzden insanların farklılığı daha saygılı ve özenli davranması gerektiği mesajı verilmiştir. Ötekileştirilen çocuk, yaşanan dışlanmadan dolayı travma yaşar ve kendi içine kapanır. Bunun sebebi toplumun bireyleri, sosyalleşmesine izin vermediği gibi baskı yöntemini de kullanması filmde gösterilmiştir.

Wonder filmi isminden anlaşılacağı gibi öteki olan Auggie, toplumun ona dayattığı kabuğunu kırıp, ön yargıları yıkıp, zor olanı başararak mucizeyi gerçekleştirmiş ve toplumun bireylerine kendini ispatlamıştır. Film, ötekileştirmenin getirdiği kötü davranış, şiddet, argo kelime kullanımı, toplumdaki soyutlanma, sosyal aktiviteleri tek başına yapma, yalnızlık, insanların bakışlarından kaçma, çoğunluğa karşı tek başına mücadele etme gibi birçok nedenin zorluğu ve yaşam şeklinin düzenini nasıl bozduğunu aktarmıştır. Kullanılan temsil kodlamaları ile çocukların bu kodlamalara göre tepki verdiği ve çocukların gözünden, toplumun farklılığa olan davranışı aktarılmıştır.

Filmde, cinsiyet, ırk, kültür, giyim tarzı, sosyal statü, ötekileştirmenin alanında var olmuş ve aktarılmıştır. Erkek ve kadının rolleri toplumda nasıl ise filmde de aynı şekilde yansıtılmıştır. Giyim tarzı kişinin kimliği hakkında bilgi verdiği, cinsiyetlerin eşitsizliğinde adaletli bir dengenin olmaması, zenginlerin üstünlüğü ve yoksulların her şeyi mecbur kabullenmesi, sosyal mekânların statüye göre belirlenmesi gibi birçok öteki kodlamalar filmde tüm gerçekçiliği ile verilmiştir. Film, temsilleri ve temsillerin oluşturduğu ötekileştirmeyi çocuk karakterler üzerinden aktardığı gibi, ötekileştiren, baskı uygulayan topluma ise eleştiri yapmıştır. Gerçek hayatta olduğu gibi, ötekileştiren ve ötekiyi savunan karakterler vardır. Bunun sonucunda öteki olana ne olduğu ve neler hissettiği aktarıldığı gibi toplumsal yapının buna göre görüşünü değiştirmesi gerektiği mesajı iletilmiştir.

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### **BİNA CEPHELERİNİN GÖRSEL ANALİZ KAPSAMINDA DEĞERLENDİRİLMESİ: MALATYA-SİNEMA CADDESİ ÖRNEĞİ**

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#### **ÖZET**

Bir kentin yapılı çevresini oluşturan konutlar, yapıldıkları dönemin kültürel, sosyal ve ekonomik özelliklerini yansıtmaktadırlar. Konutlar, barınma ihtiyacını karşılayan, insan yaşamının büyük bir bölümünü kapsayan yapılardır. Konutların plan, cephe ve malzeme özellikleri toplumun sahip olduğu değerleri yansıtmaktadır. Bu değerlerin yansıtıldığı en önemli yapı elemanlarından biri cephelerdir. Bir mimari yapıda cephe, yapıyı dışardan tanıtan ve çevre ile iletişim kuran en dikkat çekici bileşenlerden biridir. Değişen toplumsal yapı, kültürel özellikler, ekonomik ve teknolojik gelişmelerin etkilediği konutlar, bu faktörlerin etkisiyle değişmiş ve gelişerek günümüze kadar ulaşmışlardır. Tarihsel süreçte, geleneksel yapılar ve dönemin gerekliliklerine uygun olarak tasarlanan yeni yapılar kent ölçeğinde bir arada ve yan yana bulunmaktadır. Farklı dönemlerde farklı mimari anlayışlar ile oluşturulan bu yapıların cepheleri arasındaki uyum ve farklılığı tespit etmek için Malatya İli Sinema Caddesi alanına bulunan Geleneksel Malatya konutlarının ve çağdaş konutlar tespit edilmiştir. Tespit

edilen sivil mimari örneklerin cepheleri görsel analiz kapsamında değerlendirilmiş ve farklılıkları ortaya konulmuştur.

**Anahtar Kelimeler:** Görsel Analiz, Malatya Geleneksel Evleri, Cephe

**EVALUATION OF BUILDING FACADES IN THE SCOPE OF VISUAL  
ANALYSIS: CASE STUDY MALATYA-CINEMA STREET**

**ABSTRACT**

The dwellings that make up the current building environment of a city reflect the cultural, social, and economic characteristics of the period in which they were built. Dwellings are structures that meet the need for shelter and cover a large part of human life. The plan, facade, and material features of the dwellings reflect the values of the society. Facades are one of the most important building elements in which these values are reflected. In an architectural building, the facade is one of the most striking components that introduces the building from the outside and communicates with the environment. The dwellings, which are affected by the changing social structure, cultural characteristics, and economic and technological developments, have changed and developed with the effect of these factors and have reached the present day. In the historical process, traditional buildings and new buildings designed in accordance with the requirements of the period exist together and side by side at the urban scale. . In order to determine the harmony and difference between the facades of these buildings, which were created with different architectural understandings in different periods, the traditional residences and contemporary residences on Malatya Province Cinema Street were identified and examined. In this way, it is aimed to set an example of how the facades of the historical buildings and the structures built later in the city should be shaped together.

**Keywords:** Visual Analysis, Malatya Traditional Houses/ Dwellings, Facade



## GİRİŞ

Yapılar inşa edilirken dönemine ait belirli kaygılar ve estetik anlayış ile oluşmuşlardır. Günümüze kadar her dönemde farklı anlayış ile inşa edilen yapılar kentlerde bir arada var olmaktadır. Kentlerde dini yapılar, kamusal yapılar ve konut yapıları olmak üzere farklı tiplerde yapılar bulunmaktadır. Fakat konutlar, insanların barınma ihtiyaçlarını karşıladıkları, yaşamlarının büyük bir bölümünü kapsayan mekânlardır. Bu nedenle toplumun inanışları, sosyal, kültürel, ekonomik özellikleri konutların yapım özelliklerini doğrudan etkilemiştir. Konutların plan, cephe, malzeme özellikleri toplumun sahip olduğu değerleri yansıtmaktadırlar. Bu değerlerin yansıdığı en önemli yapım elemanlarından biri cephelerdir. Bir mimari yapıda cephe, yapıyı dışardan tanıtan ve çevreyle iletişim kuran en dikkat çekici bileşenlerden biridir. Cepheler formel yapılar değil, fenomenler ve şehrin kullanıcıları tarafından yorumlanan anlamları şehrin dilini şekillendiriyor. (Şenyiğit ve Altan,2011)

Günümüzde cepheler kentsel mekanlarda aktif rol almaktadır. Cephe, insanları ve binaları veya binaları ve şehri birbirine bağlayan dev bir bölme değil, bir binayı çevreleyen bir kabuktur. Bina teknolojisinin gelişmesiyle birlikte cephelerin rolü de çeşitlenmekte ve genişlemektedir. Günümüzde dış dünya ile bağlantı kuran yapısal bir unsur olan cephe, içerisi ve dışarı arasında etkin bir şekilde çevre imajı oluşturan ve yapıyı bir kentsel peyzaj olarak kazandıran bir arayüzdür. (Üstündağ,2009).Bir yapının ve kent mekânının önemli parçası olarak cephenin görsel olarak incelenmesinde ve analiz edilmesinde, algı kavramı önemli bir yer tutmaktadır. Algı, duyum verilerini yorumlayarak çevremizdeki nesne ve olaylara anlam verme süreci ve bir nesnenin farkına varma ve onu değerlendirme sürecidir. İnsanın çevresi ile ilişkilerinin incelenmesinde, yapısal çevrenin algılanması, önemli bir araç olarak kabul edilebilir.

### 1.1. Çalışmanın Amacı, Kapsamı ve Önemi

Farklı dönemlerde farklı mimari anlayışlar ile inşa edilen yapıların bir arada bulunduğu kent Bundan yola çıkarak farklı zaman dilimlerinde mimari anlayışta yaşanan değişimi anlamak için konut cepheleri incelenmiştir. Bu noktadan hareketle çalışma kapsamında Geleneksel Malatya konutlarının ve çağdaş konutların bulunduğu Sinema Caddesi çalışma alanı olarak belirlenmiş ve incelenecek konutlar tespit edilmiştir. Tespit edilen sivil mimari örneklerin cepheleri görsel analiz kapsamında değerlendirilmiş ve farklılıkları ortaya konulmuştur.

Bu çalışma ile geleneksel konutlar ile çağdaş konut cephelerinin cephe düzenleri analiz edilmiş, ritim, oran, tekrar gibi özellikleri belirlenmiştir. Böylece kentte bir arada bulunan tarihi yapılar

ile sonradan inşa edilen yapıların cephe düzenlerinin bir arada nasıl biçimlenmesi gerektiği hakkında örnek teşkil etmesi amaçlanmıştır.

### 1.2. Algılama Kavramı ve Görsel Algı

İnsan, duyu organları ve duyum mekanizmaları aracılığı ile çevresinden sürekli uyarılar almaktadır. Uyarıların alındığı nesne ya da durumların değerlendirilip yorumlanması, yani algılanması; alınmakta olan duyumların dışında başka bilgilendirme kaynaklarının da etkin olduğu dinamik ve karmaşık bir olgu olarak görülmektedir. (Akdeniz,1982)

İnsan çevredeki nesnelere beş duyu organıyla algılar. İnsan, duyuları aracılığıyla aldığı bu uyarılara bir anlam yükler. Algı, duyumların ve anlamlarının yorumlanması sonucunda ortaya çıkar. Duyu organlarımızın yapısı ve işlevi, algılarımızın şekillenmesinde rol oynar. Ama daha fazla duyuya anlam verdiğinizde algı oluşur.(Üstündağ,2009)

İnsanlar algılama, biliş ve eylem mekanizmalarıdır. Algı, duyular aracılığıyla çevreden bilgi edinme eylemidir. Biliş, algılananın kavranması ve anlaşılmasıdır. (Göler, 2009).

- Algılamanın ana özellikleri şunlardır:
- Algı kişiden kişiye değişen bir olgudur.
- Hareket, algısal olaylarda önemli bir rol oynar.
- Algılamada kişi, amacına uygun bilgiyi çevreden alır.(Aydınlı,1992).

Görüş alanında dokusal bir etki, benzer nesnelere yan yana gelmesinin, birden çok kritik özelliğe dayalı olarak, bakış açısı, görüş mesafesi ve algısal koşullara bağlı olarak, bakan kişi dışında görsel olarak algılandığı etkidir. (Kalyoncu,2000)

Dış dünya üzerinde bilgilenmelerin, tüm algıların önemli bir bölümünün, %80-90 kadarının görme duyusu yolu ile alınıp beyne ilettiği kabul edilmektedir.( Aksoy, 1975)

Görmede, nesnelere ilettiği ve gözden beyne iletilen bilgilerin yanı sıra başka bilgi kaynakları da etkindir. Bu genellikle nesnenin önceki bilgilerine dayanan bilgileri içerir. Görsel bağlamda, nesnelere sadece retinal uyarılardan daha fazlasıdır. Objelerin geçmişini ve geleceğini algılamak önemlidir..

Bütünün düzeni ve niteliği, onu oluşturan etkili unsurlar ve onların hareketleri ile ifade edilir. Seçilen ve yeniden oluşturulan çizgiler, renkler, şekiller ve tonlar her zaman birbiriyle

bağlantılıdır. Noktalar, çizgiler, renkler, şekiller, dokular, lekeler ve boyutlar gibi tasarımların oluşturulmasında etkili olan görsel tasarım öğeleri vardır. En önemli tasarım öğesi noktadır. Noktalar birbirine bitişikse, bir çizgi oluşturulur. Çizgiler tasarımın önemli bir unsurudur.

Kompozisyonunuzu dengeleyebilir veya başka bir zaman dengeye alt üst edebilir. (Ketenci ve Bilgili, 2006)

### **1.3. Mimaride Görsel Tasarım Elemanları**

#### **1.3.1.Sayı**

Elementler bir arada veya birbirinden ayrı bulunabilir. Bireysel öğeler, çevrelerine küçük referanslar sağlar. Ancak öğelerin sayısı arttıkça ve tekrarlandıkça bu tekrarlanan öğeler arasında görsel ilişkiler ve etkileşimler oluşmaya başlar. Sayı ne kadar yüksek olursa, doku veya tasarım o kadar karmaşık olur (Turgut,1999).

#### **1.3.2. Yön**

Yönler, şekiller ve çizgiler, gözlemcinin bakış açısına göre durumlarını gösterir. Nesnelere ve çizgiler konumlarında bir miktar yön gösterir. Genel olarak yatay, dikey ve eğri olarak tanımlanan bu yönler, bakan kişi üzerinde farklı etkilere sahiptir. (Ustaömeroğlu, 1998)

Üç tür konum vardır: yatay, dikey ve çapraz. Yatay konum yere paraleldir. Dikey bir konum, zeminle 90 derecelik bir açı oluşturur. Skew ise yatay ve dikey konumlar arasındaki açı olarak ifade edilebilir. (Turgut,1999)

#### **1.3.3.Biçim**

Format önemli değişkenlerden biridir. Şekillerin uyumu, tasarımın önemli bir unsurudur. Karmaşıklık, şekiller farklı ölçeklerde veya farklı görüş mesafelerinde tekrarlandığında ortaya çıkar. Tasarımdaki uyumsuz şekiller gerilimi ve görsel tutarsızlığı artırır. (Turgut,1999)

#### **1.3.4.Büyüklik ve Mesafe**

Farklı boyutlarda kullanılan şekilleri yerleşiminizde kullanarak farklı efektler elde edebilirsiniz. Boyutsal unsurlar bu nedenle tasarımda önemli bir rol oynar. (Gümüş, 2019) Daha geniş, daha büyük bir şekil daha görünür ve ön plana çıkıyor. Küçük formlar çok etkileyici değildir. Mimari tasarımda elemanlar arasındaki mesafe önemlidir. Şekiller arasındaki boşluk aynı veya farklı olabilir. Farklı aralıklarla farklı oranlarda kullanarak karmaşık dokular oluşturulabilir.

Dokular, binaların tasarımında kullanılır ve sadece kullanılan malzemeler veya binanın tamamı olabilir. Görsel etki açısından şekil, renk ve boyutlar kadar önemli bir tasarım öğesidir. Bu unsurun öneminin farkında olan tasarımcılar, mimari, iç mimari, resim, heykel ve endüstri alanlarında farklı dokulardaki malzemeleri kullanarak estetik değerin faydalarını tasarımlarına aktarırlar. Cam, plastik, metal ve tuğla gibi farklı malzemelerin kullanılması tasarımı daha geniş

ve zengin kılmaktadır. Bu yapısal etkiler, tarih boyunca çeşitli mimari akımların şekillenmesinde etkin rol oynamıştır. (Ustaömeroğlu, 1998)

## 2. ARAŞTIRMA BULGULARI

### 2.1.Çalışma Alanı

Geleneksel bir Malatya konağı mimari özelliklerini taşıyan Beş Konaklar, Saray Mahallesi'nde Sinema Caddesi üzerinde yer alıyor. 1900'lü yıllarda inşa edilen bu konaklar, Malatya'daki sivil mimarinin en güzel örneklerini temsil etmektedir. Caddeye bakan bu villalar, yan yana inşa edilmiş iki katlı beş villadan oluşmaktadır. Villanın dış cephesinde ana yapı malzemesi olarak kerpiç kullanılmıştır. Duvarları, zemini ve iç mekanı birbirine bağlayan kirişlerin, dolapların, kapı ve pencerelerin, tavanın ve bankların tamamen ahşap olduğunu görebilirsiniz. Villanın ana giriş kapısı çift kanatlı olup, üzerinde tente, ışıklık gibi isimlerin yer aldığı, çoğunlukla oval olan bir pencere yer almaktadır. Her villada konumlandırılmış, pencere seviyesinden sokağa uzanan çıkıntılı cumbalar kafesli yapılardır (malatyakultur.com).

Sinema Caddesinde tarihi Beş Konakların yan cephelerine ve karşı cephesine günümüze ulaşana kadar yapılar eklenmeye devam etmiştir. Bu yapılar da konut işlevli yapılardır. Farklı dönemlerde yapılan bu konutlar ile Beş Konaklar arasında mimari özellikler arasında farklılıklar bulunmaktadır. Kentin önemli bir caddesi olan Sinema Caddesi, geleneksel konutlar ile çağdaş konutların bir arada bulunduğu kompleks bir düzene sahiptir. Çalışma alanı olarak tarihi Beş Konaklar ve her iki yanındaki çağdaş konutlar incelenmiştir.



Çalışma Alanı



Tarihi Beş Konaklar  
Yakın Geçmişe Ait Betonarme Yapılar  
Beşkonaklar Caddesi Yol Aksı



**Şekil:1** Beş Konaklar (2. Yapı) Cephesi



**Şekil:2** 3. Yapı Cephesi



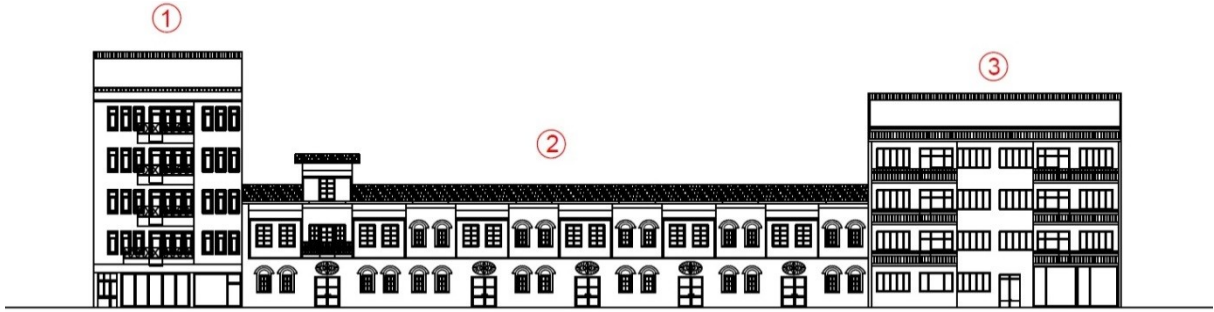
**Şekil:3** 1. Yapı Cephesi

## 2.2. Çizgisel Değerlendirme

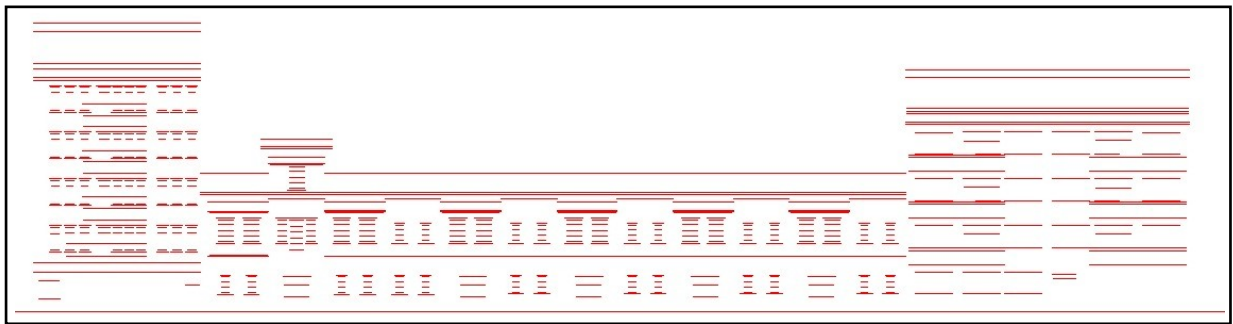
Uzayda iki noktayı birleştirerek veya noktaları belirli bir yönde zincirleyerek bir çizgi oluşturulur. Bir çizgi, uzunluğu ve genişliği olan bir şekil olarak da tanımlanabilir. Mimaride, odayı çevreleyen yüzeyler (zemin, duvarlar, tavan), odanın dış kabuğu, dış kabuğun açıklıkları (pencereler, kapılar) ve bina şeklinin silueti, hepsi doğrusal temsillerdir. (Gürer, 1992).

Sinema Caddesindeki belirlenen binaların cephelerini incelenmiş ve cephelerdeki mimari elemanlar belirlenmiştir. Pencere ve kapı boşluklarının, cumbaların, kat izlerinin, kolonların, kütsel hareketlerin çizgisel bir eleman olarak görev aldığı görülmektedir. Bu çizgisel elemanlar yatay, düşey ve eğrisel olarak sınıflandırılmış ve cephe üzerinde yapılan çizimler ile cephe üzerindeki etkileri incelenmiştir.

Cepheler üzerindeki yatay çizgiler kırmızı, düşey çizgiler mavi, eğrisel çizgiler ise yeşil renk ile tanımlanmışlardır.

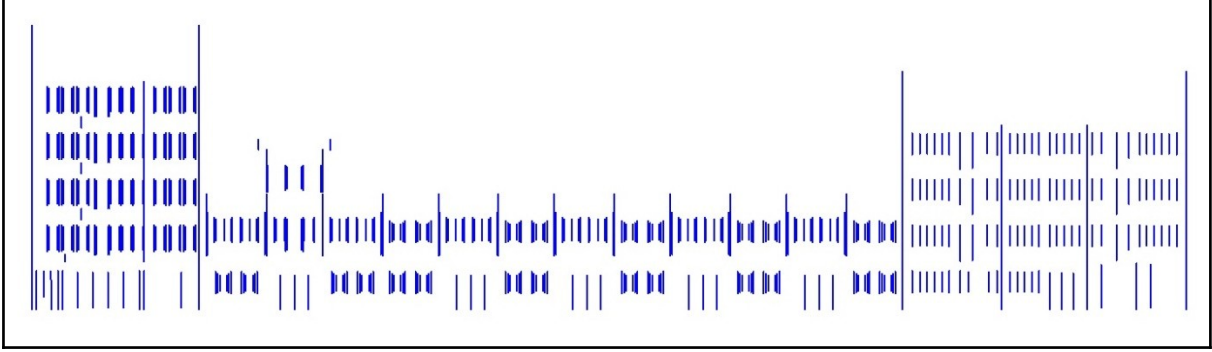


Şekil:4 Sinema Caddesi Cephesi

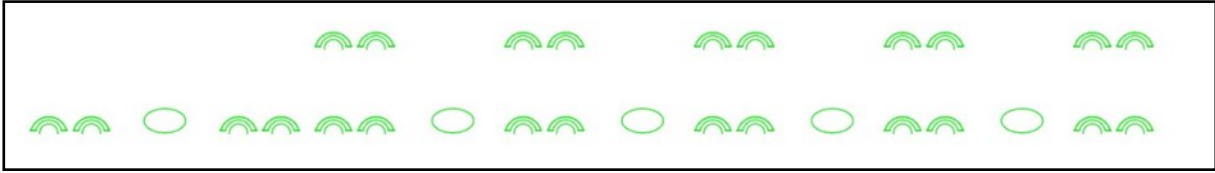


Şekil:5 Yatay Cephe Çizgileri





Şekil:6 Düşey Cephe Çizgileri



Şekil:7 Eğrisel Cephe Çizgileri

Renklendirme tamamlandıktan sonra bir çizim programı ile yapılan sayım sonucunda seçilen cephede 527 dikey çizgi, 581 yatay çizgi ve 77 eğrisel çizgi olduğu görülmüştür.

Yatay çizgiler, güven veren, durağan, dinginliği çağrıştıran, rahatlatıcı ve sakinleştirici çizgilerdir. Mimar yapıların geniş, ferah ve dengeli algılanmasını sağlamaktadır. Düşey çizgiler, yüksekliği, gücü, dinamizmi, resmiyeti çağrıştıran çizgilerdir. Mimari yapıların hareketli, ulaşılmaz algılanmasını sağlamaktadır. Eğrisel çizgiler ise pasifliği, yumuşaklığı, organikliği, esnekliği yansıtan çizgilerdir.

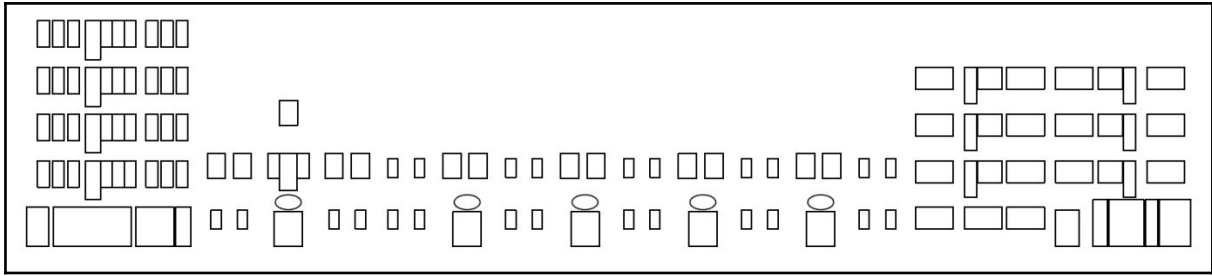
Cephedeki çizgiler incelendiğinde düşey ve yatay çizgi sayılarının birbirine yakın olduğu görülmüştür. Tarihi Beş Konakların cephesine bakıldığında yatay çizgilerin düşey çizgilerden fazla olduğu görülmüştür. Bu da konutların daha ferah, dingin ve ulaşılabilir olduğunu yansıtmaktadır. 1. ve 3. Konutlarda ise düşey çizgiler yatay çizgilerden fazla olup düşeyde hareketlilik göstermektedirler. Böylece yapıların daha aktif, dinamik ve ulaşılmaz olduğunu çağrıştırmaktadır. Eğrisel çizgiler ise yalnızca geleneksel konutların cephelerinde bulunmaktadır. Bu da bu yapıların esnek, durağan olduğunu göstermektedir.

### 2.3. Düzlemsel Değerlendirme

Bir çizginin belirli bir yönde hareket ettirilmesiyle bir düzlem oluşturulur ve bir genişliğe ve bir uzunluğa sahiptir. Ancak genişliği yoktur. Düzlemler, hacimlerin boyutunu tanımladıkları için 3B mimari tasarımda önemli bir unsurdur.(Üstündağ,2009 ).

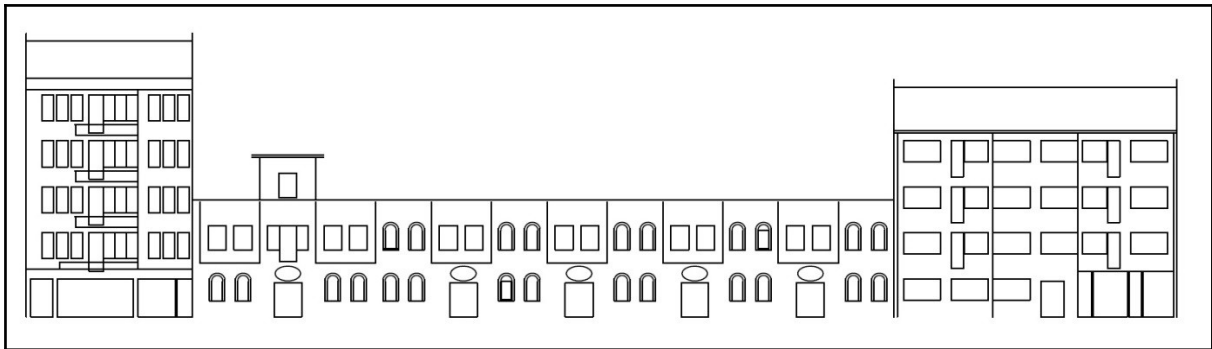
Bu bölümde kapı ve pencere boşlukları, duvarlar, kütleli hareketler düzlemsel olarak incelenmiştir. Pencere ve kapı boşlukları genel olarak dikdörtgen ve kare forma sahip olmakla beraber geleneksel konut cephelerinde elips düzlemler de bulunmaktadır.

Duvar düzlemleri kapı ve pencerelerin çıkarılması sonucu oluşan düzlemlerdir. Kütleli hareketler ise mimari formların önde veya arkada olması sonucu oluşan düzlemlerdir. Katı ve geçirgen düzlemlere bakıldığında, vitrin, pencere ve kapı geçirgen olup geriye kalan duvarlar ve masif yüzeyler ise katı düzlemler olarak görülmektedir.



Şekil:8 Kapı ve Pencere Düzlemleri

Kapı ve pencere düzlemleri incelendiğinde yapıların kendi aralarında pencere düzlemlerinin tekrar ettiği görülmektedir. Fakat bir bütün olarak bakıldığında bina cephelerinin yanlarındaki yapıların cepheleri ile uyum içerisinde olmadığı farklı oran ve sayıda boşluk düzenlendiği görülmektedir. 1. Ve 3. Konutlarda zemin katlarda büyük pencere açıklıkları düzenlenmiş olup diğer katlar ile uyumsuzluk bulunmaktadır.

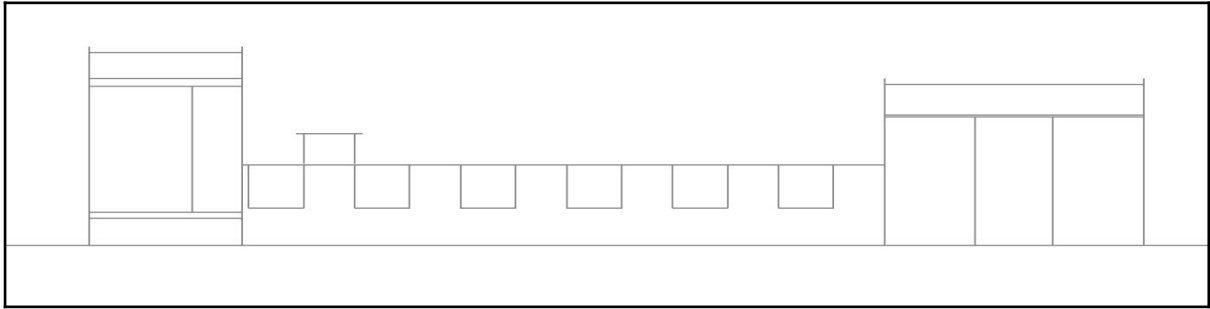


Şekil:9 Duvar Düzlemleri



Şekil:10 Katı ve Geçirgen Düzlemler

Katı ve geçirgen düzlemlere bakıldığında 2. Yapının cephesinde geçirgen yüzeylerin katı yüzeylere göre daha az oranda bulunduğundan dolayı daha kapalı bir yapıya sahiptir. 1. Ve 3. yapıların cepheleri ise katı yüzeylere oranla saydam düzlemlerin daha fazla olduğu bu nedenle bu yapıların daha geçirgen olduğu görülmektedir. Aynı zamanda bu yapıların zemin katları diğer katlara göre daha geçirgen hatta tamamen saydam bir yapıdadır. Zemin katlarda dükkânların bulunması sebebiyle bu mekânların insanlar için kolay ulaşılabilir olmasını sağlamak için daha geçirgen düzenlenmiştir.



Şekil:11 Kütlesel Hareketlerin Oluşturduğu Düzlemler

Cephenin ileri geri kütle hareketleri sonucu oluşan düzlemler ise her yapıda görülmektedir. Apartman bloklarında tüm cephe boyunca olan kütle hareketleri, Beş Konaklarda üst katlardaki cumbalarda görülmektedir.

#### 2.4. Hacimsel Değerlendirme

Cadde'deki binaların hacimlerini incelediğimizde 1. ve 3. yapının düşeyde dikdörtgen formlarına, 2. yapının ise yatayda dikdörtgen formlara sahip olduğu görülmektedir. Diğer

konutların Beş Konaklara göre daha yüksek yapıda olduğu görülmektedir. 1. ve 3. yapının daha

yüksek, heybetli olması ise iki yapı arasında kalan 2. Yapı üzerinde ezici bir etki oluşturmaktadır. Kütleler aynı hizada sıralanmış şekilde daha çok dolu hacimler olduğu görülmektedir.



Şekil:12 Doluluk- Boşluk Yüzeylerinin Oluşturduğu Düzlemler

## 2.5. Ritim Değerlendirmesi

Mimaride ritim duygusu, dönüşümlü tekrarların, mükemmel tekrarların ve gelişen öğelerin sıralı kullanımından gelir. (Aydınlı,1992). Düzenli aralıklarla tekrar eden şekiller, ritim oluşumunda önemli değişkenlerdir. Basit bir ritim veya karmaşık bir ritim olabilir. Ritim de önemli bir bileşen olarak kullanılır. (Üstündağ,2009).

Mimaride ritim, orantılı olarak değişebilen tekrar eden modüller veya ilişkiler dizisidir. Her birim bir bütün olarak ayrı olsa da, bir bütünü oluşturacak şekilde belirli bir düzende kümelenmiş olarak algılanabilir. mimari ritim; duvar parçalanmasındaki büyük çöküntüler, dolgular, boşluklar, bazen bina yapıları, modüler sistemler, bazen kullanılan mekansal elemanlar olarak adlandırdığımız ve seçilen malzemelerin biçimsel veya yapısal özelliklerinin yakalanabildiği mimari ritimdir (Gezer, 2014).

Çalışma alanındaki yapılara bakıldığında 1. ve 3. yapının yüksekliklerinin ortalarında bulunan 2.yapıdan daha yüksek olduğu görülmektedir. Bu nedenle kütleli düzlemde bir ritme sahip değillerdir. Cephelerdeki pencereler incelendiğinde, Pencerelerin genellikle kare veya dikdörtgen olduğu görülmektedir. 1. Yapıda pencereler sık ve dar olup her katta tekrarlanmıştır. Zemin katta bu pencerelerin yerine büyük ve geniş pencere ve kapı boşlukları oluşturulduğundan bu kat diğer katlar ile uyumsuzdur. 2. Yapıda ise pencereler geniş ve daha seyrek düzenlenmiştir. Farklı konutlarda aynı pencere düzeni devam etmekte ve bir ritim

oluşturmaktadır. 3.yapıda ise pencereler geniş ve sık olarak düzenlenmiştir. Cephe simetrik bir düzende olup katlarda tekrar devam etmektedir. Fakat zemin katta dükkânın olduğu bölümde

pencere tekrarı bozulmuştur. Yapıların cepheleri birlikte incelendiğinde 2. Yapının yan cephelerine sonradan eklenen 1. ve 3. Yapının aynı cephe düzenini devam ettirmediği görülmektedir. Yapıların kendi içinde bir tekrar bulunurken yapılar arasındaki ilişkide birbiriyle uyumlu bir tekrar görülmemektedir.

## **SONUÇ**

Malatya ilini önemli bir caddesi olan Sinema Caddesi üzerinde yapılan alan çalışması ile kentin simge yapılarından olan Tarihi Beş Konaklar ve yanında bulunan güncel apartmanlar belirlenerek araştırmalar yapılmıştır. Mimari yapıların önemli bir parçası olan cepheleri görsel analiz kapsamında incelenmiştir.

Bu çalışma ile tarihi ve günümüz konutlarının cepheleri değerlendirilerek aralarında denge ve uyum olup olmadığı tespit edilmiştir. Öncelikle yapılan literatür çalışması sonucu algı kavramı ve görsel algı incelenmiş, mimaride görsel tasarım elemanları belirtilmiş ve alan çalışmasında değerlendirmeler yapılmıştır.

Sinema caddesi üzerinde bulunan yapıların cepheleri çizgisel, düzlemsel ve hacimsel olarak değerlendirilmiş ayrıca ritim değerlendirmesi yapılmıştır. Yapıların kendi içerisinde çizgisel ve düzlemsel olarak tutarlı olduğu fakat bir arada denge ve uyumun sağlanmadığı görülmüştür. Sonradan eklenen yapıların tarihi yapının çizgisel ve kütsel özelliklerini dikkate almadan yapıldığı ve tarihi yapının arada hacim olarak kaybolduğu görülmektedir.

Çizgisel değerlendirmede, yapıların genellikle yatay ve düşey çizgilerin olduğu aynı zamanda tarihi konakta eğrisel çizgilerin de bulunduğu görülmektedir. Bu da cepheye esneklik ve öznellik kazandırmıştır. Düzlemsel olarak değerlendirmede doluluk- boşluk oranlarına bakıldığında 2. yapının boşluk oranların daha az olduğu böylece kapalı bir yapıda olduğu, 1. ve 3. Yapının ise boşluk oranlarının daha fazla olduğu görülmektedir. Cephelerin bütününde ise yapıların arasında oranlar arasında farklılıklar olması cephede bütünlüğü bozmaktadır. Hacimsel değerlendirmede ise 1. ve 3. yapının düşey düzlemde yükseldiği ve 2. yapının yatayda uzadığı görülmektedir. Bu da 2. yapı üzerinde ezici bir etki oluşturmaktadır. Cephe bütününde birbirini takip eden çizgiler ve düzlemler bulunmadığından bir ritim ve uyum görülmemektedir.

1. ve 3. Yapı tarihi konağın yanında yer alırken bu yapı ile birliktelik kurmadan, cephe özellikleri dikkate alınmadan inşa edilmişlerdir. Hacim olarak daha yüksek yapıldıkları için tarihi yapı sokakta ilk bakışta algılanmamaktadır. Cadde üzerinde farklı düzenlerde inşa edilen yapılar görsel olarak karmaşaya sebep olmaktadır.

Çalışma ile kent imajını etkileyen yapı cephelerinin tarihi ve modern yapılar üzerinde analizleri yapılmış ve bir arada bulunan bu yapıların uyum ve uyumsuzlukları incelenmiştir. Bu çalışma ile tarihi mirasımız olan geleneksel konutların cephelerinin çizgisel, ritim, doluluk-boşluk analizleri yapılarak tasarı elemanlarının kullanımının örnek oluşturması amaçlanmıştır. Aynı zamanda kent düzleminde bir arada bulunan geleneksel konutlar ve bu konutlara bitişik konumlanan modern konutların yapılan analizler ile karşılaştırması yapılarak daha çok uyumsuzluk olduğu tespit edilmiştir. Bu çalışma ile geleneksel konutların bulunduğu alanlara yeni yapılacak tasarımlar için örnek teşkil etmesi ve bu analizler doğrultusunda tarihi mirasımız olan bu konutları ezici ve uyumsuz olan tasarımlardan kaçınılması gerektiği anlaşılmaktadır.

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### ÖZET

Çinko eksikliği, tarla bitkilerinde ürün veriminin ve besin kalitesinin düşmesine neden olan önemli bir problemdir. Dünya’da çinko eksikliği olan topraklarda hayatını sürdüren insanların bünyesinde çinko değerleri düşüktür. Dünyada yaklaşık 2 milyon insanın çinko değerlerinden muzdarip olduğu görülmektedir. Tarla bitkileri içerisinde tahıllar, özellikle gelişmekte olan ülkelerde günlük kalori alımını karşılamada önemli bir rol oynamaktadır. Ancak özellikle çinko eksikliği olan topraklarda yetiştirildiklerinde, tahıl tanelerinin çinko konsantrasyonlarının oldukça düşük seviyelerde olduğu görülmektedir. Sürekli tahıl bazlı diyetlerle beslenen insanlarda fiziksel gelişim, bağışıklık sistemi ve beyin fonksiyonlarındaki bozukluklara sebep olan çinko noksanlığına bağlı sağlık sorunları meydana gelmektedir. İnsanlardaki çinko eksikliğine başlıca çözüm olarak gösterilen stratejiler arasında bitki ıslah stratejisi tahıldaki konsantrasyonları iyileştirmede yararlı olan en sürdürülebilir ve uygun maliyetli bir yaklaşım olarak görülmektedir. Bununla birlikte bu strateji önemli bir çaba ve kaynak gerektiren uzun vadeli bir süreç gerektirmektedir. Bitki ıslah programlarının başarısı mevcut gen havuzlarının boyutuna bağlı kalmaktadır. Bu derlemede çinko bakımından biyolojik olarak zenginleştirilmiş buğday, pirinç ve mısır gibi tarla bitkilerinin biyofortifikasyonun çinko eksikliğine bağlı sağlık sorunlarının çözümünde üstleneceği etkin stratejiler konu ile ilgili literatürün taranması ile ele alınmıştır.

**Anahtar Kelimeler:** Zn, Biyofortifikasyon, Buğday, Fasulye, Mısır

## **ZINC (ZN) BIOFORTIFICATION IN FIELD CROPS**

### **ABSTRACT**

Zinc deficiency is a significant problem that causes a decrease in crop yield and nutritional quality in field crops. Zinc values are low in the body of people who live in zinc-deficient soils worldwide. It is seen that about 2 million people in the world suffer from zinc values. Among the field crops, cereals are essential in meeting the daily calorie intake, especially in developing countries. However, cereal grains' zinc concentrations are at deficient levels, especially when grown in zinc-deficient soils. In people constantly fed grain-based diets, health problems occur due to zinc deficiency, which causes disorders in physical development, immune system, and brain functions. Among the strategies cited as the primary solution to zinc deficiency in humans, the plant breeding strategy appears to be the most sustainable and cost-effective approach useful in improving concentrations in grain. However, this strategy requires a long-term process that requires significant effort and resources. The success of plant breeding programs depends on the size of existing gene pools. In this review, the effective strategies that biofortification of field crops such as wheat, rice, and corn that are biologically enriched in zinc will undertake in solving the health problems related to zinc deficiency are evaluated by reviewing the literature on the subject.

**Keywords:** Zn, Biofortification, Wheat, Common Bean, Maize

## 1. GİRİŞ

Günümüzde 800 milyondan fazla insan gıdaya ulaşamamakta ve yetersiz beslenmektedir (Ikerd, 2022). Dünya nüfusunun 2050 yılına kadar yaklaşık 9,5 milyara ulaşacağı ve iklim değişiklikleri nedeniyle nüfusun büyük bir kısmının açlık tehlikesi altında olacağı tahmin edilmektedir (Kush vd., 2012; Nadeem vd., 2021). 1960 yılında açlık sorununun yaygınlaşması tarımda “yeşil devrimin” gerçekleşmesini hızlandırmıştır (Şahinöz, 1990). Yeşil devrim ürünlerinden buğday ve pirinç çeşitlerinin tanıtılmasıyla, çiftçiler tarlalarında yaygın olarak yüksek verimli tahıl ürünlerinin yetiştiriciliğine başlamıştır. Daha karlı olan bu ürün grubu, protein ve mikro besin açısından zengin olan baklagil ekim alanlarında azalmaya yol açmıştır (Cakmak vd., 2010). Çiftçilerin giderek daha az üründe uzmanlaşmaya başlaması “monokültür” yetiştiriciliğin yaygınlaşmasına, tahıl fiyatlarının oransal olarak düşmesine ve bakliyat fiyatlarında artışa neden olmuştur (Pfeiffer vd., 2005; Cakmak vd., 2010). Bu durum ayrıca genetik çeşitliliğin ve mikro besinler açısından zengin olan yabani çeşitlerin tarımının azalmasına yol açmıştır (Cakmak, 2008). Yapılan araştırmalara göre 7000 bitki türünden yalnızca 30 bitki türünün dünyanın gıda kaynağının %95’ini oluşturduğu tespit edilmiştir (Cakmak vd., 2002). Gıda kaynaklarına erişimin azalması, uygun fiyatlı ve bulunabilir bir ürün olan tahıl ürünleriyle sürekli beslenmeye ve Gizli Açlığa (Hidden Hunger) yani vitamin ve mineral bakımında yetersiz beslenmeye yol açmıştır (Cakmak vd., 2010). Gizli açlık, karbonhidrat bakımından zengin ancak besin değeri bakımından zayıf bir diyet sonucunda ortaya çıkan çoklu mikro besin (demir, çinko gibi) eksiklikleridir (Burchi vd., 2011).

Çinko (Zn) hayvan, bitki ve insanların hayatta kalması için gerekli olan bir mikro elementtir (Hafeez vd., 2013). Ağırılık olarak, yer kabuğunun %0,02’sini oluşturmaktadır (Yan vd., 1999). Düşük hareketliliği nedeniyle bu element toprakta genellikle nokсандır (Nazir vd., 2016). Topraktaki Zn konsantrasyonları 10 ila 300 mg kg<sup>-1</sup> arasında değişmekte olup ortalama 50 mg kg<sup>-1</sup>’dir (Alloway, 2012). Önemli bir mikro besin elementi olan çinko, karbonhidratların, lipidlerin, proteinlerin ve nükleik asitlerin sentezinde, parçalanmasında ve ayrıca diğer mikro besinlerin metabolizmasına katılan çok sayıda (>300) enzimin temel bir bileşenini oluşturmaktadır (Alloway, 2008; McClung, 2019). Çinko eksikliğinin semptomları yaşa göre değişmekte, bebeklerde ve çocuklarda ishal, iştah kaybı, büyüme geriliği ve sık enfeksiyonlara yakalanma gibi sorunlara yol açmaktadır (Ryu ve Aydemir, 2020; King vd., 2014; Jamal vd., 2021; Krebs, 2013). Ayrıca çinko eksikliği, koku ve tat alma duyularına

müdahale edebilmekte, yetişkinlerde yara iyileşmesinde gecikmelere, bilişsel ve psikolojik işlevlerde de değişikliklere

neden olabilmektedir (Nagraj vd., 2017; Gupta vd., 2020). Hindistan, Pakistan, Mısır, Çin, İran ve Türkiye gibi ülkelerin hem topraklarında hem de yaşayan insanların Zn noksanlığı yaygın olarak görülmektedir (Cakmak, 2008; Alloway, 2008). Yaklaşık 2 milyar insanın çinko eksikliği yaşadığı bildirilmiştir (Maxfield vd., 2021). Çinko eksikliğine neden olan ana faktörün fitat içeren yüksek tahıl proteinin alımı olduğu tespit edilmiştir (Prasad, 2013). Çinko eksikliği riski taşıyan okul öncesi çocuklar arasında 116.000 ölümün sebebinin zayıflamış bağışıklık sistemi olduğu düşünülmektedir (Goyena vd., 2021) Günlük alınması gereken çinko miktarı yaş ve cinsiyete göre değişmektedir. Amerikan hastalık önleme ofisinin (ODS) verdiği bilgilere göre günlük alınması gereken çinko miktarları Tablo 1’de verilmiştir.

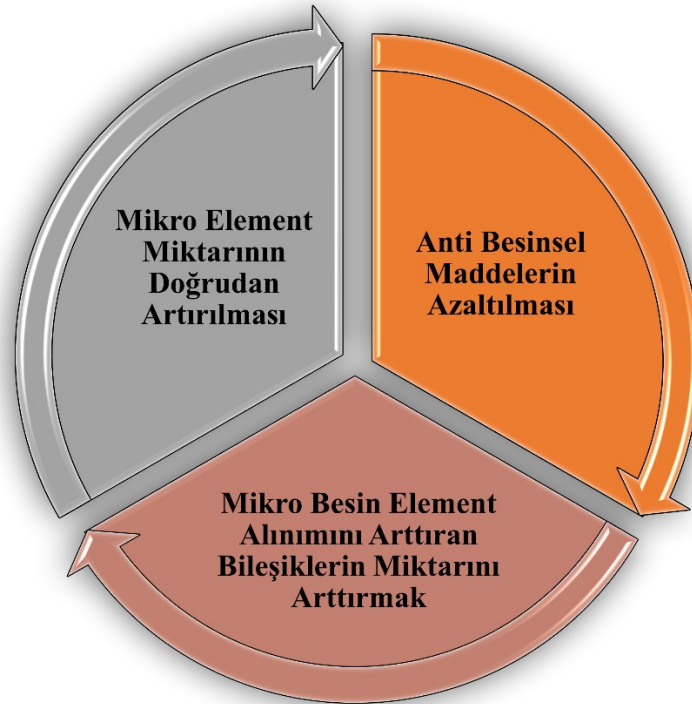
**Tablo 1:** Günlük Alınması Gereken Çinko Miktarı (ODS)

Yaşam Döngüsü	Günlük Çinko Miktarı
0-6 Ay Bebek	2 mg
7-12 Ay Bebek	3 mg
1-3 Yaş	3 mg
4-8 Yaş	5 mg
9-13 Yaş	8 mg
14-18 Yaş Erkek	11 mg
14-18 Yaş Kız	9 mg
Yetişkin Erkek	11 mg
Yetişkin Kadın	8 mg
Hamile	12 mg
Emziren	13 mg

Son yıllarda ortaya çıkan biyofortifikasyon kavramı yani biyolojik zenginleştirme bitki ıslahından faydalanılarak, bitkilerin besin kalitesinin yükseltilmesi ve besin içeriğinde iyileştirme olarak ortaya çıkan yeni bir yaklaşımdır (Cakmak vd., 2010). Biyoteknoloji ile ıslah metotlarının birlikte kullanılmasıyla bitkilerin yenilebilir kısımlarındaki mikro besin konsantrasyonlarını artırmayı amaçlayan biyofortifikasyonun ekonomik bir yöntem olduğu düşünülmektedir (Zhao ve McGrath, 2009). Özellikle gelişmemiş ve gelişmekte olan

ülkelerdeki kırsal nüfusta mikro besin yetersiz beslenmesini hafifletmek için bazı özel kuruluşlar (HarvestPlus, vs.) tarafından çeşitli ıslah programları geliştirilmiştir (Zhao ve

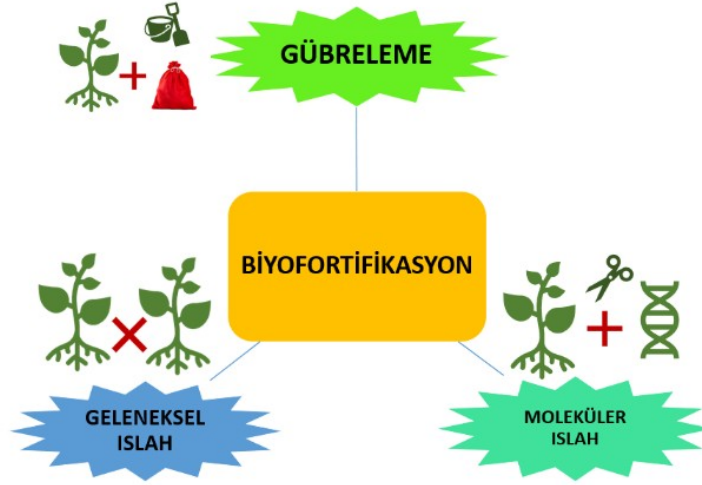
Shewry 2011). Çünkü yetersiz beslenme, gelişmekte olan ülkelerde insan gelişimini, sosyal ve ekonomik kalkınmayı engellemektedir (Khush vd., 2012). Bitkilerin biyolojik olarak zenginleştirilmesi uzun bir çaba gerektirmektedir (Şekil 1). Birçok bitki ıslah programları, verimin, biyotik ve abiyotik streslere karşı direncin ve ürünün lezzetinin iyileştirilmesine odaklanmaktadır. Son yıllarda beslenme kalitesinin iyileştirilmesi (Fe ve Zn mikro besin elementi ve Avitamini gibi) ek bir ıslah hedefi olarak eklenmiştir (Khush vd., 2012). Bitkilerin temel mikro besin içeriğinde ve vitamin seviyelerinde büyük bir genetik çeşitlilik mevcuttur. Islah stratejileri, eşeyssel olarak uyumlu olanlardan elde edilebilen germplazmda bulunan sınırlı genetik varyasyona dayanmaktadır (Hirschi 2009). Biyoteknolojik yöntemler genetik varyasyondan yararlanmayı kolaylaştırmaktadır. Demir ve çinko gibi metal iyonları, karmaşık taşıma yollarıyla topraktan tohumlara taşınmaktadır. Bu nedenle, mineral zenginleştirilmiş bitkilerin geliştirilmesinin ve mahsullerin yenilebilir dokularındaki mineral konsantrasyonlarını arttırmak için iyon taşıma mekanizmasının iyi anlaşılması gerekmektedir (Khush vd., 2012).



## 2. ÇİNKO BİYOFORTİFİKASYONU

Biyolojik zenginleştirmenin nihai hedefi yeterli ve sürdürülebilir bir şekilde besleyici ve güvenli gıdalar üretmektir (Saltzman vd., 2013). Tarla bitkileri arasında yüksek verim kapasitesine sahip olan ve yaygın olarak yetiştirilen modern buğday çeşitleri, insanların günlük gereksinimlerini karşılamak için zayıf mikro besin kaynaklarıdır. Özellikle buğday; bünyesinde insan sindirim sisteminde çinkonun emilimini azaltan fitik asit ve fenolik bileşikler gibi beslenme karşıtı bileşikler açısından zengindir (Welch ve Graham 2004). Ticari buğday çeşitlerinde tane Zn konsantrasyonları 20–35 mg/kg'dır (Rengel vd., 1999; Çakmak vd., 2004). Temel minerallerin ana kaynağı buğday olan diyetlerde bu konsantrasyonlar insan beslenmesi için yeterli değildir (Cakmak vd., 2010). Çinkonun biyoyararlanımının artması, fitat gibi anti besin maddelerinin varlığı veya destekleyici maddelerin eksikliği ile ilişkilidir (Welch ve Graham 2004; White ve Broadley 2005). Buğday bitkisi gibi önemli miktarda fitat içeren tahıllar (pirinç, mısır gibi) üzerinde yapılan çalışmalarda, Zn'nin biyoyararlanımının %25 olduğu belirlenmiştir (Cakmak vd., 2010). Tarla bitkileri arasında makarnalık buğdayın yabani ve sentetik ebeveynlerdeki Zn konsantrasyonlarının genetik çeşitliliğinden yararlanılabileceği ve beslenme kalitesinin yükseltilmesi için yetiştirmeye oldukça uygun olabileceği araştırmacılar tarafından belirtilmiştir (Cakmak vd., 2010).

Bitkide çinkonun arttırılması ile bitkinin yenilebilir kısımlarındaki kadmiyum gibi alım mekanizması çinkoya benzeyen bazı zararlı metallerin birikmesine neden olabilmektedir (Khush vd., 2012). Bu nedenle, çinko ile biyolojik olarak güçlendirilmiş bitkilerin geliştirilmesi, benzer kimyasal özellikler sergileyen herhangi bir toksik elementin birikimini en aza indirecek stratejilere ihtiyaç duymaktadır (Lee vd. 2003; Palmgren vd. 2008). Biyolojik zenginleştirme yoluyla beslenme güvenliğini sağlamaya yönelik; geleneksel ıslah, moleküler ıslah ve gübreleme gibi agronomik faaliyetleri içine alan üç ana strateji mevcuttur (Şekil 2). Tahıl ve baklagillerin zenginleştirilmesi iki farklı şekilde elde edilir. Bunlar; bitki ıslahı ile (genetik biyo-güçlendirme) çinkolu gübrelerin uygulanmasıdır (topraktan ve yapraktan) (Cakmak, 2008).



Şekil 2. Bitkileri Biyolojik Zenginleştirme Yaklaşımları

Uzun vadede genetik biyofortifikasyon, ya tohumda çinko biriktirme yeteneği yüksek olan türlerinin çaprazlanması ya da yeni çeşitler geliştirmek için genetik modifikasyon yoluyla gerçekleşmektedir. Genetik modifikasyon, çinko alımını artırmak için en sürdürülebilir ve ekonomik strateji gibi görünmektedir (Alloway, 2008). Ancak genetik olarak yüksek oranda çinko içeren çeşitlerin, marjinal çinko statüsüne sahip topraklarda yetiştirildiğinde daha fazla çinko depolama eğiliminde olabileceği bilinmelidir. Ayrıca bu çeşitlerin potansiyel olarak çinko eksikliği olan topraklardan yeterli miktarda çinko alımı yapamayacakları ve bu çeşitlerden yararlanabilmeyi azalacağı muhtemeldir. Bu nedenle, genetik biyolojik zenginleştirmenin agronomik biyo-zenginleştirmeye ilerlemesi gereken metotlar olarak değerlendirilmesi gerekmektedir (Welch, 2008; Alloway, 2008).

Çeltik bitkisi Hindistan, Endonezya ve Bangladeş gibi Asya ülkelerinde yoğun olarak yetiştiriciliği yapılmaktadır (Douthwaite, 2021). Genetik biyofortifikasyon çalışmaları incelendiğinde; HarvestPlus, Uluslararası Pirinç Araştırma Enstitüsü (IRRI) ve Uluslararası Tropikal Tarım Merkezi (CIAT) ile yapılan ortak çalışmada günlük çinko ihtiyacının yüzde 60'a kadarını karşılayabilen çinko içeriği yüksek pirinç (22-27,5 mg/kg) geliştirilmiştir (Anonim, 2022a). Ayrıca Güney Asya'da yaygın olarak yetiştirilen popüler buğday çeşitlerinin (HarvestPlus, Uluslararası Mısır ve Buğday İyileştirme Merkezi (CIMMYT) Zn bakımından üstün olanları tanımlanmıştır (Velu vd., 2015; Wani vd., 2022). Çinko içeriği arttırılmış buğday çeşitleri (29.5-54 mg/kg Zn), günlük çinko ihtiyacının %50'ye kadarını karşılayabilmekte ve

günlük buğday tüketiminin fazla olduğu bölgelerde çinko eksikliğinin azalmasına katkı sağlamaktadır. Şu anda geliştirilmiş olan bu bitkinin Afganistan, Bangladeş, Hindistan, Nepal ve Pakistan'da yetiştiriciliği yapılmaktadır (Anonim, 2022b).Yapılan başka bir çalışmada ise, 825 yabancı *T. dicoccoides* türü analiz edildiğinde, türlerin tanelerinde çinko birikiminin 14–190 mg/kg olduğu bildirilmiştir. Kültür buğdayının tanesindeki çinko içeriğinin ortalama 1 µg/tohum olduğu ve yabancı çeşitlerde ise bu içeriğin maksimum 7 µg/tohum olduğu tespit edilmiştir (Çakmak vd. 2004).

Yüksek verimli, çinko içeriği artırılmış (30-34,9 mg/kg) mısır çeşitlerinin yetiştiriciliğine başlanmıştır. Bu çeşitlerin günlük çinko ihtiyacının yüzde 70'e kadarını karşılayabilir olduğu ve günlük mısır tüketiminin yüksek olduğu bölgelerde çinko eksikliğinin azaltılmasına katkıda bulunduğu bildirilmiştir (Douthwaite, 2021). HarvestPlus, Uluslararası Mısır ve Buğday Geliştirme Merkezi (CIMMYT) ve Uluslararası Tropikal Tarım Enstitüsü (IITA) ortaklığında yürütülen çalışmalarda geliştirilen mısır çeşitleri şu anda Latin Amerika ve Afrika'da Nijerya, Kolombiya, El Salvador, Guatemala, Haiti, Honduras, Meksika, Nikaragua ve Panama gibi ülkelerde yetiştirilmektedir (Anonim, 2022c).

### 3. SONUÇ

Diğer mikro besin eksikliklerine kıyasla Zn eksikliği olan topraklar yeryüzünde daha yaygındır. İnsan popülasyonunun tahıl bazlı beslenmesi, gelişmekte olan ve az gelişmiş ülkelerdeki mikro besin eksikliğinin birincil nedenini oluşturmaktadır. Gübreleme yoluyla tarımsal biyolojik zenginleştirme, insan popülasyonundaki mikro besin eksikliğinin üstesinden gelmek için sürdürülebilir ve uygun maliyetli görünmektedir. Organik veya inorganik gübre uygulamaları, toprak özelliklerinde değişiklik yaparak mikro besinlerin biyoyararlanımını artırmaya katkıda bulursa da aşırı gübre kullanımı nedeniyle, tamamlayıcı bir yaklaşıma şiddetle ihtiyaç vardır. Biyofortifikasyon dünyada yetersiz beslenmeyi ele alan en uygun maliyetli stratejilerden biri olarak görülmektedir. Gelişmekte olan ülkelerdeki yoksullara mikro besinler sağlamaya yönelik bu strateji, geleneksel bitki ıslahı ve biyoteknoloji kullanılarak yapılan, yenilen temel gıdaları daha besleyici hale getirilmesi planlanan, etkili bir yöntemdir.



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## EGZOS DUMANLARININ TARLA ÜRÜNLERİNE ETKİLERİ

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### ÖZET

Çevre kirliliği günümüz dünyasının en kritik sorunlarından biridir. Hava kirleticiler, özellikle dizel motor emisyonları sağlıklı çevre varlığı adına önemli bir endişe kaynağıdır. Egzoz borusu yoluyla salınan metal kirleticiler, atmosfere yerleştikten sonra, özellikle toprak ve bitkilerin kirlenmesi yoluyla insan ve ekosistem sağlığı açısından ciddi tehditler oluşturmaktadır. Benzin ve dizel bazlı egzoz emisyonlarına maruz kalma, tarım endüstrisinde yükselen bir sağlık riski olarak tanımlanmaktadır. Bünyesinde barındırdıkları ağır metallerle egzoz dumanları bitkiler için ciddi toksik etkiler göstermektedir. Bu dumanların içerisinde olan özellikle kurşun, nikel, civa ve kadmiyum gibi ağır metaller ekonomik değeri yüksek olan bitkilerin verim kapasitelerini düşürmekte ve sağlıksız koşullarda yetişmelerine sebebiyet vermektedir. Çevresel ve tarımsal sürdürülebilirliğe artan ilgi nedeniyle, tarım faaliyetlerinden kaynaklanan ekolojik yapının bozulmasına yönelik kaygılar dünya çapında artış gösteren bir öneme sahiptir. Bu sebeple günümüzde özellikle hava kalitesini iyileştirmek adına yürütülen faaliyetler, egzoz dumanlarından kaynaklanan kirlenme emisyonlarının azaltılmasına yöneliktir. Bu derlemede egzoz dumanlarının çevre, doğa ve tarım faaliyetleri için oluşturduğu potansiyel tehlikeler ve bazı tarla ürünlerine karşı zarar boyutları aktarılacaktır.

**Anahtar Kelimeler:** Egzoz Dumanları, Ağır Metaller, Kurşun, Nikel, Sürdürülebilir Tarım

## **EFFECTS OF EXHAUST FUMES ON FIELD PRODUCTS**

### **ABSTRACT**

Environmental pollution is one of the most critical problems of today's world. Air pollutants, especially diesel engine emissions, are an essential concern for the existence of a healthy environment. Metal pollutants released through the exhaust pipe pose severe threats to human and ecosystem health after they settle in the atmosphere, especially through the contamination of soil and plants. Exposure to gasoline and diesel-based exhaust emissions is identified as a rising health risk in the agricultural industry. The heavy metals and exhaust fumes they contain show serious toxic effects on plants. Heavy metals such as lead, nickel, mercury, and cadmium in these fumes reduce the yield capacity of plants with high economic value and cause them to grow in unhealthy conditions. Due to the increasing interest in environmental and agricultural sustainability, concerns about the deterioration of the ecological structure caused by agricultural activities have grown in importance worldwide. For this reason, activities carried out to improve air quality, especially today, aim to reduce pollutant emissions from exhaust fumes. This review will discuss the potential dangers of exhaust fumes for the environment, nature, and agricultural activities and the extent of damage to some field products.

**Keywords:** Exhaust Fumes, Heavy Metals, Lead, Nickel, Sustainable Agriculture

## 1. GİRİŞ

Farklı inorganik ve organik kirleticiler nedeniyle, çevresel bozulmalar dünya çapında hayati bir sorun haline gelmiştir. Bu sorun zamanla küresel ekosistemin bütünlüğünü ciddi oranlarda tehdit etmektedir (Zulfiqar vd., 2019). Geleneksel olarak ılıman bölgelerdeki şehirlerin hava kirliliği iklimine kükürt dioksit (SO<sub>2</sub>) ve kömür dumanı hâkim olmuştur. Yirminci yüzyılın ikinci yarısında, insan sağlığı ve sosyo-ekonomik değişimlerle ilgili endişeler, bu kirleticilerin oranında büyük azalmalara yol açmıştır. Yine de gelişmekte olan dünya ülkelerinde bazen büyüklükleri artan bir sorun olmaya devam etmektedir (Bell ve ark., 2011). Günümüzde artan kentleşme ve sanayileşme ile ilgili çevre kirliliği oldukça artış göstermiş ve çeşitli çevresel problemler ortaya çıkmıştır. Ağır metaller bu problemlerin başında gelmekte; su, toprak ve hava kaynaklarında yadsınamayacak seviyelerde kirliliğe neden olmaktadır. Bitkilerin fizyolojik yapısını olumsuz etkileyen ve bitki üretiminin azalmasına sebep olan ağır metaller, insanlarda besin zinciri yoluyla sağlık için önemli riskler oluşturmaktadır (Yerli vd., 2020). Başlıca ağır metal kaynakları; kentsel atıklar, kanalizasyon atıkları, mineral gübreler, bazı ana taşlar, biyositler, atıksular, madencilik ve motorlu araçların egzoz gazlarıdır (Seven vd., 2018). Çevre kirliliği yoğunluğu, kamyonlar, tarım traktörleri, otomotiv makineleri ve hafif ticari araçlardaki dizel motor sayısı ile doğrudan ilişkilidir (Schlosser ve ark., 2017). Çevre sorunlarına neden olan dizel motor emisyonlarının önemli bir oranı tarım traktörleri ve ormancılık makineleri gibi iş makinelerinden kaynaklanmaktadır (Gholami ve ark., 2013). Birçok atmosfer kirleticisinin yanı sıra özellikle şehirlerde trafikten kaynaklanan egzoz dumanları, insanlar, hayvanlar ve bitkiler olmak üzere tüm canlıların yaşamları için tehdit oluşturan önemli çevre kirleticileridir (Bingöl vd., 2010). Giderek artan araç sayısından dolayı enerji talebinin artmasıyla, yakıt yanmasından kaynaklanan CO<sub>2</sub> (karbon dioksit), CO (karbon monoksit), PM (parçacıklı madde), HC (hidrokarbonlar) ve NO<sub>x</sub> (nitrojen dioksit ve nitrojen monoksit) emisyonları gibi olumsuz çevresel etkiler ortaya çıkmaktadır (Schlosser ve ark., 2017).

Egzoz gazı emisyonları ile ilgili çevresel endişeler, küresel ısınma, asitleşme ve hava kirliliği ile ilgili endişelerdeki artışa paralel olarak son yıllarda artmıştır (Lovarelli ve Bacenetti, 2019).

Atmosfer kirliliğinin %60'ını oluşturan egzoz gazı kirliliğinde dizel ve benzin motorlu araçlardan çıkan gazlardaki kirletici miktarları değişiklik göstermektedir (Bingöl vd., 2010). Dizel motorlar, ağır hizmet kamyonlarında kullanıldıkları ve benzinli motorlardan daha fazla



kirlenici yaydıkları için hava kirliliğini önemli ölçüde etkilemektedir. Bununla birlikte, dizel yakıt, birim hacim başına benzinden biraz daha yüksek bir enerji içeriğine sahiptir. Arazi

araçları, kamyonlar, otobüsler ve diğer ağır hizmet araçları neredeyse tamamen dizel motorlarla çalışmaktadır (Gholami ve ark., 2013).

Egzoz gazları ile atmosfere pek çok zararlı gaz ve partikül maddesi bırakılmaktadır. Organizmalar için toksik etkiye sahip bu maddelerin çoğunda bazı ağır metaller bulunmaktadır. Bunların başında ise Nikel (Ni), Kurşun (Pb), Kadmiyum (Cd) ve Civa (Hg) gelmektedir. Kurşun ve nikel bu ağır metallerin başında gelmekte olup bitkilere son derece etkili toksik zararlar içermektedir (Bingöl vd., 2010). Ağır metallerin oluşturdukları kirliliğin toprak ekosistemi ve topraktaki faaliyetleri üzerinde de olumsuz etkileri vardır. Bu etkiler diğer ekosistemlere yayılabilmektedir. Bitkilerin aldıkları ağır metal birikimleri, su alım aşamasında, su ve toprak kaynaklarında olan ağır metallerin bitkiye geçmesiyle gerçekleşmektedir. Ayrıca, atmosferdeki ağır metallerin de toz partikülleri ile bitkiye geçişi vasıtasıyla bitkilerde ağır metallerin birikimi olabilmektedir. Bitkilerin bünyesine geçen ağır metallerin bitkinin fizyolojik aktivitesini engellediği ve değiştirdiği, ilerleyen aşamalarda da bitkilerin ölümüne neden olduğu görülmektedir. Dolayısıyla ağır metallerin bitkilerdeki birikimleri, kalite ve verim azaltan önemli bir unsurdur (Yerli vd., 2020).

Çevre kirliliğinin sebeplerinden biri olan kurşun kirliliğinin büyük bir kısmı motorlu araçlarda kullanılan benzinin yanmasından dolayı ortaya çıkan tetra etil kurşundan kaynaklanmaktadır (Seven vd., 2018). Kurşunun etkisine maruz kalan bitkilerde Pb miktarları yükselirken fotosentez hızlarının düştüğü tespit edilmiştir. Kurşunun bu etkisinin su difüzyonunun ve stomaların karbondioksit direncinin değişimiyle ilgili olduğu düşünülmektedir. Ayrıca, kurşun klorofil biyosentezini de engellemektedir. İnhibe edilen fotosentezin kısmen yapraklarda azalmakta olan klorofil miktarıyla ilgili olabileceği düşünülmektedir. Bitkilerin yeşil aksamlarındaki Pb taşınımı köklere nazaran geride kalmaktadır (Dere, 2019). Kurşun toksisitesi, çeşitlere, Pb dozlarına ve toprak tiplerine bağlı olarak tohum çimlenmesi üzerinde zararlı etkilere neden olmaktadır. Öncelikle, Pb stresi kök gelişimini etkilemekte, çünkü bitki alımı sırasında kökle doğrudan temas etmekte ve bu da kök uçlarında hücre bölünmesini engelleyebilmektedir. Bu durumu kök hacmi, uzunluğu, çapı, yanal kök oluşumu ve toplam biyokütlerdeki olumsuz fizyolojik değişiklikler takip etmektedir. (Rizwan vd., 2018). Bitkilerde aşırı nikel (Ni) konsantrasyonları, Fe alımını ve metabolizmasını bozarak kloroz ve nekroza neden olmaktadır. Yüksek Ni konsantrasyonları, toleranslı olmayan bitkilerde kök

meristemlerinde hücre bölünmesini engelleyebilmekte ve bitki büyümesini azalmaktadır (Bhalerao vd., 2015). Ağır metaller içerisinde kadmiyum (Cd), en yüksek suda çözünme

özelliği olan elementtir. Bu özelliği ile kadmiyum, doğada hızla yayılış göstermektedir. Bu element insan yaşamı için gerekli olmayan elementlerdendir (Seven vd., 2018). Bitkilerin Cd toksik seviyelerine maruz kalması çimlenmeyi baskılamakta, bitki büyümesini ve üretimini engellemektedir. Fidelerin fizyolojik süreçlerine müdahale etmekte ve tarımsal üretkenliği azaltmaktadır (Haider vd., 2021).

## 2. TARLA ÜRÜNLERİNE EGZOZ DUMANLARININ ETKİSİ

Tarım makineleri, kırsal alanlardaki hava kirletici emisyonlarının önemli bir kaynağıdır (Gholami ve ark., 2013). Bu kaynak kullanımında en kritik konulardan biri, yakıtın yanması sırasında traktörlerden çıkan egzoz gazı emisyonlarına odaklanan çiftçilik faaliyetleridir (Lovarelli ve Bacenetti, 2019). Otoyollardan 30 m uzaklıktaki mesafelere kadar ‘kurşun’ seviyeleri oldukça yüksektir. Ayrıca kurşunun yoldan 100 km uzaklığa kadar taşındığı bazı çalışmalarla tespit edilmiştir. Yüzlerce kilometre uzaklıkta bile kurşun elementi izlerine rastlanılmıştır. Hatta kutuplar üzerinde yürütülen çalışmalarda, buz tabakaları içerisinde bile otomobillerin egzozlarından kaynaklı olan yoğun ‘Pb’ birikimlerine rastlanmıştır (Lagerwerf, 1971). Kurşun içeriği için Batı Almanya'nın çeşitli bölgelerinde ana yolların yakınında ve uzağında yetişen bitkiler analiz edilmiştir. Bölgeye bağlı olarak, yol kenarından 1-2 metre uzaklıktaki yıkanmamış çimenlerdeki ortalama kurşun seviyeleri 65-120 ppm (kuru madde) aralığında tespit edilmiştir. Değerler, yolu kullanan trafik oluşum miktarına göre de değişim göstermiştir. Yol kenarından 100 metreden daha uzaktaki sahalarda ise değerler 10 ppm'den daha az miktarlarda çıkmıştır. Yolların yakınında yetişen patates ve pancarın yapraklarında da yüksek değerler tespit edilmiş, ancak yumrularının kurşun içeriği düşük çıkmıştır (Kloke ve Leh, 1969).

Çeltik bitkileri üzerinde yürütülen bir başka çalışmada Doğu Çin'de otoyol trafiği kirliliğine maruz kalan ve maruz kalmayan bitkilerin metal (Pb, Cd, Cr, Zn ve Cu) konsantrasyonları araştırılmıştır. Maruz kalan ve maruz kalmayan bitkiler arasındaki metal konsantrasyonları için yaprakta Pb, Cd ve Zn, gövdede yalnızca Zn ve tanede Pb ve Cd miktarlarında önemli farklılıklar tespit edilmiştir. Tanedeki kurşunun yaklaşık %46'sı ve kadmiyumun %41'i atmosferden yaprak alımına bağlanmış ve tahıldaki Cr, Zn ve Cu birikimlerine atmosferin belirgin bir katkısı oluşmamıştır. Çinko dışında, gövdedeki tüm ağır metaller, yaprakta

atmosferden önemli miktarda Pb ve Cd birikimi olmasına rağmen, topraktan kök alımına bağlanmıştır (Feng vd., 2011).

Türkiye’de yürütülen geniş çaplı bir araştırmada yıllar içerisinde toplanan veriler ile bitki ve toprak örneklerinde kurşun birikiminde azalma olduğu tespit edilmiştir. Çalışmada kırsal bölgelerin metropol ve sanayi şehirlerine nazaran daha düşük seviyelerde kurşuna maruz kaldığı bildirilmiştir. Daha önceki araştırmalarda Pb seviyelerinin çoğunlukla güvenlik limitlerini aştığını tespit ettikleri ve bu durumun geçmiş zamanlar içerisinde benzine katılan kurşun sebebiyle olabileceği gibi ölçüm için kullanılan analitik metotların hassasiyetlerinin düşük olmasıyla da ilişkilendirilebildikleri mesajı verilmiştir. Yıllara göre oluşan azalmanın da 2004 yılından sonra kurşunsuz benzine olan rağbetin artmasından, hava kalitesinin artması için alınan önlemlerden ve analitik yöntemlerin hassasiyetinin yükseltilmesinden kaynaklandığı sonucuna varılmıştır (Öğütücü vd., 2021). Gaziantep-Adana otoyolu kenarında oluşabilecek erozyon ihtimalinin önlenmesi adına biberiye (*Rosmarinus officinalis*), zakkum (*Nerium oleander*) ve ateş dikenini (*Pyracantha coccinea*) bitkileri ekilmiştir. Kullanımlarının yasaklanmasına rağmen insanlar hayvanları ve kendileri için bu bitkileri gıda amacıyla temin etmektedir. Çalışmada toplanan bitki örnekleri Adana-Ceyhan otoyol gişeleri ile Misis Organize Bölgesi arasında kalan otoyol üzerinden alınmıştır. Araştırmada yedi ağır metal konsantrasyonu (Ni, Zn, Pb, Cr, Fe, Mn ve Cu) incelenmiştir. Bitkilerin element içeriklerinin sırasıyla Mn, Pb, Fe, Zn, Cr, Ni ve Cu için 71.3, 7.3, 172.9, 68.9, 1.52, 62.06 ve 13.9,  $\mu\text{g g}^{-1}$  olduğu tespit edilmiştir. Çalışma sonucunda bu düzeylerin izin verilen miktarlardan yüksek olması sebebiyle gıda amaçlı kullanılmalarının engellenmesi gerektiği mesajı verilmiştir (Kirpik vd., 2017).

Yol kenarında yetiştirilen buğday ve mısır çeşitlerinde (Siettecerros, Pavon-76, *Zea mays* L. ve *Zea mays* everta L.) metallerin (Cd, Cr, Cu, Pb, Zn) fitoakümülyasyonu ve bitkilerin toksisite ve fitoremediasyon yetenekleri araştırılmıştır. Araştırmada ürünlerin metalleri biriktirme konusunda seçici bir yeteneğe sahip olduğu ve ürünlerdeki Cd, Cr, Cu ve Zn kaynağının atmosferden çok topraktan geldiği sonucuna varılmıştır. Seçilen risk değerlendirme faktörlerinin, ürünlerde bu metallerin alım derecesinin tahmin edilmesinde yararlı olduğu kanıtlanmıştır (Anongo ve Uyovbisere, 2019). Macaristan’da çayır bitkilerinin çinko, kurşun ve kadmiyum içeriklerinin otoyoldan uzaklaştıkça azaldığı tespit edilmiştir. 5 m ve 10 m mesafelerde ölçülen değerler arasında bile anlamlı bir fark olduğu sonucuna varılmıştır. (Nasrudi vd., 2004). İran’da civanperçemi (*Achillea wilhelmsii*) ve kır teresi

(*Cardaria draba*) üzerine yürütülen bir diğer çalışmada trafik hacimlerinin Cd, Cu, Pb, Ni ve Zn içerikleri üzerindeki etkileri ve bu elementlerin dinamik özellikleri değerlendirilmiştir. Bitki örnekleri,

Hamedan eyaletindeki (Batı İran) farklı trafik hacimlerine sahip üç ana otoyolun [Hamedan-Razan (HR), Hamedan-Goltapeh (HG) ve Hamedan Kermanshah (HK)] her birinin 9 km'lik bir bölümünün 700 m'si boyunca toplanmıştır. Civanperçemi'nin toprak üstü kısımlarında ortalama element içerikleri Cd için 0.16 mg kg<sup>-1</sup>, Cu için 4.52 mg kg<sup>-1</sup>, Pb için 1.91 mg kg<sup>-1</sup>, Ni için 1.70 mg kg<sup>-1</sup> ve Zn için 44.80 mg kg<sup>-1</sup> iken, kır teresinde ortalama içerikler bu elementler için sırasıyla 0.16 mg kg<sup>-1</sup>, 2.29 mg kg<sup>-1</sup>, 2.58 mg kg<sup>-1</sup>, 1.60 mg kg<sup>-1</sup> ve 31.29 mg kg<sup>-1</sup> olarak tespit edilmiştir. Bu miktarlar ile trafik hacminin civanperçemi ve kır teresi metal içeriklerini etkilediği sonucuna varılmıştır. Otsu dokulardaki metal içeriği, iki tür arasında önemli ölçüde farklılık göstermiştir. Civanperçemi metalleri köklerde biriktirme eğilimindeyken, kır teresi onları esas olarak hava kısımlarında tutmuştur. Kapsamlı analizler (trafik hacimlerinin etkisi ve bitki dokuları ile toprak numunelerindeki elementlerin içeriği arasındaki ilişkiler), her iki otsu bitkide de Cu'nun esas olarak topraktan elde edildiğini, civanperçeminin Cd'yi ve kır teresinin Zn'yi esas olarak topraktan emdiğini göstermiştir (Hosseini vd., 2020).

### 3. SONUÇ

Ağır metallerin oluşturduğu kirlilik seviyeleri son zamanlarda hızla artmakta, bu durum toprak, su ve hava ekosistemlerini önemli oranlarda etkilemekte ve bitki, hayvan ve insan sağlığı açısından ciddi problemlere sebebiyet vermektedir. Ağır metallere maruz kalan bitkilerin kaliteleri bozulmakta, bu sebeple tüketici albenisi azaltmakta, birim alandan üretim miktarının azalması ve ağır metal kalıntıları nedeniyle ihracat miktarı olumsuz etkilemektedir. Ağır metallerin yayılımında en büyük pay sahiplerinden olan egzoz dumanları ekolojik dengeye ve ekonomik getirisi yüksek olan ürünlere verdiği zararlardan dolayı günümüzde daha çok tartışılır hale gelmiştir. Egzoz dumanlarının ekosistemimizde ve tarımsal üretimde var olan bitkiler üzerindeki zararlı etkilerine karşı gerekli önlemler alınmalıdır. Gelişmekte olan ülkelerde henüz yeterli düzeyde önlemlerin alınmadığı ve çevresel kirliliğe önlem amaçlı çalışmaların eksik kaldığı görülmektedir. Bu nedenle özellikle kirlilik açısından en yüksek potansiyele sahip bölgelerin incelenmesine ihtiyaç duyulmaktadır. Ekonomik uygunluk,

hidrojeolojik özellikler, kirletici özellikler ve saha yönetimi gibi pek çok faktörün dikkate alınıp gerekli fizibilite ve laboratuvar ölçekli çalışmaların yürütülmesi gerekmektedir

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## **FORAGE PRODUCTION UNDER DROUGHT CONDITIONS: A REVIEW**

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### **ABSTRACT**

The contemporary realities of population expansion, resource scarcity, and climate change necessitates resilient agroecosystems to sustain food production and protect the environment. Crop performance and yield are the outcomes of genotypic expression as influenced by ongoing environmental interaction. Water is one of the most significant environmental issues, which affects crop output globally. The world's water supply is slowly running out, and droughts are occurring increasingly frequently in many places. The amount of water, the quality of the forage, and the availability of food for cattle will all be negatively impacted by climate change in tropical areas. Water stress is one of the main factors affecting crop and pasture productivity in semi-arid and arid areas as well.

**Keywords:** Forage production, drought, strategies, species

## **1. INTRODUCTION**

Crop performance and yield are the outcomes of genotypic expression as influenced by ongoing environmental interaction. Water is one of the most significant environmental issues, which affects crop output globally. The world's water supply is slowly running out, and droughts are occurring increasingly frequently in many places (Staniak & Kocon, 2015). Stronger extreme events including heat waves, flooding, and severe droughts are projected to result from global warming, having a considerable impact on agriculture. The amount of water, the quality of the forage, and the availability of food for cattle will all be negatively impacted by climate change in tropical areas (Habermann et al., 2019). Tropical pastures play a significant role in the global carbon cycle and are crucial for world livestock production (Habermann et al., 2021).

The global growth of livestock systems is being driven by an increase in demand for animal products. Forage production alternatives must be enhanced and expanded for that. The semi-arid regions that are supplied by rain offer potential (Zhang et al., 2017). In semi-arid and dry areas, water stress is one of the main factors limiting crop and pasture production. In dry and semiarid areas, it is extremely difficult to reduce agricultural water use while maintaining or increasing the economic output of the agricultural sector. In many parts of the world, especially in very dry and semiarid regions, irrigated agriculture is the primary consumer of fresh water resources (Al-Karaki & Al-Hashimi, 2012).

Major ecosystem processes are projected to be impacted by an increase in intra-annual precipitation variability due to climate change, including extreme drought and high rainfall events. There is evidence that reduced climate variability will have an impact on crop and pasture output. In order to adjust or apply compensatory methods against potential negative effects, it is required to understand the impact of increased precipitation variability on forage yield and quality due to the growing human population and increasing demand for high



quality animal feed (Grant et al., 2014). Improving crop production in water-limited areas necessitates an understanding of how water-use regulation links to biomass buildup. A fundamental limitation to the ability of plants to survive and grow under water-limited conditions is the capacity of the water transport system to maintain a hydraulic connection between leaves and the soil (Holloway-Phillips & Brodribb, 2011).

## **2. STRATEGIES UNDER DROUGHT**

Dairy farmers must increase the water productivity of their fodder systems and be able to adapt to variations in water supply from year to year and within a year if the irrigated dairy sector is to remain economically sustainable. Strategies to improve water productivity are being evaluated by researchers and dairy farmers. These include (i) choosing species that are better adapted to the current and predicted climate; (ii) using species that can endure reduced irrigation and still be productive; (iii) modifying irrigation strategies to reduce water use while maintaining water productivity; and (iv) grazing management strategies that facilitate survival during and recovery from periods of moisture stress (Rogers et al., 2017).

Lack of water affects how crops are nourished with nitrogen. This has a significant effect on soil nitrogen fluxes as well as forage yield in grasslands. In order to tailor fertilization to the anticipated demands of the crop and reduce any unfavorable effects of crops on the environment, it is critical to evaluate the N balance. The ability of grassland plants, especially grasses, to use soil resources is diverse (Durand et al., 2010).

Maximizing crop growth during the rainy seasons in Mediterranean regions is the main way to improve water use efficiency (WUE). Compared to the commonly utilized annuals, perennial forage plants have a variety of benefits. While annuals must be sown or start from the soil seed bank, they can use water from autumn until spring. Perennial plants must grow from autumn to spring and survive summer aridity in order to thrive in the Mediterranean region's yearly rainfall pattern. Plant death and stand recovery following autumn rains are two ways that drought survival can affect how efficiently water is used (Lelievre et al., 2011).



**Fig. 1.** Grassland vegetation patches in may, at the beginning of the summer drought period. Lightcolored senesced patches are naturalized annual forage grasses (primarily *Avena* spp. and *Bromus* spp.). Green patches are invasive weedy grasses (*Elymus caput-medusae*, *medusahead*; and *Aegilops triuncialis*, goatgrass) (Malmstrom et al., 2017).

Hydraulic lift or redistribution is a plant mechanism that occurs when a plant's root system comes into contact with spatially heterogeneous soil moisture, typically drier surface and moister subsurface soils. The water that is thus transferred is accessible to both the plant and its neighbors. In water-scarce regions, deep-rooting plants with their branches removed serve as an irrigation tool and increase agricultural yield (Sekiya et al., 2011). As deep-rooted species have access to water and nutrients located deeper in the soil profile, root allocation and distribution patterns might affect forage output during wet or nitrogen-stressed seasons (Skinner & Comas, 2010).

In the semiarid regions, forages could be used to replace the conventional wheat (*Triticum aestivum* L.)-fallow system with reduced and no-till systems. Forages are a desirable alternative to grain and seed crops because they use water more efficiently and are less vulnerable to production decreases that could be devastating owing to extreme water stress during important growth phases (Nielsen, 2011).

Although there are many advantages of cover crops for farms and the environment, this is not currently reflected in the adoption rates of cover cropping. Farmers may be more interested in cover crops if they are planted for forage, either as a source of income or as feed. Although this change does not have a species-specific impact, cover crops have an impact on the yearly total forage output and soil water content. Winter cover crops, which enable less reliance on the main forage crop production, may reduce forage yield uncertainty in the region with repeated drought. Annual winter cover crops reduce the amount of soil water available for the next crop (Vujic et al., 2021).

### **3. FORAGE SPECIES UNDER DROUGHT**

The expected move towards more sustainable crop-livestock systems implies wider cultivation of perennial forage legumes. Tolerant of both drought and salinity, alfalfa (*Medicago sativa* subsp. *sativa*) is the main perennial legume in most temperate regions, especially where farm systems rely largely on forage conservation (Cacan & Kokten, 2014). White clover (*Trifolium repens*) and red clover (*Trifolium pratense*) are dominant in specific regions and farm systems (Annicchiarico et al., 2015).

Drought resistance is a crucial attribute of plants (Perlikowski et al., 2019). Drought-tolerant forage crops have huge development potential in drylands considering the current global challenges (climate change, natural resources overexploitation and increasing food demand) (Huang et al., 2020).

In a study of Grant et al. (2014), a field experiment was conducted in which a temperate European grassland was subjected to altered intra-annual precipitation variability (low, medium, high) in interaction with management strategies namely fertilization and alteration of harvest date (delay by 10 days). Increased intra-annual precipitation variability decreased forage yield of the grassland. Furthermore, the proportion of functional groups was altered toward less grass and more forb biomass with amplified precipitation variability. Increased crude protein content and reduced fiber content (crude fiber, NDF, ADF) with increasing precipitation variability improved the relative feed values. Crude protein content was enhanced by fertilization during drought but reduced by delayed harvest after the drought period. Fertilization reduced losses in grassland annual yield caused by extreme precipitation. Management strategies proved less effective if precipitation variability occurred later in the season than earlier in the season. A nitrogen dilution effect (decreased plant nitrogen

concentration with increasing shoot biomass) likely influenced the grassland crude protein contents under altered precipitation regimes and might have masked possible effects of precipitation variability on plant nitrogen and therefore on quality of grassland species. Nevertheless, alterations in the plant community composition and plant senescence seem to be the main drivers of forage quality change. Fertilization during drought periods and harvest delay after drought periods were only partially successful as management strategies to sustain forage production in more extreme precipitation regimes of the future. Further strategies need to be developed that acknowledge the shift in plant species compositions as the main driver of changes in forage quality in the face of changing precipitation patterns.

Tall wheatgrass (*Agropyron elongatum* Host Beauv.) and smooth brome grass (*Bromus inermis* Leyss.) are more drought-tolerant species than orchardgrass (*Dactylis glomerata* L.), June wildrye (*Elymus junceus* Fisch.), tall fescue (*Festuca arundinacea* Schreb.), perennial ryegrass (*Lolium perenne* L.), blue panicum (*Panicum antidotale* Retz.), large canarygrass (*Phalaris tuberosa* L.) and mountain wildrye (*Secale montaneum* Guss.) (Bahrani et al., 2010).

Declining groundwater supplies, the increasing cost of irrigation, and excessive summer dryness threaten the sustainability of corn production in some agriculture zones in the world. Forage sorghum and pearl millet are potential alternatives to corn silage. Forage sorghum [*Sorghum bicolor* (L.) Moench] and pearl millet [*Pennisetum glaucum* (L.) R. Br.] are known for their ability to tolerate drought and heat, which enables them to produce high forage yields with less water than corn. Pearl millet and sorghum can also be harvested as hay, greenchop, or silage like corn (Kokten et al., 2018a; 2018b). Introduction of the brown midrib (BMR) trait into pearl millet and sorghum has enhanced their nutrient composition. Brown midrib is a genetic trait associated with reduced lignin synthesis, resulting in enhanced digestion of forage fiber in the bovine (*Bos taurus*) rumen, thereby increasing weight gain and milk production per ton of forage fed over non-BMR types. Therefore, BMR forage sorghum and BMR pearl millet could be potential alternative forage crops where water is insufficient to grow corn silage. They are likely to replace much of the corn silage crop (Bhattarai et al., 2019).

To explore additional forage options in north-west China, the biomass production and nutritive value of nine spring-sown annual crops [maize (*Zea mays*), sudan grass (*Sorghum sudanense*), small millet (*Setaria italica*), millet (*Panicum milliaceum*), soybean (*Glycine*

*max*), common vetch (*Vicia sativa*), pea (*Pisum sativum*), oat (*Avena sativa*) and spring wheat (*Triticum aestivum*)] were compared by Zhang et al. (2018) under rainfed conditions over two years.

Water use efficiencies for biomass (WUEDM) and nutritional yield indices, CP yield (WUECP) and relative feed value yield (WUERFV), were calculated. Maize produced the highest biomass yields of  $>10$  t DM ha<sup>-1</sup> and had the highest WUEDM. Biomass production was next highest in the other warm-season grasses such as sudan grass and millet species (6-9 t DM ha<sup>-1</sup>) and soybean (3-7 t DM ha<sup>-1</sup>), while spring wheat produced the earliest biomass in spring ( $P < 0.05$ ). The legumes had higher crude protein concentration and produced equivalent or higher CP yields and WUECP to the grasses (1.2-1.7 kg CP ha<sup>-1</sup> mm<sup>-1</sup>). Maize and soybean had the highest WUERFV of 26.4 kg ha<sup>-1</sup> mm<sup>-1</sup> and 19.4 kg ha<sup>-1</sup> mm<sup>-1</sup>, respectively.

Alfalfa, “Queen of the Forages”, is the most productive and highest quality forage crop. Alfalfa has been cultivated in many regions around the world as an important forage crop due to its nutritive value to livestock and ability to adapt to various environments. Alfalfa quality has been determined by many factors, including protein, fiber and lignin contents, relative feed value, total digestible nutrients, and other physical and chemical factors. Alfalfa quality is directly influenced by its feeding value from animal performance. Fiber contents such as acid detergent fiber (ADF) and neutral detergent fiber (NDF) are important factors affecting the forage quality. Alfalfa forage contains 35-55% NDF, which contributes ~ 20-30% of the digestible energy value of alfalfa, the rest coming from non-fiber components (Lin et al., 2020). Alfalfa (*Medicago sativa* L.) is an important forage legume in farming and animal husbandry systems in semiarid areas. However, its forage yields in dryland farming areas are usually very low due to water shortages and low soil phosphorus (P) availability (Gu et al., 2018).

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## SİVAS İLİ ve İLÇELERİNİN TARIMSAL ÜRETİM DURUMUNUN BELİRLENMESİ

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### ÖZET

Bu çalışma, Sivas ili merkez ve ilçelerinin tarımsal üretim durumunun ortaya çıkarılması amacıyla yapılmıştır. Çalışmada tarımsal üretim içerisinde bulunan tarla bitkileri ve bahçe bitkilerinin ekim veya dikim alanları, üretim miktarları ve verim değerleri belirlenmiştir. Sivas ilinin bitkisel üretim yapılan toplam tarım alanı 9.557.216 da olup, %83'ünde tarımda kullanılmaktadır. Tarımsal üretim yapılan bu arazilerin %63.4'ünde tarla tarımı, %0.8'inde bahçe tarımı yapılmakta olup, geriye kalan %1.3'lük kısım çayır arazisi ve %34.5'lik kısmı ise nadasa bırakılmaktadır. Sivas ilinde tahıllardan en çok buğday; baklagillerden nohut; endüstri bitkilerinden patates ve şeker pancarı; yem bitkilerinden ise yonca ve korunga yetiştirilmektedir. Sebzelerden en çok kabak ve domates; meyvelerden ise en çok kayısı, ceviz ve elma yetiştiriciliği yapılmaktadır.

**Anahtar Kelimeler:** tarımsal üretim, tarla bitkileri, bahçe bitkileri, Sivas

**DETERMINATION OF AGRICULTURAL PRODUCTION STATUS OF SIVAS  
PROVINCE AND DISTRICTS**

**ABSTRACT**

This study was carried out to reveal the agricultural production status of Sivas city center and its districts. In the study, planting or planting areas, production amounts and yield values of field crops and horticultural crops in agricultural production were determined. The total agricultural area of Sivas province where plant production is made is 9,557,216 decares, 83% of which is used in agriculture. 63.4% of these agricultural lands are cultivated in fields, 0.8% are horticultural, while the remaining 1.3% is meadow land and 34.5% is fallow. Wheat is the most common grain in Sivas; chickpeas from legumes; industrial crops such as potato and sugar beet; Alfalfa and sainfoin are grown from forage crops. The most common vegetables are zucchini and tomatoes; Among the fruits, mostly apricot, walnut and apple are grown.

**Keywords:** agricultural production, field crops, horticultural crops, Sivas

## GİRİŞ

Türkiye'nin [İç Anadolu Bölgesinde](#) bulunan Sivas, ticaret yolları üzerinde olduğundan dolayı [Selçuklu Hanedanı](#) döneminde tüccarların çok fazla ziyaret ettiği bir merkezdir. Sivas, ülkemizde [Konya](#) ilinden sonra [Selçuklu](#) eserlerinin en çok bulunduğu ildir. Sivas ilinde bulunan ve 13. yüzyıla ait Gök Medrese, Çifte Minareli Medrese ve Mavi Medreseleri çini sanatı açısından mutlak suretle görülmesi gereken yerlerdir. Ayrıca ilde bulunan [Ulu Camii](#) ise 1100 yılında inşa edilmiştir. Türk Kurtuluş Savaşı'nın temellerinin atıldığı, [Selçuklu](#) devrinin dev eserleriyle süslü Sivas, Türkiye'nin yüzölçümü açısından Konya'dan sonra en büyük ikinci ilimizdir.

Sivas iline ait toprakların büyük bir bölümü İç Anadolu'nun yukarı Kızılırmak havzasında, diğer bölümleri ise [Karadeniz](#) ve Doğu Anadolu bölgesi içerisinde olup, 35° 50' ve 38° 14' doğu boylamları ile 38° 32' ve 40° 16' kuzey enlemleri arasında bulunmaktadır. İç Anadolu Bölgesi, [Doğu Karadeniz Bölgesi](#) ve Doğu Anadolu Bölgesi'nde ilçeleri ve kültür zenginliği, iklim farklılığı bulunan ve sahip olduğu değerleri ile önemli bir coğrafi konuma sahiptir. Kuzeyinde Ordu, kuzeybatısında [Tokat](#) doğusunda Erzincan, kuzeydoğusunda Giresun, batısında Yozgat, güneybatısında Kayseri, güneyinde [Malatya](#) ve [Kahramanmaraş](#) ile çevrilidir (Anonim, 2022a).

Sivas ilinde bulunana Kızıldağ'dan doğan Kızılırmak, Köse Dağı'ndan doğan [Yeşilirmak](#) ve yine Köse Dağı'ndan doğan Fırat'ın en önemli kollarından biri olan Karasu Nehri, il sınırları içerisinde doğmaktadır. Sivas coğrafi açıdan kıraç arazilere sahip, yeşili az ve oldukça sert bir iklime sahiptir. İkliminin elverdiği ölçüde ilde çoğunlukla yetiştirilebilen [tahıl](#) ürünleri, şeker pancarı, [patates](#) gibi ürünlerdir.

Sivas ili ve ilçelerinin sahip olduğu nüfusun büyük bir bölümü bitkisel üretim ve hayvancılık ile uğraşmakta olup, tarımsal üretim durumunun belirlenmesi bu çalışmanın esas amacını oluşturmaktadır.

## SİVAS İLİNİN GENEL ÖZELLİKLERİ

Sivas, 28.488 km<sup>2</sup>'lik yüzölçümü ile Türkiye'nin toprak açısından ikinci büyük ili konumunda olup, topraklarının büyük bir kısmı Kızılırmak, bir kısmı da Yeşilirmak ve Fırat havzaları içerisinde bulunmaktadır. Sivas ili, coğrafi olarak İç Anadolu, Doğu Anadolu ve Karadeniz bölgelerinin kesiştiği noktada yer almaktadır. Bu nedenle Karadeniz bölgesindeki Suşehri,

Akıncılar, Gölova, Koyulhisar ve kısmen Kuzey Zara ve Doğanşar ilçelerinin bitki örtüsü, havanın sertliği ve sıcaklığı ile yıllık yağış miktarı oldukça farklıdır. Söz konusu bölgelerde merkez ilçeden farklı olarak Giresun dağları üzerindeki yaylalar ve çok endemik orman alanları bulunmaktadır (Anonim, 2022b).

**Tablo 1.** Sivas ilçelerinin tarla ve bahçe bitkileri ekim/dikim alanları

İLÇE ADI	Tarla Bitkileri								Nadas (da)	Çayır Arazisi (da)	Toplam Tarla (da)	Bahçe Bitkileri			Tarım Yapılan Arazi Toplamı (da)	Tarıma Elverişli Kullanılmayan Arazi (da)	Toplam Tarım Alanı (da)
	Hububat (da)	Baklagiller (da)	Yağlı Tohumlar (da)	Endüstri Bitkileri (da)	Yumurta Bitkileri (da)	Tıbbi ve Aromatik Bitkiler	Yem Bitkileri (da)	Eklil Alan (da)				Meyvelik (da)	Sebzelik (da)	Örtü Altı (da)			
AKINCILAR	79.160	750	0	5.000	205	0	8.915	94.030	57.494	2.078	153.602	999	1.150	16	155.767	7.703	163.470
ALTINYAYLA	213.185	1.550	800	2.550	1.613	390	18.550	238.638	19.542	8.878	267.058	596	19	9	267.682	2.835	270.517
DİVRİĞİ	33.300	990	120	0	700	180	8.480	43.770	33.086	1.471	78.327	2.102	190	6	80.625	426.681	507.306
DOĞANŞAR	1.210	0	0	0	0	0	3.470	4.680	10.032	1.010	15.722	178	20	0	15.920	40.689	56.609
GEMEREK	209.052	7.000	1.500	26.698	9.046	0	42.000	295.296	128.714	703	424.713	1.668	13.107	0	439.488	5.300	444.988
GÖLOVA	26.732	351	0	0	0	7	6.931	34.021	27.220	1.175	62.416	156	26	0	62.598	67.259	129.857
GÜRÜN	278.500	240	0	0	435	535	58.500	338.210	171.091	10.751	520.052	13.530	59	10	533.651	25.850	559.501
HAFİK	155.600	4.800	290	24.600	5.068	197	33.407	223.962	274.289	5.339	503.590	370	582	20	504.562	24.534	529.096
İMRANLI	6.250	0	0	0	0	27	28.885	35.162	21.168	3.767	60.097	1.420	10	13	61.540	308.531	370.071
KANGAL	875.950	18.300	12.370	10.200	13.516	7.970	38.320	976.626	268.551	17.130	1.262.307	2.466	10	0	1.264.783	62.450	1.327.233
KOYULHİSAR	14.300	71	0	0	50	6	13.100	27.527	95.045	86	122.658	1.685	487	11	124.841	34.171	159.012
MERKEZ	576.650	15.695	5.500	7.020	8.625	858	78.300	692.648	839.549	18.975	1.551.172	8.022	408	59	1.559.661	112.103	1.671.764
SUŞEHİRİ	80.282	1.927	0	2.198	607	47	36.611	121.672	82.509	623	204.804	4.357	1.692	18	210.871	84.446	295.317
ŞARKIŞLA	585.103	9.850	10.000	24.294	10.120	807	65.310	705.484	172.515	9.839	887.838	1.428	1.137	12	890.415	12.244	902.659
ULAŞ	269.805	2.006	850	21.000	3.030	170	56.950	353.811	142.079	8.099	503.989	785	81	28	504.883	11.000	515.883
YILDIZELİ	489.970	17.545	5.550	34.594	13.025	342	103.237	664.263	235.022	7.642	906.927	985	439	55	908.406	41.636	950.042
ZARA	114.640	561	120	700	250	165	78.350	194.786	171.702	5.759	372.247	472	15	22	372.756	331.135	703.891
<b>TOPLAM</b>	<b>4.009.689</b>	<b>81.636</b>	<b>37.100</b>	<b>158.854</b>	<b>66.290</b>	<b>11.701</b>	<b>679.316</b>	<b>5.044.586</b>	<b>2.749.608</b>	<b>103.325</b>	<b>7.897.519</b>	<b>41.219</b>	<b>19.432</b>	<b>279</b>	<b>7.958.449</b>	<b>1.598.767</b>	<b>9.557.216</b>

Tablo 1'den de görüldüğü üzere, 9.557.216 da'lık il toplam tarım alanının %83.27'sinde tarımsal üretim yapılmakta iken geriye kalan %16.73'lük kısım ise tarıma elverişli kullanılmayan arazi durumundadır. Tarımsal üretim yapılan alanda ise en büyük pay 4.009.689 da alan ile toplam tarım alanı içerisinde yaklaşık %42'lik payı alan hububat bitkileridir. İlçeler bazında bakıldığında ise en fazla tahıllar, baklagiller, yağlı tohumlar, yumru bitkileri ve tıbbi ve aromatik bitkiler yetiştiriciliği Kangal ilçesinde yapılırken, en fazla endüstri bitkileri ve yem bitkileri Yıldızeli ilçesinde yetiştirilmektedir. Tahıllar ve yem bitkileri yetiştiriciliği Sivas'ın merkez dahil tüm ilçelerinde yapılırken, diğer tarla bitkileri Sivas'ın bazı ilçelerinde yetiştiriciliği yapılmamaktadır. En fazla nadas alanı ve çayır arazisi ise sırasıyla 839.549 da ve 18.975 da ile Merkez ilçesinde bulunmaktadır.

Bahçe bitkileri açısından bakıldığında ise 2021 yılı itibari ile en fazla meyve yetiştiriciliği 13.530 da alan ile Gürün ilçesinde, en fazla sebze yetiştiriciliği 13.107 da alan ile Gemerek ilçesinde ve en fazla örtü altı yetiştiriciliği ise 59 ve 55 da alan ile sırasıyla Merkez ve Yıldızeli ilçelerinde yapılmaktadır. Tarıma elverişli kullanılmayan arazi ise en fazla Divriği ilçesinde (426.681 da) bulunurken, bu ili Zara (331.135 da) ve İmranlı (308.531 da) ilçeleri izlemektedir.

## **TARLA BİTKİLERİ**

### **Tahıl Üretimi**

Sivas ilinde bitkisel ürünler üretimi içerisinde en önemli gelir kaynağı olarak ilk sırada yer alan tarla ürünleri tahıllar, yem bitkileri, endüstri bitkileri ve yemeklik baklagiller olmak üzere dört ana grup altında değerlendirildiğinde gerek üretim miktarı gerekse ekiliş alanı açısından ilk sırada tahıllar gelmektedir. Sivas ilinin 2021 yılında hububat yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 2’de verilmiştir.

**Tablo 2.** Sivas İline Ait Tahıl Üretiminin 2021 Yılı Verileri

<b>Ürün Cinsi</b>	<b>Ekilen Alan (da)</b>	<b>Üretim (ton)</b>	<b>Verim (kg/da)</b>
Buğday (Diğer)	2.220.740	411.729	185
Buğday (Durum)	150.105	33.927	226
Arpa	1.268.679	231.140	182
Çavdar	10.353	1.717	166
Yulaf	359.812	104.396	290
<b>Toplam</b>	<b>4.009.689</b>	<b>782.910</b>	

Tablo 2 incelendiğinde, Sivas ilinin 2021 yılındaki hububat yetiştiriciliğine ait ortalama verilere göre, Ülkemizin birçok ilinde de olduğu gibi en çok buğday yetiştiriciliğinin yapıldığı ve bunu sırasıyla arpa, yulaf ve çavdar yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen tahıllardan buğdayın üretim miktarının 445.656 ton ve veriminin diğer buğday ve durum buğdayında sırasıyla 185 ve 226 kg/da, arpanın üretim miktarının 213.140 ton, veriminin 182 kg/da, yulafın üretim miktarının 104.396 ton veriminin 290 kg/da ve çavdarın üretim miktarının 1.717 ton ve veriminin ise 166 kg/da olduğu görülmektedir.

Sivas ilinin 2021 yılında baklagil yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 3’de verilmiştir.

Tablo 3’te görüldüğü üzere, Sivas ilinin 2021 yılındaki baklagil yetiştiriciliğine ait ortalama verilere göre, en çok nohut yetiştiriciliğinin yapıldığı ve bunu sırasıyla yeşil mercimek, kuru fasulye ve kırmızı mercimek yetiştiriciliğinin izlediği görülmektedir.

**Tablo 3.** Sivas İline Ait Baklagil Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Kuru Fasulye	4.068	399	98
Nohut	71.180	198.471	2.788
Kırmızı Mercimek	385	34	88
Yeşil Mercimek	6.003	533	89
<b>Toplam</b>	<b>81.636</b>	<b>199.437</b>	

2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen baklagillerden nohudun üretim miktarının 198.471 ton ve veriminin 2.788 kg/da, yeşil mercimeğin üretim miktarının 533 ton ve veriminin 89 kg/da, kuru fasulyenin üretim miktarının 399 ton ve veriminin 98 kg/da ve kırmızı mercimeğin üretim miktarının 34 ton ve veriminin ise 88 kg/da olduğu görülmektedir.

#### **Yağlı Tohumlar Üretimi**

Sivas ilinin 2021 yılında yağlı tohumlar yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 4’de verilmiştir.

**Tablo 4.** Sivas İline Ait Yağlı Tohumlar Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Ayçiçeği (Çerezlik)	23.100	3.016	131
Ayçiçeği (Yağlık)	14.000	2.794	200
<b>Toplam</b>	<b>37.100</b>	<b>5.810</b>	

Tablo 4’de görüldüğü üzere, Sivas ilinin 2021 yılındaki yağlı tohumlar yetiştiriciliğine ait ortalama verilere göre, sadece çerezlik ve yağlık ayçiçeği yetiştiriciliğinin yapıldığı görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen yağlı tohumlardan çerezlik ayçiçeğinin üretim miktarının 3.016 ton ve veriminin 131 kg/da ve yağlık ayçiçeğinin üretim miktarının 2.794 ton ve veriminin ise 200 kg/da olduğu görülmektedir.

**Endüstri Bitkileri Üretimi**

Sivas ilinin 2021 yılında endüstri bitkileri yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 5’de verilmiştir.



**Tablo 5.** Sivas İline Ait Endüstri Bitkileri Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Şeker Pancarı	158.854	815.783	5.135
<b>Toplam</b>	<b>158.854</b>	<b>815.783</b>	

Tablo 5’de görüldüğü üzere, Sivas ilinin 2021 yılındaki endüstri bitkileri yetiştiriciliğine ait ortalama verilere göre, sadece şeker pancarı yetiştiriciliğinin yapıldığı görülmektedir. 2021 yılı verilerine göre; Sivas ilinde yetiştirilen endüstri bitkilerinden şeker pancarının üretim miktarının 815.783 ton ve veriminin 5.135 kg/da olduğu görülmektedir.

### **Yumru Bitkiler Üretimi**

Sivas ilinin 2021 yılında yumru bitkiler yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 6’da verilmiştir.

**Tablo 6.** Sivas İline Ait Yumru Bitkiler Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Patates	65.873	204.085	3.098
Sarımsak	161	57	353
Kuru Soğan	256	532	2.078
<b>Toplam</b>	<b>66.290</b>	<b>204.674</b>	

Tablo 6’da görüldüğü üzere, Sivas ilinin 2021 yılındaki yumru bitkiler yetiştiriciliğine ait ortalama verilere göre, en çok patates yetiştiriciliğinin yapıldığı ve bunu sırasıyla kuru soğan ve sarımsak yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen yumru bitkilerinden patatesin üretim miktarının 204.085 ton ve veriminin 3.098 kg/da, kuru soğanın üretim miktarının 532 ton ve veriminin 2.078 kg/da ve sarımsağın üretim miktarının 57 ton ve veriminin ise 353 kg/da olduğu görülmektedir.

### **Tıbbi ve Aromatik Bitkiler Üretimi**

Sivas ilinin 2021 yılında tıbbi ve aromatik bitkiler yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 7’de verilmiştir.

**Tablo 7.** Sivas İline Ait Tıbbi ve Aromatik Bitkiler Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Buy (Çemen Otu)	1.262	117	92
Aspir	2.249	167	74
Çörek Otu	1.066	105	99
Adaçayı	22	8	350
Kimyon	6.838	610	89
Anason	50	5	100
Lavanta	214	20	93
<b>Toplam</b>	<b>11.701</b>	<b>1.032</b>	

Tablo 7’de görüldüğü üzere, Sivas ilinin 2021 yılındaki tıbbi ve aromatik bitkiler yetiştiriciliğine ait ortalama verilere göre, en çok kimyon yetiştiriciliğinin yapıldığı ve bunu sırasıyla aspir, çemen otu, çörek otu, lavanta, anason ve adaçayı yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen tıbbi ve aromatik bitkilerinden kimyon üretim miktarının 610 ton ve veriminin 89 kg/da, aspirin üretim miktarının 167 ton ve veriminin 74 kg/da, çemen otunun üretim miktarının 117 ton ve veriminin 92 kg/da, çörek otunun üretim miktarının 105 ton ve veriminin 99 kg/da, lavantanın üretim miktarının 20 ton ve veriminin 93 kg/da, anasonun üretim miktarının 5 ton ve veriminin 100 kg/da ve adaçayının üretim miktarının 8 ton ve veriminin ise 350 kg/da olduğu görülmektedir.

### Yem Bitkileri Üretimi

Sivas ilinin 2021 yılında yem bitkileri yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 8’de verilmiştir.

**Tablo 8.** Sivas İline Ait Yem Bitkileri Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Yonca (Yeşil Ot)	255.176	171.933	674
Korunga (Yeşil Ot)	183.405	81.255	443
Fiğ (Yeşil Ot)	47.256	21.148	448
Mısır (Silaj)	32.650	137.539	4.213
Tritikale	158.440	33.685	213
Mürdümük	1.500	525	350
Bezelye	889	222	250
<b>Toplam</b>	<b>679.316</b>	<b>446.306</b>	

Tablo 8’de görüldüğü üzere, Sivas ilinin 2021 yılındaki yem bitkileri yetiştiriciliğine ait ortalama verilere göre, en çok yonca yetiştiriciliğinin yapıldığı ve bunu sırasıyla korunga,

tritikale, fiğ, silajlık mısır, mürdümük ve bezelye yetiştiriciliğinin izlediği görülmektedir.  
2021

yılı verilerine göre; Sivas ilinde en çok yetiştirilen yem bitkilerinden yoncanın üretim miktarının 171.933 ton ve veriminin 674 kg/da, korunganın üretim miktarının 81.255 ton ve veriminin 443 kg/da, tritikalenin üretim miktarının 33.685 ton ve veriminin 213 kg/da, fiğın üretim miktarının 21.148 ton ve veriminin 448 kg/da, silajlık mısırın üretim miktarının 137.539 ton ve veriminin 4.213 kg/da, mürdümüğün üretim miktarının 525 ton ve veriminin 350 kg/da ve bezelyenin üretim miktarının 222 ton ve veriminin ise 250 kg/da olduğu görülmektedir.

## BAHÇE BİTKİLERİ

### Meyve Üretimi

#### *Yumuşak Çekirdekli*

Sivas ilinin 2021 yılında yumuşak çekirdekli yetiştiriciliğine ilişkin kapladığı alan (da), toplu meyve veren ağaç sayısı (adet), dağınk meyve veren ağaç sayısı (adet) ve üretim miktarı (ton) Tablo 9’da verilmiştir.

**Tablo 9.** Sivas İline Ait Yumuşak Çekirdekli Üretiminin 2021 Yılı Verileri

Meyve Cinsi	Kapladığı Alan (da)	Toplu Meyve Veren Ağaç Sayısı (adet)	Dağınk Meyve Veren Ağaç Sayısı (adet)	Üretim Miktarı (ton)
Armut	1.424	38.799	31.531	645
Ayva	61	1.823	3.829	53
Elma	7.113	156.145	76.315	2.397
<b>Toplam</b>	<b>8.598</b>	<b>196.767</b>	<b>111.675</b>	<b>3.096</b>

Tablo 9’da görüldüğü üzere, Sivas ilinin 2021 yılındaki yumuşak çekirdekli yetiştiriciliğine ait ortalama verilere göre, en çok elma yetiştiriciliğinin yapıldığı ve bunu sırasıyla armut ve ayva yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen yumuşak çekirdekli elmanın kapladığı alan 7.113 da, toplu meyve veren ağaç sayısının 156.145 adet, dağınk meyve veren ağaç sayısının 76.315 adet ve üretim miktarının 2.397 ton, armudun kapladığı alan 1.424 da, toplu meyve veren ağaç sayısının 38.799 adet, dağınk meyve veren ağaç sayısının 31.531 adet ve üretim miktarının 645 ton ve

ayvanın kapladığı alan 61 da, toplu meyve veren ağaç sayısının 1.823 adet, dağınık meyve veren ağaç sayısının 3.829 adet ve üretim miktarının 53 ton olduğu görülmektedir.

### ***Sert Çekirdekli***

Sivas ilinin 2021 yılında sert çekirdekli yetiştiriciliğine ilişkin kapladığı alan (da), toplu meyve veren ağaç sayısı (adet), dağınık meyve veren ağaç sayısı (adet) ve üretim miktarı (ton) Tablo 10’da verilmiştir.

**Tablo 10.** Sivas İline Ait Sert Çekirdekli Üretiminin 2021 Yılı Verileri

Meyve Cinsi	Kapladığı Alan (da)	Toplu Meyve Veren Ağaç Sayısı (adet)	Dağınık Meyve Veren Ağaç Sayısı (adet)	Üretim Miktarı (ton)
Erik (Tüm Çeşitler)	1.132	26.668	19.040	421
İğde	5	164	1.174	16
Kayısı (Zerdali Hariç)	13.910	198.449	33.929	2.205
Kızılcık	5	164	657	11
Kiraz	853	12.253	13.630	254
Şeftali	57	1.576	2.731	45
Vişne	1.829	46.211	27.932	625
<b>Toplam</b>	<b>17.791</b>	<b>285.485</b>	<b>99.093</b>	<b>3.576</b>

Tablo 10’da görüldüğü üzere, Sivas ilinin 2021 yılındaki sert çekirdekli yetiştiriciliğine ait ortalama verilere göre, en çok kayısı yetiştiriciliğinin yapıldığı ve bunu sırasıyla vişne, erik, kiraz, şeftali, iğde ve kızılcık yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen sert çekirdeklilerden kayısının kapladığı alan 13.910 da, toplu meyve veren ağaç sayısının 198.449 adet, dağınık meyve veren ağaç sayısının 33.929 adet ve üretim miktarının 2.205 ton, vişnenin kapladığı alan 1.829 da, toplu meyve veren ağaç sayısının 46.211 adet, dağınık meyve veren ağaç sayısının 27.932 adet ve üretim miktarının 625 ton, eriğin kapladığı alan 1.132 da, toplu meyve veren ağaç sayısının 26.668 adet, dağınık meyve veren ağaç sayısının 19.040 adet ve üretim miktarının 421 ton, kirazın kapladığı alan 853 da, toplu meyve veren ağaç sayısının 12.253 adet, dağınık meyve veren ağaç sayısının 13.630 adet ve üretim miktarının 254 ton, şeftalinin kapladığı alan 57 da, toplu meyve veren ağaç sayısının 1.576 adet, dağınık meyve veren ağaç sayısının 2.731 adet ve üretim miktarının 45 ton, iğdenin kapladığı alan 5 da, toplu meyve veren ağaç sayısının 164 adet, dağınık meyve veren ağaç sayısının 1.174 adet ve üretim miktarının 16 ton ve kızılcığın kapladığı alan 5 da,

toplu meyve veren ağaç sayısının 164 adet, dağınık meyve veren ağaç sayısının 657 adet ve üretim miktarının 11 ton olduğu görülmektedir.

### ***Sert Kabuklular***

Sivas ilinin 2021 yılında sert kabuklular yetiştiriciliğine ilişkin kapladığı alan (da), toplu meyve veren ağaç sayısı (adet), dağınık meyve veren ağaç sayısı (adet) ve üretim miktarı (ton) Tablo 11’de verilmiştir.

**Tablo 11.** Sivas İline Ait Sert Kabuklular Üretiminin 2021 Yılı Verileri

Meyve Cinsi	Kapladığı Alan (da)	Toplu Meyve Veren Ağaç Sayısı (adet)	Dağınık Meyve Veren Ağaç Sayısı (adet)	Üretim Miktarı (ton)
Ceviz	10.964	33.355	21.581	860
Fındık	29	1.157	557	2
Badem	622	3.249	973	60
Antep Fıstığı	55	165	6.714	76
<b>Toplam</b>	<b>11.670</b>	<b>37.926</b>	<b>29.825</b>	<b>997</b>

Tablo 11’de görüldüğü üzere, Sivas ilinin 2021 yılındaki sert kabuklular yetiştiriciliğine ait ortalama verilere göre, en çok ceviz yetiştiriciliğinin yapıldığı ve bunu sırasıyla badem, Antep fıstığı ve fındık yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen sert kabuklulardan cevizin kapladığı alan 10.964 da, toplu meyve veren ağaç sayısının 33.355 adet, dağınık meyve veren ağaç sayısının 21.581 adet ve üretim miktarının 860 ton, bademin kapladığı alan 622 da, toplu meyve veren ağaç sayısının 3.249 adet, dağınık meyve veren ağaç sayısının 973 adet ve üretim miktarının 60 ton, Antep fıstığının kapladığı alan 55 da, toplu meyve veren ağaç sayısının 165 adet, dağınık meyve veren ağaç sayısının 6.714 adet ve üretim miktarının 76 ton ve fındığın kapladığı alan 29 da, toplu meyve veren ağaç sayısının 1.157 adet, dağınık meyve veren ağaç sayısının 557 adet ve üretim miktarının 2 ton olduğu görülmektedir.

### ***Üzümsü Meyveler***

Sivas ilinin 2021 yılında üzüksü meyveler yetiştiriciliğine ilişkin kapladığı alan (da), toplu meyve veren ağaç sayısı (adet), dağınık meyve veren ağaç sayısı (adet) ve üretim miktarı (ton) Tablo 12’de verilmiştir.

**Tablo 12. Sivas İline Ait Üzüksü Meyveler Üretiminin 2021 Yılı Verileri**

Meyve Cinsi	Kapladığı Alan (da)	Toplu Meyve Veren Ağaç Sayısı (adet)	Dağınık Meyve Veren Ağaç Sayısı (adet)	Üretim Miktarı (ton)
Dut	147	817	8.100	111
Gojiberi	151	0	0	61
Kuşburnu	807	21.600	0	43
Çilek	40	0	0	25
Bağ (Üzüm)	2.015	0	0	1.018
<b>Toplam</b>	<b>2.202</b>	<b>817</b>	<b>8.100</b>	<b>1.155</b>

Tablo 12’de görüldüğü üzere, Sivas ilinin 2021 yılındaki üzüksü meyveler yetiştiriciliğine ait ortalama verilere göre, en çok üzüm yetiştiriciliğinin yapıldığı ve bunu sırasıyla kuşburnu, gojiberi, dut ve çilek yetiştiriciliğinin izlediği görülmektedir. 2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen üzüksü meyvelerden üzümün kapladığı alan 2.2015 da ve üretim miktarının 1.018 ton, kuşburnunun kapladığı alan 807 da, toplu meyve veren ağaç sayısının 21.600 adet ve üretim miktarının 43 ton, gojiberinin kapladığı alan 151 da ve üretim miktarının 61 ton, dutun kapladığı alan 147 da, toplu meyve veren ağaç sayısının 817 adet, dağınık meyve veren ağaç sayısının 8.100 adet ve üretim miktarının 111 ton ve çileğin kapladığı alan 40 da ve üretim miktarının 25 ton olduğu görülmektedir.

#### **Açık Alan Sebze Üretimi**

Sivas ilinin 2021 yılında sebze yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 13’de verilmiştir.

Tablo 13’de görüldüğü üzere, Sivas ilinin 2021 yılındaki sebze yetiştiriciliğine ait ortalama verilere göre, en çok çerezlik kabak yetiştiriciliğinin yapıldığı ve bunu sırasıyla domates, taze fasulye, kavun, hıyar, karpuz, sivri biber, beyaz lahanaya, dolmalık biber, taze soğan, bal kabağı, sakız kabağı, şalgam, bayır turpu, havuç, patlıcan, taze sarımsak, karayaprak lahanaya, nane, pırasa, ıspanak, kıvırcık marul, maydanoz ve kırmızı turp yetiştiriciliğinin izlediği görülmektedir.

2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen sebzelerden çerezlik kabağın üretim miktarının 1.444 ton ve veriminin 104 kg/da, domatesin üretim miktarının 6.378 ton ve veriminin 2.852 kg/da, taze fasulyenin üretim miktarının 1.476 ton ve veriminin 1.370 kg/da, kavunun üretim miktarının 3.425 ton ve veriminin 4.001 kg/da, sofralık hıyarın üretim miktarının 1.093 ton ve veriminin 3.079 kg/da, karpuzun üretim miktarının 987 ton ve veriminin 3.771 kg/da, sivri biberin üretim miktarının 362 ton ve veriminin 1.541 kg/da, beyaz lahananın üretim miktarının 508 ton ve veriminin 3.848 kg/da, dolmalık biberin üretim miktarının 102 ton

ve veriminin 1.538 kg/da, taze soğanın üretim miktarının 100 ton ve veriminin 1.566 kg/da, bal kabağının üretim miktarının 205 ton ve veriminin 3.727 kg/da, sakız kabağının üretim miktarının 131 ton ve veriminin 2.918 kg/da, şalgamın üretim miktarının 56 ton ve veriminin 2.452 kg/da, bayır turpunun üretim miktarının 49 ton ve veriminin 2.218 kg/da, havucun üretim miktarının 45 ton ve veriminin 2.230 kg/da, patlıcanın üretim miktarının 35 ton ve veriminin 2.175 kg/da, taze sarımsağın üretim miktarının 10 ton ve veriminin 800 kg/da, karayaprak lahananın üretim miktarının 30 ton ve veriminin 3.000 kg/da, nanenin üretim miktarının 5 ton ve veriminin 450 kg/da, pırasanın üretim miktarının 7 ton ve veriminin 1.440 kg/da, ıspanağın üretim miktarının 6 ton ve veriminin 1.525 kg/da, kıvırcık marulun üretim miktarının 4 ton ve veriminin 1.050 kg/da, maydanozun üretim miktarının 2 ton ve veriminin 400 kg/da ve kırmızı turpun üretim miktarının 5 ton ve veriminin ise 2.400 kg/da olduğu görülmektedir.

**Tablo 13.** Sivas İline Ait Sebze Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Kabak (Bal)	55	205	3.727
Kabak (Çerezlik)	13.940	1.444	104
Kabak (Sakız)	45	131	2.918
Biber (Dolmalık)	66	102	1.538
Biber (Sivri)	235	362	1.541
Domates (Sofralık)	2.236	6.378	2.852
Fasulye (Taze)	1.078	1.476	1.370
Havuç	20	45	2.230
Hıyar (Sofralık)	355	1.093	3.079
Ispanak	4	6	1.525
Karpuz	238	897	3.771
Kavun	856	3.425	4.001
Lahana (Beyaz)	132	508	3.848
Lahana (Karayaprak)	10	30	3.000
Marul (Kıvırcık)	4	4	1.050
Maydanoz	4	2	400
Nane	10	5	450
Patlıcan	16	35	2.175
Pırasa	5	7	1.440
Sarımsak (Taze)	12	10	800
Soğan (Taze)	64	100	1.566
Şalgam	23	56	2.452
Turp (Bayır)	22	49	2.218
Turp (Kırmızı)	2	5	2.400
<b>Toplam</b>	<b>19.432</b>	<b>16.374</b>	



### Örtü Altı Sebze Üretimi

Sivas ilinin 2021 yılında örtü altı sebze yetiştiriciliğine ilişkin ekim alanı (da), üretim miktarı (ton) ve verimleri (kg/da) Tablo 14’de verilmiştir.

Tablo 14’de görüldüğü üzere, Sivas ilinin 2021 yılındaki örtü altı sebze yetiştiriciliğine ait ortalama verilere göre, en çok domates yetiştiriciliğinin yapıldığı ve bunu sırasıyla hıyar, sivri biber, dolmalık biber, göbek marul, dereotu ve maydanoz yetiştiriciliğinin izlediği görülmektedir.

2021 yılı verilerine göre; Sivas ilinde en çok yetiştirilen örtü altı sebzelerden domatesin üretim miktarının 723 ton ve veriminin 5.432 kg/da, sofralık hıyarın üretim miktarının 442 ton ve veriminin 5.394 kg/da, sivri biberin üretim miktarının 148 ton ve veriminin 3.016 kg/da, dolmalık biberin üretim miktarının 12 ton ve veriminin 1.967 kg/da, göbek marulun üretim miktarının 20 ton ve veriminin 4.060 kg/da, dereotu ve maydanozun üretim miktarlarının her biri için 2 ton olduğu görülmektedir.

**Tablo 14.** Sivas İline Ait Örtü Altı Sebze Üretiminin 2021 Yılı Verileri

Ürün Cinsi	Ekilen Alan (da)	Üretim (ton)	Verim (kg/da)
Biber (Dolmalık)	6	12	1.967
Biber (Sivri)	49	148	3.016
Domates (Sofralık)	133	723	5.432
Dereotu	2	2	0
Hıyar (Sofralık)	82	442	5.394
Marul (Göbekli)	5	20	4.060
Maydanoz	2	2	0
<b>Toplam</b>	<b>279</b>	<b>1.349</b>	

### SONUÇ VE ÖNERİLER

Sivas merkez ve ilçelerinde tahıl grubunda en çok buğday, arpa ve yulaf; baklagil grubunda nohut, yeşil mercimek ve kuru fasulye; yağlı tohumlar grubunda çerezlik ve yağlık ayçiçeği; endüstri bitkileri grubunda şeker pancarı; yumrulu bitkiler grubunda patates ve kuru soğan; tıbbi ve aromatik bitkiler grubunda kimyon ve aspir; yem bitkileri grubunda yonca ve korunga; yumuşak çekirdekli grubunda elma ve armut; sert çekirdekli grubunda kayısı, vişne ve erik; sert kabuklular grubunda ceviz ve badem; üzümü meyveler grubunda üzüm ve kuşburnu; açık alan sebzeler grubunda çerezlik kabak ve domates; örtü altı sebzeler grubunda ise domates ve sofralık hıyar yetiştiriciliği yapıldığı görülmektedir.

Sivas ilindeki tarımsal üretime bakıldığında Türkiye'deki diğer birçok ilde olduğu gibi en fazla buğday yetiştiriciliğinin yapıldığı, buğdaydan sonra ise en fazla arpa ve yulaf yetiştiriciliğinin yapıldığı görülmektedir. Sivas'ın tarımsal üretiminin belirlenmesi amacıyla yapılan bu çalışmanın sonucunda bölge koşullarına uygun buğday, arpa ve yulaf çeşitlerinin ortaya çıkarılmasına yönelik çalışmaların yapılması gerektiği kanaati oluşmuştur. Verimli ve kaliteli bir üretim amacıyla, çeşit, tür, yöntem ve teknolojiler yaygınlaştırılmalı, tarım-sanayi entegrasyonu sağlanmalıdır.

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## İNME TESPİTİ İÇİN KONTRASTSIZ BEYİN BT GÖRÜNTÜLERİNİN BÖLÜTLENMESİ

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### ÖZET

Yapay zekâ ve derin öğrenme tekniklerine dayalı uygulamalar, son yıllarda farklı araştırma alanlarında olduğu gibi medikal alanda tıbbi görüntülemenin yorumlamasında da önemli gelişmelere yol açmıştır. Anormallikleri tespit eden, insan hatasını minimize eden, doğru sonuçlar sağlayan ve harcanan süreyi azaltan derin öğrenme modellerinden belirli bir düzeyde yararlanılmaktadır. Özellikle radyoloji ve nöroradyoloji, üretilen büyük miktarda veri nedeniyle derin öğrenme modellerinin uygulanması için uygun alanlardır. Görüntü işleme kurallarının anlamlı bir şekilde uygulanmasıyla tıbbi tanı güvenilirliğinin sağlandığı en önemli alanlardan biri tıbbi görüntülemedir. İnme, nörogörüntülemenin klinik yönetiminde önemli rol oynayan hastalıklardan biridir. Tüm dünyada önemli bir sağlık sorunu olan inme, yetişkinlerde fiziksel, sosyal, psikolojik ve ekonomik yıkıma neden olan en önemli sakatlık ve ölüm nedenlerinden biridir. Beyin, inmenin erken evrelerinde sağlıklı beyin fonksiyonları gibi davrandığı için erken teşhis imkânı zorlaşmaktadır. Uzman radyologlar bile inmenin başlangıç aşamasında bulguları gözden kaçırabilmektedir. İnme de zaman faktörü çok değerli olduğundan kullanılan tedavilerin etkili olabilmesi için semptomların başlamasıyla birlikte bu tedavilerin en kısa sürede uygulanması gerekmektedir. Erken uygulanan tedavi hayat kurtarır. Bu nedenle inmenin sebebinin (iskemik, hemorajik) ne olduğunu anlamak, kanamanın ekarte edilmesi, infarkt alanının belirlenmesi, etiyoloji hakkında bilgi edinilmesi ve tedavi planlamasının yapılabilmesi için inme vakalarında görüntülemeye ihtiyaç duyulmaktadır. Kontrastsız BT, inme şüphesi olan hastaların ilk değerlendirmesinde kullanılan birincil görüntüleme protokolüdür. Hızlı inme protokollerinin ilk adımı olan kontrast madde verilmeden elde edilen Beyin BT görüntülerinde inmenin patolojik tipini belirlemeye yönelik derin öğrenme çalışmaları oldukça sınırlıdır. Bu çalışmada, kontrastsız beyin BT görüntülerinden inme lezyonlarının tespiti ve teşhisi için otomatik segmente edilmesine yönelik derin öğrenme tabanlı yeni bir yaklaşım önerilmiştir.

**Anahtar Kelimeler:** Bilgisayarlı Tomografi, Evrişimsel Sinir Ağları, Beyin İnme, Derin Öğrenme, Anlamsal Bölütleme, U-Net.

## **SEGMENTATION OF NON-CONTRAST BRAIN CT IMAGES FOR BRAIN STROKE DETECTION**

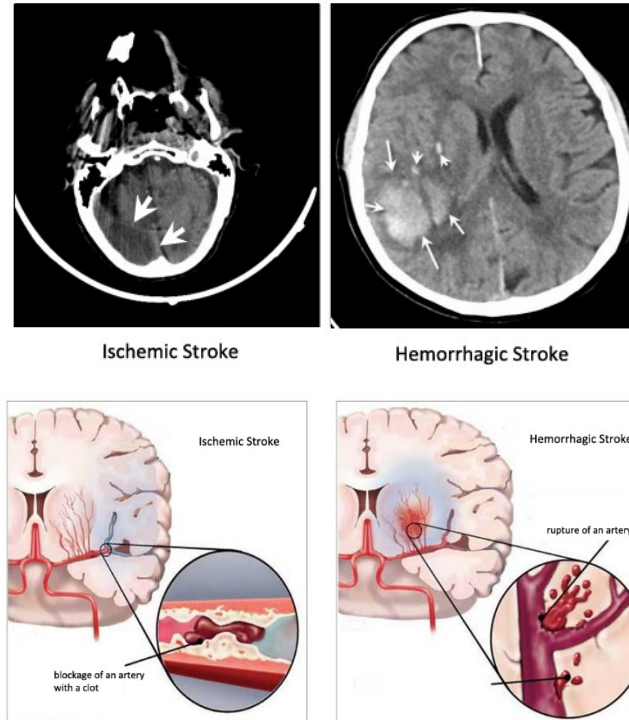
### **ABSTRACT**

Applications based on AI and deep learning techniques have come a long way in the interpretation of medical imaging in the medical field, as well as in different research areas in recent years. Deep learning models, which detect anomalies, minimize human error, provide accurate results and reduce time spent, are utilized to a certain extent. Especially radiology and neuroradiology are suitable fields for the application of deep learning models due to the large amount of data generated. One of the most important areas in which medical diagnosis reliability is achieved by applying image processing rules in a meaningful way is medical imaging. Stroke is one of the diseases in the clinical management of neuroimaging plays an important role. Stroke, which is a major health problem all over the world, is one of the most important causes of disability and mortality in adults, causing physical, social, psychological, and economic destruction. Early diagnosis becomes difficult as the brain behaves like healthy brain functions in the early stages of stroke. Even specialist radiologists may overlook the findings at the initial stage of stroke. The time factor is very valuable in stroke. Therefore, in order for the treatments to be effective, these treatments should be applied as soon as possible with the onset of symptoms. Early treatment saves lives. Therefore, imaging is needed in stroke cases in order to understand what the cause of stroke (ischemic, hemorrhagic) is, to rule out bleeding, determine the infarct area, obtain information about the etiology, and plan treatment. Non-contrast CT is the primary imaging protocol used in the initial evaluation of patients with suspected stroke. Deep learning studies on determining the pathological type of stroke on Brain CT images obtained without contrast agent administration, which is the first step of rapid stroke protocols, are very limited. In this study, a deep learning-based new approach to automatically segmentation and classification for the detection and diagnosis of stroke lesions from non-contrast brain CT images is proposed.

**Keywords:** Computer Tomography, Convolutional Neural Network, Brain Stroke, Deep Learning, Semantic Segmentation, U-Net.

## 1. GİRİŞ

İnme, tüm dünyada önemli bir sağlık sorunu olmakla birlikte yetişkinlerde fiziksel, sosyal, psikolojik ve ekonomik yıkıma neden olan en önemli sakatlık ve ölüm nedenlerinden birisidir (Nazlıel ve ark.,2020). İnme, beyne giden kan akışının durması veya beyne yeterli miktarda kan gelmemesi durumudur [1]. Bu nedenle inme etiyojisine göre tıkaçıcı (iskemik) veya kanamalı (hemorajik) olarak sınıflandırılmaktadır. **İskemik İnme**, beyin damarında pıhtı oluşması, damar sertleşmesi, beyin damarına pıhtı atması, küçük damar tıkanıklığına bağlı oluşabilmektedir. Tüm inme vakalarının %87'sini İskemik İnme oluşturmaktadır [2]. **Hemorajik inme** ise, damarın kendiliğinden yırtılması, anevrizma, travma, damar bozukluğu, yüksek tansiyon ve kanama bozuklukları gibi bir çok neden bağlı olarak ortaya çıkabilmektedir. Bu tip inme aynı zamanda yüksek tansiyondan da kaynaklanmaktadır [3]. İnme acil bir durum olduğundan inme sürecinde zaman çok değerlidir. Bu yüzden erken teşhis ve tedavi hayat kurtarır. İskemik inmede, hasta denge kaybı, bulanık görme, kollarda güçsüzlük, konuşma bozukluğu gibi belirtiler gösterebilir. Hemorajik inmede ise, semptomlar nedene bağlı olarak değişmektedir. Ancak şiddetli baş ağrısından bilinç kaybına kadar çeşitli belirtiler ortaya çıkabilmektedir (Şekil-1'de gösterilen ilk görüntü, beyin BT görüntülerini, ikinci görüntü ise beynin örnek şeklini göstermektedir).



Şekil-1: İskemik ve Hemorajik İnme [4]

İnme, serebrovasküler (*beyin damar*) bir hastalıktır. Serebrovasküler hastalıklar, beynin bir bölümünün iskemi veya kanama nedeniyle geçici veya kalıcı olarak etkilendiği ve/veya beyni besleyen damarların patolojik bir süreçten doğrudan etkilendiği tüm hastalıkları kapsamaktadır. İnme şüphesi olan bir hasta ile karşılaşıldığında cevaplanması gereken ilk soru, belirtilerin vasküler kaynaklı olup olmadığıdır. İkincisi ise inmenin patolojik tipidir (iskemik, hemorajik). Özetle, hastanın anamnez ve nörolojik muayene aşamasından sonra en önemli adım; klinik ön tanıyı doğrulamak ve inmenin patolojik tipi (iskemik mi, hemorajik mi) arasında ayırıcı tanıyı yapmaktır. Bu ayrımı doğru yapmanın günümüzdeki yolu erken dönemde beyin BT çekiminin yapılmasıdır. Bilgisayarlı Tomografi (BT), hızlı, kolay erişilebilir ve kafa içi lezyonları doğru bir şekilde saptayabilmesi nedeniyle nöroradyolojik görüntüleme önemi ve kullanımı giderek artmaktadır [4-5]. İskemik inmenin başlamasından sonra geçen süre ne kadar uzun olursa, beyin BT'sinde lezyon yanıtını görme şansı o kadar artar. Beyin, inmenin erken evrelerinde sağlıklı beyin fonksiyonları gibi davrandığı için erken teşhis oldukça güçtür. Bu durumda klinik bulgular inme ile uyumlu ise iskemik inme tanısı konur. Kontrastsız BT, özellikle acil nöroradyolojik görüntüleme gerektiren travma, kafa içi kanama ve iskemik inme hastalarında kullanılan birincil görüntüleme protokolüdür [6]. İnme tanısı konan bir hastada amaç penumbral dokuyu kurtarmaktır. Bu nedenle, iskemik inmenin başlamasından sonraki birkaç saat içinde beyne giden kan akışı yeniden sağlanmazsa, penumbral doku kurtarılamaz. İskemik inme sonucunda hücre ölümüne bağlı olarak **infarkt alanı** oluşur. Doku enfarktüsü olduğunda, süreç geri döndürülemeyerek penumbral doku kurtarılamaz duruma gelir [7]. İnfarkt alanı ise henüz ölmemiş ancak beyin kan akışının belirgin azaldığı penumbra alanı ile çevrilidir. Nöroradyolojik görüntüleme özellikle inme gibi acil durumlarda hızlı inme protokolleri ile birlikte ileri BT görüntüleme protokolleri uygulanmaktadır. Bu nedenle, inme şüphesi olan hastaların ilk değerlendirilmesinde kullanılan birincil görüntüleme protokolü **Kontrastsız BT**'dir. Prognoz düşünüldüğünde Manyetik Rezonans (MR) her hasta için maliyet etkinlik analizinde pozitif sonuçlar vermemektedir. Hızlı inme protokollerinin ilk adımı olan kontrast madde verilmeden elde edilen beyin BT görüntülerinde inmenin patolojik tipini belirlemeye yönelik derin öğrenme çalışmaları oldukça sınırlıdır. Ayrıca, inmenin ilk saatlerinde beyin normal beyin fonksiyonları gibi davrandığından iskemi tipi inme bulgusunun saptanması hemorajik inmeye göre daha zordur. Bu çalışmada kontrastsız BT kullanılmasının başlıca nedenleri şunlardır:

- 1- Kontrastsız BT görüntüleme, hızlı inme protokollerinin ilk adımıdır.
  - 2- Tetkik süresi ortalama 1 dakikadır.
  - 3- Kontrastsız BT, özellikle kafa içi kanama tespitinde yüksek duyarlılık oranlarına sahiptir  
[8].
  - 4- Kontrastsız BT ile inme benzeri semptomlara neden olan ve “inme taklitçileri” olarak adlandırılan neoplazmi ve arteriyovenöz malformasyonlar (*damar yumağı*) gibi patolojiler saptanabilir ve ayırımı yapılabilmektedir.
  - 5- Acil durumlarda inme bulgularını taklit edebilecek diğer beyin dokusu içinde gerçekleşen kanamalı patolojileri (tumör vb.) dışlamak için kullanılır.
  - 6- Kontrastsız BT infarkt alanını saptamada difüzyon ağırlıklı manyetik rezonans (Difüzyon MR) görüntülemeye göre daha az duyarlıdır [9]. Ancak BT, hızlı ve kolay erişilebilir olması nedeniyle bir çok sağlık tesisinde kullanılan ilk görüntüleme yöntemidir.
  - 7- Erken dönemde enfarktüs dokusu ile normal beyin dokusu arasındaki kontrastın düşük olması nedeniyle uzmanların çıplak gözle ince farkları tespit edememesi, kontrastsız BT’nin akut iskemik inmeli hastalarda karar vermede yardımcı olma yeteneğini kısıtladığından Derin Öğrenme tabanlı bir evrimsel sinir ağının yardımıyla bu sınırlamanın üstesinden gelinebilmesi hedeflenmektedir.
- Çalışmanın ana amaçlarından biri, kontrastsız beyin BT görüntülerinden elde edilen sonuçlarla inme teşhisine yönelik segmentasyon problemlerini çözmek için ilgili teknolojinin geliştirilmesidir. Bu tür otomatik yazılımlar (Bilgisayar Destekli Tanı Sistemleri), hekimlere karar destek sağlamak için yardımcı olarak kullanılabilir. Hekimlerin tıbbi görüntüleri yorumlamalarına destek olmak, tanı ve tedavi için bir karar destek sistemi sağlamak için uygulama düzeyinde inme yönetimini standart hale getirmek amacıyla yapılan çalışmamız, tasarlanan sistemin hedeflediği işlemler ve sunacağı öneriler aşağıdaki gibidir:
- 1- Hekimlere yardımcı bir sistem tasarlamak.
  - 2- Beyin damar hastalıkları ve inmenin topluma getirdiği ekonomik ve sağlık kaybı yükünün azaltılması için teşhis ve tahminlemeyi maksimum orana çıkarmak.
  - 3- Klinik işleyişi geliştirmek.
  - 4- Acil ve öncelikli hastaları sınıflandırmak.
  - 5- İşgücünü azaltmak.
  - 6- Maliyet ve zaman kaybını en aza indirmek.



7- Derin öğrenme modelleri ile akademik yönün gelişmesine katkıda bulunmak.

8- Sakatlık ve ölümleri azaltmak.

Yukarıda açıklanan problemin çözümü için hastanın öyküsü ve nörolojik muayenesi sonrasında klinik ön tanının doğrulanması ve inmenin patolojik tipi arasında ayırıcı tanıyı yapacak bir karar destek sisteminin tasarlanması amaçlanmaktadır.

Bilgisayar Destekli Tanı Sistemleri, tıbbi görüntüler ile radyolog hekimler arasında bir ara katman görevi görmektedir. Burada dikkat edilmesi gereken nokta, Bilgisayar Destekli Tanı Sistemleri tarafından üretilen çıktılarının **kesin sonuç** olarak kabul edilmeyeceğidir. Ancak ortaya çıkan sonuç çıktısı hekimlere bir karar destek sistemi sağlayacaktır.

Bu hususta birçok modern yöntem kullanılabilir. Burada çözülmesi gereken problemimiz Segmentasyon (Bölütleme) problemidir. Derin Öğrenme Tabanlı Evrışimsel Sinir Ağları bu problemleri çözmek için yaygın olarak kullanılmaktadır.

**Segmentasyon (Bölütleme)** : Beyin BT görüntüsünde inme varsa, inmenin patolojik tipinin (iskemik, hemorajik) bulunduğu bölgelerin tespit edilmesidir. Bu tür bir problemde, problem çözümü için genellikle bir **backbone** ve bir **decoder** kullanılmaktadır. **Backbone**; beyin BT görüntülerinden bilgi toplama, **Decoder**; Backbone tarafından toplanan bilgileri bölütlere (*segmentlere*) ayırarak ve inmenin meydana geldiği bölgeleri işaretleyerek görsel bir harita sunar. Bu anlamda Decoder modeli için **U-Net** kullanılmıştır.

Çalışmada, Etik Kurul kararı ile Elazığ Fethi Sekin Şehir Hastanesi'nden hasta mahremiyet kuralları dikkate alınarak idari izinle alınan 4.000 BT görüntüsü (*görüntü kesitleri*) kullanılmıştır. Bu görüntülerden 2.000 görüntü İnme bulguları içeren görüntü iken diğer 2.000 görüntü ise normal beyin görüntülerinden oluşmaktadır. Performans değerlendirme metrikleri ile elde edilen sonuçlar ve segmentasyon sonucunda elde edilen IoU ve Dice katsayı değeri, hekimler için erken evrede tahminlemede inme yönetimine yardımcı olma potansiyeline sahip olduğunu söyleyebiliriz.

## 2. LİTERATÜR ARAŞTIRMASI

Bu bölüm, 2015-2020 yılları arasında yayınlanan derin öğrenme tabanlı evrışimli sinir ağları anahtar kelimeleri kullanılarak beyin BT görüntülerinden inme tespiti ve inmenin patolojik tipinin segmentasyonu üzerine yapılan araştırma makelelerine ayrıntılı bir genel bakış sağlamaktadır.

Literatürde kontrast madde verilmeden elde edilen beyin BT görüntülerinden inme belirtisinin olup olmadığını ayırt eden, inmenin patolojik tipini tespit eden ve ilgili bölgenin BT görüntüsü üzerinde işaretlemesini yapan çok sınırlı sayıda çalışma bulunmaktadır. Ancak bu çalışmalar ayrı ayrı çalışmalar olup, birlikte kullanımlarını araştıran bir makale çalışması bulunmamaktadır. Ayrıca, literatürdeki çalışmalarda kullanılan veri setleri kamuya açık veri setlerinden oluşan küçük veri setleri ile sınırlandırılmıştır. Bu çalışmanın en özgün yanı ise hastaların mahremiyet kuralları gözetilerek etik kurul kararı ile Elazığ Fethi Sekin Şehir Hastanesinden alınan gerçek hasta veri setlerinden oluşan gerçek sonuçların literatüre kazandırılmasıdır. Literatür taraması

için, hemorajik inme ve akut iskemik inmede kontrastsız BT'yi değerlendirmek için bir hesaplama yöntemini tanımlayan veya test eden çalışmaları dahil ettik. Aşağıdaki kriterler literatür çalışmamıza dahil edilmemiştir.

- 1- Akut iskemik inme veya hemorajik inme lezyonlarına odaklanmayan makaleler veya çalışmalar.
- 2- Kontrastsız BT görüntülerinden derin öğrenme tabanlı evrimsel sinir ağlarını test etmeyen makaleler ve çalışmalar.
- 3- Türkçe veya İngilizce olarak sunulmayan bildiri ve çalışmalar.

Başlıca literatür araştırmaları aşağıda listelenmiştir:

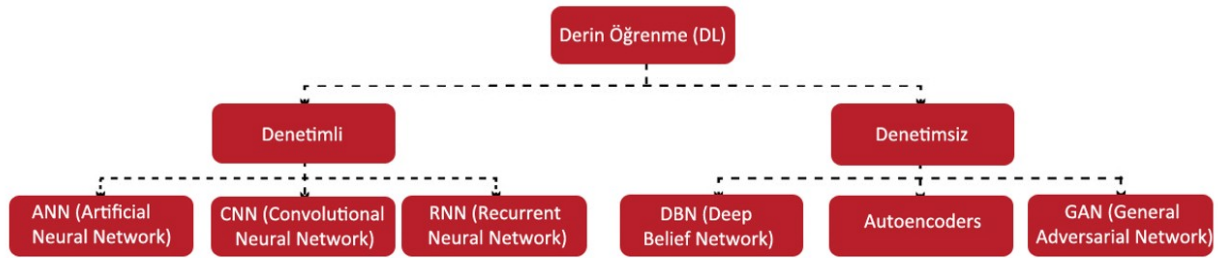
Chin ve ark., BT modalitesine dayalı olarak iskemik lezyonları segmentlere ayırmak için beş katmandan oluşan geleneksel bir CNN kullanmıştır [10]. Barmen ve ark., 11 katmandan oluşan Derin simetriye duyarlı Deep SymNet adlı bir modeli açıklamışlardır[11]. Model başlangıç modüllerinden, L-1 farkıyla birleştirme katmanlarından, maksimum havuzlama katmanlarından ve tam bağlantılı katmanlardan oluşmaktadır. Öman ve ark.'nın çalışmasından farklı olarak, bu araştırma manuel olarak segmentlere ayrılmış lezyonlara dayanmaktadır. Daha iyi performans gösterdiği için lezyon tespiti için tam otomatik bir yöntem olarak tanımlanmıştır. Akasaka ve ark., 14 radyolog arasında kontrastsız BT görüntülerinde inme teşhisinde ortalama duyarlılığın %26.5 olduğunu saptamıştır [12]. İnme ile ilgili olarak birkaç çalışma, derin öğrenme tabanlı bir evrimsel sinir ağının, BT görüntülerinde intrakraniyal kanamayı ve hemorajik inmeyi tespit etmek için başarılı bir şekilde kullanılabileceğini ortaya koymuştur [13,14,15]. Bununla birlikte, kontrastsız BT kullanılarak akut iskemik inme tespitini içeren çalışmaların nadir olduğu bilinmektedir.

### 3. TEORİK ARKA PLAN

Bu bölümde, çalışmalarını gerçekleştirmek için kullanılan derin öğrenme, derin öğrenme tabanlı evrişimsel sinir ağları ve mimarisinin tanımı ve metodolojisine teorik olarak kısa bir giriş yapılmıştır.

#### 3.1. Evrişimsel Sinir Ağları ve Derin Öğrenme

Derin öğrenme (*Deep Learning*), özellik çıkarma (*feature extraction*) için birçok doğrusal olmayan (non-linear) işlem birimi katmanını kullanmaktadır. Her ardışık katman, önceki katmandaki çıktıyı girdi olarak kullanır. Derin öğrenmeyi, ham veri kümesinden özellikleri otomatik çıkarabilen bir makine öğrenmesi sınıfı/tekniki olarak tanımlayabiliriz. Kısaca; Deep Learning (*Derin Öğrenme*), klasik makine öğreniminin daha gelişmiş bir versiyonudur. Şekil-2’de belirtildiği gibi Derin Öğrenmenin iki türü bulunmaktadır [16].



Şekil-2: Derin Öğrenme'nin Türleri

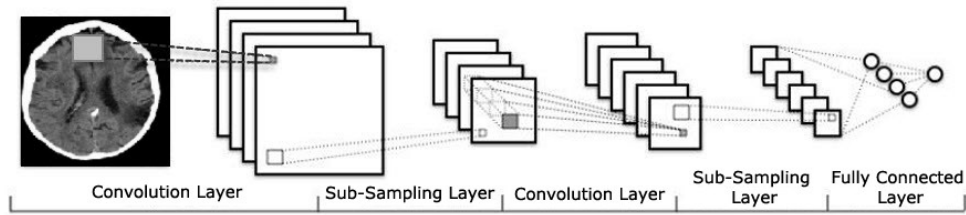
Derin öğrenme mimarileri oluşturulurken kullanılacak algoritma büyük önem taşımaktadır. Bu algoritmalar verinin tipine, boyutuna, hacmine, yapısına ve kullanılacak parametrelere göre farklılık gösterebilir.

- 1- Evrişimli Sinir Ağları (CNN),
- 2- Tekrarlayan Sinir Ağları (RNN),
- 3- Kısıtlı Boltzmann Makineleri (RBM) ve
- 4- Derin İnanç Ağları (DBN)

başlıcalarıdır. Problemimizin çözümü için en uygun algoritma Evrişimli Sinir Ağları'dır.

Evrişimli Sinir Ağları, bilinen en iyi derin öğrenme algoritmalarıdır. Genellikle görüntü sınıflandırma problemlerinde kullanılır. CNN veya ConvNet olarak da bilinir. Evrişimsel Sinir Ağları, bir girdi görüntüsü alabilen ve görüntüdeki çeşitli nesnelere ayırabilen derin öğrenme modelidir. CNN'nin birden fazla katmanı vardır (*bir giriş ve çıkış katmanının yanı sıra birden çok gizli katmandan oluşur*). Çünkü Evrişimsel Sinir Ağları, görsel nitelikler

hijerarşik yapının tamamını bulmak için birden fazla katmana ihtiyaç duyar. Tipik bir sinir ağından daha az nöron bağlantısı gerektirir. Bu, evrişimsel sinir ağı modelini eğitmeyi kolaylaştırır. Temel bir CNN mimarisinin ilk birkaç aşaması Evrişim (*convolution*) ve Havuzlama (*pooling*) katmanlarından oluşur. Son aşama, Tam Bağlantılı Katman (*Fully-Connected Layer*) ve ardından sınıflandırma (*classification*) katmanından oluşur (Şekil 3, *CNN Mimarisi tabanlı LeNet'in genel görünümü*).

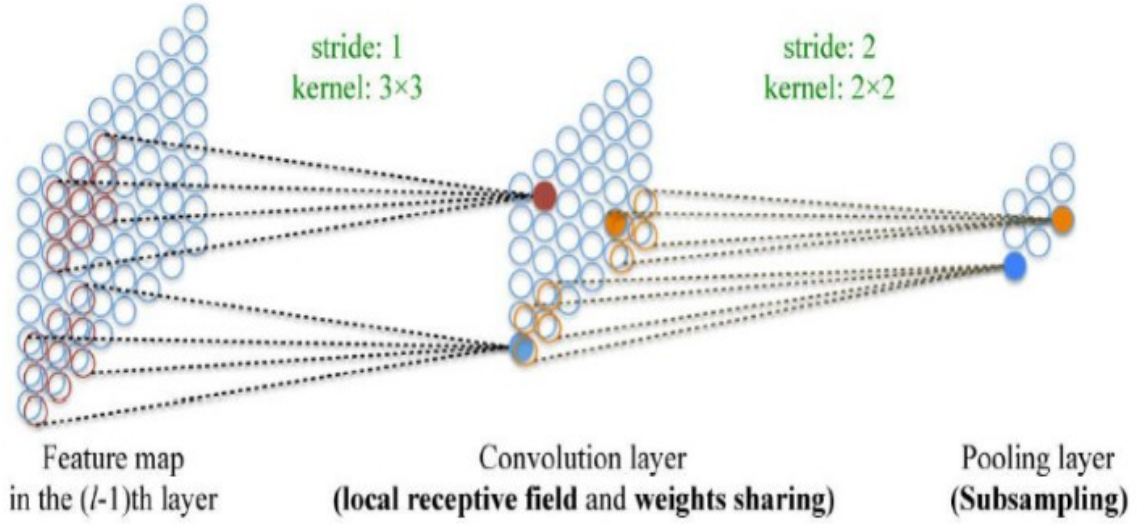


Şekil-3: Genel CNN Mimarisi

Evrişimsel bir sinir ağını diğer derin öğrenme algoritmalarından ayıran en önemli özellik, görüntünün kendisini girdi olarak almasıdır. Geleneksel sinir ağlarında girdi (*input*) vektör biçimindedir.

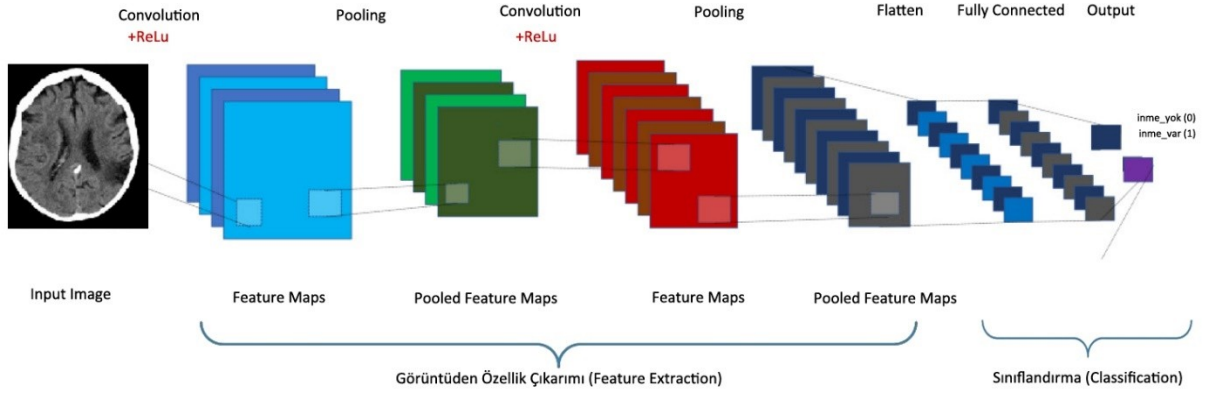
Evrişimsel sinir ağlarının en önemli avantajları aşağıda gösterildiği gibidir:

- 1- Evrişimsel filtre ve havuzlama katmanlarını kullanarak görüntüden daha fazla bilgi alınarak eğitilecek ağ parametresini büyük bir ölçüde azaltılabilir.
- 2- Önemli özelliklerden biri de *weight sharing* denilen ağırlık paylaşımıdır.
- 3- Evrişimsel Sinir Ağları'nın *local connectivity* özelliğinden de bahsedilebilir (Şekil-4 . *Evrişimsel Sinir Ağları'nın işleyişi, local connectivity, weight sharing, size reduction*)



Şekil-4: Evrişimsel Sinir Ağlarının İşleyişi (*local connectivity, weight sharing, size reduction*)

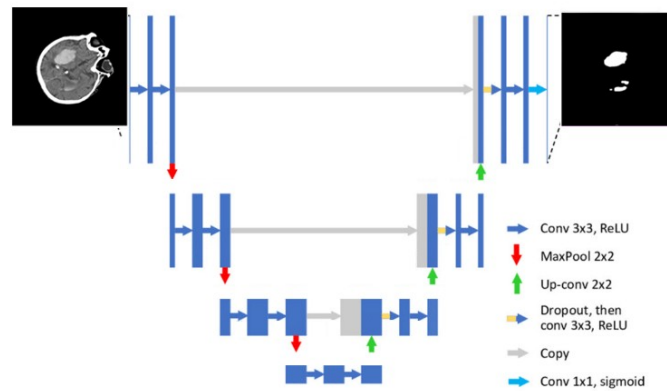
Şekil 5’de görüldüğü gibi, önerilen modelin CNN Mimarisinde iki ana bölüm bulunmaktadır. Birincisi; görüntüden özellik çıkarma adı verilen süreçte analiz için görüntünün çeşitli özelliklerini ayıran ve tanımlayan bir evrişim aracı. İkincisi ise; evrişim sürecinin çıktısını kullanan ve önceki aşamalarda çıkarılan özelliklere dayalı olarak görüntünün sınıfını tahmin eden tam bağlantılı bir katman. Burada önerilen modelin CNN mimarisi, beyin BT görüntülerinden inme olup olmadığını (*inme var, inme yok*) göstermektedir. Sınıflandırma modeli ile etiketlenen veriler, uzman hekim tarafından daha önceden etiketlenmiş doğru sınıf ile karşılaştırılarak beyin BT’inde inme olup olmadığı ayırt edilecektir.



Şekil-5 : Genel CNN Mimarisi Üzerine Kurulu, Önerilen Modelin CNN Mimarisi

### 3.2. U-NET

CNN tabanlı bir sinir ağı olan U-Net, Evrişimli bir sinir ağının kavram ve katmanlarını kullanır. Bu nedenle U-Net, piksel tabanlı görüntü bölütlemeye klasik modellere göre daha başarılı sonuçlar vermektedir. U-Net, en basit tanımıyla tıbbi bir segmentasyon aracı olarak nitelendirilse de, çok sınıflı bir segmentasyon ağı olarak karşımıza çıkmaktadır. Geleneksel evrişimsel sinir ağı modelleri, eğitim için çok büyük veri setleri gerektirir. Bu veri setlerindeki görüntüler etiketlenir ve ağa verilir. Ağ, bu etiket bilgileri aracılığıyla görüntüleri tanır. Tıbbi görüntülerde etiketleme sürecinin, uzman hekim ve zaman sağlama açısından oldukça maliyetli bir süreç olduğunu belirtebiliriz. U-Net mimarisinin bir avatanjı olarak, genellikle veri setlerinin yetersiz olduğu durumlarda tıbbi görüntülemeye doğru sonuçlar elde etmek için piksel tabanlı görüntü segmentasyonu sunmaktadır. Şekil-6'da U-Net Mimarisi verilmiştir. U-net mimarisindeki katmanlar bir araya geldiğinde U harfini çağrıştırdığı için adını bu çağrışımdan almaktadır.



Şekil-6 : Genel U-Net Mimarisi

U-Net mimarisindeki her mavi kutucuk, çok kanallı bir özellik haritasına (*feature map*) karşılık gelmektedir. Kanal sayısı kutucukların üzerinde gösterilir ve X-y boyutu kutucuğun sol alt köşesindedir. Beyaz kutucuklar ise, kopyalanan özellik haritalarını temsil etmektedir. Oklar farklı süreçleri gösterir. U-Net mimarisi daralan bir yol (*encoder path*) ve genişleyen bir yol'dan (*decoder path*) oluşmaktadır.

U-net mimarisindeki encoder, geleneksel bir evrişimsel ağın tipik mimarisini takip etmektedir. 3x3 evrişim işleminin iki kez tekrarlanmasından oluşmaktadır. Bunu daha sonra aktivasyon ve alt örnekleme olarak bilinen bir ReLu için iki adımlı 2x2 maksimum havuzlama izlemektedir. Her bir alt örnekleme işlemi ile özellik kanallarının sayısı iki katına çıkar. Mimarideki decoder her üst örnekleme işleminden sonra özellik kanallarının sayısını yarıya indiren 2x2 evrişim işleminden oluşur. U-net kullanmamızın avantajları aşağıdaki gibi sıralanabilir:

- 1- U-Net, sınırlı sayıda etiketlenmiş eğitim görüntüsünü kullanarak görüntülerin verimli bir şekilde bölütlemesini yapabilir.
- 2- U-Net mimarisi, makul düzeyde bir segmentasyon haritasını tahminlemek için encoder'dan alınan konum bilgisini ve decoder'dan alınan bağlamsal bilgiyi birleştirir.

#### 4. METODOLOJİ

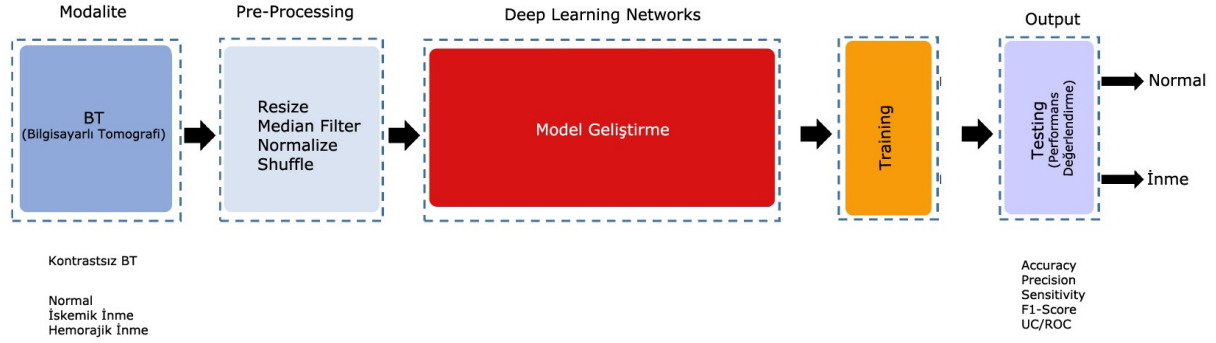
Bu retrospektif çalışma hasta mahremiyet kuralları göz önünde bulundurularak Elazığ Fethi Sekin Şehir Hastanesi Başhekimliği ve Fırat Üniversitesi Etik Kurul Başkanlığı tarafından onaylanan bir çalışma olup, önerilen modelin mimarisi ve çalışmada kullanılan veriseti bu bölümde açıklanmıştır.

##### 4.1 Bilgisayarlı Tomografi'de Derin Öğrenme Yöntemi

Bilgisayarlı Tomografi'den inme infarkt alanını analiz edebilen bilgisayar destekli bir teşhis sistemi genellikle bazı adımlardan oluşmaktadır. Bu adımlar;

- 1- Enfarktüs tespiti
- 2- Enfarktüs segmentasyonu
- 3- Enfarktüs sınıflandırması

Ancak, kontrastsız BT'de bu adımları tespit etmenin bazı zorlukları bulunmaktadır. Karşılaşılan bu zorluklar; rekonstrüksiyon, gürültü azaltma ve artefakt azaltma gibi süreçlerdir. Bu zorlukların üstesinden gelmek adına, çözünürlük iyileştirme için ön işleme aşamasında *medyan filtreleme (median filtering)*, *yeniden boyutlandırma (resizing)*,



Şekil-7 : Blok Diyagram

## 4.2 Veri Seti

Elde edilen görüntüler, hemorajik inme, iskemik inme ve normal beyin görüntülerini içeren görüntülerden oluşmaktadır. Modeli eğitmek için verisetinin %80'i eğitim için, %20'si test verileri olarak tanımlanmıştır. Çalışmada, etkilenen görüntüler **inme**, sağlıklı görüntüler ise **normal** olarak adlandırılan iki sınıftan oluşmaktadır. Etkilenen vakalar, hemorajik ve iskemik vakaların toplamıdır.

Orijinal görüntü kesitlerinin boyutu 512x512 piksel olup DICOM formatındadır. Bu çalışmada DICOM formatı yerine PACS DICOM Viewer uygulamasının sunduğu dönüştürme özellikleri kullanılarak "PNG" formatına dönüştürme işlemi yapılmıştır. DICOM formatındaki veriler "png" ye dönüştürüldükten sonra 512x512 piksellik 8 bitlik gri seviyeli görüntüler elde edilmiştir. Ancak, görüntü sayısının fazla olmasından dolayı orijinal boyutu 512x512 piksel olan görüntüler, 150x150 piksel olarak yeniden boyutlandırılarak eğitilmiştir. Verisinde bulunan 4.000 görüntüden 3.200 görüntü eğitim, 800 görüntü ise test görüntüsüdür. Görüntülerden inme (iskemik, hemorajik) bulguları içeren 2.000 görüntü manuel olarak segmentlere ayrılmıştır (bkz: Tablo-1).



	İnme	Normal	Toplam
Eğitim	1.600	1.600	3.200
Test	400	400	800
Toplam	2.000	2.000	4.000

	İkili (Binary) Sınıflandırma	Bölütleme (Segmentasyon)
İnme/Normal	2.000 / 2.000	2.000 / 2.000
Maske	-	2.000 / -

	İskemik	Hemorajik
Eğitim	800	800
Test	200	200
Toplam	1.000	1.000

**Tablo -1 :** Çalışmada kullanılan BT görüntüleri veri setleri

Ayrıca, inme bulguları içeren her bir görüntü için bir maske görüntüsü de bulunmaktadır. Çalışmadaki verisetinin manuel olarak segmentlere ayrılmış maske görüntüleri, uzman hekim tarafından sağlanan maske görüntülerinden oluşmaktadır. Bu görüntülerin önerilen modelimiz ile en doğru ve en güvenilir şekilde tahmin edilmesi beklenmektedir.

Şekil 8’de rastgele seçilen bir görüntünün manuel segmente edilmiş ve uygulama tarafından tahmin edilen maske görüntüsü görülmektedir. Manuel olarak bölütlenen görüntülerde, inme vakası içeren her bir görüntüdeki hemorajik ve iskemik alanlar, uzman hekim tarafından ITK-SNAP adı verilen bir medikal görüntü bölütleme (segmentasyon) yazılımı kullanılarak bölütlenmiştir. ITK-SNAP, tıbbi görüntülerde manuel işaretlemeyi sağlamaktadır. Ayrıca, aktif kontur yöntemleri kullanılarak tıbbi görüntülerin yarı veya otomatik olarak bölütlenmesine olanak tanır. ITK-SNAP tıbbi görüntü analiz yazılımında diğer görüntü analiz araçlarına göre özellikle görüntü bölütleme sorunu üzerinde durulmuş, bunun dışındaki özellikler minimumda tutulmuş ve fazla ön plana çıkarılmamıştır.

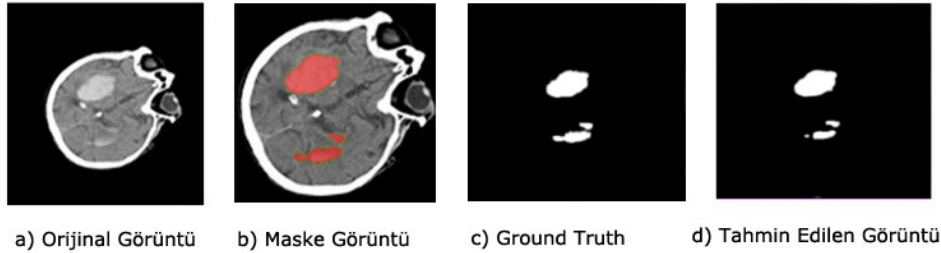
#### 4.3 Segmentasyon Çerçevesi

Görüntü bölütleme, bir giriş görüntüsünün verilen görüntüdeki ilgi alanı (RoI) ile farklı bölümlere ayırmayı içermektedir. Tıbbi görüntünün segmentlere ayırmanın amacı, vücudun ilgili bölümünün anatomisini incelemek, ilgilenilen bölgeyi belirlemek, enfarktüsün boyutunu (anormal olan alan) ölçmek ve karar vermeye yardımcı olmak için verilen bir girdi görüntüsünü anlamlı bir biçimde göstermektir. Görüntü bölütleme yöntemleri genel olarak semantik bölütleme (*semantic segmentation*) ve örnek bölütleme (*instance segmentation*) olarak sınıflandırılmaktadır.

**Semantik bölütleme**, bir görüntüdeki pikselleri sınıflandırma problemidir. Semantik bölütleme yöntemi, görüntüdeki her pikselin belirli bir sınıfla etiketlenmesidir.

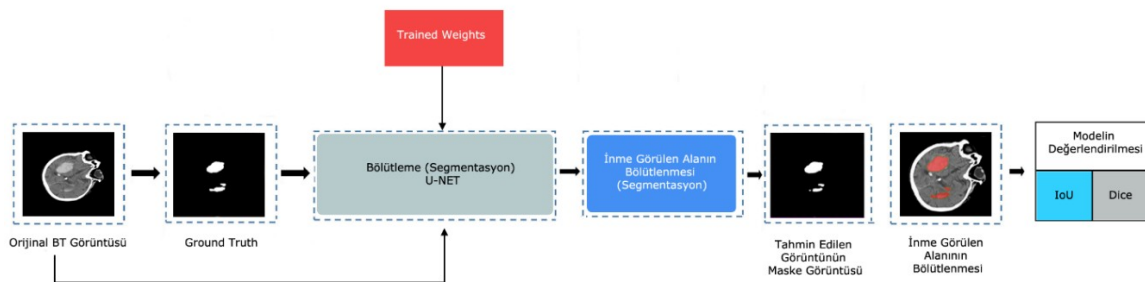
**Örnek (instance) bölütleme**, giriş görüntüsünde bulunan her bir ilgili nesneyi algılar ve tanımlar. Örnek (instance) bölütleme yöntemi, görüntüdeki ilgilenilen pikselleri sınıflandırmak ve her nesnenin konumunu kutuyla seçmektir.

Bu çalışmada, bölütleme türlerinden biri olan semantik bölütlemeyi kullanarak inme için bir teknik sunmaktayız. Önerilen segmentasyon ağ modeli çerçevemizi temsil eden bir akış diyagramı şekil 10'da verilmiştir. Segmentasyon, sınıflandırılmış kontrastsız beyin BT görüntüsündeki anormal bölgeleri tespit etmek için kullanılır. Modelimizin segmentasyon işlemini otomatik olarak yapabilmesi için test aşamasında test için ayrılan görüntülerin maskelenmiş kontrastsız beyin BT görüntülerini kullandık.



**Şekil 8** - a) Orijinal BT Görüntüsü, b) Maskelenmiş BT Görüntüsü (*Manuel Bölütlenmiş Orijinal BT Görüntüsü*), c) Ground Truth Orijinal Maske Görüntüsü, d) İnme'nin Görüntüde tespit edilmesi (*Tahmin edilen maske görüntüsü*)

Şekil 8a orijinal BT görüntüsünü gösterir, 8b manuel bölütlenmiş inme infarkt alanını (maskelenmiş BT görüntüsü) gösterir, 8c Ground Truth orijinal maskelenmiş görüntüyü gösterir ve Şekil 8d beyin BT görüntüsündeki inme infarkt alanının tahminini gösterir (tahmin edilen maske görüntüsü).



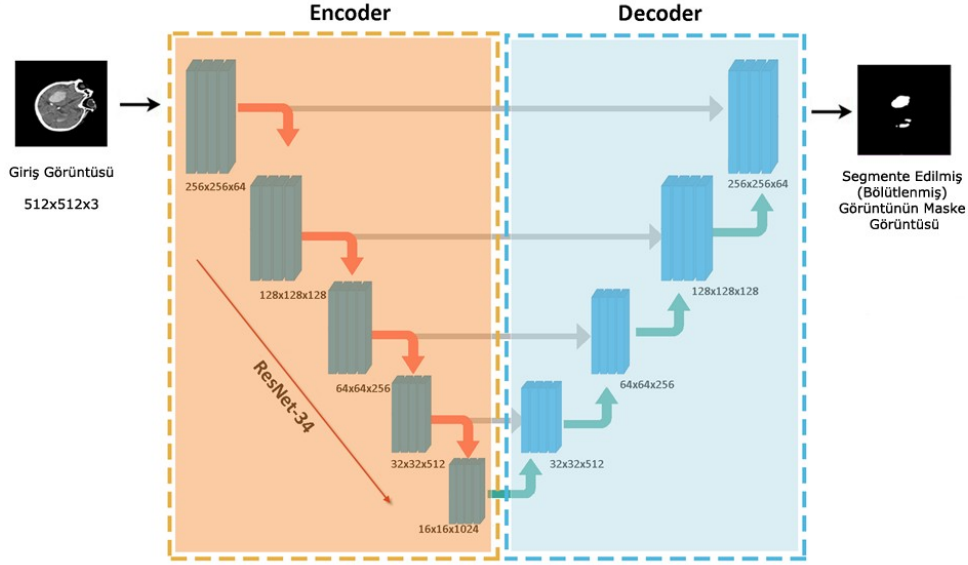
**Şekil 9** – Modelin Segmentasyon Çerçevesi

#### 4.4 Segmentasyon Mimarisi

Çalışmamızda, tıbbi görüntü segmentasyonu için derin öğrenme modelimizi eğitmek üzere Transfer Learning kullanıldı. Makalenin ana amacı sınıflandırma olmadığından sınıflandırma aşaması için performans değerlendirme sonuçlarına yer verilmemekle birlikte çalışmanın bu aşamasındaki sınıflandırma çalışmasının da segmentasyona dayalı olduğunu söyleyebiliriz. Önce görüntü üzerinde bulunan inme bulgularının olduğu alanlar segmente edilmiş ardından inme'nin tipi (*iskemik, hemorajik ve etiketlenmemiş*) olarak sınıflandırılmıştır. *Backbone* olarak ResNet34 gibi modern teknoloji mimarisi kullanılmıştır. Ayrıca, 34 katmanlı bir ResNet mimarisi olan ResNet34 kullanmamızın nedeni, ResNet50, ResNet101 ve ResNet152'den daha hızlı eğitilmiş olması ve daha az bellek kullanmasıdır.

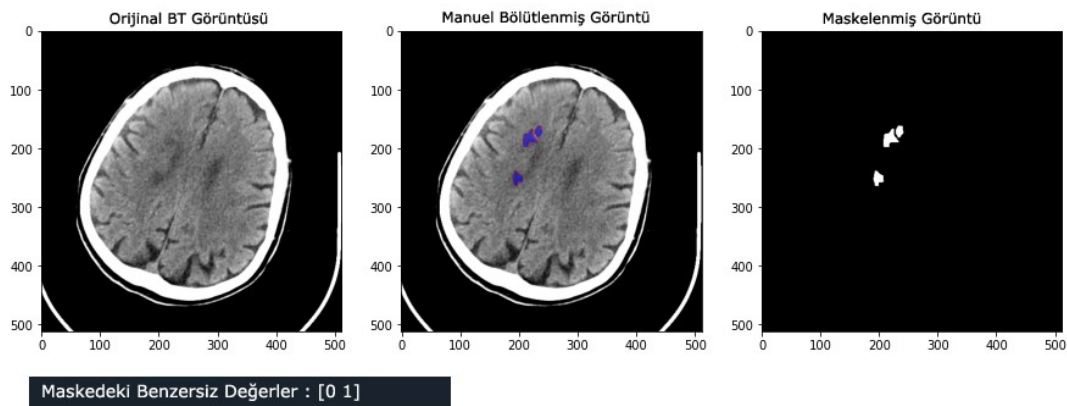
U-Net'in *encoder* ve *decoder* evrişimli sinir ağı katmanlarından oluşan bir mimari olduğunu daha önce açıklamıştık. Evrişimsel katmanlar yinlemeli olarak eğitilirken, düşük ve yüksek boyutlu özellikleri öğrenmek için bu katmanlardaki filtreler kullanılarak özellik çıkarımı gerçekleştirilir. U-Net mimarisinin arkasındaki çalışma prensibi; *encoder*, evrişimsel sinir ağı'ndan geçen görüntüyü kodlaması ve ardından *decoder* bu kodu çözerek segmentasyon maskesini elde etmesidir (*bkz: Şekil 10*). Segmentasyon maskelerinin özellikleri, öğrenilen ağırlık filtrelerine *encoder* ve *decoder* ağlarına ve atlama, birleştirme bağlantılarına bağlıdır. *Backbone*, bu katmanların *encoder* ağında nasıl düzenlendiğini tanımlayan ve *decoder* ağına nasıl kurulması gerektiğini belirleyen mimari unsurdur. Segmentasyon için, literatürde sunulan en iyi genel sonuçları göz önünde bulundurarak inme içeren kontrastsız beyin BT görüntülerini segmentlere ayırmak için ResNet34 kodlayıcılı U-Net tabanlı bir model kullanmaya karar verdik. ImageNet üzerinde önceden eğitilmiş ResNet34, derin semantik özellikleri elde etmek için *encoder* olarak kullanılmaktadır.

U-net mimarimiz şekil-10 görüldüğü gibi *encoder* ve *decoder* olarak iki aşamadan oluşmaktadır.



Şekil -10 : Backbone olarak ResNet34 ile U-Net yapısının gösterimi

Backbone, U-Net'in encoder kısmı için kullanılacak modeldir. Bu önceden eğitilmiş ağırlıklar (*pre-trained weights*, ör: imagenet) kullanarak transfer learning'den yararlanmamızı sağlar. Önerilen U-Net mimarimiz, önceden işlenmiş görüntüler ve bunlarla ilgili Ground Truth'lar üzerinde eğitilmiştir. Eğitilmiş ağırlıklar (*trained weights*) daha sonra Şekil-9'da gösterildiği gibi inme'nin patolojik tipinin (hemorajik veya iskemik) tespiti ve segmentasyonu için modelimizde kullanılmıştır. Modelimiz ilk olarak segmentasyon ağı aracılığıyla hastanın hemorajik ve iskemik inme segmentlerini çıkararak, bu segmente edilen inme bölgelerini tahmin için sınıflandırma ağına göndermektedir. Şekil-11'de orijinal bir kontrastsız beyin BT görüntüsü üzerinde inme bulgularının olduğu alan uzman hekim tarafından manuel olarak segmente edilerek , bu segmente edilen görüntünün de maskelenmiş görüntüsü oluşturularak etiketlenmiştir.



Şekil-11: Rastgele görüntü ve buna karşılık gelen Manuel segmentasyon görüntüsü ve maske görüntüsü.

## 5. SONUÇ VE DEĞERLENDİRME

Segmentasyon modellerinin kalitesini ölçmek için yaygın olarak kullanılan başlıca değerlendirme metrikleri modelimizin değerlendirilmesinde kullanılmıştır. Seçilen metrik, IoU'dur (*Kesiştirilmiş Bölgeler Ölçütleri*). Ground Truth ile model tahmini arasındaki benzerlik, Jaccard İndeksi ile ölçülmüştür. Bu nedenle IoU hesaplaması, iki dikdörtgenin kesiştiği alanın bu iki dikdörtgenin birleşim alanına bölünmesiyle hesaplanmıştır. Hesaplama formülümüz Şekil-12'de verilmiştir.

$$IoU = \frac{\text{Area of Overlap}}{\text{Area of Union}}$$

Şekil-12: IoU Hesaplama Formülü

Model doğrulama verilerine uygulandığında elde edilen sonuçlar cesaret vericidir. Modelde bir eşik değeri (threshold) oluşturulmuş ve bu değer 0,5 olarak belirlenmiştir. Bu değer altında kalan pikseller mor arka plan rengiyle maskelenmiştir ve bu eşik değerini aşan pikseller sarı olarak maskelenmiştir. Modelin her döneminde (epoch) eğitim (train) ve doğrulama (val) IoU ve loss için bir fonksiyon tanımlanmıştır. Her biri 10 saniye süren 300 epochs sonucunda, çalışmamızın segmentasyon moeli %0,8332'lik bir doğrulama Mean IoU puanına ulaşmış olup elde edilen sonuçlar şekil-13'de verilmiştir.

```
In [34]: n_classes = 3
...: IOU_keras = MeanIoU(num_classes=n_classes)
...: IOU_keras.update_state(test_pred_batch_argmax, test_mask_batch_argmax)
...: print("Mean IoU =", IOU_keras.result().numpy())
Mean IoU = 0.83327055
```

Şekil-13: Mean IoU Puanının Hesaplanması

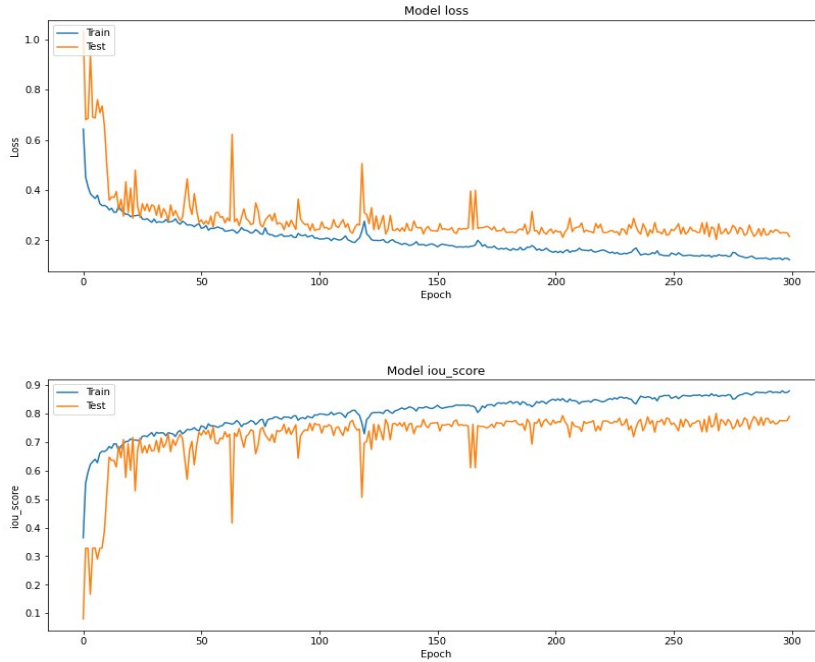
Her sınıf için IoU puanını hesapladığımızda, elde edilen sonuçlar ise Şekil -14'de gösterildiği gibidir. Sınıf 1 etiketlenmemiş (arka plan) , Sınıf 2 iskemik ve Sınıf 3 hemorajik inme'dir. Etiket değerleri, class1=0, class2=1, class3=2'dir. Buna göre, sınıf 3, kanama tipi inme (%86,71), sınıf 2 iskemik inmeden (%63,92) daha iyi segmente edilmektedir.

Sınıf 1 , inme olmayan bölgeleri (etiketlenmemiş veya arka plan) temsil ettiğinden, IoU puanı (%99,34) beklendiği gibi yüksek çıkmıştır.

```
In [42]: class1_IoU = values[0,0]/(values[0,0] + values[0,1] + values[0,2] + values[1,0]+ values[2,0])
In [43]: class2_IoU = values[1,1]/(values[1,1] + values[1,0] + values[1,2] + values[0,1]+ values[2,1])
In [44]: class3_IoU = values[2,2]/(values[2,2] + values[2,0] + values[2,1] + values[0,2]+ values[1,2])
In [45]: print("IoU for class1 is: ", class1_IoU)
...: print("IoU for class2 is: ", class2_IoU)
...: print("IoU for class3 is: ", class3_IoU)
IoU for class1 is: 0.9934552
IoU for class2 is: 0.6392343
IoU for class3 is: 0.86712205
```

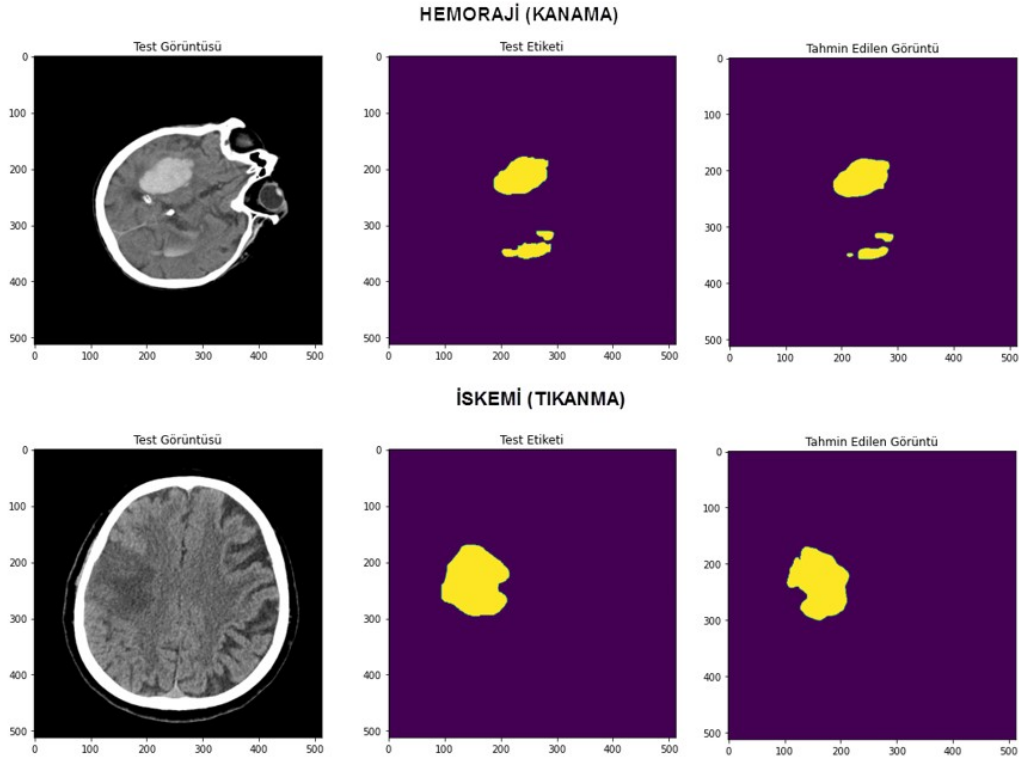
Şekil-14: Her sınıf için IoU puanının hesaplanması

Eğitim aşamasının IoU puanı ve loss değerlerinin grafik gösterimi Şekil-15’de gösterilmiştir. Şekil 16 ve Şekil 17’de her iki inme tipinin beyin BT görüntülerini ve bu görüntüler için uzman hekim tarafından manuel olarak işaretlenen maske görüntüleri ve U-Net+ResNet34+Backbone segmentasyon modeli ile tahmin edilen maske görüntülerini içermektedir. Şekil 16 ve 17’de uygulama tarafından rastgele seçilen gerçek maskeler ile tahmin edilen maskelerin birbirine çok benzediği ve kullanılan modelin performansını ortaya koyduğu gösterilmektedir. Şekil 16 ve Şekil 17’de verilen hemoraji ve iskemik görüntülerinin IoU skoru hesaplandığında sırasıyla 0,92015 değeri ile %92,01 ve 0,82229 değeri ile %82,22 başarı sağlanmıştır.

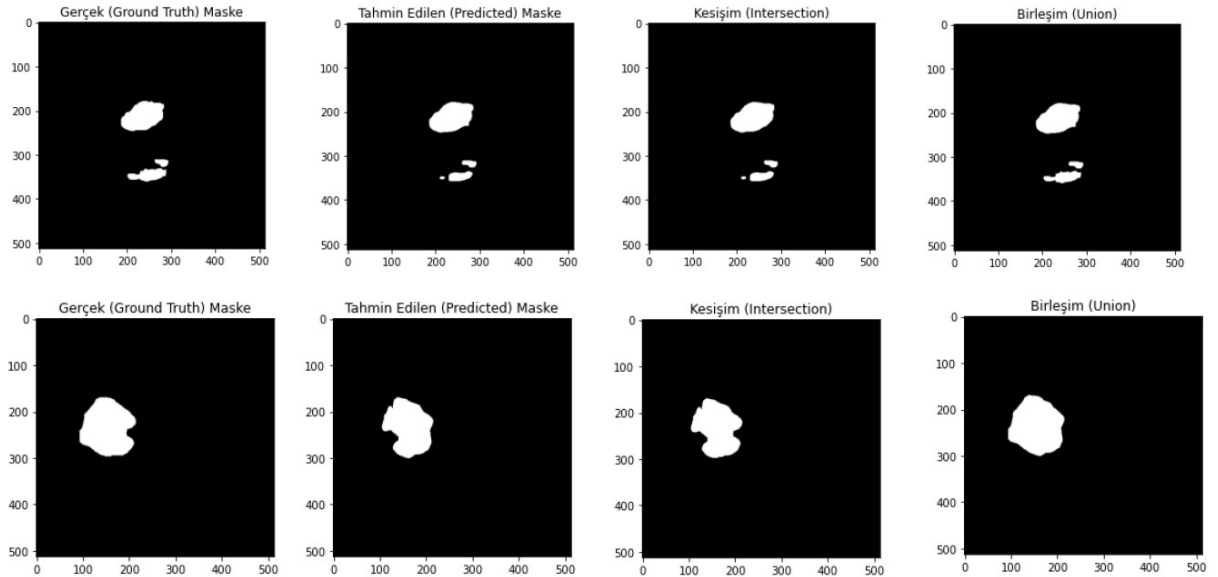


Şekil-15: Önerilen segmentasyon modelinin

Train ve Validation IoU puanı ve Loss değerleri grafiği



Şekil-16 : Test Görüntüleri ve Tahmin Edilen Görüntüleri



Şekil-17: Hemorajik ve İskemik inme görüntülerine ait IoU görüntüleri

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**EĞİTİM KURUMLARI ÇEVRESİNDEKİ ŞÜPHELİ İNSAN DAVRANIŞLARININ  
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**ÖZET**

Bu çalışmada, eğitim kurumlarında oluşması muhtemel güvenlik zafiyetlerinin derin öğrenme çözümlerini kullanarak en aza indirgenmesi hedeflenmektedir. Oluşturulan sistem eğitim kurumlarının iç ve dış mekânlarında bulunan insan davranışlarını tehlikeli, şüpheli ve normal olarak ayırt etmek için kesici ve delici alet tespiti yapmaktadır. Tespit edilen davranışlar sayesinde kurum içerisindeki öğrencilerin daha güvenli bir eğitim modeline ulaşması sağlanmaktadır. Öğrencilerin güvenli eğitim ortamına ulaşmasının sağlandığı bu projede Derin Öğrenme Sınır Ağ Modeli eğitilerek, kamera yardımıyla elde edilen görüntüler yoluyla insan davranışları kategorize edilmektedir. %90 üzerinde başarılı tahminler ile ateşli silahlar ve kesici aletler tespit edilebilmektedir.

**A SYSTEM FOR DETECTING DANGEROUS AND SUSPICIOUS HUMAN  
BEHAVIOR FOR EDUCATIONAL INSTITUTIONS**

**ABSTRACT**

This study aims to minimize the security vulnerabilities that may occur in educational institutions by using deep learning solutions. The designed system detects cutting and piercing tools to distinguish between dangerous, suspicious, and normal human behaviors in indoor and outdoor spaces of educational institutions. Thanks to the detected behaviors, it is ensured that the students in the institution reach a safer education model. In this project, where students are provided with safety education, Deep Learning Neural Network Model is trained and human behaviors are categorized with the images obtained with the help of the camera. Pistols and knives can be detected with over 90% of successful predictions.

**GİRİŞ**

Eğitim kurumları için güvenlik kavramı çok boyutlu ve hassas bir konudur. Okul güvenliği araştırmaları okullarda, öğrenci ve okul çalışanlarının fiziksel, sözel ve psikolojik güvenliği gibi temel konularda problem yaratabilecek, suç ve şiddet olaylarının (psikolojik şiddet, hırsızlık, örgütlenme, okula silah, bıçak vb. gibi kesici aletler getirilmesi...) yaşanabileceğini bize göstermektedir. Ayrıca okulda ve çevresinde yaşanan bu suç olaylarının okulun bulunduğu konuma, okul binasının bulunduğu yerde yaşayan insanlara, okul güvenilirliğine, öğrencilerin ve okul personelinin bireysel özelliklerine hasar verdiği ve etkilediği gözlemlenmektedir [1]. Bu sorunlara yönelik olarak güvenlik sistemleri geliştirilmektedir.

Güvenlik sistemleri iç ve dış mekânlar için geniş uygulama alanlarına sahiptir. Özellikle güvenlik kameraları temel korumanın ayrılmaz bir parçasıdır. Bu kameralar insanları güvenlik amacıyla kayıt altına almaktadır. Kayıt altına alınan veriler incelenerek problem tespit edilmektedir. Güvenlik kamerasına yansıyan bütün olayların insanlar tarafından manuel olarak incelenmesi mümkün değildir. Bu problem sistemin verimini büyük ölçüde azaltmaktadır. Çünkü uzun süreli video verileri incelemek müdahaleyi geciktirmekte ve zaman kaybına yol açmaktadır. Günümüzde yapay zekâ, makine öğrenmesi ve derin öğrenme sistemlerine sahip teknolojiler insan gücünün ulaşamayacağı hızda çözümler üretmektedir. Video gözetim sistemleri ile bu teknolojilerin kombinasyonu öngörülemez güvenlik açıklarını yüksek hızlarda tespit edebilmektedir. Derin öğrenme yaklaşımı kullanılarak insan davranışları incelenebilmekte ve bu davranışların şüpheli ya da normal olup olmadığı tahmin edilebilmektedir [2]. Derin öğrenme yaklaşımının avantajları, etkili izleme, daha az insan kaynağına ihtiyaç duyulması, uygun maliyet, hızlı şüpheli aktivite tespiti, yeni güvenlik eğilimlerini benimsenmesi, öngörülemez suç oranının azaltılması şeklinde sıralanabilir.

Literatürde nesne tanıma ile ilgili yapılan çalışmalar incelendiğinde; [3]'te SSD MobileNet V2 algoritması kullanılarak, istenmeyen tehdit unsuru nesnelere eğitildiği ve bu nesnelere tespitinin sağlandığı görülmektedir. Bu çalışmada nesnelere tespiti hususunda %91 oranında başarı sağlanmıştır. [4]'te ise tarım ürünleri, nesne tanıma yöntemleri kullanılarak tespit edilmiş ve bu ürünlerin toplanması için robot kol tasarlanmıştır. Nesne tanıma yöntemleri kullanılarak farklı alanlarda iş faaliyetlerinin de gerçekleştirilebileceği bu bildiride görülebilmektedir.

Bu çalışma ile eğitim kurumlarında oluşan güvenlik zafiyetlerinin YoloV5 yapay zekâ modeli üzerinde, eğitilen silah ve bıçak verilerinin tespiti ile en aza indirgenmesi sağlanmaktadır. Oluşturulan sistem eğitim kurumlarının iç ve dış mekânlarında bulunan insan davranışlarını

tehlikeli, şüpheli ve normal olarak ayırt edip etiketlemektedir. Etiketleme sistemi kesici aletlerin varlığının olup olmaması ile çalışmaktadır. Etiketlenen davranışlar sayesinde kurum içerisindeki öğrencilerin daha güvenli bir eğitim modeline ulaşması sağlanmaktadır.

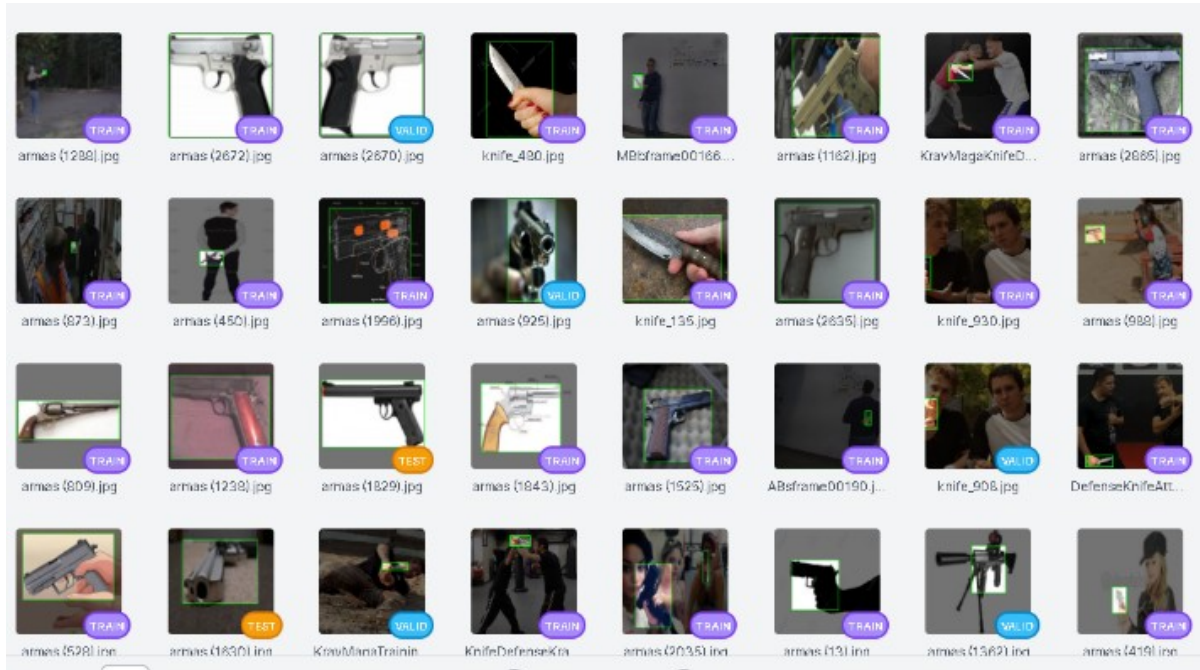
Bölüm 2’de sistem modeli aktarılmakta ve çalışmadaki hazırlık ve süreç aşamalarından bahsedilmektedir. Nesne tespiti için gerekli eğitim, test ve doğrulama verileri sunulmaktadır. Eğitim yapılacak olan algoritmanın tercihi ve çalışma mekanizması verilmektedir. Eğitim sonuçları ve bu sonuçlardan elde edilen çıkarımlar yine aynı bölümde aktarılmaktadır. Bölüm 3’te genel olarak çalışmanın sonuçları ve literatüre olan katkısından bahsedilmektedir.

## SİSTEM MODELİ

Bu çalışmanın temelini eğitilmiş derin öğrenme modeli oluşturmaktadır. Etiketlenen veriler sayesinde, ateşli silahları ve kesici aletleri yüksek doğrulukla tespit eden model eğitilmiştir.

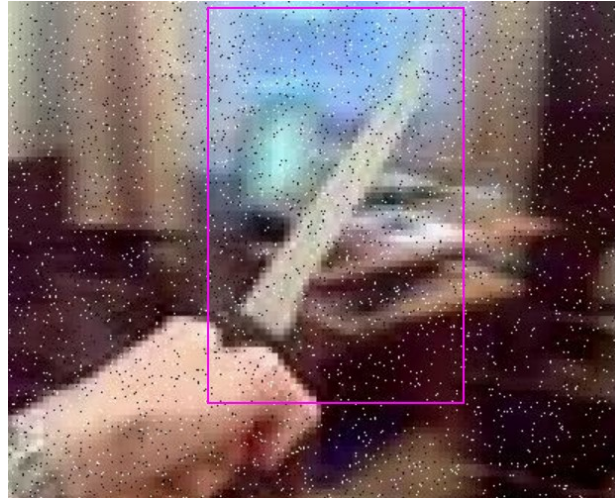
### Veri Seti

Bu çalışmada veri seti olarak iki farklı sınıf etiketlenmiştir. Bunlardan ilki bıçak diğeri ise silah sınıfıdır. Veriler etiketlenirken bu sınıflar görseller üzerinde fark edildikten sonra sınırlayıcı kutucuklarla işaretlenmiştir. Etiketleme yapılırken *Roboflow* web uygulaması ve *LabelImg* programları kullanılmıştır [5]. Şekil 1’ de *Roboflow* uygulaması üzerinden etiketlenmiş veriler görülmektedir.



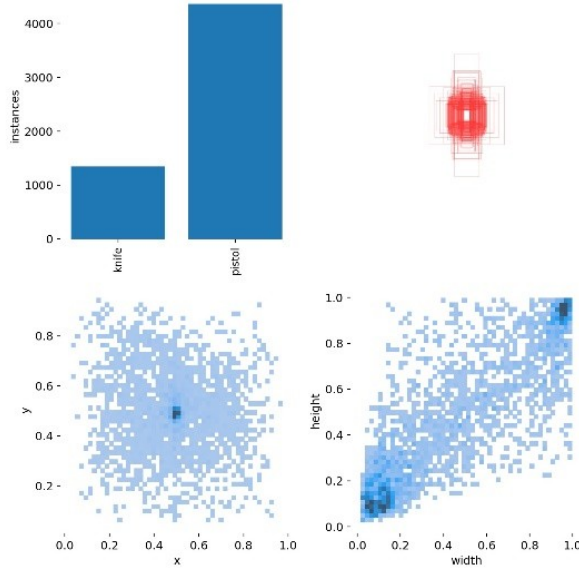
Şekil 1: Roboflow üzerinden etiketlenmiş veriler

Veri seti olarak açık kaynaklı etiketli veriler ve internet ortamında bulunan fotoğraflar etiketlenerek kullanılmıştır. Toplamda 4093 adet veri etiketlenmiştir. Bunlardan 1041 tanesi bıçak, 3052 tanesi silah görüntüsünü içermektedir. Bu veriler modele aktarılmadan önce veri ön işleme yapılmıştır. Veri ön işlemede görüntüler 416x416 piksel oranlarına getirilerek standart bir format elde edilmiştir. Ardından veri artırma yöntemlerinden parlaklık ayarı uygulanmıştır. Bu ayar ile veriler %25 oranında parlatılmış ve parlaklığı kısılmıştır. Son olarak verilere %5 piksele kadar gürültü eklenerek yeni sentetik veriler üretilmiştir. Şekil 2’de gürültü eklenmiş veri görülmektedir. Üretilen bu ilave veriler veri setine eklenmiştir.



Şekil 2: Gürültü eklenmiş sentetik veri

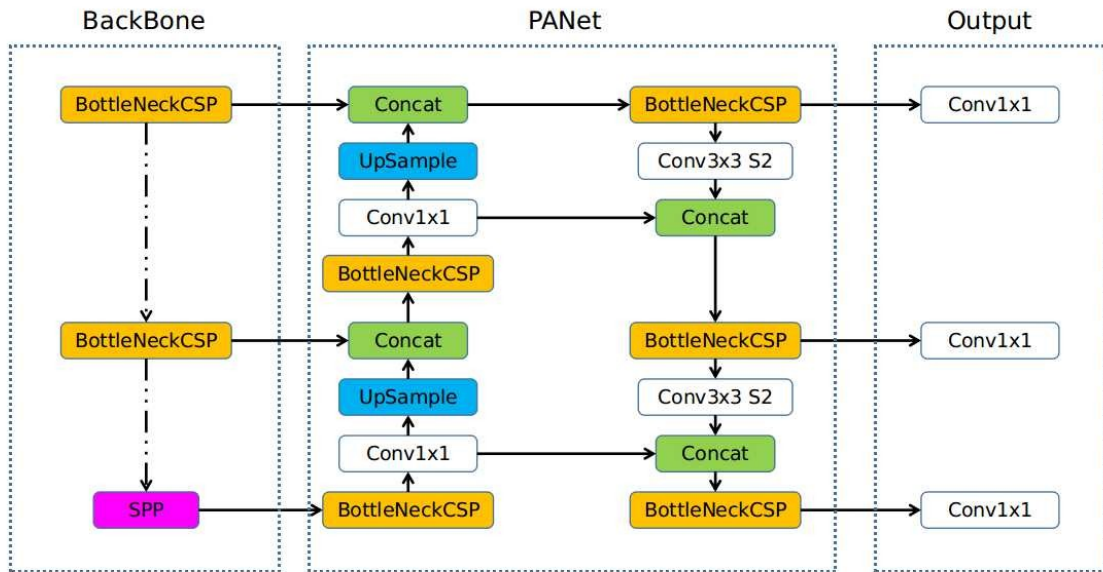
Eklenen veriler ile yeni veri seti 6295 adet imge sayısına ulaşmıştır. Bu verilerden 5339 adeti silah, 1637 adeti ise bıçak verisini temsil etmektedir. 6295 veride 6976 adet etiketleme yapılmıştır ve görüntüler ortalama 0.17mp çözünürlüğü sahiptir. Veri ve etiket dağılımı Şekil 3’te görülmektedir. Veriler istenen formata getirildikten ve artırıldıktan sonra %70 eğitim, %20 doğrulama ve %10 test olmak üzere üçe ayrılmıştır. Eğitim setiyle model eğitilmiş, test ve doğrulama setiyle tahminlerin başarısı kontrol edilmiştir. Veriler modele aktarılmadan önce model YoloV5 modeli olacağı için etiket formatı için uygun format olan *txt* formatına çevrilmiştir.



Şekil 3: Veri ve etiket dağılım tabloları

### YOLOv5 Algoritması

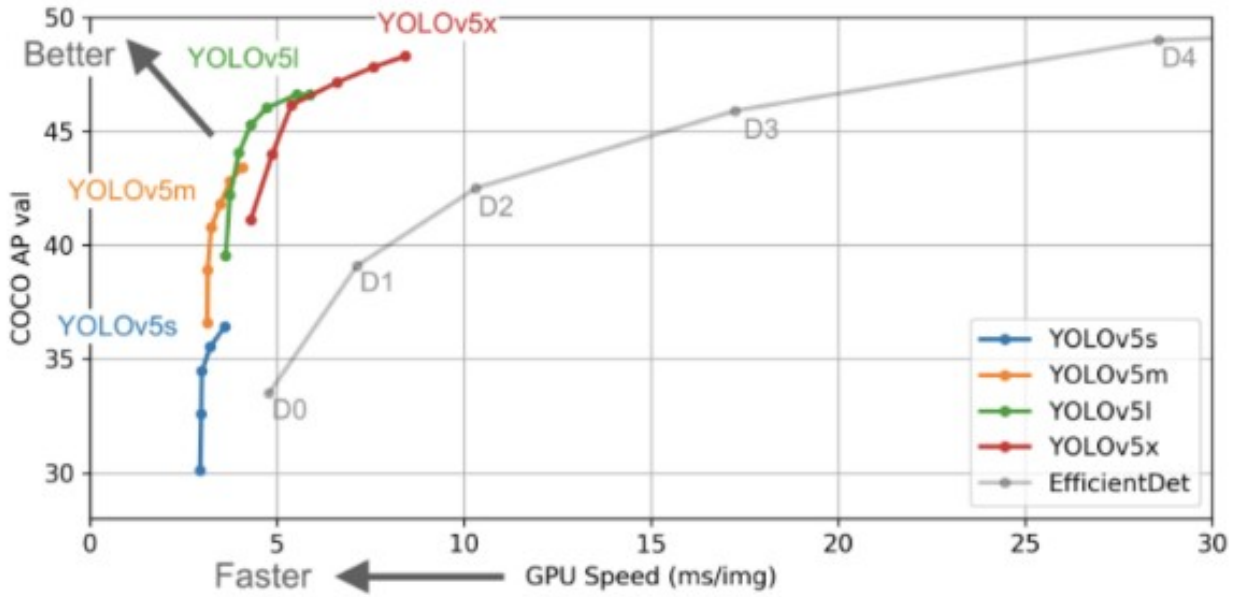
YOLO (You only look once) bir obje tespit algoritmasıdır. Bu ismin verilmesindeki temel neden YOLO'nun görüntüleri ızgara sistemi ile bölmesinden gelir. Izgaradaki her bölüm, o hücrede bulunan nesnelere tespit etmekten sorumludur. YOLO hızı ve doğru tespit etmesiyle en popüler nesne tespit algoritmalarından biridir. YOLO mimarisi, Şekil 4'te görüldüğü gibi, uçtan uca türevlenebilir bir ağ yapısına ve sınırlayıcı kutucuk etiket sınıflarını tahminleme yeteneğine sahiptir [6].



Şekil 4: YOLOv5 mimarisi [6]



Bu nedenle bu çalışmada YOLO'nun Pytorch çerçevesini kullanan 18 Mayıs 2020'de paylaşılan YOLOv5 versiyonu tercih edilmiştir. YOLOv5 için 4 farklı model bulunmaktadır. Bunların karşılaştırılması incelendiğinde YOLOv5x modelinin daha fazla GPU desteğine ihtiyaç duyduğu ama çok daha yüksek doğruluk verdiği gözlemlenmiştir. Şekil 5'te YOLOv5 modellerinin karşılaştırılması görülmektedir [7].

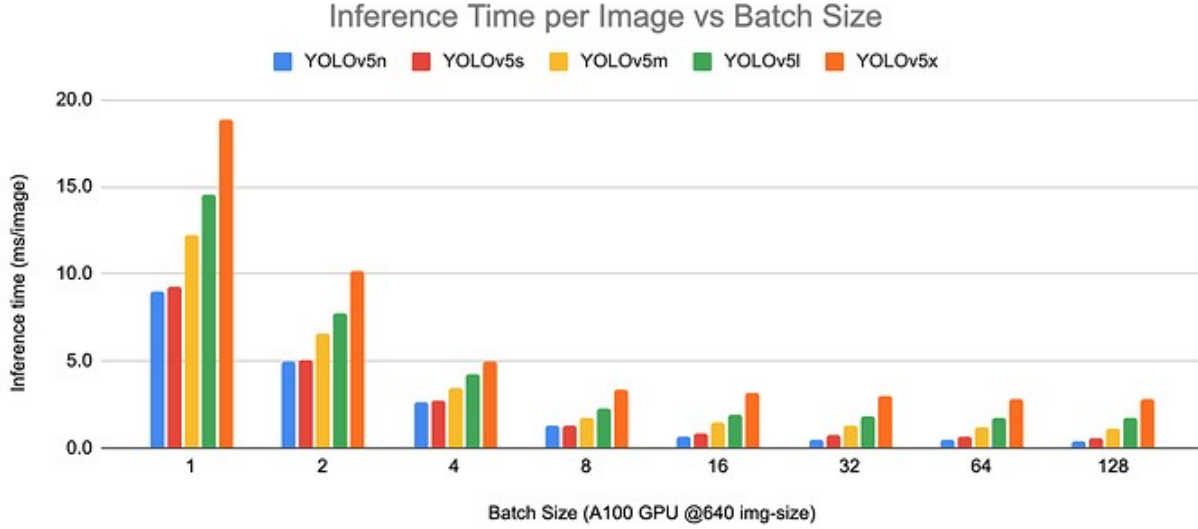


Şekil 5: YOLOv5 modelleri performans karşılaştırması [7]

## Deney

Bu çalışmada hazırlanan özel veri setinin YOLOv5x modeli ile eğitilmesi için COCO veri setinin ağırlıklarından öğrenim aktarımı kullanılmıştır. Bu sayede sıfırdan ağırlık üretmek yerine daha önce hazırlanmış ağırlıklar bu çalışmanın modeline uyarlanmıştır. Eğitim yapılırken eğitim tur sayısı (epoch) 160 olarak belirlenmiştir. Eğitim tur sayısı kadar model eğitiminde veri kümesi parçalar halinde modele aktarılmış olur. Eğitim tur sayısının ilk adımlarında öğrenme kabiliyeti düşük seviyede olmaktadır. Veri seti modelden geçtikçe ağırlıklar belirlenir ve modelin öğrenme kabiliyeti artar. Bu değer belirlendikten sonra batch değeri 16 olarak belirlenmiştir. Batch değeri ile verinin parçalar halinde modele girmesi sağlanır. Buradaki amaç, modelin tek parça ile yavaş ilerlemesi yerine, belirlenen batch değeri ile orantılı veri bloğunun tek seferde işlenmesinin sağlanmasıdır. Batch sayısı arttıkça model eğitim tur süresi de doğru orantılı şekilde artmaktadır. Bunun yanı sıra batch boyutu arttıkça tahminleme süresinin düştüğü Şekil 6'da görülmektedir [8].

Batch boyutu modele uygun olarak belirlendikten sonra eğitim başlatılmış ve 3 saatin sonunda eğitim başarı ile tamamlanmıştır. Tablo 1’de eğitimin sonunda elde edilen doğruluk değerleri verilmiştir.

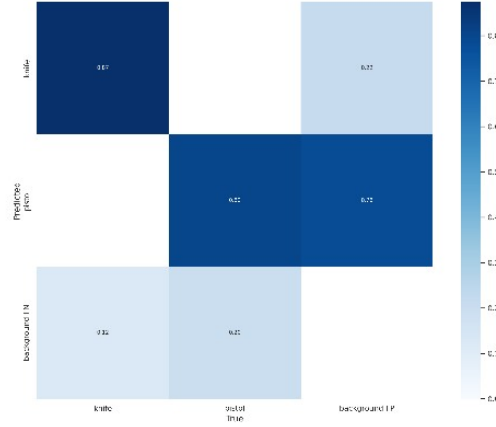


Şekil 6: YOLOv5 modelleri batch size ile tahminleme süresinin karşılaştırması [8]

Sınıflar	Doğruluk (mAP@.5)
Silah	%85,3
Bıçak	%90,9
Toplam	%88,1

Tablo 1: Eğitim doğruluk değerleri

Tabloda görüldüğü gibi model yüksek doğruluk değerleri vermektedir. Bunun yanı sıra doğruluk (mAP) değeri kullanılarak hata matrisi oluşturulmaktadır. Hata matrisinde 4 adet değer bulunmaktadır [9]. Bu değerler; Doğruya doğru denmesi (True Positive – TP) doğru, yanlışla yanlış denmesi (True Negative – TN) doğru, doğruya yanlış denmesi (False Positive – FP) yanlış, yanlışla doğru denmesi (False Negative – FN) yanlış şeklinde değerlendirilmektedir. Model eğitim sırasında oluşan hata matrisi Şekil 7’de görülmektedir.



Şekil 7:Eğitimin hata matrisi

Bu hata matrisi ile birlikte 3 farklı model ölçüm metriği elde edilmektedir. Bunlardan ilki, hassasiyet (precision) olarak adlandırılmaktadır. Hassasiyet, elde edilen başarılı tahminlerin tüm tahminlere oranlanması ile bulunmaktadır. Hassasiyet (1) ile ifade edilmektedir. Duyarlılık (Recall) ise modelin doğru olarak tahmin etmesi gereken adımların kaç tanesini doğru olarak tahmin ettiğini gösteren bir ölçümdür. Duyarlılık denklem 2’de verilmektedir. Son olarak F1 skor metriği, hassasiyet ve duyarlılık değerlerinin harmonik ortalamasıyla bulunmakta ve (3) ile ifade edilmektedir. Tablo 2’de bu metriklerin eğitim sonucunda oluşan karşılıkları görülmektedir.

$$\text{Hassasiyet} = \frac{TP}{TP + FP} \quad (1)$$

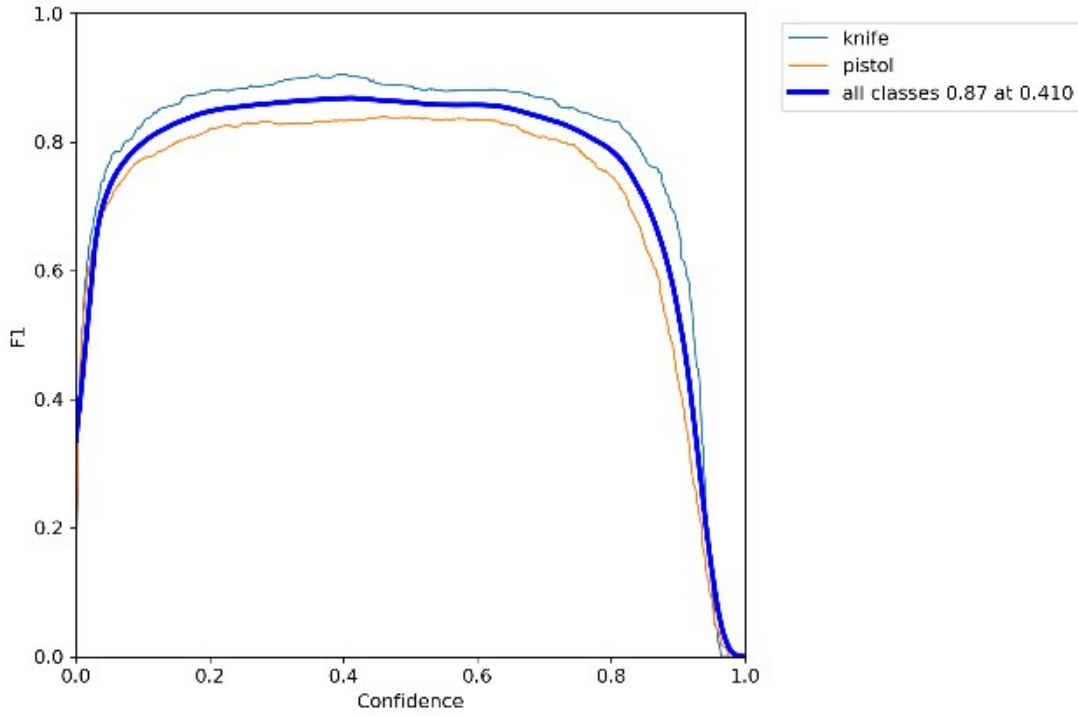
$$\text{Duyarlılık} = \frac{TP}{TP + FN} \quad (2)$$

$$F1 = \frac{2 * \text{Hassasiyet} * \text{Duyarlılık}}{\text{Hassasiyet} + \text{Duyarlılık}} \quad (3)$$

Sınıflar	Hassasiyet (Precision)	Duyarlılık (Recall)
Silah	%90.2	%77,4
Bıçak	%96.3	%85,4
Toplam	%93.3	%81,4

Tablo 2: Eğitim hassasiyet ve duyarlılık değerleri

Bu değerlerin eğitim boyunca alınan harmonik ortalaması ile oluşturulan F1 eğrisi Şekil 8’de görülmektedir.

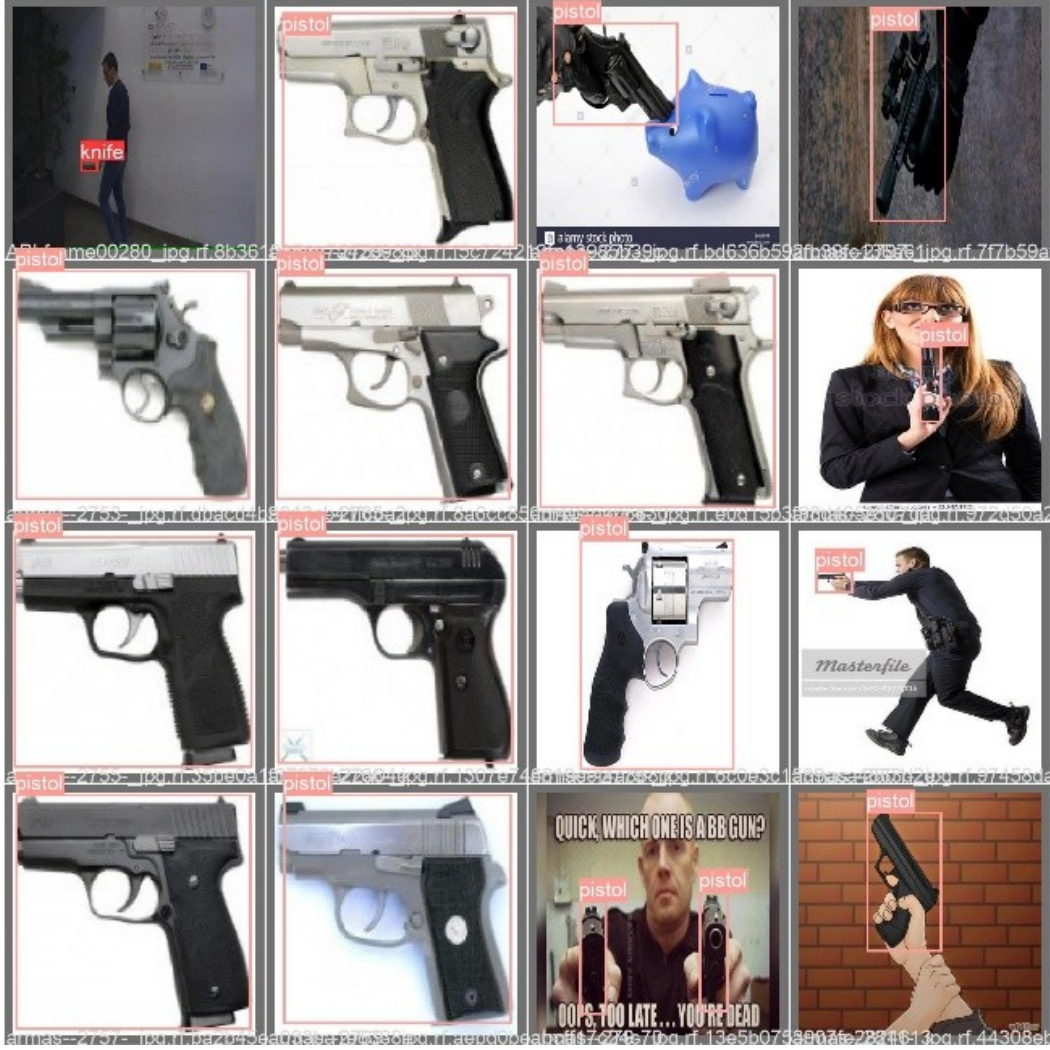


Şekil 8:Eğitimin F1 eğrisi

Model başarısının ölçülmesi için doğrulama kümesi eğitilmiş modelden geçirilmiştir. Oluşan sonuçlar, Şekil 9’da aktarılmaktadır.

## SONUÇLAR

Bu çalışmada tasarlanan yapay zekâ modeli ile eğitim kurumlarının güvenliği tek bir sistem ile kontrol edilebilecek, şüpheli kişilerin kesici ve delici alet kullandığı saniyeler içinde %90 doğrulukla tespit edilebilecek ve tehlikeli olayların kötü sonuçlarından maksimum seviyede korunmuş olunacaktır. Bu sayede az maliyet ve düşük insan gücüyle eğitim kurumları güvenli bir ortam haline getirilecektir. Çalışmanın UNESCO’nun 2030 sürdürülebilir kalkınma hedeflerinden herkes için eğitim projesine [10] hizmet etmesi amaçlanmaktadır. Bu sayede *kapsayıcı ve eşit kalitede eğitim almayı ve herkes için hayat boyu öğrenme fırsatlarını teşvik etmek* maddesine katkı sağlanması öngörülmektedir. Öte yandan eğitilen modelden alınan sonuçlar ile sınıflandırıcı model uç uça eklenerek erken tespit ve alarm sistemi çalışmanın bir sonraki fazının içeriğini oluşturulacaktır.



Şekil 9: Modelin doğrulama kümesi sonuçları

## TEŞEKKÜR

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**ERGENLERDE AİLE BÜTÜNLÜK DUYGUSU VE ÖZNEL ZİNDELİĞİN POZİTİF  
RUH SAĞLIĞI ÜZERİNDEKİ ROLÜ**

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**ÖZET**

Aile, içine büyüdüğümüz toplumun en küçük birimidir. Ailede birçok şeyi öğrenmekteyiz bunlar için konuşmadan tutun da karakterimizi, kültürümüzü toplumun bütünlüğüne kadar her şeyi hemen hemen aileden öğrenmekte olduğumuzu söyleyebiliriz. Aile, toplumda nüfusun kaynağını oluşturmakla birlikte toplumun temeli olarak bilinmektedir. Aile annelik babalık ve çocuk rollerinde kişilerin sosyal ve toplumsal olarak kabul ettiği bir çatı veya birlik olarak yaşamakta olduğu kabul edilmektedir bu durumda da kendi içinde kültürel ve yapı olarak incelendiğinde sosyal bir yapıdır. Böylelikle yapı içerisinde ailenin dengelerini koruyabilmek için her birey kendi rolüne uygun davranış göstermesi gerekmektedir. Ailede kişilerin sayıları ve rolleri toplumlar arası değişiklik göstermekle birlikte kırsal bölgelerde kentsel bölgelere göre üye sayısı daha fazla olan geniş aileler bulunmaktadır. Burada hem birey hem toplum için aile bütünlüğünün bireyde sağlam olması çok önemlidir. (Nazlı, 2018:32). Bireyleri dinamik, güvenli, sağlıklı, uyarıcı ve mutlu olması, empati kurabilme, kimliklerini kabul etme, yeteneklerini- ilgilerini araştırma ve kendini geliştirmeyi pozitif yönde etkilemektedir. Aile ile bireyin bir bütün olması araştırmalara da bakıldığında bireyin gelişimi, topluma karışması için önem arz eder. Bu durumda birey bütünlüğünün önemli olacağı gibi aile bütünlük duygusu da bireyler için özellikle de kişiliğimizin oturmaya başladığı dönemler için çok kritiktir. Aile bireylerinin stresli durumların üstesinden gelmesi ve aile bütünlüğü duygusunu gelişmesi için, bütünlük duygusunu bireyselden aileye doğru aktarılması ve aile bütünlük duygusu ile ailenin pozitif ruh hali uyumunu ilişkili hale getirmesi gerekmektedir (Antonovsky1988:21-25). Toplum hayatında pozitif, dinamik, mutlu olmanın temel gerekçilerden bir tanesi pozitif bakış açısına yönelik olarak öznel olarak iyi hissetmesi kişinin psikolojik olarak da iyi hissetmesinden geçer (Peterson, 2000: 108-125). Kişilerin psikolojik olarak daha iyi hissetmesi öznel zindeliklerinin güçlenmesi ile doğru orantılı olarak kabul edilmektedir. Buna göre bu çalışmada aile bütünlük duygusu ve öznel zindeliğin pozitif ruh sağlığı üzerindeki rolü incelenmiş olup nicel yöntemler; spss analizleri ile yapılan ilişki tarama, betimsel analiz, korelasyon ve regresyon analizlerini içermektedir.

**Anahtar Kelimeler:** Öznel Zindelik, Pozitif Ruh Sağlığı, Aile, Aile Bütünlüğü

**THE ROLE OF FAMILY INTEGRITY AND SUBJECTIVE VITALITY ON  
POSITIVE MENTAL HEALTH IN ADOLESCENTS**

**ABSTRACT**

The family is the smallest unit of the society we grew up in. We learn many things in the family, so we can say that we learn almost everything from the family, from speaking to our character, our culture, and the integrity of the society. The family is known as the basis of the society as well as forming the source of the population in the society. It is accepted that the family lives as a roof or unity that people accept socially and socially in the roles of mother, father and child, and in this case, it is a social structure when it is examined in terms of culture and structure. Thus, in order to maintain the balance of the family within this structure, each individual must behave in accordance with his/her own role. Although the number and roles of people in the family vary between societies, there are extended families with more members in rural areas than in urban areas. Here, it is very important for both the individual and the society that the integrity of the family is strong in the individual (Nazlı, 2018:32). Being dynamic, safe, healthy, stimulating and happy affects individuals positively, being able to empathize, accepting their identities, researching their abilities-interests and self-development. The integration of the family and the individual is important for the development of the individual and his involvement in the society. In this case, as the integrity of the individual will be important, the sense of family integrity is also very critical for individuals, especially during the periods when our personality begins to settle. In order for family members to overcome stressful situations and develop a sense of family unity, it is necessary to transfer the sense of unity from the individual to the family and to associate the sense of family unity with the positive mood of the family (Antonovsky1988:21-25). One of the main reasons for being positive, dynamic and happy in social life is to feel good subjectively for a positive perspective, and to feel good psychologically (Peterson, 2000: 108-125). It is accepted that people feel better psychologically in direct proportion to the strengthening of their subjective vitality. Accordingly, in this study, the role of family cohesion and subjective vitality on positive mental health was examined. It includes relational screening, descriptive analysis, correlation and regression analyzes with spss analysis.

**Keywords:** Subjective Vitality, Positive Mental Health, Family, Family Integrity



## **1.GİRİŞ**

Antonovsky (1987) aile bütünlük duygusu kavramını, aile bireylerinin ortak olarak dünyayı daha anlaşılabilir, çözümlenebilir ve anlamlandırılabilir olarak kabul etmesine ilişkin bir duygu olarak tanımlamaktadır. Bütünlük duygusuna sahip ailenin karşılarına çıkan problemler ve stresli durumların üstesinden diğer aile yapılarına göre daha rahat gelmektedir (Antonovsky, 1979, 1987; akt: Çeçen 2008:1202). Aile bütünlüğü olmayan yapılarda olumsuz duygu durumlarına ve bunların bireyler ya da kişiler arası ilişkiler üzerindeki etkisine odaklanan geleneksel psikoloji yaklaşımını kabul eden araştırmaların odaklandığı durumların tersine (Greenglass, 2006:137), pozitif psikolojiyi konu alan araştırmalar hayatın pozitif, olumlu ve iyi olan özelliklerine odaklanmaktadır (Seligman, 2002; Uysal, Sarıçam ve Akın, 2014:137). Pozitif psikolojinin bir kavramı olan öznel zindelik, bireylerin canlı ve enerji dolu olmasına yönelik göndermeleri bulunmaktadır (Ryan ve Frederick, 1997:184). Öznel zindelik, bireylerin hayatlarını nasıl pozitif durumlarla değerlendirdikleri ile ilgili temel olarak kabul edilebilir. İçsel olan kaynaklarla ilgili olan neşeli, pozitif, enerjik ve mutlu olma ile ilgili olan (Fini, Kavousian, Beigny ve Emami, 2010:137), hem zihinsel hem de fiziksel boyutu bulunmaktadır (Ryan ve Frederick, 1997:1223). Öznel zindelik ergenlerin birey olma yolundaki yaşam doyumları ve duygulanımlarını, motivasyon ve öz saygıları ile pozitif ilişkiliyi açıklayabilmektedir. Ergenlerin kontrol mekanizmalarında düzenleyici bir işleve sahip olan bu kavram iyi oluşun da yordayıcısı arasında (Ryan ve Fredrick, 1997:1223). Bu noktada pozitif psikoloji kavramlarından biri olan öznel zindelik grupların, bireylerin ve toplumların iyi oluşlarının ideal fonksiyonelliğine ulaşmalarına katkı sağlamaktadır (Gable ve Haidt, 2005:184). Bunun için ergen bireyin içsel mutluluk, affedicilik, iyimserlik, empati gibi pozitif özelliklerini ön planda tutarak patoloji odaklı olmaktan uzak durması gerektiği savunulmuştur (Seligman, 2002:184). Geleneksel psikoloji anlayışının aksine pozitif psikolojinin araştırmaları bireylerin yaşamlarının pozitif yönlerine odaklanmaktadır (Ryan ve Frederick, 1997:184). Öznel zindelik kişilerin enerjik, sağlıklı ve canlı karakterize edilen bir kavramdır ve Akın (2012) da öznel zindeliğin içsel mutlulukla doğrudan ilişkili olduğunu belirtmiştir. Bu araştırmada incelenen bir diğer kavram olan pozitif ruh sağlığı bireylerin davranışlarını bilimsel yolla inceleyen bir disiplin olarak tanımlanmaktadır (Doğan,2016). Modernleşmenin etkisindeki sorunlara odaklı olan psikolojinin insanı olumsuz duygu durumuna ve insanların zayıf yönlerine yaptığı öneme karşı, koruyucu/önleyici olan pozitif

ruh sağlığı kişinin güçlü ve olumlu yönlerine odaklanmıştır. Bireylerin gelişimlerinin sağlıklı olmasına bağlı olarak da

bireylerin güçlü yönlerini ön plana çıkarmayı amaçlayan pozitif psikoloji akımlarından biri olan pozitif ruh sağlığı bireylerin kaliteli ve iyi bir hayat sürmelerini sağlamak için ortam oluşturmak ve bireyin baskın olan pozitif yönlerini ortaya çıkarmak için önemli bir etken olarak görülmektedir ( Kararımak ve Siviş, 2008:30).

Yapılan literatür taramasında, günlük yaşamamızda birileri tarafından gücendirilmek ya da birilerini gücendirme gibi olumsuz duygular barındıran yaşam olaylarına karşı karşıya kalma ihtimalini göz önüne almaktadır. Bu olumsuz günlük olaylarla başa çıkabilmek yaşamı daha olumlu ve sağlıklı devam ettirmek için pozitif ruh hali oldukça gereklidir (Ekşi, Erök-Özkapu ve Ümmet, 2019:189). Olumsuz yaşam olayları kişiler arası ilişkilerle birlikte öncelikle aile içinde sonrasında ise çevreye etki eder. Aile bütünlüğü ise kişilerin iyi oluş düzeylerini, yanlışlara ilişkin bakış açılarını düzenleyerek bireyin hatalı olan kişiye, hataya ve yapılan hatanın oluşturduğu sonuçlara yönelik geliştirdiği tepkilerinin olumsuzdan olumluya doğru bir yol çizmesi anlamını bireylere aşılacaktır. Olumlu olmayan her duyguya sebep olan hatalı duygu veya davranışın kaynağı kişinin kendisinin de olabileceği gibi dışarıdan kontrol edilemeyen bir etken veya başka bir birey olabilmektedir. Bireylerin karşı karşıya kaldıkları durumlara hangi açıdan baktıkları, savunma mekanizmalarını nasıl kullandıkları, iletişim şekilleri aile bütünlüğü ile beraber öznel zindeliklerini ve ruh sağlıklarını nasıl etkilediği de değerlendirmektedir. Olaylara olumlu bir bakış açısıyla yaklaşan bireyler sorun yaratan durumlarla daha özgüvenli ve rahat bir şekilde mücadele edebilmektedir. Bu olumlu bakış açısında rol alan ve bireyin davranışlarını yönlendiren şey iyimserliktir. Bireyler karşılaştıkları sorunlara karşın yaşanan durumlara pozitif bakabilirlerse hayatı daha yaşayabilir bulup hayattan daha fazla doyum elde edeceklerdir. Bireyin dıştan gelen motivasyona bağlı kalmaksızın enerjik, pozitif ve canlı olmasından bahseden öznel zindelik, pozitif ruh sağlığının da iyi oluşuyla ilişkili olmasını (Ryan ve Frederick, 1997:1223) aile bütünlüğünün sağlam olması ile ilişkilendirmektedir. Buna bakılarak aile bütünlüğü, pozitif ruh sağlığı ve öznel zindelik kavramları araştırmacılar tarafından ilgi gören kavramlar arasında yer almaya başlamış olsa da üçünün bir arada ele alındığı ve üç değişken arasındaki ilişkiye birlikte bakılmış herhangi bir çalışmaya rastlanmamış olması konunun önemini yansıtmaktadır. Bununla birlikte, pozitif ruh sağlığı ve öznel zindelik kavramları arasındaki

ilişkiden oluşan demografik değişkenlerin farklılık durumlarına bakılarak elde edilen bulguların ergenlerle çalışan uzmanlara yol gösterebileceği düşünülmektedir.

Açıklamalardan anlaşılacağı üzere aile bütünlük duygusu öznel iyi olma ve pozitif ruh sağlığı ile ilişkili olduğu kavramları belirlemeye yönelik araştırmalar yapılmıştır.

## **2. AİLE BÜTÜNLÜK DUYGUSU ÖLÇEĞİ**

Ölçeğin orijinali Antonovsky ve Sourani tarafından 26 madde olarak geliştirilmiş, daha sonra Sagy tarafından 12 maddelik kısa formu oluşturulmuştur. Ölçek 1 ile 7 arasında değişen likert tipinde bir kişinin aile bütünlük duygusunu değerlendirme ölçeğidir. Ölçek sonucunda yüksek puan alan kişiler aile ilişkilerine yönelik olan bütünlük duygusunun yüksek olduğunu ifade eder. Öncesinde yapılan güvenilirlik ve geçerlik çalışmalarında ölçeğin toplam puan korelasyonlarının .45 ile .65 arasında değişiklik gösterdiği ve ölçeğin aile işlevlerini değerlendirmelerinde pozitif işlevlerle olumlu ve orta düzeyde yüksek, olumsuz işlevlerde ise negatif korelasyonlara sahip olduğu Sagy tarafından belirtilmektedir. Ölçeğin iç tutarlılık katsayıları ise .88 (Sagy, 1998:1205) ve .77 (Sagy & Dotan, 2001:1205) olarak belirtilmektedir.

## **3. ÖZNEL ZİNDELİK ÖLÇEĞİ**

Bireylerin kendileri ile ilgili bilgileri vermelerine yoğunlaşmış ölçme aracı olan ÖZÖ yine kendilerini iyi hissetmelerine yönelik yaşadıkları kişisel deneyimleri ve zinde oluş düzeylerini belirlemeye yönelik olan ölçme aracıdır. ÖZÖ 7 maddeden oluşmaktadır ve 7'li Likert (1kesinlikle katılmıyorum-7 kesinlikle katılıyorum) türü olan ölçme aracıdır. Ölçekte bulunan bütün maddelerden elde edilen puanlar toplanarak bireyin öznel zindelik puanı hesaplanmaktadır. Ölçeğin 2. maddesi ters kodlanmaktadır. Ölçekte bulunan puanların ranjı 7 ile 49 arasında değişmekte olup ölçeğin yüksek puanları bireylerin öznel zindelik düzeylerinin yüksek olduğunu göstermektedir. Ölçekte maddeler tek faktörde toplanmakta ve tek faktör modelin toplam varyansı %62 sini açıkladığı gözlemlenmiştir (ÖZÖ; Ryan ve Frederick, 1997:139).

## **4. POZİTİF RUH SAĞLIĞI ÖLÇEĞİ**

Lluch tarafından tanımlanan pozitif ruh sağlığının kavramsal modeli, pozitif ruh sağlığını ölçmek amacıyla geliştirilmiştir. 4'lü Likert ölçek biçiminde olmakla birlikte ölçekte ters ve düz maddeler bulunmaktadır. Ölçekten alınacak puan 39-156 aralığındadır. Bireylerin yüksek puan almaları pozitif ruh sağlığının olumlu etkilendiğini göstermektedir. Ölçeğin iç tutarlılık

katsayısı 0.89, test-tekrar test güvenilirlik katsayısı 0.92 olarak belirlenmiştir (Lluch-Canut, 1999).

### **3. YÖNTEM**

Araştırmanın evreni, yöntemi ve örnekleme, veri toplama araçlarının yapısı ve psikometrik özellikleri, veri toplama süreci ve verilerin analizi ile alakalı bilgilere yer verilmiştir. Araştırma süreci likert ölçekler aracılığıyla tamamlanacak olup, ergenlerde aile bütünlüğü, öznel zindelik ve pozitif ruh sağlığı düzeyleri ile yaş ve aile bütünlük durumları arasındaki farklılaşmaya bakılacaktır. Ayrıca aile bütünlüğü, öznel zindelik ve pozitif ruh sağlığı arasındaki ilişki incelenmiştir. Bu araştırmanın çalışma grubunu örnekleme yöntemi ile seçilmiş yaşları 13 yaş ve üzeri bireyler oluşturmaktadır. Örneklem seçiminde İstanbul, Küçükçekmece ilçesinde öğrenim gören öğrenciler katılım sağlamıştır. Ölçeklere yanıt veren herkes aynı zamanda araştırmanın örnekleimidir. Katılımcılar araştırmada kullanılan form ve ölçekleri yüzyüze ve online şekilde doldurmuşlardır. Tük, verilerinden elde edilen bilgiye göre evreni oluşturan, Küçükçekmece ilçesinde 13 yaş üstü 789.633 birey arasından en az 400 öğrenci örneklem büyüklüğüne ulaşılması hedeflenmektedir.

Aile bütünlük duygusunun, öznel zindeliğe ve pozitif ruh sağlığına etki eden puanlarının olumsuz yaşantı yaşayıp yaşamamaya göre farklılaşp farklılaşmadığına bakmak için kullanılmıştır.

### **4. AİLE BÜTÜNLÜK DUYGUSU, ÖZNEL ZİNDELİK, POZİTİF RUH SAĞLIĞI KONULARINDAKİ ÇALIŞMALAR**

Aile Bütünlük Duygusu çalışmalarına bakacak olursak; Çamaş'ın yaptığı araştırma ile başlayacak olursa üniversite öğrencileri ile birlikte yaptığı bu araştırma damgalama düzeyleri ile ilgilidir. Araştırma da aile bütünlük duygusu yer almakla birlikte sosyal destek ve öz yeterlilik ile ilişkisinden de bahsetmektedir (Güler,2019:41). Turan'ın araştırması evli çiftler ile yapılmış olup, evlilikte bireylerin birbirini desteklemesi ve problem durumlarına karşı

nasıl bir çözüm yöntemi uyguladıklarını incelemiştir. Turan'ın araştırmasında bireylerin problemlerini çözme becerileri ve aile bütünlük duygusu arasında anlamlı bir ilişki bulunmuştur. Çeçen'in araştırmasına bakacak olursak yetişkin ve ergen grupları ile çalışmış olup bireysel ve aile bütünlük duygusuna bununla birlikte yaşam doyumu ve benlik saygısını araştırmıştır. Bu araştırma da ise bütünlük duyguları ile yaşam doyumu ve benlik saygısı

arasında anlamlı bir ilişki bulunmuştur (Güler,2019:41). Yurt dışında ki araştırmalara göz atacak olursak 1995 yılında Myers ve Diener'in araştırması için bireyler arasında yakın ilişki kurmanın cinsiyet,yaş,ırk ve ekonomik düzeyden daha pozitif bir bakış açısı elde ettikleri araştırılmıştır. Buna göre bireyler aile içinde hayata bakış açılarını anlamlı bir şekilde yorumladıkları zaman yaşam istekleri anlamlı bir şekilde artış göstermektedir (Çeçen, 2008:26). Öğrenciler üzerinde çalışılan bir diğer çalışma ise Liesl ve Abraham'ın yine öğrenciler üstünde çalışmışlık bir bütünlük duygusu çalışmasıdır. İçsel kaynakları kullanma, bireyin potansiyelleri, ikili ilişkiye yönelik bir çalışma olup sonucunda içsel motivasyon kaynaklarının aile ve bireysel bütünlük duygusu arasında tamamen anlamlı bir ilişki bulmuşlardır (Güler,2019:41).

Öznel zindelik kavramı için ilk olarak Akin'ın çalışmasıyla başlayacak olursak, üniversite lisans öğrencileri hedef kitlesi ile internet bağımlılığı ile öznel mutluluk arasında ki ilişkiyi ele almıştır. Çalışmanın sonucuna göre öznel mutluluk ve internet bağımlılığı arasında ilişki olmadığı sonucuna varılırken öznel mutluluk ve zindelik arasında anlamlı bir ilişki bulunmuştur (Sivri,2019: 49). (2015) üniversite öğrencileri ile birlikte yaptığı çalışma da öznel zindelik, kendini affetme, mutluluk, yaşam enerjisi, öznel iyi oluş kavramlarının ara değişken olma yönünü test etmiştir. Yapılan bu araştırma sonucunda öznel iyi oluş, öznel zindelik ve kendini affetme değişkenleri arasında anlamlılık ortaya çıkmıştır (Sivri,2019: 49). Çelik ve Topçuoğlu'nun yaptığı çalışmada üniversite öğrencilerinin katılımıyla proaktif kişilik, öznel zindelik ve merak değişkenlerinin arasında ki ilişki incelenmiş ve bu değişkenlerin aracılık etkileri de araştırmaya konu olmuştur. Öznel zindeliğin, proaktif kişiliğin ve merak duygusunun anlamlı bir ilişkisi olduğu sonucuna ulaşılmıştır. Sarıçam, lise öğrencileri ile öznel zindelik ve okul tükenmişliği değişkenleri üstünde çalışmış ve araştırmanın sonucunda iki değişken arasında anlamlı bir ilişki bulunmuştur (Sivri,2019: 50). Yurt dışı araştırmalarına da göz atacak olursak Fini ve arkadaşları üniversite öğrencilerinin katılımıyla psikolojik iyi oluş, üniversite uyumu, öz yeterlilik, yaşam doyumu, yaşam becerileri ve öznel zindelik arasında bir ilişki olup olmadığını incelemiş buna yönelik olarak

da psikolojik iyi oluşun, yaşam becerilerinin ve yaşam doyumunun öznel zindelik ile anlamlı bir ilişkisi olduğu sonucuna varılmıştır (Sivri,2019: 51). Ryan ve Frederick birlikte yaptıkları çalışmada birçok değişkeni ele almış ve bu değişkenler ile öznel zindelik arasındaki ilişkiyi incelemiştir.

Literatür taramasında pozitif ruh sağlığına yönelik çok araştırma bulunmamakla birlikte Pozitif ruh sağlığı alanında araştırmacıları inceleyecek olursak; Araştırmacılar mental sağlık ile pozitif ruh sağlığı arasındaki tezatlıktan yana her iki kavramında mental sağlığa katkıda bulunabileceği iki kavram olarak belirtmişlerdir ( Keyes, 2005; Suldo ve Shaffer, 2008).

## **5.SONUÇ VE DEĞERLENDİRMELER**

Aile bütünlük duygusu ve öznel zindelik birlikte yaşa göre incelendiğinde anlamlı bir farklılık bulunamamış olup bu durumda aile bütünlük duygusu ve öznel zindeliğin yaş grubuna göre etkilenmediğini söyleyebilmekteyiz. Fakat aile bütünlük durumu ile birlikte incelendiğinde anlamlılık ortaya çıkmış olup ebeveynlerinin ayrı ya da birlikte olma durumlarının ergen bireyleri yakından etkilediğini belirtebilmekteyiz. Pozitif ruh sağlığı değişkenini alt boyutlarıyla yaş ve aile bütünlük durumu etkilerine göre incelediğimiz zaman anlamlı bir farklılık görülmemiştir. Bunlara ek olarak sonuç kısmında aile bütünlük duygusu ve öznel zindeliği pozitif ruh sağlığı ve alt boyutlarına göre incelediğimiz zaman regresyon analizlerinde anlamlılık elde edilmiştir. Buradan çıkardığımız sonuç aile bütünlük duygusu ve öznel zindeliğin pozitif ruh sağlığını alt boyutlarıyla birlikte olmak üzere etkilemiştir. Sonuçları değerlendirdiğimiz zaman aile bütünlük duygusu ve öznel zindelik boyutlarının ebeveynlerin ayrı ve ya birlikte olmasına göre etkilendiğini ve pozitif ruh sağlığına etki ettiğini belirtebilmekteyiz. Bu çerçevede bireylerin daha iyi, özgüvenli, hayatı seven, üretken bireyler olması için öncelikle aile bütünlük duygularının sağlam bir temele oturmuş olması yani bireyle birlikte ailelerinde ruh sağlığı konusuna önem verilmeli ve öznel zindelik duygusunun güçlenmesi için öz saygılarının, kendine güvenme, sosyal olma becerilerinin kuvvetlenmesi gerekmektedir.

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**ESKİ ÇAĞ TARİHİ'NİN TAHRİBATLARI ÜZERİNE GÖZLEMLER:  
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ABD

**ÖZET**

Eski Çağ'dan itibaren insanlar çeşitli amaçlarla yapılar inşa etmişlerdir. Bu yapılar konumlanmış oldukları bölgenin tarihinin aydınlatılmasında önemli rol oynamaktadırlar. Özellikle Tarih Öncesi Dönem olarak isimlendirilen, yazının icadından önceki sürecin aydınlatılması, tarihi yapılardan elde edilen veriler neticesinde mümkün olmaktadır. Anadolu, Eski Çağ'dan itibaren insanlar tarafından yerleşim yeri olarak tercih edilen önemli coğrafyalardan biridir. Anadolu'nun stratejik konumu ve yaşama elverişli imkanlara sahip olması yerleşim yeri olarak tercih edilmesinde önemli bir rol oynamıştır. Ancak buradaki tarihi yapılar, geçmişten günümüze kadar yoğun bir şekilde tahribata maruz kalmıştır. Anadolu'nun Eski Çağ Tarihi'nde önemli bir yere sahip olan Ağrı ilinde bulunan Patnos'ta gerçekleştirilen bilimsel kazı çalışmaları ve yüzey araştırmaları neticesinde tespit edilen buluntular, bölgenin özellikle Geç Kalkolitik Çağ'dan itibaren yoğun bir şekilde yerleşim gördüğünü kanıtlamaktadır. Bölgede 2019 ve 2022 yıllarında gerçekleştirdiğimiz yüzey araştırmaları sonucunda tarihi yapıların yoğun bir şekilde tahribata uğradığı gözlemlenmiştir. Bu tahribatın oluşmasında kaçak kazıların etkisinin büyük olduğu ifade edilebilir. Bununla birlikte bölgedeki tarihi merkezlerin bir kısmı günümüzde yöre halkı tarafından tarla olarak kullanılmaktadır. Bazı kalelerin sur duvarlarındaki taşlar modern evlerin inşasında kullanılmak üzere götürülmüştür. Yapılan bu tahribatlar bölgenin Eski Çağ Tarihinin izlerinin silinmesine neden olmaktadır. Bu çalışma, Patnos'ta tarihin derinliklerinden günümüze kadar önemli veriler taşıyan tarihi yapıların tahribatı hakkında bilgi aktarmayı ve bu tahribatın önlenmesini hedeflemektedir.

**Anahtar Kelimeler:** Eski Çağ Tarihi, Patnos, Yüzey Araştırması, Kaçak Kazı, Tahribat

**OBSERVATIONS ON THE DAMAGES OF ANCIENT HISTORY: THE CASE OF PATNOS (AĞRI)**

**ABSTRACT**

Since ancient times, people have built structures for various purposes. These structures play an important role in illuminating the history of the region where they are located. In particular, it is possible to illuminate the period before the invention of writing, which is called the Prehistoric Period, as a result of the data obtained from historical buildings. Anatolia is one of the important geographies preferred by people as a settlement since ancient times. The strategic location of Anatolia and its favorable opportunities for life played an important role in its preference as a settlement. However, the historical buildings here have been heavily damaged.

The finds identified as a result of scientific excavations and surveys carried out in Patnos in the province of Ağrı, which has an important place in the Ancient History of Anatolia, prove that the region was intensively inhabited, especially since the Late Chalcolithic Age. As a result of the surveys we carried out in the region in 2019 and 2022, it was observed that the historical buildings were heavily damaged. It can be stated that illegal excavations have a great effect on these damages. However, some of the historical centres in the region are currently used as fields by the local people. The stones on the city walls of some castles have been taken away to be used in the construction of modern houses. These destructions cause the traces of the ancient history of the region to be erased. This study aims to provide information about the destructions and damages of historical buildings in Patnos, which carry important data from the depths of history to the present day, and to prevent this damages.

**Keywords:** Ancient History, Patnos, Survey, Illegal Excavation, Damages

## 1. GİRİŞ

Anadolu; Eski Çağ'dan itibaren çeşitli uygarlıklara ev sahipliği yapmış bir coğrafyadır. Bu coğrafyadaki uygarlıklardan miras kalan kültürel varlıklar, tahribata uğramaktadır ve bu tahribat sonucunda yok olma tehlikesi içerisinde. Tahribatın oluşmasında doğa olayları ve afetlerin yanı sıra hızlı ve kontrolsüz kentleşme, kaçak kazılar ve kültür varlıklarının tarla olarak kullanılması gibi sebepler yer almaktadır.

Araştırma sahasını oluşturan Patnos, Doğu Anadolu bölgesinin Yukarı Murat - Van bölümünde yer alan Ağrı iline bağlı bir ilçedir. Patnos'un kuzeyinde Tutak ve Hamur, batısında Malazgirt, güney ve güneydoğusunda Adilcevaz, doğusunda ise Erciş ilçeleri yer almaktadır<sup>47</sup>.

Patnos, geçmişten günümüze kadar yoğun bir şekilde kullanılan önemli ticaret yollarının geçiş güzergahı üzerinde konumlanmıştır. Batı yönünden Trabzon - Gümüşhane - Bayburt - Erzurum - Hasankale - Tahir Geçidi - Eleşkirt - Ağrı - Taşlıçay - Doğubayazıt üzerinden gelerek Kuzeybatı İran'a ulaşan yol ağının Ağrı'dan ayrılan kolu Hamur-Tutak'tan geçerek Patnos'a ulaşır. Yol ağı, Patnos'tan devam ederek Erciş'ten Van'a varmaktadır. Erzurum - Van arasındaki yol ağının en önemli durak noktalarından birini ise yine Patnos oluşturmaktadır<sup>48</sup>.

Patnos'ta, çok sayıda bilimsel kazı çalışmaları ve yüzey araştırmaları gerçekleştirilmiştir. Söz konusu çalışmalar, bölgenin Eski Çağ'da önemli bir konuma sahip olduğunu göstermektedir. Bu bağlamda, bölgede 2019 yılında N. Ceylan'ın başkanlığında gerçekleştirilen yüzey araştırması<sup>49</sup> ve 2022 yılında tarafımızdan yürütülen yüzey araştırması neticesinde, bölgenin Eski Çağ Tarihi'ne ışık tutacak önemli merkezler tespit edilmiştir<sup>50</sup>. Bu merkezlerin hemen hepsinin tahribata uğramış olması, çağlar boyunca ayakta kalmayı başarmış olan bu yapıların tarihi dokusuna zarar vermiştir.

## 2. 2019 YILINDA PATNOS'TA TESPİT EDİLEN TARİHİ VE ARKEOLOJİK MERKEZLERİN TAHRİBATI

Bölgede 2019 yılında gerçekleştirilen yüzey araştırması sırasında incelenen merkezlerin büyük bir çoğunluğunda yoğun tahribat yapıldığı anlaşılmıştır. Bu merkezler arasında yer

<sup>47</sup> Yıldız, 1996: 1 vdd.

<sup>48</sup> Yıldız, 1996: 60; Ceylan-Günaşdı, 2018: 54 vd.; Ceylan, N. 2020: 361.

<sup>49</sup> N. Ceylan'ın bilimsel başkanlığındaki ekip tarafından yürütülen 2019 yılı yüzey araştırması hakkında geniş bilgi için bkz. Ceylan, N. 2020: 361-366.

<sup>50</sup> 2022 yılı yüzey araştırmaları yayın aşamasındadır.

alan, K. Balkan başkanlığında 1961-1962 yılları arasında bilimsel kazı çalışmaları yürütülen Giriktepe

Höyük'ün, sonraki süreçte kaçak kazılara maruz kaldığı gözlemlenmiştir<sup>51</sup>. Kaçak kazılar, höyüğün tarihi dokusuna büyük oranda zarar vermiştir (Foto 1).

Bölgenin önemli kalelerinden birisi olan ve Dizginkale köyünün 500 m batısında yer alan Dizginkale Kalesi II (İlk Tunç, Erken Demir, Orta Demir [Urartu], Geç Demir ve Orta Çağ) kaçak kazılar neticesinde büyük zarar görmüştür (Foto. 2). Yine bölgenin stratejik kalelerinden olan, Yalçinkaya köyünün hemen kuzeyinde yer alan Yalçinkaya Kalesi I (Geç Kalkolitik, İlk Tunç, Orta Tunç, Orta Demir [Urartu], Helenistik ve Orta Çağ) ve kalenin yaklaşık 3 km doğusunda yer alan Yalçinkaya Kalesi II (İlk Tunç, Erken Demir ve Orta Çağ) kaçak kazılar neticesinde yoğun tahribata uğrayan merkezlerdendir<sup>52</sup> (Foto. 3-4). Bunun yanı sıra Yalçinkaya Kalesi II'nin doğusunda yer alan nekropol alanı, iş makineleri ile tahrip edilmiştir.

Bölgedeki önemli obsidiyen işleme merkezlerinden biri olduğu düşünülen Bozoğlak Kalesi (İlk Tunç, Erken Demir, Orta Demir [Urartu] ve Orta Çağ) kaçak kazılar neticesinde tahrip olmuştur (Foto. 5). Kalenin hemen doğusunda yer alan Bozoğlak Nekropol Alanı (İlk Tunç, Erken Demir, Orta Demir [Urartu], Geç Demir, Helenistik ve Orta Çağ), yine kaçak kazılar sonucunda yoğun keramik verisinin gün yüzüne çıktığı merkezlerdendir (Foto. 6).

Günümüzde tarla olarak kullanılan, Çatmaoluk Köyünün 500 m doğusundaki Çatmaoluk Yerleşmesi (İlk Tunç, Erken Demir ve Orta Demir [Urartu]), Molla İbrahim köyünde yer alan Molla İbrahim Höyük (İlk Tunç ve Orta Çağ) ve höyüğün batısında bulunan Molla İbrahim Nekropolü ile Çay Mahallesi'nde tespit edilen Çay Mahallesi Yerleşmesi iş makineleri ile sürüldüğünden dolayı tamamen tarihi dokularını kaybetmişlerdir (Foto. 7-9).

Yukarı Kamışlı köyünün batısında yer alan Yukarı Kamışlı Kalesi (İlk Tunç, Erken Demir ve Orta Çağ) kaçak kazılar sonucunda tahribata uğrayan merkezlerden biridir (Foto. 10). Yukarı Kamışlı Köyü'nün su ihtiyacını karşılayan su deposunun kale ile aynı tepede bulunması, kalenin tahrip olmasına sebep olmuştur. Bunların yanı sıra, Bağdışan Mahallesi'nde bulunan ve üzerine modern evler inşa edilen Bağdışan Höyüğü (Geç Kalkolitik, İlk Tunç, Erken Demir, Orta Demir [Urartu] ve Orta Çağ), mahalle ile iç içe geçmiş durumdadır. Höyük alanı günümüzde bahçe ve tarla olarak kullanıldığından dolayı büyük oranda tahrip olmuştur.

<sup>51</sup> Giriktepe Höyüğü hakkında detaylı bilgi için bkz. Balkan, 1964: 239 vd.

<sup>52</sup> Yalçinkaya Kalesi I ve Yalçinkaya Kalesi II hakkında detaylı bilgi için bkz. Kalmış-Karageçi, 2021: 620-622.



### 3. 2022 YILINDA PATNOS'TA TESPİT EDİLEN TARİHİ VE ARKEOLOJİK MERKEZLERİN TAHRİBATI

Bölgede, 2022 yılında yüzey araştırması sırasında incelenen merkezlerin de büyük bir çoğunluğunun yoğun tahribata uğradığı görülmüştür. Bu merkezler arasında yer alan Andaçlı Kayalar Mezra Yerleşmesi I ve Andaçlı Kayalar Mezra Yerleşmesi II kaçak kazılar neticesinde tahrip olmuştur (Foto. 11-12). Ayrıca Andaçlı Kayalar Mezra Yerleşmesi II'nin üzerinden geçirilen yol, yerleşmenin büyük oranda yok olmasına neden olmuştur. Tarım ve mera arazileri açısından önemli bir noktada yer alan Andaçlı Yamaç Yerleşmesi, kaçak kazılar sonucunda büyük oranda tahrip olan merkezlerdendir (Foto. 13). Yerleşmenin eteklerinin tarla olarak sürüldüğü ve bu alanda yoğun keramik verisinin varlığı gözlemlenmiştir.

Eryılmaz köyünün hemen batısında yer alan Eryılmaz Yerleşmesi, kaçak kazılara maruz kalan merkezlerdendir (Foto. 14). Yerleşmenin zirvesinde, Eryılmaz Köyü'nün su ihtiyacını karşılamak amacıyla inşa edilen su deposu yer almaktadır. Yerleşme üzerinde bulunan kaçak kazı çukurları ve su deposu, yerleşmenin tahrip olmasına yol açmıştır.

Esenbel köyünün hemen batısında yer alan ve Patnos'ta tespit edilen önemli kalelerden biri olan Esenbel Kalesi'nin tepe kısmında büyük çaplı kaçak kazı çukuru mevcuttur (Foto. 15). Kalenin kuzey eteğinde, Esenbel Köyü'nün su ihtiyacını karşılamak amacıyla inşa edilen su deposu yer almaktadır. Su deposu, kalenin tarihi dokusuna zarar vermiştir.

Bölgenin Eski Çağ Tarihini aydınlatılması açısından önem arz eden, Gönlüaçık köyünün yaklaşık 1 km güneybatısında yer alan Gönlüaçık Kalesi ve Yerleşim Alanı'nda gerçekleştirilen kaçak kazılar neticesinde, yer altında bulunan duvar yapısı gün yüzüne çıkmış durumdadır (Foto. 16). Gönlüaçık Kalesi ve Yerleşim Alanı'nın 250 m kuzeydoğusunda yer alan Gönlüaçık Kalesi II, kaçak kazılar sebebiyle tahrip olan merkezlerdendir (Foto. 17).

2022 yılı yüzey araştırmasından anlaşıldığı kadarıyla en büyük boyutlu kaçak kazı çalışmaları, Kazanbey köyünün 3 km kuzeyindeki Kazanbey Yerleşmesi I (39 x 18 m) ve yerleşmenin 300 m kuzeybatısında bulunan Kazanbey Yerleşmesi II (16 x 11 m)'de gözlemlenmiştir (Foto. 18-19). Her iki yerleşme de iş makineleri ile tahrip edilmiş durumdadır. Yöre halkının ifadelerine göre Kazanbey Yerleşmesi II'de gerçekleştirilen kaçak kazılar sonucunda mimari bir yapı gün yüzüne çıkmıştır. Ancak bu mimari yapı, kaçak kazıların devamı neticesinde yıkılmış/yok olmuş durumdadır.

Patnos'ta tespit edilen kaleler göz önünde bulundurulduğunda, oldukça geniş bir alanı kontrol altında tutan nadir kalelerden birisi olan Kürekli Kalesi ve Nekropol Alanı, kaçak kazılar

neticesinde yoğun tahribata uğramıştır (Foto. 20). Ayrıca kalenin güney ve güneybatı eteklerinde bulunan Kürekli Yerleşmesi I'de gözlemlenen kaçak kazılar, çok sayıda mimari yapı kalıntısının gün yüzüne çıkmasına sebep olmuştur (Foto. 21). Kürekli Yerleşmesi II, yoğun tahribata uğrayan diğer bir merkezdir (Foto. 22). Yerleşmede açılan kaçak kazı çukurlarında, keramik verileri tespit edilmiştir.

Ürküt köyünün 1,5 km batısında yer alan Ürküt Yerleşmesi, iş makineleri ile kazılan merkezlerdendir (Foto. 23). Yerleşmedeki kaçak kazılar (en büyüğü 16 x 5,20 m), yerleşmenin birçok özelliğini kaybetmesine sebebiyet vermiştir. Daha önce nekropol olarak kayıt altına alınan merkezde, kaçak kazılarla tahrip edildiği için belirtilen özelliklere rastlanılmamıştır<sup>53</sup>. Patnos'taki önemli kalelerden birisi olan ve Yurtöven Köyünün yaklaşık 1 km kuzeybatısında bulunan Yurtöven (Turnatepe) Kalesi'nde de kaçak kazı çalışmaları yoğun bir tahribata sebep olmuştur (Foto. 24).

#### 4. SONUÇ VE DEĞERLENDİRME

Anadolu, coğrafi konumu, iklim şartlarının elverişliliği ve zengin su kaynakları gibi insan hayatını olumlu yönde etkileyen özellikleri nedeniyle Tarih Öncesi ve Tarihi Çağların her döneminde yerleşim yeri olarak tercih edilmiştir. Bu coğrafya, ev sahipliği yaptığı uygarlıkların izlerini taşımaktadır. Ancak günümüzde tarihi yapıların büyük bir kısmı tahribata uğramış durumdadır. Bu tahribatın meydana gelmesinde doğa olaylarının yanı sıra insan etkisi de oldukça büyüktür.

Araştırma sahasını oluşturan Patnos; zengin su kaynaklarının varlığı, önemli yol güzergâhlarının kesişim noktasında bulunması ve stratejik konumundan dolayı geçmişten günümüze kadar önemli uygarlıklara ev sahipliği yapmıştır. Eski Çağ'dan itibaren yerleşim gören Patnos'ta gerçekleştirilen yüzey araştırmaları neticesinde tespit edilen tarihi ve arkeolojik merkezlerde yoğun tahribatlara rastlanmıştır. Tahrip edilen merkezlerin hemen hepsinde, kaçak kazı çukurlarının varlığı gözlemlenmiştir.

Bölgenin Eski Çağ Tarihi'nin aydınlatılmasında büyük önem arz eden ve geçmiş yıllarda bilimsel kazı çalışmaları yürütülen Giriktepe Höyük'te sonraki yıllarda kaçak kazı çukurlarının açılmış olduğu görülmektedir. Bölgedeki bir başka önemli yerleşim yeri olan

<sup>53</sup> Daha önceki yıllarda tespit edilen yerleşme, "Duloz Mezarlığı" olarak kayıt altına alınmıştır. Detaylı bilgi için bkz. Özfirat, 2009: 352.



Kazanbey Yerleşmesi I, iş makineleri ile kazıldığından dolayı yok olmaya yüz tutmuştur. Bu alanda

gerçekleştirilen çalışmalarda, yoğun keramik verisi tespit edilmiştir. Bölgedeki bazı merkezler ise günümüzde tarla olarak kullanıldığından dolayı tamamen tahrip olmuştur. Çatmaoluk Yerleşmesi, Molla İbrahim Höyük ve Bağdışan Höyüğü, günümüzde tarla olarak kullanılan merkezlerdendir. Bölgede tespit edilen bazı tarihi yapıların üzerine, modern yerleşimlerin su ihtiyacını karşılamak amacıyla su depolarının inşa edildiği görülmektedir. Yine bu durum da tarihi yapıların tahribatına yol açmıştır. Yukarı Kamışlı Kalesi, Esenbel Kalesi ve Eryılmaz Yerleşmesi üzerinde su depolarının mevcudiyeti, söz konusu merkezlerin tahrip olmasında etkili olmuştur. Sonuç olarak Patnos'un Eski Çağ Tarihi'nin aydınlatılmasında önemli roller üstlenen tarihi ve arkeolojik merkezlerde gerçekleşen tahribat, bu merkezlerin korunması için gerekli önlemlerin alınması gerektiğini göstermektedir. Bu manada merkezi ve yerel yöneticilerin yanı sıra T.C. Kültür ve Turizm Bakanlığı'na, Milli Eğitim Bakanlığı'na ve eğitim kurumlarına önemli görevler düşmektedir.

Bilimsel kazı çalışmaları, kültürel mirasın korunması hususunda en etkili yöntem olarak değerlendirilmektedir. Patnos ve çevresinde bilimsel kazı çalışmalarının sayısının artırılması, bölgenin Eski Çağ Tarihi'nin korunması ve geleceğe aktarılması açısından önem arz etmektedir. Bölgede gerçekleştirilecek olan kazı çalışmaları sonlandığında, bu merkezlerin güvenliğinin artırılması gerekmektedir. Aksi takdirde Giriktepe Höyüğü örneğindeki, bilimsel kazı sonrasında bölgedeki merkezlerin tahribatının engellenemez olduğu görülmektedir.

Merkezi yönetim, yerel yönetimleri kültürel mirasın korunması için maddi olarak desteklemelidir. Yerel yönetimler, halka yakınlıklarından dolayı büyük bir kitleyi yönlendirebilme imkanına sahiptir. Bu sebeple, yerel yönetimler koruma kültürünün gelişip yaygınlaşmasında önemli roller üstlenmektedirler. Başta valiler, belediye başkanları ve kaymakamlar olmak üzere, kültürel mirası korumaya duyarlı yerel yöneticilerin yönetimde olması, halkın koruma bilincinin artırılmasını sağlamaktadır.

Bunun yanı sıra bölge halkına, konunun uzmanları tarafından, kültürel mirasın korunmasına yönelik seminerler tertip edilmelidir. Özellikle eğitim-öğretim çağındaki çocuklar, öğretmenler tarafından kültürel mirasın nasıl korunması gerektiği yönünde bilgilendirilmelidir. Milli Eğitim Bakanlığınca hazırlanan ders kitaplarında "kültürel mirasın korunması" konusuna ilişkin başlıklara yer verilmeli, öğretmenler bu konuya yönelik hizmet içi eğitime tabi

tutulmalıdır. Bu sayede öğrenciler, yaşamış oldukları çevrede bulunan tarihi yapıların koruyuculuğunu bilinçli bir şekilde üstlenebilmelidirler.

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**EKLER**

**FOTOĞRAFLAR**



**Fotoğraf 1.** Giriktepe Höyük



**Fotoğraf 2.** Dizginkale Kalesi II



**Fotoğraf 3.** Yalçinkaya Kalesi I



**Fotoğraf 4.** Yalçinkaya Kalesi II



**Fotoğraf 5.** Bozoğlak Kalesi



**Fotoğraf 6.** Bozoğlak Nekropol Alanı



**Fotoğraf 7.** Çatmaoluk Yerleşmesi



**Fotoğraf 8.** Molla İbrahim Höyük ve Nekropolü



**Fotoğraf 9.** Çay Mahallesi Yerleşmesi



**Fotoğraf 10.** Yukarı Kamışlı Kalesi



**Fotoğraf 11.** Andaçlı Kayalar Mezra Yerleşmesi I

**Fotoğraf 12.** Andaçlı Kayalar Mezra Yerleşmesi II



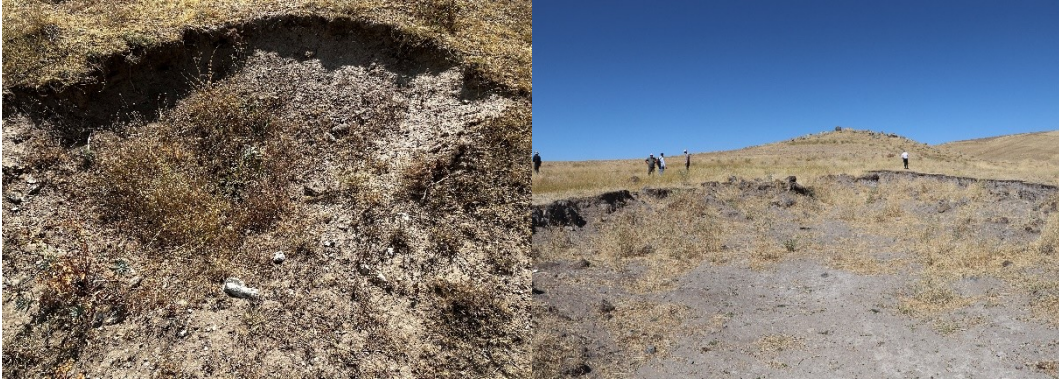
**Fotoğraf 13.** Andaçlı Yamaç Yerleşmesi

**Fotoğraf 14.** Eryılmaz Yerleşmesi



**Fotoğraf 15.** Esenbel Kalesi

**Fotoğraf 16.** Gönlüaçık Kalesi ve Yerleşim Alanı



**Fotoğraf 17.** Gönlüaçık Kalesi II

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**Fotoğraf 23.** Ürküt Yerleşmesi

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**FEN EĞİTİMİNDE 2005-2022 YILLARI ARASINDA BEYİN TEMELLİ  
ÖĞRENMENİN ÖĞRENCİLERİN AKADEMİK BAŞARILARINA ETKİSİ: BİR  
META-ANALİZ ÇALIŞMASI**

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**ÖZET**

Bu çalışmanın amacı, 2005-2022 yılları arasında yapılan beyin temelli öğrenmenin programda öngörülen yöntemle kıyasla öğrencilerin fen akademik başarısına etkisini meta analiz yöntemi kullanılarak genel etki büyüklüğünü hesaplamaktır. Aynı zamanda akademik başarı değişkeninin, öğretim kademesi, coğrafi bölge ve çalışılan yayın türü moderatörleri de ele alınmıştır. Bu sebeple konu alanında yapılmış olan çalışmalar incelenerek belirlenen ölçütleri karşılayan akademik başarı ile ilgili 27 çalışma için meta analize dahil edilmiştir. Bu çalışmadaki meta analiz sonuçları değerlendirildiğinde beyin temelli öğrenmenin öğrencilerin akademik başarı üzerindeki etki büyüklüğü 0.922 olarak hesaplanmıştır. Ulaşılan etki büyüklüğü Cohen (1988) sınıflamalarına göre; akademik başarı etki büyüklüğü “büyük düzey” olarak açıklanmaktadır. Thalheimer ve Cook (2002) akademik başarı etki büyüklüğü “geniş düzey” olarak açıklanmaktadır. Bu sonuçlara bakılarak beyin temelli öğrenme, programda öngörülen yöntemle göre öğrencilerin akademik başarı üzerinde anlamlı bir etkiye sahiptir ve olumlu yönde etki etmiştir. Araştırmaya dahil edilen çalışmalarda ayrıca beyin temelli öğrenmenin öğretim kademesi, coğrafi bölge ve çalışılan yayın türü göre karşılaştırmalı etki büyüklükleri hesaplanmıştır.

**Anahtar kelimeler:** Beyin Temelli Öğrenme, Beyin, Fen eğitimi, Meta analiz

**THE EFFECT OF BRAIN-BASED LEARNING ON STUDENTS' ACADEMIC ACHIEVEMENT IN SCIENCE EDUCATION BETWEEN 2005-2022: A META-ANALYSIS STUDY**

**ABSTRACT**

The aim of this study is to calculate the overall effect size of the effect of brain-based learning between 2005-2022 on students' science academic achievement compared to the method envisaged in the program, using the meta-analysis method. At the same time, moderators of academic achievement variable, academic level, geographical region and type of publication studied were also discussed. For this reason, the studies conducted in the subject area were examined and 27 studies related to academic achievement that met the determined criteria were included in the meta-analysis. When the meta-analysis results in this study were evaluated, the effect size of brain-based learning on students' academic achievement was calculated as 0.922. According to the Cohen (1988) classifications, the effect size reached; academic achievement effect size is described as “large level”. Thalheimer and Cook (2002) describe the effect size of academic achievement as “broad level”. Looking at these results, brain-based learning has a significant effect on the academic achievement of the students according to the method envisaged in the program and has a positive effect. In the studies included in the research, the comparative effect sizes of brain-based learning were calculated according to the teaching level, geographical region and the type of publication studied.

**Keywords:** Brain Based Learning, Brain, Science education, Meta-analysis



## 1. GİRİŞ

İnsanoğlu var olduğundan bu yana hep öğrenmeye ilgi duymuş, öğrenmeye açık olmuş, öğrenmenin nasıl gerçekleştiğini her zaman merak etmiş ve bu konuda çeşitli araştırmalar yapmıştır. Son dönemlerde teknolojinin yardımıyla da artan araştırmalar öğrenme sürecinin daha çok beyinle ilgili olduğunu ortaya çıkarmıştır. Nöroloji, bilişsel psikoloji ve eğitim alanında yapılan çalışmalar öğrenme ve öğrenmenin beyinde nasıl gerçekleştiğinin anlaşılmasını sağlayarak anlamlı ve nitelikli öğrenmelerin daha kolay bir şekilde gerçekleştirilmesine katkı sağlamaktadır (Harman ve Çökelez, 2012; Gözüyeşil, 2012). Günümüzde gelişen görüntüleme ve ölçme tekniklerinin kullanımı ile beynin iç yapısını daha iyi görebilmekte ve beynin içinde gerçekleşen olayları daha iyi kavrayabilmekteyiz. Eğitim, oldukça önemli ve heyecan verici bir döneme adım atmaktadır: Bu dönem, beyin çağı dönemidir. İnsan beyninin yapısı, işleyişi ve öğrenme metotları hakkında bugün eskiye göre çok daha fazla şey biliyoruz. Yeni bulgular ile bilgilerimiz sürekli olarak artış göstermektedir (Erlauer L., 2003).

Beyin temelli öğrenme, beynimizde öğrenmenin nasıl gerçekleştiğine dair bulgular ortaya koyan sinirbilim araştırmalarına dayalı, geniş kapsamlı bir öğrenmedir. Gelişimin çeşitli basamaklarında insan beyninin fonksiyonu ve yapısı hakkındaki bilgilere dayalı bir eğitim, öğretme ve öğrenme için biyolojik olarak bir çerçeve oluşmasını sağlar ve ortaya çıkan öğrenme davranışlarının açıklanmasına katkı sağlar (Gözüyeşil, 2012). Bu çok sayıda teknikler içeren bir kavramdır. Bu teknikler, öğrencilerin gerçek yaşam tecrübelerini öğrenmelerinde onlarla ilişki kuracak olan öğretmenlere rehberlik eder. Bütün öğrenmelerin bir anlamda beyin temelli olmasına karşın, beyin temelli öğrenme, anlamlı öğrenme için beyin kurallarının kabul edilmesini ve öğretimin zihindeki bu kurullarla örgütlenmesini içerir. Beyin bir örüntü detektörü gibi tasarlanmıştır. Eğitimciler olarak bizim işlevimiz, öğrencilere ‘bağlantılı örüntüleri’ anlamalarına olanak sağlayacak çeşitli tecrübeler sunmaktır (Caine, R.N. and Caine G., 2002; Albayrak, 2013; Yücel,2019; Canbulat ve Küçükkaragöz, 2014).

Fen bilimleri alanında yapılan çalışmalarda kullanılan beyin temelli öğrenmenin öğrencilerin fen dersindeki akademik başarılarına etkisini belirlemek amacıyla yapılan pek çok çalışma olmasına rağmen bu konuda yapılmış bir meta-analiz çalışmasına taramalarda çok az sayıda rastlanmıştır (Gözüyeşil, 2012; Ekemen, 2017). Bu sebepten, “Fen bilgisi derslerinde kullanılan beyin temelli öğrenmenin öğrencilerin akademik başarılarına etkisi nedir”

sorusuna verilecek cevap önem arz etmektedir. Bu çalışmada, fen eğitiminde beyin temelli öğrenmenin

etkisini inceleyen çalışmalar bir araya getirilerek fen eğitimine olan etkisini incelemek ve yorumlamak amaç olarak belirlenmiştir.

Bu araştırmanın amacı, fen eğitiminde kullanılan beyin temelli öğrenme etkinliklerinin yapıldığı 2005-2022 yılları arasındaki çalışmaların meta analiz yöntemi ile inceleyerek öğrencilerin fenedeki akademik başarılarına olan etkisini belirlemektir. Mevcut çalışmada beyin temelli öğrenmenin etkililiğini akademik başarı yönünden inceleyen deneysel çalışmalar bir araya getirilmiştir. Buradan hareketle meta analiz yöntemi kullanılarak beyin temelli öğrenmenin akademik başarı etki büyüklükleri hesaplanmıştır. Çalışmada ayrıca moderatör olarak seçilen değişkenlere ait alt problemler bulunmaktadır. Bunlar;

1. Beyin temelli öğrenmenin öğretim kademesi (İlkokul-Ortaokul-Lise-Lisans) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?
2. Beyin temelli öğrenmenin coğrafi bölgeler (İç Anadolu-Doğu Anadolu-Güneydoğu Anadolu-Ege-Akdeniz-Karadeniz-Marmara) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?
3. Beyin temelli öğrenmenin çalışılan yayın türü (Doktora, Yüksek Lisans, Makale) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?

## 2. YÖNTEM

### 2.1. Araştırmanın Yöntemi

Fen eğitiminde kullanılan beyin temelli öğrenme etkinliklerinin yapıldığı 2005-2022 yılları arasındaki çalışmaların öğrencilerin fenedeki akademik başarılarına olan genel etkisini belirlemektir amacı ile yapılan bu araştırmanın yöntemi meta-analiz yöntemidir. Meta-analiz, araştırma bulgularını inceleyerek bireysel çalışmalardan veri aktarma yöntemiyle elde ettiği nicel etki büyüklüklerini birleştirir ve bu bilgiyi analiz etmek için kullanır (Durlak, 2008). Meta-analiz, diğer analizlerin analizidir. Bireysel çalışmalardan elde edilmiş çok sayıda analiz sonuçlarını bütünleştirmek amacıyla kullanılan istatistiksel analizlerdir (Glass, 1976; Dinçer, 2014).

### 2.2 Örneklem

Mevcut meta analiz çalışması için yapılan literatür taraması sonucunda elde edilen ve meta analiz çalışmasına alınan, akademik başarı değişkenini inceleyen 26 adet bireysel çalışmaya ulaşılmıştır. Araştırmalar incelendikten sonra bazı çalışmalarda birden fazla çalışmaya dahil

olabilecek veri olduğu sonucuna ulaşılmış ve bu çalışmalar birden fazla çalışma olarak analize dahil edilmiştir. Bu çalışmalara ait bilgiler aşağıda verilmiştir.

➤ Akyürek (2012) yaptığı çalışmayı bir deney iki kontrol grubu ile gerçekleştirmiştir. Bu nedenle araştırmaya dahil edilecek iki ayrı veri oluşturdukları için çalışmalar ikişer çalışma olarak analize alınmıştır.

➤ Erduran Avcı (2007), yaptığı çalışmada belirlediği fen konusu hakkındaki araştırmasını iki farklı kontrol grubuyla gerçekleştirmiştir. Bu doğrultuda çalışmadan iki farklı başarı testi sonucunda veriler bulunmaktadır. Bu nedenle araştırma iki farklı çalışma olarak analize dahil edilmiştir.

➤ Inci (2014), yaptığı çalışmada bir deney iki kontrol grubu öğrencileri ile gerçekleştirmiş ve iki farklı akademik başarı verisi elde etmiştir. Bu sebeple araştırmaya iki farklı çalışma olarak dahil edilmiştir.

➤ Keles (2007), yaptığı çalışmada bir deney iki kontrol grubu kullanmıştır. Bu sebeple araştırmaya dahil edilecek iki ayrı veri oluşturdukları için çalışmalar ikişer çalışma olarak analize dahil edilmiştir.

➤ Oktay Esen (2014), yaptığı çalışmada belirlediği fen konusu hakkındaki araştırmasını iki farklı deney grubuyla yürütmüştür. Bu doğrultuda çalışmada iki farklı başarı testi sonucunda veriler yer almaktadır.

Bu nedenle araştırma iki farklı çalışma olarak analize dahil edilmiştir.

Bu durumlar sonucunda meta analize dahil edilen çalışma sayısı 31 olarak alınmıştır. Meta analiz çalışmasına dahil edilecek akademik başarı değişkenine ait 31 bireysel çalışmanın tamamındaki örneklem sayısı 863 deney grubu, 898 kontrol grubu öğrencisidir.

### **2.3. Verilerin Toplanması**

Bu araştırmada meta-analiz çalışması yapılacak konu hakkında; yayınlanmış ve yayınlanmamış tüm doktora tezleri, yüksek lisans tezleri, hakemli ve hakemsiz dergilerde yayınlanmış makaleler, YÖK'e ait tez katalogu, makale için Ulakbim, Eric, Ebsco gibi birçok veri tabanı, SSCI indeksli dergiler, Türkiye'deki üniversite kütüphanelerinin elektronik katalogları, konferans sunumları ve bildirimler gibi birçok kaynaktan yararlanılmıştır.

Veri toplamak amacıyla öncelikle internet ortamında “beyin temelli öğrenme”, “brain-based learning”, “brain compatible instruction”, “brain-based strategies”, “brain compatible classrooms” anahtar sözcükleri kullanılarak YÖK kütüphanesi, makaleler, bildiri kitapçıkları taranmıştır. Araştırmaların Türkiye’de yapılmış olan çalışmalar olmasına dikkat edilmiştir.

Çalışmaların bir kısmı deneysel araştırmalar olmadığından bu araştırmadan çıkarılmıştır. Bazı çalışmalar hem yüksek lisans/doktora tezi hem de bildiri olarak sunulduğundan bunlardan daha çok tezler dikkate alınarak analize dahil edilip kodlanmıştır. Taranan bazı deneysel çalışmaların meta analiz için gerekli sayısal verileri içermediğinden bu araştırmanın dışında bırakılmıştır.

Araştırmada yer alan çalışmaların seçiminde esas alınan kriterler aşağıda sunulmuştur:

1. Meta analize dahil edilecek çalışmaların zaman aralığı: Çalışmaların 2005-2022 yılları içerisinde yapılmış olması. Çalışmanın 2005 yılında başlamış olması, 2005 yılında Türkiye de yapılandırmacı yaklaşıma geçilmesinden kaynaklanmaktadır.
2. Yayınlanmış veya yayınlanmamış çalışma kaynakları: Yüksek lisans ve doktora tezleri, hakemli ve hakemsiz akademik dergiler, elektronik akademik dergiler, veritabanları, kongre ve sempozyumlarda sunulmuş bildiriler.
3. Çalışmalardaki araştırma yönteminin uygun olması: Meta analiz çalışmalarında standartlaştırılmış etki büyüklüğüne ulaşabilmek için, dahil edilen çalışmaların kontrol ve deney gruplarına sahip olmaları gerekmektedir. Çalışmada deney grubu ise beyin temelli öğrenmenin uygulandığı öğrenci grubunu temsil etmektedir.
4. Amaca uygun öğrenme yaklaşımının kullanılması: Deney grubunda beyin temelli öğrenme yaklaşımının kullanılması.
5. Yeterli sayısal veri içermesi: Meta analiz çalışması için gerekli olan etki büyüklüklerinin hesaplanabilmesi için, çalışmaya dahil edilen araştırmaların deney ve kontrol grupları için betimleyici sayısal verilere ihtiyaç duyulur. Bu amaçla deney ve kontrol gruplarında aşağıda sunulan değerleri verilen çalışmalar araştırmaya dahil edilmiştir:

- Örneklem büyüklüğü (N)
- Ortalama (M)
- Standart sapma (SD)

Bir çalışmanın araştırmamızdaki meta-analize dahil edilmemesi, çalışmanın araştırma sınırları içerisinde olmamasından ya da meta analiz için gerekli istatistiksel verilere sahip olmamasından kaynaklanmaktadır (Lipsey ve Wilson, 2001; Wolf, 1986). Bu yüzden dahil

edilme kriterlerine uygun olmayan çalışmalar, meta-analiz için kullanılacak araştırmalardan hariç tutulmuştur.

Meta-analiz çalışması ile ilgili araştırmalar toplandıktan sonra dahil edilme kriterlerine uyan çalışmaların, sonraki adımlarda meta-analiz çalışmaları arasındaki karşılaştırmalarda kullanılabilmesi için araştırmaların özelliklerini sürekli veya kategorik değişkenlere dönüştürecek bir kodlama yöntemi geliştirilmesi gerekmektedir. Meta-analize dahil edilen

çalışmalar ile ilgili mümkün olduğunca açık ve detaylı bir kodlama sistemi geliştirilmelidir. Araştırmada kullanılan kodlama sistemi üç bölümden oluşmaktadır. Birinci bölüm “çalışma kimliği”dir. Bu bölüm çalışmanın kimliğini tespit etmek amacıyla çalışmanın adı, araştırmayı yapan yazar veya yazarların adı, çalışmanın yapıldığı yıl gibi bilgileri içermektedir. İkinci bölüm “çalışma içeriği”dir. Bu bölümde beyin temelli öğrenmenin uygulandığı öğretim kademesi, çalışmanın uygulandığı coğrafi bölge, yapılan araştırmanın yayın türü gibi bilgiler yer verilmiştir. Çalışma verileri üçüncü bölümde yer almaktadır. Bu bölümde çalışmalarda deney ve kontrol gruplarının betimsel bilgileri belirlenmiştir.

#### **2.4. Verilerin Analizi**

Bu çalışmada verilerin analizinde, Meta-Analizi yöntemi kullanılmıştır. Bu yöntemin amacı  $d=(X_e-X_c)/SD$  formülü ile gösterilen, deneysel çalışmalarda yer alan deney ve kontrol gruplarının ortalamaları arasındaki farkların hesaplanmasıdır (Hunter ve Schmidt, 2004). Bu çalışmada etki büyüklüğü hesaplamasında Hedges “d” kullanılmıştır. Etki büyüklüğü “d”, işlemler arası farkın iki grubun birleştirilmiş standart sapması ile bölünmesidir (Cooper, 1989). Etki büyüklüğü ile incelenen bir olayın “Ne kadar etkin olduğu” sonucu bulunmaktadır (Cohen, 1988).

Araştırmanın bulgular ve yorum kısmında kullanılan hesaplamaların, tablo ve grafiklerin oluşturulmasında MS Office Excel 2007, Comprehensive Meta Analysis (CMA) istatistik programından yararlanılmıştır. Araştırmada istatistiksel analizlerin önemlilik düzeyi olarak .05 önemlilik düzeyi seçilmiştir. Bu çalışmada farklı veri türlerinin bir araya getirilmesinde kullanışlı olmasından dolayı CMA istatistik programı tercih edilmiştir.

Burada çalışma istatistiklerine göre sınıflamalar yapıldıktan sonra sabit etki modeli ve rastgele etki modeli kullanılarak meta-analiz yapılmıştır.

### **3. BULGULAR**

Gerçekleştirilen meta analiz çalışmasındaki temel amaç, beyin temelli öğrenmenin öğrencilerin akademik başarı etki büyüklüğünü hesaplamaktır. Bu doğrultuda literatür çalışmasında belirlenen dahil edilme kriterlerine uygun çalışmalar toplanmış ve analiz edilmiştir. Bunun sonucunda beyin temelli öğrenmenin programda öngörülen eğitim sistemine göre akademik başarı açısından etki büyüklüklerinin istatistiksel anlamda arasındaki fark açıklanmıştır. Ayrıca seçilen moderatörlere göre istatistiksel analizlere yer verilmiştir. Buna göre;

Yapılan meta analiz çalışmasının literatür taraması sonucu dahil edilme kriterlerine uyan çalışmaların yayın türüne göre (Tablo 1), çalışmanın yapıldığı yıllara (Tablo 2), çalışmaların uygulandığı öğretim kademesine (Tablo 3), çalışmanın gerçekleştirildiği coğrafi bölgeye göre (Tablo 4) göre frekans/yüzde istatistikleri aşağıda verilmektedir.

**Tablo 1. Çalışmanın Yayın Türüne Göre Dağılımı**

AKADEMİK BAŞARI		
Yayın Türü	Frekans	Yüzde
Doktora	8	25,80%
Yüksek Lisans	16	51,61%
Makale	7	22,58%
Toplam	31	100

Meta analiz çalışmasına dahil edilen çalışmaların yayın türüne göre dağılımı incelendiğinde; akademik başarı değişkenini inceleyen çalışmalarda tezlerin (77,41%) ağırlıklı olduğu görülmektedir. Tezler arasından ise en çok veri yüksek lisans tezlerinden elde edilmiştir. Yüksek lisans tezleri çalışmanın %51,61'ini oluşturmuştur.

**Tablo 2. Çalışmaların Yıllara Göre Dağılımı**

AKADEMİK BAŞARI		
Çalışma Yılı	Frekans	Yüzde
2005	1	3,22%
2007	4	12,90%
2008	4	12,90%
2009	1	3,22%
2010	2	6,45%
2011	1	3,22%
2012	3	9,67%
2013	4	12,90%

2014	5	16,12%
2016	1	3,22%
2017	1	3,22%
2018	2	6,45%
2019	2	6,45%
<b>Toplam</b>	<b>31</b>	<b>100</b>

Meta analiz çalışmasına dahil edilen çalışmaların yıllara göre dağılımı incelendiğinde akademik başarı değişkenini inceleyen çalışmaların 2012-2014 yılları arasında arttığı görülmektedir. Bu nedenle çalışmanın %38,70'ini bu yıllar arasında yapılan çalışmalar oluşturmaktadır.

**Tablo 3. Çalışmaların Öğretim Kademelerine Göre Dağılımı**

AKADEMİK BAŞARI		
Öğretim Kademesi	Frekans	Yüzde
İlkokul	3	9,67%
Ortaokul	21	67,74%
Lise	6	19,35%
Lisans	1	3,22%
<b>Toplam</b>	<b>31</b>	<b>100</b>

Meta analiz çalışmasına dahil edilen çalışmaların akademik başarı değişkeninde ortaokul düzeylerinde daha fazla çalışıldığı gözlenmiştir. Meta analize dahil edilen 31 çalışmanın 21 adeti ortaokul öğrencileri üzerinde yapılan çalışmalardan oluşmaktadır. Bu da çalışmanın büyük çoğunluğu olan %67,74 sına karşılık gelmektedir.

**Tablo 4. Çalışmaların Coğrafi Bölgelere Göre Dağılımı**

AKADEMİK BAŞARI		
Coğrafi Bölge	Frekans	Yüzde
İç Anadolu	9	29,03%
Doğu Anadolu	6	19,35%
G. Doğu Anadolu	0	0,0%
Ege	4	12,90%
Marmara	4	12,90%
Akdeniz	0	0,0%
Karadeniz	8	25,80%
<b>Toplam</b>	<b>31</b>	<b>100</b>

Coğrafi bölge olarak belirlenen moderatör analizi için yapılan araştırmalar incelenmiş akademik başarı değişkeni için “Güney Doğu Anadolu Bölgesi”nde ve “Akdeniz Bölgesi”nde gerçekleştirilen çalışmaya ulaşılamamıştır. Bu nedenle frekans tablosunda değeri sıfır(0)dır. Meta analiz çalışmasına dahil edilen araştırmaların akademik başarı değişkenini inceleyen 31



çalışmadan 9 tanesi “İç Anadolu Bölgesi”nde gerçekleştirilmiştir ve bu araştırmalar çalışmanın çoğunluğu olan %29,03’ünü oluşturmuştur.

### 3.1. Akademik Başarı ile İlgili Genel Etki Büyüklüğü Bulguları

Araştırmada “Fen eğitiminde kullanılan beyin temelli öğrenme öğrencilerin akademik başarısına olumlu etkisi var mıdır?” sorusuna cevap aranmıştır. 31 çalışmadan alınan grup ortalaması, standart sapma ve örneklem büyüklüğü verileri bireysel etki büyüklüğü ve genel etki büyüklüğü CMA 2.0 programı ile analiz edilmiştir. Verilerin yorumlanması için Cohen (1988) sınıflaması ve daha detaylı olan Thalheimer ve Cook (2002) sınıflandırması kullanılmıştır.

Meta analiz çalışmasına dahil edilen 31 çalışmanın bireysel etki büyüklükleri, p değerleri, alt ve üst limitleri aşağıda verilmektedir.

**Tablo 5.** Meta Analiz Çalışmasında Kullanılan Akademik Başarı Çalışmalarının Etki Büyüklükleri ve Çalışma Verileri

ÇALIŞMA KODU	ETKİ BÜYÜKLÜĞÜ	STANDART HATA	VARYANS	ALT LİMİT	ÜST LİMİT	P
AKYUREK,2012a	0,98	0,337	0,114	0,32	1,641	0,004
AKYUREK,2012b	1,293	0,351	0,123	0,606	1,98	0,000
ALBAYRAK,2013	1,965	0,355	0,126	1,269	2,66	0,000
ALBAYRAK,2019	0,709	0,328	0,108	0,067	1,352	0,031
AYDIN,2008	0,67	0,305	0,093	0,073	1,267	0,028
CAKIROGLU,2014	2,532	0,323	0,105	1,898	3,166	0,000
CELEBI,2008	0,336	0,243	0,059	-0,141	0,813	0,167
CORUHLU, ERNAS, KELES, 2016	0,59	0,265	0,07	0,071	1,109	0,026
DEMIRHAN,2010	-0,337	0,248	0,061	-0,823	0,148	0,173
ERDURAN AVCI,2007a	1,395	0,285	0,081	0,837	1,953	0,000
ERDURAN AVCI,2007b	0,947	0,267	0,071	0,423	1,47	0,000
GUNAY ERMURAT,2013	0,67	0,305	0,093	0,073	1,267	0,028
GURER,2012	0,306	0,245	0,06	-0,174	0,786	0,212
INCI,2014a	1,19	0,252	0,063	0,697	1,683	0,000
INCI,2014b	0,615	0,237	0,056	0,15	1,08	0,00

						9
KELES,2007a	0,792	0,271	0,073	0,262	1,323	0,003
KELES,2007b	0,396	0,253	0,064	-0,099	0,891	0,117
KILIC,2018	1,154	0,358	0,128	0,452	1,856	0,001
OKTAY ESEN,2014 a	1,843	0,356	0,126	1,146	2,539	0,000
OKTAY ESEN,2014 b	0,751	0,3	0,09	0,163	1,339	0,012
OKTAY, ÇAKIR,2013	0,845	0,356	0,127	1,148	2,542	0,000
ONER,2008	0,481	0,263	0,069	-0,034	0,997	0,067
OZDEN,2005	0,786	0,308	0,095	0,183	1,389	0,011
PALAVAN,2018	0,297	0,181	0,033	-0,058	0,652	0,101
SURAL,2013	0,991	0,275	0,076	0,451	1,53	0,000
UCUNCU, SAKIZ,2019	0,682	0,248	0,061	0,197	1,168	0,006
UCUNCU,2017	0,682	0,248	0,061	0,197	1,168	0,006
YILDIRIM,2010	0,845	0,372	0,138	0,117	1,574	0,023
YUCEL,2011	2,411	0,342	0,117	1,74	3,083	0,000
OZDEN, GULTEKIN,2008	0,786	0,308	0,095	0,183	1,389	0,011
TUFEKCI, DEMIREL,2009	0,928	0,233	0,054	0,471	1,385	0,000
Sabit Etkiler	0,824	0,050	0,003	0,726	0,922	0,000
Rastgele Etkiler	0,922	0,106	0,011	0,714	1,131	0,000

Çalışmaların bireysel etki büyüklükleri incelendiğinde etki büyüklüğünün negatif yönde (sıfırdan küçük) ve en küçük olduğu çalışma Demirhan (2010) “-0,337” etki büyüklüğüne sahiptir. Çalışmada etki büyüklüğünün pozitif yönde (sıfırdan büyük) ve en büyük olduğu çalışma Çakıroğlu (2014) “2,532” etki büyüklüğüne sahiptir. Çalışmaların etki büyüklükleri frekansları ve sınıflamaları aşağıda verilmektedir.

**Tablo 6.** Meta Analiz Çalışmasında Kullanılan Akademik Başarı Çalışmalarının Etki Büyüklükleri Yönüne Ait Frekans Tablosu

Etki Büyüklüğü Yönü	Frekans	Yüzde
Sıfır (0)	0	0
Pozitif (+)	30	96,77%
Negatif (-)	1	3,22%

<b>Toplam</b>	31	100
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Tablo 6' ya bakıldığında çalışmaların bireysel etki büyüklüğüne bakılan 31 çalışmanın 30 tanesi pozitif yönde etki ettiği söylenebilir. Yani Çalışmaların %96,77'si pozitif yönde %3,22'lik dilimi negatif yönde bir sonuç göstermektedir. Çalışmaların büyük bir bölümü pozitif yönde sonuç gösterdiğinden beyin temelli öğrenmenin programda öngörülen eğitim yöntemiyle işlenen derslere göre akademik başarı değişkeninin daha etkili olduğu sonucuna ulaşılmıştır. Çalışmaların etki büyüklükleri Cohen (1988) ve Thalheimer ve Cook (2002) sınıflandırmalarına göre yorumlanmıştır.

**Tablo 7.** Cohen (1988) Etki Büyüklüğü Sınıflaması

Sınıflama Düzeyi	Frekans	Yüzde
Önemsiz	1	3,22%
Küçük	5	16,12%
Orta	11	35,48%
Büyük	14	45,16%
<b>Toplam</b>	<b>31</b>	<b>100</b>

Cohen (1988) sınıflandırmasına göre çalışmaların ağırlıklı olarak etki büyüklüklerinin “büyük düzey”de olduğu görülmektedir. Etki büyüklüğü “büyük düzey”deki çalışmalar 31 adet çalışmanın 14 tanesi ile meta analiz çalışmasının %45,16 ini oluşturmaktadır. 11 tanesi %35,48'i ise “orta düzey”de etki etmektedir. Daha ayrıntılı bir sınıflandırma ile Thalheimer ve Cook (2002) sınıflandırması aşağıda verilmiştir.

**Tablo 8.** Thalheimer Ve Cook (2002) Etki Büyüklüğü Sınıflaması

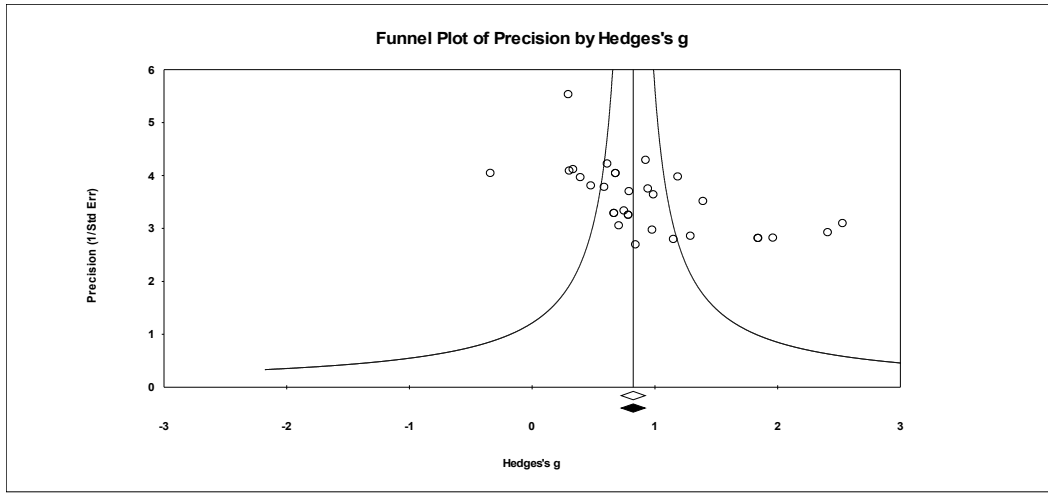
Sınıflama Düzeyi	Frekans	Yüzde
Önemsiz	0	0,00%
Küçük	4	13,33%
Orta	8	26,66%
Geniş	9	30,00%
Çok Geniş	4	13,33%
Muazzam	5	16,66%
<b>Toplam</b>	<b>30</b>	<b>100</b>

Thalheimer ve Cook (2002) sınıflandırmasına göre bir çalışmanın Demirhan (2010) etki büyüklüğü “-0,337” değerinde çıkmıştır. Bu değer, sınıflandırmanın dışında kalması sebebiyle

tabloya dahil edilmemiştir. Thalheimer ve Cook (2002) sınıflamasına göre çalışmanın %30,00'

unun “geniş etki” büyüklüğüne sahip olduğu görülmektedir. Çalışmanın etki büyüklükleri frekansına bakıldığında beyin temelli öğrenme lehine pozitif yönde olduğu söylenebilir. Fakat net bir görüş elde etmek için meta analizde birleştirilmiş etki büyüklüğüne bakmak gerekmektedir.

Yapılan analiz sonucu iki model için ayrı ayrı etki büyüklükleri hesaplanmıştır. Fakat önce çalışma modelini belirlemek gerekmektedir (Sutton, Abrams, Jones, Sheldon & Song, 2000). Çalışma modelini belirlemek üzere Heterojenlik Huni Grafiği aşağıda verilmiştir.



Şekil 1. Hedges's g Değerine Göre Etki Büyüklüklerinin Dağılım Huni Grafiği

Meta analiz etki büyüklüğü hesaplama programı olan CMA 2.0'da yapılan hesaplamalarla etki büyüklüklerinin dağılımının verildiği huni grafiğinde çalışmaların dağılımı ve yoğunluğun olduğu alan görülmektedir. Bireysel yapılan her çalışmanın hemen hemen hepsinin huninin içinde yer alması beklenmektedir. Çalışmaların huninin dışında da dağılım göstermesi çalışmaların frekanslarının heterojen bir şekilde dağılım gösterdiği fikrini vermektedir. Fakat bu grafik tek başına model belirlenmesi için yeterli veriyi vermemektedir. Bu sebeple çalışmaların “Q” veya “p” değerlerine bakılması gerekmektedir (Dinçer, 2014). Aşağıdaki tabloda değerler verilmektedir.

**Tablo 9.** Akademik Başarıyı İnceleyen Çalışmaların Heterojenlik Test Sonuçları

Q	Heterojenlik			Tau-squared	Tau-Squared		
	df	p	I <sup>2</sup>		Standard	Variance	Tau
					Error		
132,420	30	<,001	77,345	0,266	0,092	0,008	0,516

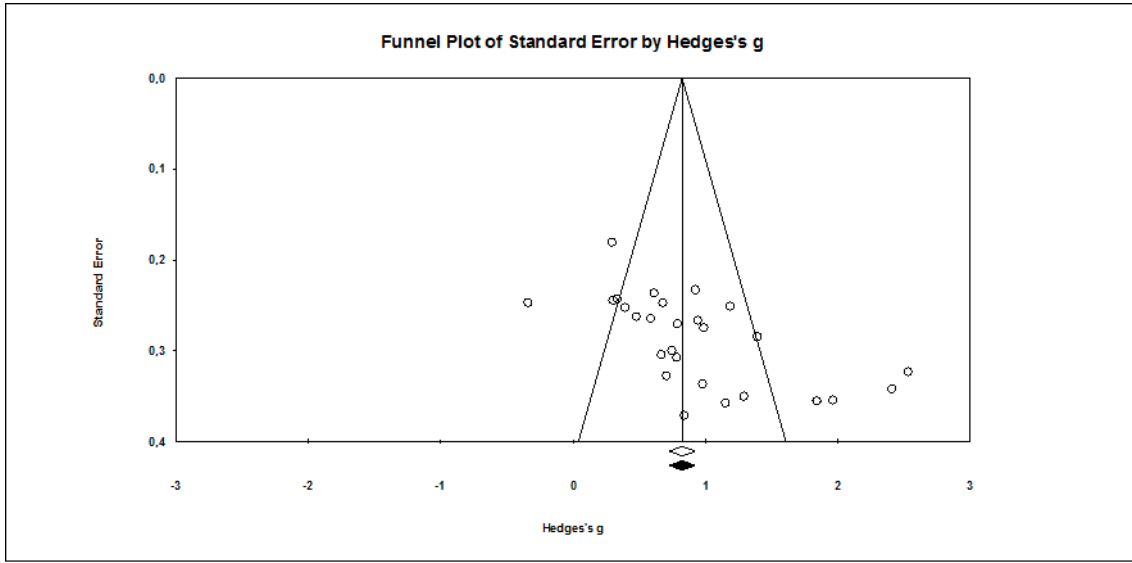
Çalışmanın ilk olarak heterojenlik testi yapılmıştır. Yapılan testin sonucunda Q istatistiksel değeri 132,420 ve serbestlik derecesi 30 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 43,773 değerlerine karşılık gelmektedir. Hesaplanan Q istatistiksel değeri 132,420 ( $p < 0,05$ ) ile 30 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değerinin üzerinde olduğu gözlenmiştir. Bu durum sonucunda çalışmanın etki büyüklüğünün dağılımı için “heterojendir” yorumu yapılabilir. Model seçiminde heterojen çalışmalar için Rastgele Etkiler Modeli kullanılmalıdır (Akgöz vd., 2004; Borenstein vd, 2009).

Çalışmadaki bireysel çalışmaların heterojen özellik göstermesinden dolayı yanılmaları ortadan kaldırılabileceği için (Gözüyeşil, 2012; Yıldız, 2002) model seçiminin bu yönde olması uygundur. Çalışmanın her iki model için etki büyüklükleri hesaplanmış ve Tablo 10’da verilmiştir. Rastgele Etkiler Modeli çalışmanın uygun modeli olduğundan yorumlar o doğrultuda yapılmıştır (Lipsey ve Wilson, 2001).

**Tablo 10.** Meta Analiz Çalışmasına Ait Akademik Başarı Birleştirilmiş Etki Büyüklükleri

Model	Çalışma Sayısı	Etki Büyüklüğü	Standart Hata	Varyans	%95 Güven Aralığı		p
					Alt Limit	Üst Limit	
					Sabit Etki	31	
Rastgele Etki	31	0,922	0,106	0,011	0,714	1,131	<,001

Yapılan meta analiz sonucunda etki büyüklüğü 0,922 olarak bulunmuştur. Cohen (1988) ve Thalheimer ve Cook (2002) sınıflandırmalarına göre etki büyüklüğü “geniş düzey” olarak açıklanmaktadır. Ayrıca çalışmanın p değeri incelendiğinde ( $p < 0,05$ ) anlamlı olduğu yorumu yapılmaktadır. Bu durumda beyin temelli öğrenmenin, programda öngörülen yönetime göre akademik başarı üzerinde etkisi daha büyük olduğu söylenebilir. Çalışmaların etki büyüklüğünü önemli derecede etkileyen çalışmaların incelenmesi için yayın yanlılığı incelenmelidir (Dinçer, 2014).



**Şekil 2.** Akademik Başarı Yayın Yanlılığı Huni Grafiği

Yayın yanlılığı grafiğinde huninin dışında kalan kısım yayın yanlılığı hakkında bilgi vermektedir. Yatay (x) eksen etki büyüklüğü hakkında bilgi verirken dikey (y) eksen örneklem büyüklüğü ya da varyans hakkında bilgi vermektedir. Huni grafiğini simetrik bölen çizgi genel etki büyüklüğünü göstermektedir. Çalışmaların huni grafiğin içinde ve simetrik olması aynı zamanda genel etki büyüklüğü çizgisinin etrafında toplanması beklenmektedir. Huni dışında kalan çalışmaların yayın yanlılığına sebep olabileceği unutulmamalıdır. Bu sebeple çalışmaların çoğunluğunun huni içinde olması çalışmanın güvenilirliği açısından önem taşımaktadır.

Oluşan bu grafikte huni dışında 6 adet çalışma görülmekte ve bu çalışmanın %19,35'ini oluşturmaktadır. Fakat çalışmaların huni grafiğinden çok uzakta kalmamış olması yayın yanlılığının çok önemsiz derecede olabileceği fikrini vermektedir. Çalışmanın yayın

yanlılığının çok önemsiz olduğunu göstermek için aşağıda Classic Fail-Safe N ve Kendall's istatistikleri değerleri verilmektedir.

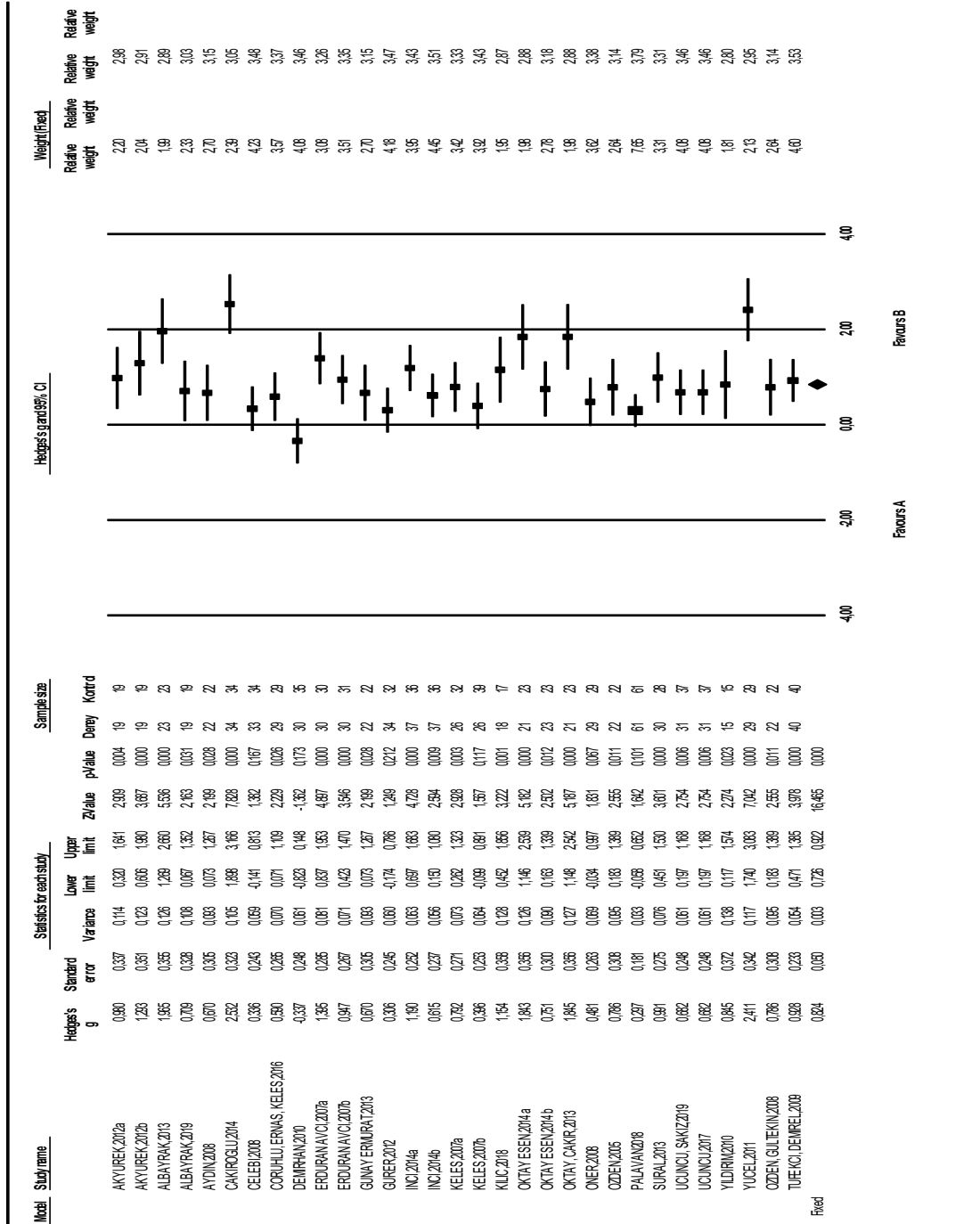
**Tablo 11.** Yayın yanlılığı Classic Fail-Safe N ve Kendall's istatistikleri

Z – Değeri	17,48572
p – Değeri	<,001
Alfa Değeri	0,05000
Tails	2,000000
Alfa için Z – Değeri	1,95996
Örneklem	31,0000
p>alfa sonucu için gerekli eksik çalışma sayısı	2437,00000
<b>Yanlılık durumu</b>	
Kendall's (P-Q)	238
Kendall's Tau	0,51515
Tau için Z – değeri	4,04515
Kendall's p1	0,00006
Kendall's p2	0,00003

Yayın yanlılığı analizi sonucunda Classic Fail-Safe N analizi ve Kendall's analizi yapılmıştır. Elde edilen veriler doğrultusunda meta analiz çalışmasına dahil edilen 31 çalışmanın etki büyüklüğünün neredeyse sıfır olacak düzeye gelebilmesi için analize 2437 çalışma daha meta analize eklenmesi gerekmektedir. Diğer bir ifadeyle 31 çalışmanın dahil edildiği bu meta analiz çalışmasından elde edilen bulgularının geçersiz sayılabilmesi için literatürden bu verilerin tersi yönünde 2437 adet çalışmanın eklenmesi gerekmektedir. Literatür taraması sonucu bu sayıda çalışmaya ulaşılması mümkün olmadığından meta analizde yayın yanlılığı yoktur denebilir.

Tablo 11'e göre, meta-analiz kapsamına alınan çalışmalarda yanlılık bulunmadığı bulgusuna ulaşılmıştır.

Çalışmaların analizlerinin sonucunda genel çerçeveyi görebilmek için Hedges's g değerine göre öğrencilerin fen eğitimindeki akademik başarı durumlarını inceleyen çalışmaların bireysel etki büyüklüklerini ve genel etki büyüklüğünün genel dağılımını gösteren Orman grafiği ve çalışma ağırlıkları aşağıda verilmiştir.



Şekil 3. Akademik Başarıyı İnceleyen Çalışmalar için Hedge's g Değerine Göre Etki Büyüklükleri Dağılımı – Orman Grafiği – Çalışma Ağırlığı

Meta Analysis



Çalışmaların orman grafiğine bakıldığında etki büyüklüğünü simgeleyen elmas, sıfırdan büyük bir değer aralığında görülmektedir. Bu durum akademik başarı üzerinde programda öngörülen yöntemle göre beyin temelli öğrenmenin daha etkili olduğunu ifade etmektedir.

Çalışma ağırlıkları incelendiğinde veriler birbirine yakın değerlerden oluşmaktadır. Çalışma ağırlıkları için ise en yüksek değer Palavan (2018) “3,79” değeridir. Çalışma ağırlığı değerlerinin birbirine yakın değerlerde olması gerekmektedir. Diğer çalışmalara ait çalışma ağırlıklarından daha büyük ya da daha düşük değerler çalışmanın yayın yanlılığını etkilemektedir. Bu sebeple çalışmadaki değerlerin normale yakın dağılım göstermesi sebebiyle çalışmada yayın yanlılığı bulunmamaktadır.

### **3.2. Öğretim Kademesi Değişkenine Göre Moderatör Analizi**

Yapılan meta analiz çalışmasındaki alt problemlerden biri olan “beyin temelli öğrenmenin öğretim kademeleri (ilkokul, ortaokul, lise, lisans) açısından incelendiğinde akademik başarı açısından etki büyüklüğü arasında fark var mıdır?” sorusu araştırılmıştır.

Fen eğitiminde Beyin Temelli Öğrenmenin öğrencilerin öğretim kademelerinin akademik başarıları açısından etkililik dereceleri, karşılaştırmalı etki büyüklük değerleri ile belirlenmiştir

Çalışmalar ilkokul-ortaokul-lise-lisans aralığındaki öğretim kademeleri olmak üzere 4 farklı kategoriye ayrılmıştır. Yapılan analiz sonuçları aşağıda verilmiştir.

**Tablo 12.** Öğretim Kademesi Moderatörünün Akademik Başarı Değişkenine Göre Etki Büyüklük Değerleri

Öğretim Kademesi	Çalışma Kodu	Etki Büyüklüğü	%95 Güven Aralığı		p
			Alt Limit	Üst Limit	
İlkokul	PALAVAN,2018	0,297	-0,058	0,652	0,101
İlkokul	UCUNCU, SAKIZ, 2019	0,682	0,197	1,168	0,006
İlkokul	UCUNCU, 2017	0,682	0,197	1,168	0,006
Sabit Etkiler (İlkokul)		0,496	0,249	0,743	<,001
Rastgele Etkiler (İlkokul)		0,505	0,236	0,775	<,001
Ortaokul	AKYUREK, 2012a	0,980	0,320	1,641	0,004
Ortaokul	AKYUREK, 2012b	1,293	0,606	1,980	0,000
Ortaokul	AKBAYRAK, 2019	0,709	0,067	1,352	0,031
Ortaokul	CELEBİ, 2008	0,336	-0,141	0,813	0,167
Ortaokul	CORUHLU, ERNAS, KELES, 2016	0,590	0,071	1,109	0,026
Ortaokul	ERDURAN AVCI, 2007a	1,395	0,837	1,953	0,000
Ortaokul	ERDURAN AVCI, 2007b	0,947	0,423	1,470	0,000
Ortaokul	INCI, 2014a	1,190	0,697	1,683	0,000
Ortaokul	INCI, 2014b	0,615	0,150	1,080	0,009
Ortaokul	KELES, 2007a	0,792	0,262	1,323	0,003
Ortaokul	KELES, 2007b	0,396	-0,099	0,891	0,117
Ortaokul	OKTAY ESEN, 2014a	1,843	1,146	2,539	0,000
Ortaokul	OKTAY ESEN, 2014b	0,751	0,163	1,339	0,012
Ortaokul	OKTAY, ÇAKIR, 2013	1,845	1,148	2,542	0,000

Ortaokul	ONER, 2008	0,481	-0,034	0,997	0,067
Ortaokul	OZDEN, 2005	0,786	0,183	1,389	0,011
Ortaokul	SURAL, 2013	0,991	0,451	1,530	0,000
Ortaokul	YILDIRIM, 2010	0,845	0,117	1,574	0,023
Ortaokul	YUCEL, 2011	2,411	1,740	3,083	0,000
Ortaokul	OZDEN, GULTEKİN, 2008	0,786	0,183	1,389	0,011
Ortaokul	TUFEKÇİ, DEMİREL, 2009	0,928	0,471	1,385	0,000
Sabit Etkiler (Ortaokul)		0,916	0,794	1,038	<,001
Rastgele Etkiler (Ortaokul)		0,964	0,759	1,169	<,001
Lise	ALBAYRAK, 2013	1,965	1,269	2,660	0,000
Lise	AYDIN, 2008	0,670	0,073	1,267	0,028
Lise	CAKIROGLU, 2014	2,532	1,898	3,166	0,000
Lise	GUNAY ERMURAT, 2013	0,670	0,073	1,267	0,028
Lise	GURER, 2012	0,306	-0,174	0,786	0,212
Lise	KILIC, 2018	1,154	0,452	1,856	0,001

Sabit Etkiler (Lise)		1,076	0,830	1,322	<,001
Rastgele Etkiler (Lise)		1,201	0,498	1,904	<,001
Lisans	DEMİRHAN, 2010	-0,337	-0,823	0,148	0,173
Sabit Etkiler (Lisans)		0,694	0,437	0,952	<,001
Rastgele Etkiler (Lisans)		0,732	0,384	1,081	<,001
Sabit Etkiler (Tümü)		0,824	0,726	0,922	<,001
Rastgele Etkiler (Tümü)		0,704	0,553	0,856	<,001

Yapılan analiz sonucunda her iki modele göre etki büyüklükleri hesaplanmıştır. Öğretim kademesinin akademik başarıya olan etkisi için genel etki büyüklüğünü hesaplarken yorumlayabilmek için hangi istatistiksel modelin seçileceğini belirlemek amacıyla heterojenlik testi yapılmıştır. Testin sonuçları aşağıda verilmiştir.

**Tablo 13. Öğretim Kademesi Moderatörünün Akademik Başarıya Göre Heterojenlik Testi**

Öğretim	N	Standart Hata	Heterojenlik				Genel Etki	%95 Güven	
			Q	df	p	I <sup>2</sup>		Büyükülüğü	Alt
Kademesi								Sınır	Sınır
İlkokul	3	0,126	2,337	2	0,311	14,408	0,779	0,249	0,743
Ortaokul	21	0,248	55,053	20	0,000	63,672	1,400	0,794	1,038
Lise	6	0,125	40,041	5	0,000	87,513	0,698	0,830	1,322
Lisans	1	0,062	0,000	0	1,000	0,000	0,830	-0,823	0,148
Total Within									
(Sabit Etkiler Modeli)			97,431	27	<,001				
Total Between									
(Karışık Etkiler Modeli)			34,989	3	0,000		0,809	0,641	0,976

Çalışmaya ait heterojenlik testi sonucunda öğretim kademeleri kategorilerinin grup heterojenlik durumları incelendiğinde “p değeri” lisans düzeyi için 1,000 ve ilkökul düzeyi için 0,311 ( $p > 0,05$ ) olarak hesaplanmıştır. Aynı zamanda bu iki düzeydeki Q değerleri  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değerlerinin altında kalmaktadır. Bu sebeple bu gruplar için Sabit Etki Büyükülüğü Modeli seçilmiştir. Diğer iki sınıf düzeyi için heterojenlik testi anlamlılık düzeyleri ( $p < 0,05$ ) hesaplanmıştır. Ayrıca Q istatistiksel değerine bakıldığında dört öğretim kademeleri için  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değerinin üstünde olduğu için çalışmalar heterojen özellikte olduğu sonucuna ulaşılmıştır. Bu sebeple bu öğretim kademeleri için Rastgele Etki Büyükülüğü Modeli seçilmiştir.

Çalışmanın heterojenlik testi sonuçları incelenirken öncelikle sabit etkiler modeline bakılmıştır. Sabit etkiler modeli bölümündeki grup içi heterojenlik testi anlamlılık düzeyi ( $p < ,005$ ) olarak hesaplanmış. Ayrıca Q istatistiksel değerine bakıldığında 97,431 ve serbestlik derecesi 27 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 40,113 değerleri aralığındadır. Hesaplanan Q istatistiksel değeri 97,431 ( $p < 0,05$ ) ile 27 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değeri aştığı gözlenmiştir. Buna göre çalışmalar kendi

içlerinde aynı yaygın etkiye sahiptir denilmekte ya da çalışmalar kendi içlerinde beklenenden yüksek dağılıma sahiptirler.

Ulaşılan sonuca göre Karışık Etkiler Modeline geçilmiştir ve gruplar arası (between-group) heterojenlik testine göre p değeri hesaplanmıştır. Testin anlamlılık düzeyi ( $p=0,00$ )  $<$  ( $p=0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın Q istatistiksel değerine bakıldığında 34,989 ve serbestlik derecesi 3 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 7,815'dir. Hesaplanan Q istatistiksel değeri 34,989 ( $p<0,05$ ) ile 3 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değerinin altında kaldığı gözlenmiştir. Bu durumda beyin Temelli Öğrenmenin öğrencilerin fen dersi akademik başarı etki büyüklüklerinin oluşturulmuş olan öğretim kademesi kategorilerine göre anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

### **3.3. Coğrafi Bölge Değişkenine Göre Moderatör Analizi**

Yapılan meta analiz çalışmasındaki alt problemlerden “beyin temelli öğrenmenin coğrafi bölgeler (İç Anadolu, Doğu Anadolu, Güney Doğu Anadolu, Akdeniz, Karadeniz, Marmara, Ege) açısından incelendiğinde akademik başarı açısından etki büyüklüğü arasında fark var mıdır?” sorusu araştırılmıştır.

Fen eğitiminde beyin temelli öğrenmenin öğrencilerin öğrenim gördüğü coğrafi bölgeye ait akademik başarıları açısından etkililik dereceleri, karşılaştırmalı etki büyüklük değerleri ile belirlenmiştir. Çalışmalar Türkiye'deki yedi coğrafi bölge olmak üzere 7 farklı gruba ayrılmıştır. Ancak dahil edilme kriterlerine uygun çalışmalar içinde coğrafi bölge için frekans tablosunda (Tablo 14) verildiği gibi, Güney Doğu Anadolu ve Akdeniz bölgelerinde gerçekleştirilen çalışma olmadığından moderatör için 5 adet kategori oluşturulmuştur. Yapılan analiz sonuçları aşağıda verilmiştir.

**Tablo 14.** Coğrafi Bölge Moderatörünün Akademik Başarı Değişkenine Göre Etki Büyüklük Değerleri

Coğrafi Bölge	Yazar	Yıl	Etki Büyüklüğü	Alt Sınır	Üst Sınır	Alt Sınır	Üst Sınır
İç Anadolu	AKYUREK, 2012a	2012	0,320	0,000	0,640	0,000	0,004
İç Anadolu	AKYUREK, 2012b	2012	0,606	0,000	1,212	0,000	0,000
İç Anadolu	AYDIN, 2008	2008	0,073	0,000	0,146	0,000	0,028
İç Anadolu	CELEBİ, 2008	2008	-0,141	0,000	0,282	0,000	0,167
İç Anadolu	ERDURAN AVCI, 2007a	2007	0,837	0,000	1,674	0,000	0,000
İç Anadolu	ERDURAN AVCI, 2007b	2007	0,423	0,000	0,846	0,000	0,000
İç Anadolu	KILIC, 2018	2018	0,452	0,000	0,904	0,000	0,001
İç Anadolu	YUCEL, 2011	2011	1,740	0,000	3,480	0,000	0,000
İç Anadolu	TUFEKÇİ, DEMİREL, 2009	2009	0,471	0,000	0,942	0,000	0,000
Sabit Etkiler (İç Anadolu)			0,842	0,000	1,684	0,000	0,000
Rastgele Etkiler (İç Anadolu)			0,734	0,000	1,468	0,000	0,000
Karadeniz	CORUHLU, ERNAS, KELES, 2016	2016	0,071	0,000	0,142	0,000	0,026
Karadeniz	GURER, 2012	2012	0,174	0,000	0,348	0,000	0,212
Karadeniz	KELES, 2007a	2007	0,262	0,000	0,524	0,000	0,003
Karadeniz	KELES, 2007b	2007	-0,099	0,000	0,198	0,000	0,117
Karadeniz	OKTAY ESEN, 2014a	2014	1,146	0,000	2,292	0,000	0,000
Karadeniz	OKTAY ESEN, 2014b	2014	0,163	0,000	0,326	0,000	0,012
Karadeniz	OKTAY, ÇAKIR, 2013	2013	1,148	0,000	2,296	0,000	0,000
Karadeniz	YILDIRIM, 2010	2010	0,117	0,000	0,234	0,000	0,023
Sabit Etkiler (Karadeniz)			0,584	0,000	1,168	0,000	0,000
Rastgele Etkiler (Karadeniz)			0,496	0,000	0,992	0,000	0,000
Marmara	DEMİRHAN, 2010	2010	-0,823	0,000	1,646	0,000	0,173
Marmara	GUNAY ERMURAT, 2013	2013	0,073	0,000	0,146	0,000	0,028
Marmara	UCUNCU SAKIZ, 2019	2019	0,197	0,000	0,394	0,000	0,006
Marmara	UCUNCU, 2017	2017	0,197	0,000	0,394	0,000	0,006
Sabit Etkiler (Marmara)			0,148	0,000	0,296	0,000	0,002
Rastgele Etkiler (Marmara)			-0,098	0,000	0,196	0,000	0,113
Sabit Etkiler (Tümü)			0,726	0,000	1,452	0,000	0,000
Rastgele Etkiler (Tümü)			0,675	0,000	1,350	0,000	0,000

Yapılan analiz sonucunda her iki modele göre etki büyüklükleri hesaplanmıştır. Coğrafi bölge farklılıklarının akademik başarıya olan etkisi için genel etki büyüklüğünü hesaplarken yorumlayabilmek için hangi istatistiksel modelin seçileceğini belirlemek amacıyla heterojenlik testi yapılmıştır. Testin sonuçları aşağıda verilmiştir.

**Tablo 15.** Coğrafi Bölge Moderatörünün Akademik Başarıya göre Heterojenlik Testi

Coğrafi Bölge	N	Standart Hata		df	F	I <sup>2</sup>	Genel Etki Büyüklüğü	%95 Güven Aralığı	
		Q	Q					Alt Sınır	Üst Sınır
Doğu Anadolu	6	0,105	48,552	5	0,000	89,702	0,725	0,732	1,143
Ege	4	0,143	1,836	3	0,000	0,000	0,854	0,471	1,032

İç Anadolu	9	0,097	28,439	8	0,000	71,870	1,133	0,842	1,223
Karadeniz	8	0,103	24,510	7	0,001	71,440	0,851	0,584	0,987
Marmara	4	0,129	12,245	3	0,007	75,501	0,819	0,148	0,655
Total Within									
(Sabit Etkiler Modeli)			115,583	26	<,001				
Total Between									
(Rastgele Etkiler, Karışık Etkiler Modeli)			16,836	4	0,119		0,675	0,675	1,023

Çalışmaya ait heterojenlik testi sonucunda coğrafi bölge kategorilerinin grup heterojenlik durumları incelendiğinde Ege Bölgesi ( $p>0,05$ ) olarak hesaplanmıştır. Aynı zamanda bu coğrafi bölgeye ait Q değeri  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değerlerinin altında kalmaktadır. Bu sebeple bu gruplar için Sabit Etki Büyüklüğü Modeli seçilmiştir. Diğer dört coğrafi bölge için heterojenlik testi anlamlılık düzeyleri ( $p<0,05$ ) olarak hesaplanmıştır. Ayrıca Q istatistiksel değerine bakıldığında dört coğrafi bölge için  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değerinin üstünde olduğu için çalışmalar heterojen özellikte olduğu sonucuna ulaşılmıştır. Bu sebeple bu gruplar için Rastgele Etki Büyüklüğü Modeli seçilmiştir.

Çalışmanın heterojenlik testi sonuçları incelenirken öncelikle sabit etkiler modeline bakılmıştır. Sabit etkiler modeli bölümündeki grup içi heterojenlik testi anlamlılık düzeyi ( $p<,005$ ) olarak hesaplanmıştır. Ayrıca Q istatistiksel değerine bakıldığında 115,583 ve serbestlik derecesi 26 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 38,885 değerleri aralığındadır. Hesaplanan Q istatistiksel değeri 115,583 ( $p<0,05$ ) ile 26 serbestlik derecesindeki

ki-kare dağılımında belirlenmiş kritik değeri aştığı gözlenmiştir. Buna göre çalışmalar kendi içlerinde aynı yaygın etkiye sahiptir denilmekte ya da çalışmalar kendi içlerinde beklenenden yüksek dağılıma sahiptirler.

Ulaşılan sonuca göre Karışık Etkiler Modeline geçilmiştir ve gruplar arası (between-group) heterojenlik testine göre p değeri hesaplanmıştır. Testin anlamlılık düzeyi ( $p=0,119>(p=0,05)$ ) olarak hesaplanmıştır. Ayrıca çalışmanın Q istatistiksel değerine bakıldığında 16,836 ve serbestlik derecesi 4 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 9,488'dir. Hesaplanan Q istatistiksel değeri 16,836 ( $p<0,05$ ) ile 4 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değerin üzerinde kaldığı gözlenmiştir. Bu

durumda beyin temelli öğrenmenin öğrencilerin fen dersi akademik başarı etki büyüklüklerinin oluşturulmuş olan coğrafi bölge kategorilerine göre anlamlı bir farklılık gösterdiği sonucuna ulaşılmıştır.

### **3.4 Çalışmanın Yayın Türü Değişkenine Göre Moderatör Analizi**

Yapılan meta analiz çalışmasındaki alt problemlerden biri olan “beyin temelli öğrenmenin çalışmanın yayın türü (makale, yüksek lisans tezi, doktora tezi) açısından incelendiğinde akademik başarı açısından etki büyüklüğü arasında fark var mıdır?” sorusu araştırılmıştır.

Fen eğitiminde Beyin Temelli Öğrenmenin öğrencilerin için çalışılan yayın türlerinin akademik başarıları açısından etkililik dereceleri, karşılaştırmalı etki büyüklük değerleri ile belirlenmiştir.

Çalışmalar yayınlanan makale, yüksek lisans tezleri ve doktora tezleri olmak üzere 3 farklı kategoriye ayrılmıştır. Yapılan analiz sonuçları aşağıda verilmiştir.



**Tablo 16.** Çalışmanın Yayın Türü Moderatörünün Akademik Başarı Değişkenine Göre Etki Büyüklük Değerleri

Çalışmanın Yayın Türü	Çalışma Kodu	Etki Büyük lülü	%95 Güven Aralığı		p
			Alt Limit	Üst Limit	
Doktora	ERDURAN AVCI, 2007a	1,395	0,837	1,953	0,000
Doktora	ERDURAN AVCI, 2007b	0,947	0,423	1,470	0,000
Doktora	GUNAY ERMURAT, 2013	0,670	0,073	1,267	0,028
Doktora	INCI, 2014a	1,190	0,697	1,683	0,000
Doktora	INCI, 2014b	0,615	0,150	1,060	0,009
Doktora	KELES, 2007a	0,792	0,262	1,323	0,003
Doktora	KELES, 2007b	0,396	-0,099	0,891	0,117
Doktora	UCUNCU, 2017	0,682	0,197	1,168	0,006
Sabit Etkiler (Doktora)		0,821	0,640	1,003	0,000
Rastgele Etkiler (Doktora)		0,827	0,602	1,051	0,000
Makale	CORUHLU, ERNAS, KELES, 2016	0,590	0,071	1,109	0,026
Makale	OKTAY, ÇAKIR, 2013	1,845	1,148	2,542	0,000
Makale	PALAVAN, 2018	0,297	-0,058	0,652	0,101
Makale	SURAL, 2013	0,991	0,451	1,530	0,000
Makale	UCUNCU, SAKIZ, 2014	0,682	0,197	1,168	0,006
Makale	OZDEN, GULTEKİN, 2008	0,786	0,183	1,389	0,011
Makale	TUFEKÇİ, DEMİREL, 2009	0,928	0,471	1,385	0,000
Sabit Etkiler (makale)		0,734	0,549	0,920	0,000
Rastgele Etkiler (makale)		0,824	0,497	1,151	0,000

Sabit Etkiler (makale)	0,734	0,549	0,920	0,000
Rastgele Etkiler (makale)	0,824	0,497	1,151	0,000
Yüksek Lisans AKYUREK, 2012a	1,980	0,320	1,641	0,004
Yüksek Lisans AKYUREK, 2012b	1,293	0,606	1,980	0,000
Yüksek Lisans ALBAYRAK, 2013	1,965	1,269	2,660	0,000
Yüksek Lisans AKBAYRAK, 2019	0,709	0,067	1,352	0,031
Yüksek Lisans AYDIN, 2008	0,670	0,073	1,267	0,028
Yüksek Lisans ÇAKIROĞLU, 2014	2,532	1,898	3,166	0,000
Yüksek Lisans CELEBİ, 2008	0,336	-0,141	0,813	0,167
Yüksek Lisans DEMİRHAN, 2010	-0,337	-0,823	0,148	0,173
Yüksek Lisans GURER, 2012	0,306	-0,174	0,786	0,212
Yüksek Lisans KILIC, 2018	1,154	0,452	1,856	0,001
Yüksek Lisans OKTAY ESEN, 2014a	1,843	1,146	2,539	0,000
Yüksek Lisans OKTAY ESEN, 2014b	0,751	0,163	1,339	0,012
Yüksek Lisans ONER, 2008	0,481	-0,034	0,997	0,067
Yüksek Lisans OZDEN, 2005	0,786	0,183	1,389	0,011
Yüksek Lisans YILDIRIM, 2010	0,845	0,117	1,574	0,023
Yüksek Lisans YUCEL, 2011	2,411	1,740	3,083	0,000
Sabit Etkiler (Yüksek Lisans)	0,883	0,734	1,033	0,000
Rastgele Etkiler (Yüksek Lisans)	1,025	0,630	1,419	0,000

Yapılan analiz sonucunda her iki modele için de etki büyüklükleri hesaplanmıştır. Çalışılan yayın türlerindeki farklılıklarının akademik başarıya olan etkisi için genel etki büyüklüğünü hesaplarken yorumlayabilmek ve hangi istatistiksel modelin seçileceğini belirlemek amacıyla heterojenlik testi yapılmıştır. Testin sonuçları aşağıda verilmiştir.

**Tablo 17.** Çalışılan Yayın Türü Moderatörünün Akademik Başarıya Göre Heterojenlik Testi

Çalışılan Yayın Türü	N	Standart Hata	Heterojenlik				Genel Etki Büyüklüğü	%95 Güven Aralığı	
			Q	df	p	I2		Alt Sınır	Üst Sınır
Doktora	8	0,093	10,592	7	0,157	33,910	0,725	0,640	1,003
Makale	7	0,095	17,514	6	0,008	65,741	0,854	0,543	0,520
Yüksek Lisans	1	0,076	102,821	15	0,000	85,411	1,133	0,734	1,003
Total Within									
(Sabit Etkiler Modeli)			130,926	28	<,001				
Total Between									
( Karışık Etkiler Modeli)			1,494	2	0,620		0,675	0,726	0,922

Yapılan meta analiz çalışmasına ait heterojenlik testi sonucunda çalışılan yayın türü kategorilerinin grup heterojenlik durumları incelendiğinde Doktora çalışmalarının 0,157 ( $p>0,05$ ) olarak hesaplanmıştır. Aynı zamanda bu çalışmaların Q değerleri  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değerlerinin altında kalmaktadır. Bu sebeple bu gruplar için Sabit Etki Büyüklüğü Modeli seçilmiştir. Diğer iki çalışma türü için heterojenlik testi anlamlılık düzeyleri ( $p<0,05$ ) olarak hesaplanmıştır. Ayrıca Q istatistiksel değerine bakıldığında iki tür çalışmanın için  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değerinin üstünde olduğu için çalışmalar heterojen özellikte olduğu sonucuna ulaşılmıştır. Bu sebeple bu gruplar için Rastgele Etki Büyüklüğü Modeli seçilmiştir.

Çalışmanın heterojenlik testi sonuçları incelenirken öncelikle sabit etkiler modeline bakılmıştır. Sabit etkiler modeli bölümündeki grup içi heterojenlik testi anlamlılık düzeyi ( $p<,005$ ) olarak hesaplanmıştır. Ayrıca Q istatistiksel değerine bakıldığında 130,926 ve serbestlik derecesi 28 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 41,337 değerleri aralığındadır. Hesaplanan Q istatistiksel değeri 130,926 ( $p<0,05$ ) ile

28 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değeri aştığı gözlenmiştir.

Buna göre çalışmalar kendi

içlerinde aynı yaygın etkiye sahiptir denilmekte ya da çalışmalar kendi içlerinde beklenenden yüksek dağılıma sahiptirler.

Ulaşılan sonuca göre Karışık Etkiler Modeline geçilmiştir ve gruplar arası (between-group) heterojenlik testine göre p değeri hesaplanmıştır. Testin anlamlılık düzeyi ( $p=0,620$ )>( $p=0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın Q istatistiksel değerine bakıldığında 1,494 ve serbestlik derecesi 2 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 5,991'dir. Hesaplanan Q istatistiksel değeri 1,494 ( $p<0,05$ ) ile 2 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değerin altında kaldığı gözlenmiştir. Bu durumda beyin temelli öğrenmenin öğrencilerin fen dersi akademik başarı etki büyüklüklerinin oluşturulmuş olan çalışılan yayın türü kategorilerine göre anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

#### 4. TARTIŞMA ve SONUÇ

Fen eğitiminde kullanılan “beyin temelli öğrenmenin öğrencilerin akademik başarısına olumlu etkisi var mıdır?” sorusuna cevap aranmıştır. Meta analizi yapılan 31 çalışmanın etki büyüklüğü değerleri incelenmiştir. Gerçekleştirilmiş olan etki büyüklüğü analizine bakıldığında etki büyüklüğünün negatif yönde ve en küçük olduğu çalışmanın “-0,337” değeri ile Demirhan (2010)’a, etki büyüklüğünü pozitif yönde en büyük olduğu çalışmanın ise “2,532” değeri ile Çakıroğlu (2014)’e ait olduğu görülmüştür. Çalışmaların %96,77’si pozitif yöndeyken, %3,22’lik dilimi negatif yönde bir sonuç göstermektedir. Çalışmaların büyük bir kısmı pozitif yönde sonuç verdiği için beyin temelli öğrenmenin programda öngörülen eğitim yöntemiyle işlenen derslere göre akademik başarı değişkeninin daha etkili olduğu sonucuna ulaşılmıştır. 31 çalışmanın etki büyüklükleri hesaplandığında Cohen (1988) etki büyüklüğü sınıflamasına göre çalışmaların %45,16’sinin “büyük etki” büyüklüğüne sahip olduğu ve Thalheimer ve Cook (2002) etki büyüklüğü sınıflamasına göre çalışmaların %30,00’unun “geniş etki” büyüklüğüne sahip olduğu görülmektedir.

Meta analize dahil edilen çalışmaların dağılımını incelemek için gerçekleştirilen heterojenlik testi sonucunda elde edilen Q istatistiksel değeri 132,420 ( $p<0,05$ ) ve 30 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değeri aşmış olduğu görülmüştür. Buradan yola çıkarak çalışmaların heterojen bir dağılım gösterdiği sonucu elde edilmiştir.

Beyin temelli öğrenmenin akademik başarıya olan etki büyüklüğü pozitif yönde ve 0,922 olarak bulunmuştur. Elde edilen bu değer için etki büyüklüğü Cohen(1988) ve Thalheimer ve

Cook(2002) sınıflandırmalarındaki karşılığı “geniş düzey” olarak ifade edilmiştir. İncelemeler sonucunda beyin temelli öğrenmenin akademik başarıya olan etkisi programda ön görülen öğretim yönteminin akademik başarıya olan etkisinden daha fazladır sonucuna ulaşılmıştır.

Literatür taraması sonucunda beyin temelli öğrenme ile gerçekleştirilen meta analiz sayısı yok denecek kadar azdır. Ancak beyin temelli öğrenmenin akademik başarı üzerindeki olumlu etkisini gösterecek bireysel çalışmalar mevcuttur.( Koca, 2019; Özer, 2019; Kural, 2020).

Fen alanında gerçekleştirilen çalışmaların akademik başarı üzerindeki etkisi incelenirken öğretim kademelerindeki etkilerine de bakılmıştır. Öğretim kademelerinin etki yönleri incelendiğinde çoğunlukla pozitif yönde olduğu görülmektedir. Heterojen dağılım gösterdiği görülen çalışmaların öğretim kademelerindeki en yüksek etki büyüklüğü değeri 1,201 değer ile “Lise”ye aittir. Çalışmaların genel etki büyüklükleri incelendiğinde gruplar arasında anlamlı bir fark bulunamamıştır. Buradan yola çıkarak öğretim kademelerinin akademik başarı açısından bir farklılığı bulunmamaktadır. Literatür incelendiğinde öğretim kademesi moderatörüne göre benzer sonuçlara ulaşılmıştır.(Koca, 2019; Durlak, 2013).

Fen alanında gerçekleştirilen çalışmaların akademik başarı üzerindeki etkisi incelenirken öğrenim görülen coğrafi bölgenin etkilerine de bakılmıştır. Gerçekleştirilen analize göre coğrafi bölge moderatörü heterojen dağılım göstermektedir. Coğrafi bölgelerin etki yönleri incelendiğinde çoğunlukla pozitif yönde olduğu görülmektedir. Ayrıca çalışmaların etki büyüklüğü değerleri incelendiğinde etki büyüklüğü en fazla olan 1,053 ile “İç Anadolu Bölgesi” olmuştur. Çalışmaların genel etki büyüklükleri incelendiğinde gruplar arasında anlamlı bir fark vardır. Buradan yola çıkarak öğrenim görülen coğrafi bölgenin akademik başarı açısından bir farklılığı bulunmamaktadır. Literatür incelendiğinde coğrafi bölge moderatörüne göre benzer sonuçlara ulaşılmıştır.(Koca, 2019; Özer, 2019).

Fen alanında gerçekleştirilen çalışmaların akademik başarı üzerindeki etkisi incelenirken yapılan çalışmanın yayın türü etkilerine de bakılmıştır. Gerçekleştirilen analize göre çalışılan yayın türü moderatörü heterojen dağılım göstermektedir. Çalışılan yayın türü moderatörünün etki yönleri incelendiğinde çoğunlukla pozitif yönde olduğu görülmektedir. Ayrıca çalışmaların etki büyüklüğü değerleri incelendiğinde etki büyüklüğü en fazla olan 1,025 ile “Yüksek Lisans” çalışmaları olmuştur. Çalışmaların genel etki büyüklükleri incelendiğinde gruplar arasında anlamlı bir fark bulunamamıştır. Buradan yola çıkarak çalışılan yayın türü

moderatörünün akademik başarı açısından bir farklılığı bulunmamaktadır. Literatür incelendiğinde çalışılan

yayın türü moderatörüne göre benzer sonuçlara ulaşılmıştır.(Koca, 2019; Özer, 2019, Kural, 2020).

## **5. ÖNERİLER**

Gerçekleştirilen çalışmada Beyin Temelli Öğrenmenin fen eğitimi üzerindeki etkililiği; akademik başarı değişkeni açısından incelenmiştir. Yapılacak olan diğer çalışmalarda okuma becerilerine, karar verme becerilerine, bilişsel süreç becerilerine ilişkin farklı değişkenlerde etkililiği incelenebilir.

Gerçekleştirilen çalışmada Beyin Temelli Öğrenmenin fen eğitimine etkililiği incelenmiştir, diğer disiplinlerde (Matematik, Türkçe vb.) etkililiği incelenebilir.

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Sezgi ÇAKIROĞLU	2014	Öğrenme Stilleri Ve Beyin Temelli Öğrenme Yaklaşımının Öğrencilerin Biyoloji Dersindeki Başarı Ve Tutumları Üzerine Etkisi	Yüksek Lisans Tezi	Lise	Doğu Anadolu Bölgesi
Erkan AKYÜREK	2012	Beyin Temelli Öğrenme Yaklaşımının İlköğretim Fen Ve Teknoloji Dersi 8.Sınıf Öğrencilerinin Akademik Başarı, Derse Yönelik Tutum, Motivasyon Ve Hatırlama Düzeylerine Etkisi	Yüksek Lisans Tezi	Ortaokul	İç Anadolu Bölgesi
Zeynep KILIÇ	2018	Beyin Temelli Öğrenme Yaklaşımının Öğrencilerin Anatomi Ve Fizyoloji Dersindeki Başarı Ve Tutumlarına Etkisi	Yüksek Lisans Tezi	Lise	İç Anadolu Bölgesi
Kübra Nur ALBAYRAK	2019	Biyoloji Öğretiminde Beyin Temelli Öğrenmenin İlköğretim Öğrencilerinin Akademik Başarısına Etkisi	Yüksek Lisans Tezi	Ortaokul	Doğu Anadolu Bölgesi
Gökşen ÜÇÜNCÜ Gönül SAKIZ	2019	Beyin Temelli Öğrenmenin Fen Bilimleri Dersinde Öğrencilerin Akademik Başarıları ve Başarıya Yönelik Duyguları Üzerine Etkisi	Makale	İlkokul	Marmara Bölgesi
Nuray İNCİ	2014	Beyin Temelli Öğrenme Tasarımlarının Öğrencilerin Akademik Başarı, Tutum Ve Öğrenmelerinin Kalıcılığı Üzerine Etkisi	Doktora	Ortaokul	Doğu Anadolu Bölgesi
Derya GUNAY ERMURAT	2013	Öğrenme Stilleri Ve Beyin Temelli Öğrenme Yaklaşımının Öğrencilerin Biyoloji Dersindeki Başarı ve Tutumları Üzerine Etkisi	Doktora	Lise	Marmara Bölgesi
Emel ÖNER	2008	Fen Ve Teknoloji Öğretiminde, Beyin Temelli Öğrenme Yaklaşımının İlköğretim Öğrencilerinin Başarısına, Tutumuna Ve Hatırda Tutma Düzeyine Etkisi	Yüksek Lisans Tezi	Ortaokul	Ege Bölgesi

Ek 1. MetaAnalize Dahil Edilen Çalışmalar



Ahmet ALBAYRAK	2013	Beyin Temelli Öğrenme Kuramına Dayalı Eğitiminin Öğrencilerin Başarı Ve Tutumları Üzerine Etkisi	Yüksek Lisans Tezi	Lise	Doğu Anadolu Bölgesi
Nazlı Sevda GÜRER	2012	Beyin Temelli Öğrenme Kuramına Göre Geliştirilen Bir Web Destekli Fen Ve Teknoloji Materyalinin Öğrenciler Üzerindeki Etkililiğinin Araştırılması	Yüksek Lisans Tezi	Lise	Karadeniz Bölgesi
Özkan YILDIRIM	2010	Fen Ve Teknoloji Dersinde (7. Sınıf) Beyin Temelli Öğrenme Yaklaşımının Akademik Başarı, Derse Yönelik Tutum Ve Motivasyon Düzeylerine Etkisi	Yüksek Lisans Tezi	Ortaokul	Karadeniz Bölgesi
Solmaz AYDIN	2008	Beyin Temelli Öğrenme Kuramına Dayalı Biyoloji Eğitiminin Akademik Başarı Ve Tutum Üzerine Etkisi	Yüksek Lisans Tezi	Lise	İç Anadolu Bölgesi
Dilek ERDURAN AVCI	2007	Beyin Temelli Öğrenme Yaklaşımının İlköğretim 7. Sınıf Öğrencilerinin Fen Bilgisi Dersindeki Başarı, Tutum Ve Bilgilerinin Kalıcılığı Üzerine Etkisi	Doktora Tezi	Ortaokul	İç Anadolu Bölgesi
Özcan PALAVAN	2018	Fen Bilimleri Dersinde Beyin Temelli Öğrenme Etkinliklerinin Akademik Başarıya Etkisi	Makale	İlkokul	Doğu Anadolu Bölgesi
Yavuz YAMAN	2014	Beyin Temelli Fen	Doktora Tezi	Ortaokul	Marmara Bölgesi

		Öğretiminin Üstün Zekalı Ve Yetenekli Öğrencilerinin Akademik Başarılarına, Yaratıcılıklarına, Eleştirel Düşüncelerine Ve Tutumlarına Etkisi			
Serhat SÜRAL	2013	Beyin Temelli Öğrenme Yönteminin Öğrencilerin Fen Bilimleri Dersinin Erişimine Etkisi	Makale	Ortaokul	Ege Bölgesi
Gökşen ÜÇÜNCÜ	2017	Dördüncü Sınıf Fen Bilimleri Dersinde Beyin Temelli Öğrenme Modelinin Çeşitli Değişkenler Açısından İncelenmesi	Doktora Tezi	İlkokul	Marmara Bölgesi
Muhammet ÖZDEN Mehmet GÜLTEKİN	2008	The Effects Of Brain-Based Learning On Academic Achievement And Retention Of Knowledge In Science Course	Makale	Ortaokul	Ege Bölgesi
Serap TÜFEKÇİ Melek DEMİREL	2009	The Effect of Brain Based Learning On Achievement, Retention, Attitude And Learning Process	Makale	Ortaokul	İç Anadolu Bölgesi
Tülay Şenel ÇORUHLU Sibel ER NAS Esra KELEŞ	2016	Beyin Temelli Öğrenme Yaklaşımına Dayalı Web Destekli Öğretim Materyalinin Etkililiğinin Değerlendirilmesi: Işık ve Ses Ünitesi	Makale	Ortaokul	Karadeniz Bölgesi
Esra KELEŞ	2007	Altıncı Sınıf Kuvvet Ve Hareket Ünitesine Yönelik Beyin Temelli Öğrenmeye Dayalı Web Destekli Öğretim Materyalinin Geliştirilmesi Ve Etkililiğinin Değerlendirilmesi	Doktora Tezi	Ortaokul	Karadeniz Bölgesi



**FEN EĞİTİMİNDE LABORATUVAR DESTEKLİ ÖĞRETİMİN ÖĞRENCİLERİN  
AKADEMİK BAŞARISINA ETKİSİ: BİR META-ANALİZ ÇALIŞMASI**

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**ÖZET**

Bu çalışmanın amacı 2010-2021 yılları arasında yapılan fen eğitiminde laboratuvar destekli öğretimin programda öngörülen öğrenme yöntemine kıyasla öğrencilerin fen dersine yönelik akademik başarı üzerine etkisini meta analiz yöntemi kullanarak genel etki büyüklüğünü hesaplamaktır. Aynı zamanda akademik başarı değişkene bağlı moderatör olarak konu alanı, sınıf düzeyi, coğrafi bölge değişkenleri ele alınmıştır. Bu sebeple konu alanında yapılmış olan araştırmalar incelenerek, belirlenen ölçütlere uygun 31 tane çalışma meta analiz çalışmasına dahil edilmiştir. Bu çalışmadaki meta-analiz sonuçları incelendiğinde laboratuvar destekli öğretimin öğrencilerin akademik başarıları yönündeki etki büyüklüğü 1,239 olarak hesaplanmıştır. Elde edilen etki büyüklüğü Cohen (1988) ve Thalheimer ve Cook (2002) sınıflamalarına göre etki büyüklüğü “geniş düzey” olarak yorumlanmaktadır. Sonuç olarak fen eğitiminde laboratuvar destekli öğretimin programda yer alan yöntemlere göre fen dersinde laboratuvar destekli öğretim akademik başarı üzerinde anlamlı bir etkiye sahiptir. Araştırmaya dahil edilen çalışmalarda ayrıca laboratuvar destekli öğretimin öğrenme alanlarına, çalışmaların yapıldığı bölgelere ve sınıf düzeylerine göre karşılaştırmalı etki büyüklükleri hesaplanmıştır.

**Anahtar kelimeler:** Laboratuvar yaklaşımları, Laboratuvar destekli öğrenme, Meta analiz

**THE EFFECT OF BRAIN-BASED LEARNING ON STUDENTS' ACADEMIC ACHIEVEMENT IN SCIENCE EDUCATION BETWEEN 2005-2022: A META-ANALYSIS STUDY**

**ABSTRACT**

The aim of this study is to calculate the overall effect size of the effect of laboratory supported teaching in science education between 2010-2021 on students' academic achievement compared to the learning method envisaged in the program by using meta-analysis method. At the same time, moderators of academic achievement variables; subject area, grade level, geographical region variables were discussed. For this reason, by examining the studies in the subject area, 31 studies suitable for the determined criteria were included in the meta-analysis study for academic achievement. When the meta-analysis result in this study were examined, the effect size of laboratory-assisted teaching on the academic achievement of students was calculated as 1,239. According to the Cohen (1998) and Thalheimer and Cook (2002) classifications, the effect size is interpreted as "broad level". As a result, according to the method included in the curriculum of laboratory-supported teaching in science education, laboratory-assisted teaching in science lessons has a significant effect on academic achievement. In the studies included in the research, comparative effect sizes were also calculated according to the learning areas of laboratory assisted learning, the regions where the studies were carried out, and the class levels.

**Keywords:** Laboratory Approaches, Laboratory supported learning, Meta-analysis

## 1.GİRİŞ

Gelişen teknoloji ve küreselleşen dünyada eğitimin önemi her geçen gün daha da artmaktadır. Buda eğitimde birçok yeniliği ve değişimi beraberinde getirmektedir. Dünyanın her yerinde eğitimin tanımı günden güne değişmektedir. Eğitim genel anlamıyla yeni nesillerin toplumda yer edinmeleri için gerekli bilgi, beceri, donanım ve eğilimleri edinmelerine, öz varlıklarını geliştirmelerine yardım etme sürecidir (TDK, 2019). Bu süreçte geleneksel eğitimin yerini hızlı bir şekilde çağdaş eğitim almıştır.

Geleneksel eğitimde ezberciliğe dayanan öğrenmeler yerini çağdaş eğitimle birlikte kalıcı ve somut öğrenmelere bırakmıştır. Geleneksel eğitimde en önemli öge öğretmendir. Oysaki öğretmen öğrenen değil öğreten konumundadır. Eğitimin üzerinde durması gereken bireyler öğrencilerdir. Öğrencilerin önemli ve değerli olduğu eğitim sistemi çağdaş eğitimle mümkündür.

Türkiye’de 2005 yılında kullanılmaya başlanan yapılandırmacılık yaklaşımı çağdaş öğrenme ile paralellik göstermektedir. Yapılandırmacılıkla birlikte birey var olan şemalarını genişleterek kendi bilgisini oluşturmaya başlamıştır. Eski bilgisinin üzerine yenilerini inşa ederek öğrenmedeki kalıcılığı arttırmıştır. Bu da yeni yöntemlere geçmeyi zorunlu kılmıştır. Çağdaş eğitimle birebir örtüşen laboratuvar uygulamalarının kullanımı artmıştır.

Laboratuvar öğrenci ve öğretmenlerin materyallere kolayca ulaşabildikleri, öğrenmeyi kalıcı kılan ortamlardır. Laboratuvar öğrencilere ve öğretmenlere teorik bilgilerin uygulanmasında kolaylık sağlamaktadır. Öğrencinin aktif olduğu laboratuvar yönteminde araştıran, sorgulayan, eleştiren, kendi bilgisini oluşturan bireyler yetiştirmek mümkündür. Bütün bunlar fen bilimlerinin temel amacıyla örtüşmektedir. Fen bilimleri doğayı tanıma ve doğa olaylarını anlama amacıyla yapılan çalışmalardan doğmuştur (Soslu, 2010).

Toplumların gelişmesinde fen bilimlerinin ve ona dayalı olarak üretilen teknolojinin etkisi oldukça büyüktür. Fen bilimlerinin temel amacı ise fen okuryazarı bireyler yetiştirmektir (MEB, 2018). Fen okuryazarı bireyler bilgiye daha çabuk ulaşır ve bilginin doğruluğunu her zaman sorgularlar, şüphecidirler. Günlük hayatta karşılaştıkları sorunlara pratik çözümler üretirler. Fen eğitiminde bireyin daha iyi ve kalıcı öğrenmeler sağlayabilmesi, bilişsel beceriler, duyuşsal beceriler ve psiko-motor beceriler kazanabilmesi açısından laboratuvarda uygulanan deneyler oldukça önemlidir.

Shulman ve Tamir (1973) laboratuvar eğitiminin amaçlarını beş başlıkta özetlemiştir. Bunlar;

- 1- Bilime karşı ilgili, pozitif tutum sergileyen, meraklı ve açık fikirli olmayı sağlamak.
- 2- Yaratıcı düşünme ve problem çözme becerisini geliştirmek.
- 3- Bilimsel düşünmeyi ve bilimsel metodu desteklemek.
- 4- Kavramsal anlayışı ve zihinsel beceriyi geliştirmek.
- 5- Pratik ve uygulanabilir beceriler geliştirmek (Köseoğlu ve Tümay, 2010).

Her dersin kendine has bir konusu ve içeriği olup bu hususta ilgili kazanımların kazandırılabilmesi uygun yöntem, özel donanımlı yer, ayrıca özel araç ve gereçlere gerek vardır. Deney yönteminin fen öğretiminde kullanılmaya başlanmasından bu yana etkili ve verimli bir şekilde dersin işlenebileceği ortam olarak ilk akla gelen yer muhakkak laboratuvarlardır.

Bütün bunlardan yola çıkarak bu çalışmada Fen eğitiminde laboratuvar destekli öğretimin öğrencilerin akademik başarısına etkisi var mıdır? Sorusuna cevap aranacaktır. Ayrıca moderatör olarak seçilen değişkenlere ait alt problemler de yer almaktadır. Bunlar,

- a) Laboratuvar destekli öğretimin fen bilimleri dersi alt başlıkları (Konu Alanı: Fen-Fizik-Kimya-Biyoloji) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?
- b) Laboratuvar destekli öğretimin sınıf düzeyleri (İlkokul-Ortaokul-Lise ve Üniversite) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?
- c) Laboratuvar destekli öğretimin coğrafi bölgeler (İç Anadolu-Doğu Anadolu-Güneydoğu Anadolu- Ege-Akdeniz-Karadeniz-Marmara) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?

## 2.YÖNTEM

### 2.1. Araştırmanın Modeli

Bu araştırma Meta-Analiz yöntemiyle yapılmıştır. Bu çalışmada CMA yazılımı kullanılacaktır. Meta- Analiz yönteminin daha net anlaşılması için bu yöntem ile ilgili gerekli açıklamalar aşağıda verilmiştir:

Meta analiz, aynı konu üzerinde birbirinden bağımsız olarak gerçekleştirilen deney ve araştırmalarda ulaşılan bulguları bir bütün haline getirmek, bu bulgulardaki farklılığı açıklamak, daha güvenilir ve daha geçerli sonuçlara ulaşmak için hesaplama yöntemlerinin kullanılması sürecidir (Dinçer, 2014).

Genel olarak meta analiz birden farklı çalışmalara ait standartlaştırılmış etki büyüklükleri, korelasyon katsayıları veya p değerleri gibi sayısal verilerin özet istatistiklerinin tipik bir analizi olarak da tanımlanabilmektedir (Çarkungöz, 2009).

## 2.2. Evren ve Örneklem

Bu araştırmada meta-analiz çalışması yapılacak konu hakkında; yayınlanmış ve yayınlanmamış tüm doktora tezleri, yüksek lisans tezleri, hakemli ve hakemsiz dergilerde yayınlanmış makaleler, YÖK'e ait tez katalogu, Eric, Ebso gibi birçok uluslararası veri tabanlarından SSCI indeksli dergilerden yararlanılacaktır. Bunların sonucunda kriterlere uygun 27 adet bireysel çalışmaya ulaşılmıştır. Çalışmalar incelendikten sonra bazı çalışmalarda birden fazla çalışma olarak analize dahil edilmiştir.

➤ Ünal (2018), Kaya ve Oral (2013), Bilen Kaya (2012), Oymak(2018) ve Toprak (2011)yaptıkları çalışmalarda iki ayrı deney ve kontrol grubu ile yürütmüşlerdir bunlar 2 ayrı deney grubu verileri olarak çalışmaya dahil edilmiştir.

## 2.3. Verilerin Toplanması

Bu araştırmada meta-analiz çalışması yapılacak konu hakkında; yayınlanmış ve yayınlanmamış tüm doktora tezleri, yüksek lisans tezleri, hakemli ve hakemsiz dergilerde yayınlanmış makaleler, YÖK'e ait tez katalogu, makale için Ulakbim, Eric, Ebsco gibi birçok veri tabanı, SSCI indeksli dergiler, Türkiye'deki üniversite kütüphanelerinin elektronik katalogları, konferans sunumları ve bildirimler gibi birçok kaynaktan yararlanılmıştır.

Veri toplamak amacıyla öncelikle internet ortamında "Laboratuvar destekli öğrenme", "laboratory assisted learning", "laboratory applications", anahtar sözcükleri kullanılarak YÖK kütüphanesi, makaleler, bildiri kitapçıkları taranmıştır. Araştırmaların Türkiye'de yapılmış olan çalışmaları olmasına dikkat edilmiştir.

Çalışmaların bir kısmı deneysel araştırmalar olmadığından bu araştırmadan çıkarılmıştır. Bazı çalışmalar hem yüksek lisans/doktora tezi hem de bildiri olarak sunulduğundan bunlardan daha çok tezler dikkate alınarak analize dahil edilip kodlanmıştır. Taranan bazı deneysel çalışmaların meta analiz için gerekli sayısal verileri içermediğinden bu araştırmanın dışında bırakılmıştır.

Araştırmada yer alan çalışmaların seçiminde esas alınan kriterler aşağıda sunulmuştur:



1. Meta analize dahil edilecek çalışmaların zaman aralığı: Çalışmaların 2010-2021 yılları içerisinde yapılmış olması. Çalışmanın 2010 yılında başlamış olmasının nedeni daha önce benzer bir çalışmanın bulunmasıdır.

2. Yayınlanmış veya yayınlanmamış çalışma kaynakları: Yüksek lisans ve doktora tezleri, hakemli ve hakemsiz akademik dergiler, elektronik akademik dergiler, veritabanları, kongre ve sempozyumlarda sunulmuş bildiriler.

3. Çalışmalardaki araştırma yönteminin uygun olması: Meta analiz çalışmalarında standartlaştırılmış etki büyüklüğüne ulaşabilmek için, dahil edilen çalışmaların kontrol ve deney gruplarına sahip olmaları gerekmektedir. Çalışmada deney grubu ise laboratuvar destekli öğrenmenin uygulandığı öğrenci grubunu temsil etmektedir.

4. Amaca uygun öğrenme yaklaşımının kullanılması: Deney grubunda laboratuvar destekli öğrenme yaklaşımının kullanılması.

5. Yeterli sayısal veri içermesi: Meta analiz çalışması için gerekli olan etki büyüklüklerinin hesaplanabilmesi için, çalışmaya dahil edilen araştırmaların deney ve kontrol grupları için betimleyici sayısal verilere ihtiyaç duyulur. Bu amaçla deney ve kontrol gruplarında aşağıda sunulan değerleri verilen çalışmalar araştırmaya dahil edilmiştir:

- Örneklem büyüklüğü (N)
- Ortalama (M)
- Standart sapma (SD)

Bir çalışmanın araştırmamızdaki meta-analize dahil edilmemesi, çalışmanın araştırma sınırları içerisinde olmamasından ya da meta analiz için gerekli istatistiksel verilere sahip olmamasından kaynaklanmaktadır (Lipsey ve Wilson, 2001; Wolf, 1986). Bu yüzden dahil edilme kriterlerine uygun olmayan çalışmalar, meta-analiz için kullanılacak araştırmalardan hariç tutulmuştur.

Meta-analiz çalışması ile ilgili araştırmalar toplandıktan sonra dahil edilme kriterlerine uyan çalışmaların, sonraki adımlarda meta-analiz çalışmaları arasındaki karşılaştırmalarda kullanılabilmesi için araştırmaların özelliklerini sürekli veya kategorik değişkenlere dönüştürecek bir kodlama yöntemi geliştirilmesi gerekmektedir. Meta-analize dahil edilen çalışmalar ile ilgili mümkün olduğunca açık ve detaylı bir kodlama sistemi geliştirilmelidir. Araştırmada kullanılan kodlama sistemi üç bölümden oluşmaktadır. Birinci bölüm “çalışma kimliği”dir. Bu bölüm çalışmanın kimliğini tespit etmek amacıyla çalışmanın adı, araştırmayı

yapan yazar veya yazarların adı, çalışmanın yapıldığı yıl gibi bilgileri içermektedir. İkinci bölüm “çalışma içeriği”dir. Bu bölümde laboratuvar destekli öğrenmenin uygulandığı öğretim kademesi, çalışmanın uygulandığı coğrafi bölge, yapılan araştırmanın yayın türü gibi bilgilere yer verilmiştir. Çalışma verileri üçüncü bölümde yer almaktadır. Bu bölümde çalışmalarda deney ve kontrol gruplarının betimsel bilgileri belirlenmiştir.

#### 2.4. Verilerin Analizi

Bu çalışmada verilerin analizinde, Meta-Analizi yöntemi kullanılmıştır. Bu yöntemin amacı  $d=(X_e-X_c)/SD$  formülü ile gösterilen, deneysel çalışmalarda yer alan deney ve kontrol gruplarının ortalamaları arasındaki farkların hesaplanmasıdır (Hunter ve Schmidt, 2004). Bu çalışmada etki büyüklüğü hesaplamasında Hedges “d” kullanılmıştır. Etki büyüklüğü “d”, işlemler arası farkın iki grubun birleştirilmiş standart sapması ile bölünmesidir (Cooper, 1989). Etki büyüklüğü ile incelenen bir olayın “Ne kadar etkin olduğu” sonucu bulunmaktadır (Cohen, 1988).

Araştırmanın bulgular ve yorum kısmında kullanılan hesaplamaların, tablo ve grafiklerin oluşturulmasında MS Office Excel 2007, Comprehensive Meta Analysis (CMA) istatistik programından yararlanılmıştır. Araştırmada istatistiksel analizlerin önemlilik düzeyi olarak .05 önemlilik düzeyi seçilmiştir. Bu araştırmada farklı veri türlerinin bir araya getirilmesinde kullanışlı olmasından dolayı CMA istatistik programı tercih edilmiştir.

Burada çalışma istatistiklerine göre sınıflamalar yapıldıktan sonra sabit etki modeli ve rastgele etki modeli kullanılarak meta-analiz yapılmıştır.

### 3. BULGULAR

Yapılan meta analiz çalışmasının bu kısmında dahil edilme kriterlerine uygun çalışmaların analizleri sonucu elde edilen bulgular yer almaktadır. İlk önce meta analiz çalışmasına dair betimleyici veriler açıklanıp daha sonra CMA2.0 programıyla hesaplanan etki büyüklüğü değerleri arasındaki farka yer verilecektir.

Gerçekleştirilen meta analiz çalışmasındaki temel amaç, fen eğitiminde laboratuvar destekli öğretimin öğrencilerin akademik başarı yönünden etki büyüklüğünü hesaplamaktır. Bu doğrultuda literatür çalışmasında belirlenen dahil edilme kriterine uygun çalışmalar toplanmış ve analiz edilmiştir. Bunun sonucunda fen eğitiminde laboratuvar destekli öğretimin programda öngörülen öğretim yöntemine göre akademik başarı açısından etki büyüklüklerinin istatistiksel anlamda arasındaki fark açıklanmıştır.

Gerçekleştirilen meta-analiz çalışmasına dahil edilen çalışmaların yayın türüne göre (Tablo 1) , çalışmanın uygulandığı sınıf düzeyine göre (Tablo 2) , çalışmanın uygulandığı coğrafi bölgeye göre (Tablo 3), çalışmanın konu alanına göre (Tablo 4) frekans/ yüzde istatistikleri şu şekildedir.

**Tablo 1.** Çalışmanın Yayın Türüne Göre Dağılımı

AKADEMİK BAŞARI			AKADEMİK BAŞARI		
Yayın Türü	Frekans	Yüzde	Yayın Türü	Frekans	Yüzde
Doktora	9	29,032%	Yükseklisans	15	48,387
Makale	7	22,580%			
<b>Toplam</b>	31	100			

Meta analizi yapılan çalışmaların yayın türüne göre dağılımı incelendiğinde; akademik başarı değişkenini inceleyen çalışmalarda tezlerin (77,5%) ağırlıklı olduğu görülmektedir. Tezler arasından ise en çok veri yüksek lisans tezlerinden elde edilmiştir. Yüksek lisans tezleri çalışmanın %48,38'ini oluşturmuştur.

**Tablo 2.** Çalışmanın Sınıf Düzeyine Göre Dağılımı

AKADEMİK BAŞARI			AKADEMİK BAŞARI		
Sınıf Düzeyi	Frekans	Yüzde	Sınıf Düzeyi	Frekans	Yüzde
İlkokul	2	6,45%	Ortaokul	11	35,48%
Üniversite	13	41,93%	Lise	5	16,12%
<b>Toplam</b>	31	100			

Meta analizi yapılan çalışmaların akademik başarı sınıf düzeyi değişkeni incelendiğinde ortaokul ve üniversite düzeylerinde daha fazla çalışıldığı gözlenmiştir. Meta analize dahil edilen 31 çalışmanın 11 adet orta okul ve 13 adet üniversite olmak üzere toplam 24 çalışmasını oluşturmaktadır. Bu da çalışmanın büyük çoğunluğu olan %77,41' ine denk gelmektedir.

**Tablo 3. Çalışmaların Coğrafi Bölgelere Göre Dağılımı**

AKADEMİK BAŞARI					
Çalışılan coğrafi Bölge	Frekans	Yüzde	Coğrafi bölge	Frekans	Yüzde
İç Anadolu	3	9,67%	Ege	4	12,90%
Doğu Anadolu	9	29,03%	Marmara	4	12,90%
G. Doğu Anadolu	0	0,0%	Akdeniz	4	12,90%
Karadeniz	7	22,58%			
<b>Toplam</b>	<b>31</b>	<b>100</b>			

Meta analiz çalışmasına dahil edilen araştırmalar incelendiğinde akademik başarı değişkenine yönelik Güney Doğu Anadolu bölgesinde gerçekleştirilmiş bir çalışmaya ulaşılamamıştır. Akademik başarı değişkenini inceleyen 31 çalışmadan 9 tanesi Doğu Anadolu Bölgesinde gerçekleştirilmiştir ve bu araştırmalar çalışmanın çoğunluğu olan %29,03'ünü oluşturmuştur.

**Tablo 4. Çalışmaların Konu Alanına Göre Dağılımı**

Konu Alanı	Frekans	Yüzde	Konu Alanı	Frekans	Yüzde
Fen	13	41,93%	Kimya	9	29,03%
Fizik	3	9,67%	Biyoloji	6	19,35%
<b>Toplam</b>	<b>31</b>	<b>100</b>			

Çalışmalar Fen Bilimleri konu alanlarının alt branşları olan Fen, Fizik, Kimya ve Biyoloji alanlarına göre kategorize edilmiştir. Meta analize dahil edilecek çalışmaların akademik başarı değişkenini inceleyen çalışmalara bakıldığında normale yakın bir dağılım gözlenmektedir. Fakat en çok Fen alanındaki araştırmalar, çalışmanın çoğunluğu olan %41,93'ünü oluşturmuştur.

### 3.1. Akademik Başarı ile ilgili Genel Etki Büyüklüğü Bulguları

Araştırmanın birinci problemine ait 'Fen eğitiminde laboratuvar destekli öğretimin öğrencilerin akademik başarısına olumlu bir etkisi var mıdır?' sorusunun cevabını araştırmak için 31 tane çalışmanın grup ortalaması, standart sapma ve örneklem büyüklüğü verileri alınarak bireysel etki büyüklüğü ve genel etki büyüklüğü ile analiz edilmiştir. Analiz işlemi CMA2.0 programı ile yapılmıştır. Verilerin yorumlanması için Cohen (1988) sınıflaması ve Thalheimer ve Cook (2002) sınıflandırması kullanılmıştır.

Meta analizi yapılan 31 çalışmanın bireysel etki büyüklükleri, p değeri, alt ve üst limitleri aşağıda verilmiştir.

Tablo 5. Meta Analiz çalışmasında Kullanılan Akademik Başarı Çalışmalarının Etki Büyüklükleri ve Çalışma Verileri

Çalışma Kodu	Etki Büyüklüğü	Standart Hata	Varyans	Alt Limit	Üst Limit	P
ASLAN ,2015	2,111	0,343	0,118	1,438	2,784	0,000
SAHIN&SAGLAMERYAZGAN,2010	1,673	0,245	0,060	1,193	2,153	0,000
AKSAKAL&KARATAS&SIMSEK,2011	1,009	0,306	0,093	0,410	1,608	0,001
SOSLU ,2010	3,532	0,411	0,169	2,727	4,338	0,000
YILDIZ ,2010	0,488	0,228	0,052	0,042	0,934	0,032
ALTINOK, 2011	1,424	0,372	0,138	0,696	2,152	0,000
KARA ,2010	1,040	0,204	0,042	0,640	1,439	0,000
O.ATICI&T.ATICI ,2012	1,486	0,209	0,044	1,076	1,895	0,000
DUMAN ,2019	2,063	0,438	0,192	1,204	2,923	0,000
AKPULLUKCU ,2011	1,298	0,257	0,066	0,794	1,802	0,000
DASDEMİR&DOYMUS , 2012	0,662	0,308	0,096	0,099	1,265	0,032
KAYA & ORAL ,2013 a	0,644	0,240	0,057	0,174	2,418	0,007
KAYA & ORAL ,2013 b	1,858	0,286	0,082	1,296	1,114	0,000
DEMİR ,2018	0,479	0,288	0,083	0,086	1,044	0,097
GULER ,2016	0,713	0,199	0,040	0,323	1,103	0,000
BILEN KAYA,2012 a	0,443	0,234	0,055	-	0,903	0,058
BILEN KAYA,2012 b	0,862	0,253	0,064	0,016	1,357	0,001
BILIR ,2019	1,768	0,392	0,154	0,367	4,507	0,000
KIZILAY ,2016	0,185	0,291	0,085	0,999	0,755	0,524
OYMAK,2018	1,521	0,248	0,061	-	2007	0,000
UNAL,2010	2,677	0,334	0,112	0,385	3,332	0,000
DASDEMİR&UZOGLU&CENGİZ,2012	0,806	0,371	0,138	1,035	1,533	0,030
TOPRAK,2011 a	1,544	0,308	0,096	2,021	5,013	0,000
TOPRAK,2011 b	0,986	0,301	0,090	0,079	3,279	0,001
MERAL, 2018	0,276	0,256	0,066	0,941	0,778	0,231
İNCE& GUVEN&AYDOĞDU,2010	1,091	0,226	0,081	0,397	1,533	0,000
YUCEL,2019	1,075	0,314	0,099	-	1,691	0,001
GOKTURK,2017 a	1,546	0,292	0,086	0,226	2,119	0,000
GOKTURK,2017 b	1,461	0,279	0,078	0,649	2,007	0,000
BATIR,2018	2,098	0,384	0,148	0,459	2,851	0,000
KARACALI&OZKAN,2021	0,689	0,319	0,102	0,973	1,314	0,031
				0,914		
				1,345		
				0,063		
Sabit Etkiler Modeli						
Rastgele Etkiler Modeli						

Çalışmaların bireysel etki büyüklükleri incelendiğinde etki büyüklüğünün en küçük olduğu çalışma Kızılay (2016) ‘0.185’ etki büyüklüğüne sahiptir. Çalışmada etki büyüklüğünün pozitif yönde en büyük olduğu çalışma Soslu (2010) ‘3,532’ etki büyüklüğüne sahiptir. Çalışmaların etki büyüklükleri ve frekansları aşağıda verilmiştir.

**Tablo 6.** Meta Analiz Çalışmasında Kullanılan Akademik Başarı Çalışmalarının Etki Büyüklükleri Yönüne Ait Frekans Tablosu

Etki Büyüklüğü Yönü	Frekans	Yüzde
Sıfır	0	0,00%
Pozitif	31	100%
Negatif	0	0,00%
Toplam	31	100

Tablo 6. incelendiğinde çalışmaların bireysel etki büyüklüğüne bakıldığında 31 çalışmanın tamamının pozitif yönde olduğu görülmektedir. Çalışmaların %100’ü pozitif yönde etki göstermiştir de denilmektedir. Fen eğitiminde laboratuvar destekli öğretimin programda öngörülen yönetime göre akademik başarı değişkeni açısından daha etkili olduğu sonucunda yorum yapılmaktadır. Çalışmaların etki büyüklükleri Cohen (1988) ve Thalheimer ve Cook (2002) sınıflandırması aşağıdaki gibidir.

**Tablo 7.** Cohen (1988) Etki Büyüklüğü Sınıflaması

Sınıflama Düzeyi	Frekans	Yüzde
Önemsiz	1	3,22%
Küçük	5	16,12%
Orta	5	16,12%
Büyük	20	64,51%
Toplam	31	100

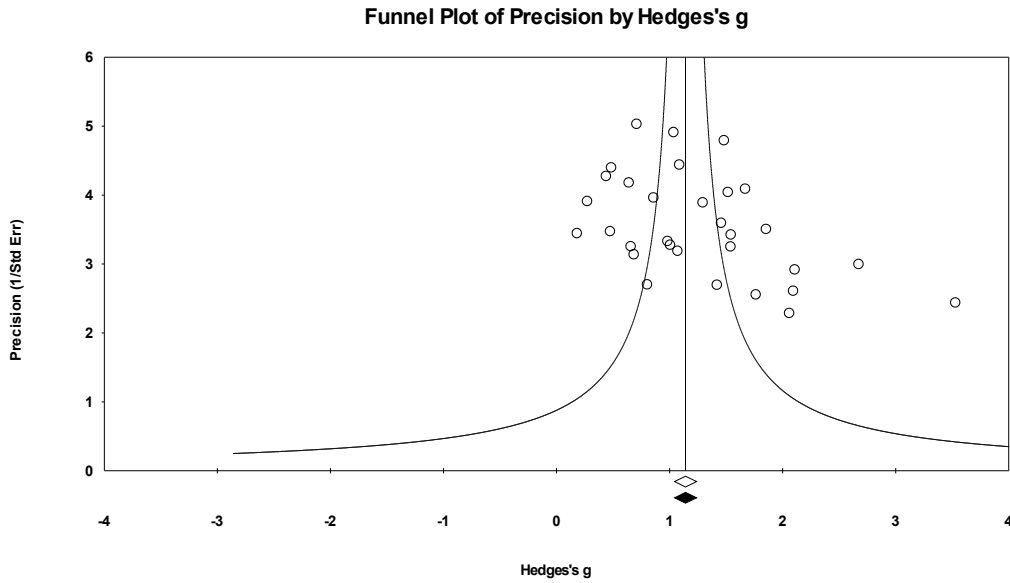
Cohen (1988)’in yapmış olduğu sınıflandırmaya göre çalışmaların büyük bir çoğunluğunun etki büyüklüklerinin büyük düzeyde olduğu görülmektedir. Etki büyüklüğü büyük düzeyde olan çalışmalar 20 tane ile meta analiz çalışmasının %64,51’ini oluşturmaktadır. Daha detaylı bir sınıflandırma Thalheimer ve Cook (2002) sınıflandırması aşağıdaki gibidir

**Tablo 8.** Thalheimer ve Cook (2002) Etki Büyüklüğü Sınıflaması

Sınıflama Düzeyi	Frekans	Yüzde	Sınıflama Düzeyi	Frekans	Yüzde
Önemsiz	0	0,00%	Geniş	7	22,58%
Küçük	2	6,45%	Çok Geniş	3	9,67%
Orta	5	16,12%	Muazzam	14	45,16%
Toplam	31	100			

Çalışmanın %45,16'sının muazzam etki büyüklüğüne sahip olduğu görülmektedir. Çalışmanın etki büyüklükleri frekansına bakıldığında laboratuvar destekli öğretimin lehine pozitif yönde olduğu söylenebilir fakat net bir görüş elde etmek için meta analizde birleştirilmiş etki büyüklüğüne bakmak gerekmektedir.

Yapılan meta analiz sonucu iki model için ayrı ayrı etki büyüklükleri hesaplanmıştır fakat öncelikle çalışma modelini belirlemek gerekmektedir (Sutton, ve diğ., 2000). Çalışma modelini belirlemek için heterojenlik huni grafiği aşağıda verilmiştir.



**Şekil 1.** Hedges's g Değerine Göre Etki Büyüklüklerinin Dağılım Huni Grafiği

Meta analiz programı olarak kullanılan CMA 2.0'da gerçekleştirilen hesaplamalarla etki büyüklüklerinin dağılımının verildiği bu grafikte çalışmaların dağılımı ve yoğunluğun olduğu alan hakkında bilgi vermektedir. Bireysel yapılan her çalışmaların tamamına yakınının huninin içinde yer alması beklenmektedir. Çalışmaların huninin dışında da dağılım göstermesi çalışmaların frekanslarının heterojen bir şekilde dağılım gösterdiği

fikrini oluşturmaktadır. Fakat bu grafik tek başına model belirlenmesi için yeterli veriyi içermemektedir. Bu sebeple çalışmaların heterojenlik testinin yapılması “Q” veya “p” değerlerine bakılması gerekmektedir (Dinçer, 2014). Aşağıda yer alan tabloda değerler verilmektedir.

**Tablo 9.** Akademik Başarıyı İnceleyen Çalışmaların Heterojenlik test sonuçları

Heterojenlik				Tau-Squared			
Q	Df	P	I <sup>2</sup>	Tau-squared	Standard	Variance	Tau
					Error		
158,861	30	0,000	86,748	0,330	0,110	0,012	0,575

Çalışmanın ilk olarak heterojenlik testi yapılmıştır. Yapılan testin sonucunda Q istatistiksel değeri 158,861 ve serbestlik derecesi 30 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 43,773 değer aralığındadır. Hesaplanan Q istatistiksel değeri 158,861 ( $p < 0,05$ ) ile 30 serbestlik derecesindeki ki-kare dağılımında belirlenmiş kritik değeri aştığı gözlenmiştir. Bu durumdan yola çıkarak çalışmanın etki büyüklüğünün dağılımı için “heterojendir” yorumu yapılabilir. Model seçiminde heterojen çalışmalar için Rastgele Etkiler Modeli (Random Effect Size) kullanılmalıdır (Akgöz ve diğ., 2004; Borenstein ve diğ., 2013).

Çalışmada yer alan bireysel çalışmaların heterojen özellik göstermesi nedeniyle yanılmaları ortadan kaldırabileceği için (Gözüyeşil, 2012) model seçiminin bu şekilde yapılması uygundur. Çalışmanın her iki model için de ayrı ayrı etki büyüklükleri hesaplanmış ve Tablo 11’de verilmiştir. Çalışma için uygun model Rastgele Etkiler Modeli olduğundan yorumlar ona göre yapılmıştır (Lipsey ve Wilson, 2001).

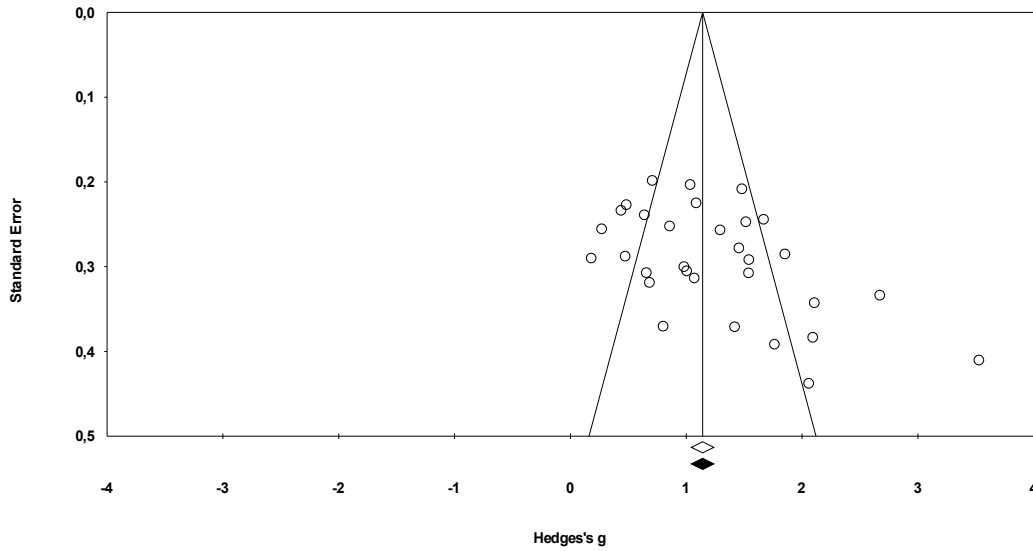
**Tablo 10.** Meta Analiz Çalışmasına Ait Akademik Başarı Birleştirilmiş Etki Büyüklükleri

Model	Çalışma Sayısı	Etki Büyüklüğü	Standart Hata	Varyans	%95 Güven Aralığı		
					Alt Limit	Üst Limit	P
Sabit Etki	31	1,141	0,050	0,002	1,044	1,238	0,000
Rastgele Etki	31	1,239	0,116	0,013	1,012	1,467	0,000



Yapılmış olan meta analiz sonucunda etki büyüklüğü 1,239 olarak hesaplanmıştır. Cohen (1988) ve Thalheimer ve Cook (2002) sınıflamalarına göre etki büyüklüğü “geniş düzey” olarak açıklanmaktadır. Ayrıca çalışmanın p değerine bakıldığında ( $p < 0,05$ ) anlamlı olduğu yorumu yapılabilir. Bu durumda fen eğitiminde laboratuvar destekli öğretimin, programda öngörülen yönetime göre akademik başarı üzerinde etkisinin daha büyük olduğu söylenebilir. Çalışmaların etki büyüklüğünü önemli derecede etkileyen çalışmaların incelenmesi için yayın yanlılığına bakılmalıdır (Dinçer, 2014).

#### Funnel Plot of Standard Error by Hedges's g



Şekil 2. Akademik Başarı Yayın Yanlılığı Huni Grafiği

Yayın yanlılığı grafiğine bakıldığında huninin dışında kalan kısım yayın yanlılığı hakkında bilgi vermektedir. Yatay (x) eksen etki büyüklüğü hakkında bilgi verirken dikey (y) eksen örneklem büyüklüğü ya da varyans hakkında bilgi vermektedir. Huni grafiğini simetrik bölen çizgi genel etki büyüklüğünü göstermektedir. Çalışmaların huni grafiğin içinde ve genel etki büyüklüğü çizgisinin etrafında toplanması aynı zamanda simetrik dağılım göstermesi beklenmektedir. Huni dışında kalan çalışmaların yayın yanlılığına sebep olmaktadır. Bu nedenle çalışmaların çoğunluğunun huni içinde olması çalışmanın güvenilirliği açısından önemlidir.

Oluşan bu grafikte huni dışında 13 tane çalışma görülmekte ve bu çalışmanın %41'ini oluşturmaktadır. Fakat çalışmaların çoğunluğunun huni grafiğinden çok uzakta kalmamış

olması yayın yanlılığının çok önemsiz derecede olabileceği sonucunu çıkarmaktadır. Çalışmanın yayın yanlılığının çok önemsiz olduğunu göstermek için aşağıda Classic Fail-Safe N ve Kendall's istatistikleri değerleri verilmektedir.

**Tablo 11.** Yayın yanlılığı Classic Fail-Safe N ve Kendall's istatistikleri

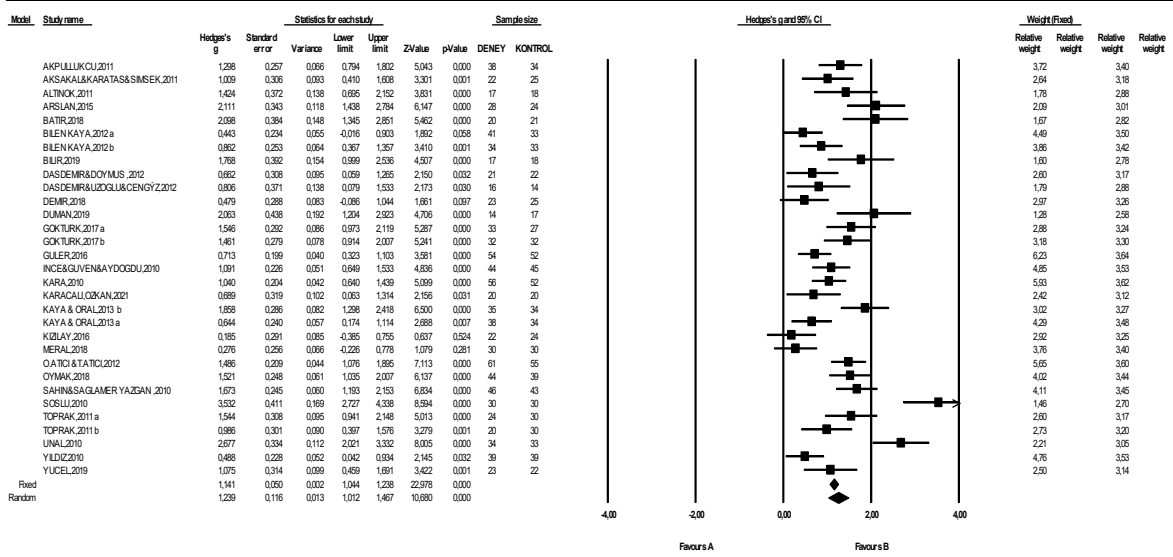
### Meta Analizin Gücü

Z – Değeri	23,69563
p – Değeri	0,00000
Alfa Değeri	0,05000
Tails	2,00000
Alfa için Z – Değeri	1,95996
Örneklem	31,00000
p>alfa sonucu için gerekli eksik çalışma sayısı	4501,00000
<b>Yanlılık durumu</b>	
Kendall's (P-Q)	143,00000
Kendall's Tau	0,30753
Tau için Z – değeri	2,43049
Kendall's P1	0,00754
Kendall's P2	0,01580

Yayın yanlılığı analizi sonucunda Kendall's analizi ve Classic Fail Safe N analizi yapılmıştır. Elde edilen bulgular doğrultusunda meta analiz çalışmasına dahil edilen 31 çalışmanın etki büyüklüğünün sıfıra yakın olabilmesi için analize 4501 çalışma daha eklenmesi gerekmektedir. Başka bir deyişle 31 çalışmanın dahil edildiği bu çalışma bulgularının geçersiz sayılabilmesi için literatürden bu verilerin tersi yönde 4501 tane çalışmanın eklenmesi gerekmektedir. Literatür taraması sonucunda bu sayıda çalışmaya ulaşmak mümkün olmadığından meta analizde yayın yanlılığı yoktur denilebilir. Tablo 11'e göre meta analiz kapsamına alınan çalışmalarda yanlılık bulunmadığı bulgusuna ulaşılmıştır.

Çalışmalardan yapılan analizler sonucunda genel durumu görebilmek için Hedges's g değerine göre öğrencilerin fen eğitimindeki akademik başarılarını inceleyen çalışmaların

bireysel etki büyüklükleri ile genel etki büyüklüğünün genel durumunu gösteren orman grafiği ve çalışma ağırlıkları aşağıdaki gibidir.



### Meta Analysis

Şekil 3. Akademik Başarıyı İnceleyen Çalışmalar için Hedges's g Değerine Göre Etki Büyüklükleri Dağılımı – Orman Grafiği – Çalışma Ağırlığı

Çalışmaların orman grafiği incelendiğinde etki büyüklüğünü simgeleyen elmas sıfırdan büyük bir değer aralığında görülmektedir. Bu durum fen eğitiminde laboratuvar destekli öğretime dayalı öğrenmenin programda yer alan yöntemlere göre akademik başarı açısından daha etkili olduğunu ifade etmektedir.

Çalışma ağırlıkları incelendiğinde veriler birbirine yakın değerlerden oluşmaktadır. Çalışma ağırlığı için en yüksek değer Güler (2016) “3,64” değeridir. Çalışma ağırlığında yer alan değerlerin birbirine yakın olması beklenmektedir. Diğer çalışmalara ait çalışma ağırlıklarından daha büyük veya daha düşük olan değerler çalışma yayın yanlılığını etkilemektedir. Buradan yola çıkarak çalışmadaki değerlerin normale yakın değer göstermesi ile çalışmada yayın yanlılığı bulunmamaktadır.

### 3.2. Konu Alanı Değişkenine Göre Moderatör Analizi

Yapılan meta-analiz çalışmasındaki alt problemlerden ‘Fen eğitiminde laboratuvar destekli öğretimin fen bilimleri dersi alt başlıkları (Konu Alanı: Fen- Fizik-Kimya-Biyoloji) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında

fark var mıdır?’ sorusuna cevap aranmıştır.Çalışmalar Fen- Fizik-Kimya-Biyoloji konu alanları olmak üzere 4 kategoriye ayrılmıştır. Yapılan analiz sonuçları aşağıda verilmiştir.

**Tablo 12.** Konu Alanı Moderatörünün Akademik Başarı Değişkenine Göre Etki Büyüklük Değerleri

Fen Alanı	Çalışma Kodu	Etki Büyük- Lüğü	%95 Güven Aralığı		P
			Alt Limit	Üst Limit	
BİYOLOJİ	ARSLAN, 2015	2,111	1,438	2,784	0,000
BİYOLOJİ	AKSAKAL,KARATAŞ, 2011	1,009	0,410	1,608	0,001
BİYOLOJİ	KARA, 2010	1,040	0,640	1,439	0,000
BİYOLOJİ	O.ATICI T.ATICI, 2012	1,486	1,076	1,896	0,000
BİYOLOJİ	KIZILAY, 2016	0,185	-0,885	0,755	0,524
BİYOLOJİ	DASDEMİR,UZOGLU,2012	0,806	0,079	1,538	0,030
<b>Sabit Etkiler</b>	<b>Biyoloji</b>	<b>1,124</b>	<b>0,912</b>	<b>1,336</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Biyoloji</b>	<b>1,105</b>	<b>0,636</b>	<b>1,575</b>	<b>0,000</b>
FEN	ŞAHİN,SAĞLAMER,2010	1,673	1,193	2,153	0,000
FEN	DUMAN, AVCI,2016	2,063	1,204	2,923	0,000
FEN	YILDIZ,2010	0,488	0,042	0,934	0,032
FEN	ALTINOK,2011	1,424	0,695	2,152	0,000
FEN	DUMAN,2019	2,063	1,204	2,923	0,000
FEN	YUCEL,2019	1,075	0,459	1,691	0,001
FEN	AKPULLUKÇU,2011	1,296	0,794	1,802	0,000
FEN	DOYMUŞ,2012	0,662	0,059	1,265	0,032
FEN	DEMİR,2018	0,479	-0,086	1,044	0,097
FEN	GULER,2018	0,713	0,323	1,103	0,000
FEN	BİLİR,2019	1,768	0,999	2,586	0,000
FEN	MERAL,2018	0,276	-0,226	0,778	0,281
FEN	İNCE,GÜVEN,2010	1,091	0,649	1,533	0,000
FEN	KARACALI,ÖZKAN,2021	0,689	0,063	1,314	0,031
<b>Sabit Etkiler</b>	<b>Fen</b>	<b>0,947</b>	<b>0,798</b>	<b>1,096</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Fen</b>	<b>1,008</b>	<b>0,728</b>	<b>1,288</b>	<b>0,000</b>
FİZİK	SOSLU,2010	3,532	2,727	4,338	0,000
FİZİK	OYMAK,2018	1,521	1,035	2,007	0,000
FİZİK	BATIR,2018	2,098	1,345	2,851	0,000
<b>Sabit Etkiler</b>	<b>Fizik</b>	<b>2,067</b>	<b>1,703</b>	<b>2,431</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Fizik</b>	<b>2,351</b>	<b>1,199</b>	<b>3,504</b>	<b>0,000</b>
KİMYA	KAYA,ORAL,2013a	0,644	0,174	1,114	0,007
KİMYA	KAYA,ORAL,2018 b	1,858	1,298	2,418	0,000
KİMYA	BİLEN KAYA,2012 a	0,443	-0,016	0,903	0,058
KİMYA	BİLENKAYA,2012 b	0,862	0,367	1,357	0,001
KİMYA	UNAL,2010	2,677	2,021	3,332	0,000
KİMYA	TOPRAK,2011 a	1,544	0,941	2,148	0,000
KİMYA	TOPRAK,2011b	0,986	0,397	1,576	0,001
KİMYA	GOKTURK,2017 a	1,546	0,973	2,119	0,000

KİMYA	GOKTURK,2017 b	1,461	0,914	2,007	0,000
<b>Sabit Etkiler</b>	<b>Kimya</b>	<b>1,210</b>	<b>1,030</b>	<b>1,390</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Kimya</b>	<b>1,2314</b>	<b>0,877</b>	<b>1,750</b>	<b>0,000</b>
<b>Sabit Etkiler</b>	<b>(Tümü)</b>	<b>1,141</b>	<b>1,044</b>	<b>1,238</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>(Tümü)</b>	<b>1,139</b>	<b>0,932</b>	<b>1,346</b>	<b>0,000</b>

Yapılan analiz sonucunda her iki modele göre etki büyüklükleri hesaplanmıştır. Konu alanı akademik başarıya etkisi için genel etki büyüklüğünü hesaplarken yorumlayabilmek için hangi istatistiksel modelin seçileceğini belirlemek amacıyla heterojenlik testi yapılmıştır. Testin sonuçları aşağıda verilmiştir.

**Tablo 13.** Konu Alanı Moderatörünün Akademik Başarıya göre Heterojenlik Testi

Konu Alanı	N	Standart Hata	Q	Heterojenlik		Genel Etki Büyüklüğü	%95 Güven Aralığı		
				df	P		Alt Sınır	Üst Sınır	
						I <sup>2</sup>			
Biyoloji	6	0,108	22,731	5	0,000	78,003	1,124	0,912	1,336
Fen	13	0,076	40,195	12	0,000	70,146	0,947	0,798	1,096
Fizik	3	0,186	17,574	2	0,000	88,619	2,067	1,703	2,431
Kimya	9	0,092	46,426	8	0,000	82,768	1,210	1,030	1,390
Total Within									
(Sabit Etkiler Modeli)			126,926	27	0,000				
Total Between									
(Karışık Etkiler Modeli)			5,726	3	0,000		1,139	0,932	1,346

Çalışmanın heterojenlik testi sonuçlarına bakıldığında öncelikli olarak sabit etkiler modeline bakılmıştır. Sabit etkiler modelinde yer alan grup içi heterojenlik testi anlamlılık düzeyi ( $p < 0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın heterojenlik testi Q istatistiksel değeri incelendiğinde 126,926 ve serbestlik derecesi 27 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 40,113 değeri aralığındadır. Hesaplanan Q istatistiksel değeri 126,926 ( $p < 0,05$ ) ile 27 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değeri aştığı görülmüştür. Buradan yola çıkarak çalışmalar kendi içinde aynı yaygın etkiye sahiptir denilmekte veya çalışmalar kendi içinde beklenenden yüksek dağılıma sahiptir denilmektedir.

Elde edilen bulgular sonucuna göre karışık etkiler modeline geçilmiştir ve gruplar arası (between-group) heterojenlik testine göre p değeri hesaplanmıştır. Testin anlamlılık düzeyi ( $p=0,000$ )< ( $p=0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın heterojenlik testi Q istatistiksel değerine bakıldığında 5,726 ve serbestlik derecesi 3 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95

anlamlılık düzeyindeki kritik değeri 7,815 değeridir. Hesaplanan Q istatistiksel değerine bakıldığında 5,726 ( $p<0,05$ ) ile 3 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değerin altında olduğu görülmüştür. Ayrıca p değeri 0.000 olarak hesaplanmış ve anlamlı bir değer olmadığı sonucuna ulaşılmıştır. Bu durumda konu alanları açısından fen eğitiminde laboratuvar destekli öğrenmenin akademik başarıdaki etki büyüklükleri arasında anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

### 3.3 Sınıf Düzeyi Değişkenine Göre Moderatör Analizi

Yapılan meta analiz çalışmasındaki alt problemlerden “Fen Eğitiminde laboratuvar destekli öğretimin sınıf düzeyleri (ilkokul-ortaokul-lise-üniversite) açısından incelendiğinde akademik başarı açısından etki büyüklüğü arasında fark var mıdır?” sorusu araştırılmıştır. Yapılan analiz sonuçları aşağıda verilmiştir.

Çalışmalar İlkokul-Ortaokul-Lise-Üniversite olmak üzere 4 kategoriye ayrılmıştır. Yapılan analiz sonuçları aşağıda verilmiştir

**Tablo 14.**Sınıf Düzeyi Moderatörünün Akademik Başarı Değişkenine Göre Etki Büyüklük Değerleri

Sınıf Düzeyi	Çalışma Kodu	Etki Büyüklüğü	%95 Güven Aralığı		P
			Alt Limit	Üst Limit	
İLKOKUL	BİLİR,2019	1,768	0,999	2,586	0,000
İLKOKUL	YUCEL,2019	1,075	0,459	1,691	0,001
<b>Sabit Etkiler</b>	<b>İlkokul</b>	<b>1,346</b>	<b>0,865</b>	<b>1,826</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>İlkokul</b>	<b>1,382</b>	<b>0,707</b>	<b>2,056</b>	<b>0,000</b>
ORTAOKUL	ŞAHİN,SAĞLAMER,2010	1,673	1,193	2,153	0,000
ORTAOKUL	YILDIZ,2010	0,488	0,042	0,934	0,032
ORTAOKUL	ALTINOK,2011	1,424	0,695	2,152	0,000
ORTAOKUL	DUMAN,2019	2,063	1,204	2,923	0,000
ORTAOKUL	AKPULLUKÇU,2011	1,296	0,794	1,802	0,000
ORTAOKUL	DOYMUŞ,2012	0,662	0,059	1,265	0,032
ORTAOKUL	DEMİR,2018	0,479	-0,086	1,044	0,097
ORTAOKUL	MERAL,2018	0,276	-0,226	0,778	0,281
ORTAOKUL	BATIR,2018	2,098	1,345	2,851	0,000
ORTAOKUL	KARACALI,ÖZKAN,2021	0,689	0,063	1,314	0,031
ORTAOKUL	DASDEMİR,CENGİZ,2012	0,806	0,079	1,533	0,030
<b>Sabit Etkiler</b>	<b>Ortaokul</b>	<b>0,972</b>	<b>0,797</b>	<b>1,148</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Ortaokul</b>	<b>1,050</b>	<b>0,680</b>	<b>1,420</b>	<b>0,000</b>
LİSE	O.ATICI T.ATICI, 2012	1,486	1,076	1,896	0,000
LİSE	OYMAK,2018	1,521	1,035	2,007	0,000
LİSE	UNAL,2010	2,677	2,021	3,332	0,000
LİSE	GOKTURK,2017 a	1,546	0,973	2,119	0,000
LİSE	GOKTURK,2017 b	1,461	0,914	2,007	0,000
<b>Sabit Etkiler</b>	<b>Lise</b>	<b>1,645</b>	<b>1,416</b>	<b>1,875</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Lise</b>	<b>1,699</b>	<b>1,311</b>	<b>2,086</b>	<b>0,000</b>
ÜNİVERSİTE	ARSLAN, 2015	2,111	1,438	2,784	0,000
ÜNİVERSİTE	AKSAKAL,KARATAŞ, 2011	1,009	0,410	1,608	0,001
ÜNİVERSİTE	SOSLU,2010	3,532	2,727	4,338	0,000
ÜNİVERSİTE	KARA, 2010	1,040	0,640	1,439	0,000
ÜNİVERSİTE	KAYA,ORAL,2013a	0,644	0,174	1,114	0,007
ÜNİVERSİTE	KAYA,ORAL,2018 b	1,858	1,298	2,418	0,000
ÜNİVERSİTE	BİLEN KAYA,2012 a	0,443	-0,016	0,903	0,058
ÜNİVERSİTE	BİLENKAYA,2012 b	0,862	0,367	1,357	0,001
ÜNİVERSİTE	KIZILAY, 2016	0,185	-0,885	0,755	0,524
ÜNİVERSİTE	İNCE,GÜVEN,2010	1,091	0,649	1,533	0,000
ÜNİVERSİTE	GULER,2018	0,713	0,323	1,103	0,000
ÜNİVERSİTE	TOPRAK,2011 a	1,544	0,941	2,148	0,000
ÜNİVERSİTE	TOPRAK,2011b	0,986	0,397	1,576	0,001
<b>Sabit Etkiler</b>	<b>Üniversite</b>	<b>1,042</b>	<b>0,900</b>	<b>1,183</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Üniversite</b>	<b>1,187</b>	<b>0,818</b>	<b>1,555</b>	<b>0,000</b>
<b>Tümü</b>	<b>Sabit Etkiler Modeli</b>	<b>1,141</b>	<b>1,044</b>	<b>1,238</b>	<b>0,000</b>
<b>Tümü</b>	<b>Rastgele Etkiler Modeli</b>	<b>1,308</b>	<b>1,101</b>	<b>1,514</b>	<b>0,000</b>

Yapılan analiz sonucunda her iki modele göre etki büyüklükleri hesaplanmıştır. Sınıf düzeylerinin akademik başarıya etkisi için genel etki büyüklüğünü hesaplarken yorumlayabilmek için hangi istatistiksel modelin seçileceğini belirlemek amacıyla heterojenlik testi yapılmıştır. Testin sonuçları aşağıda verilmiştir.

**Tablo 15.** Sınıf Düzeyi Moderatörünün Akademik Başarıya göre Heterojenlik Testi

Sınıf Düzeyi	N	Standart Hata	Q	Heterojenlik		Genel Etki Büyüklüğü	%95 Güven Aralığı		
				df	P		Alt Sınır	Üst Sınır	
						$I^2$			
İlkokul	2	0,245	1,900	1	0,168	47,368	1,346	0,865	1,826
Lise	5	0,117	10,904	4	0,028	63,316	1,645	1,416	1,875
Ortaokul	11	0,089	42,899	10	0,000	76,689	0,972	0,797	1,148
Üniversite	13	0,072	78,519	12	0,000	84,717	1,042	0,900	1,183
Total Within									
(Sabit Etkiler Modeli)			134,222	27	0,000				
Total Between									
(Rastgele Etkiler, Karışık Etkiler Modeli)			6,231	3	0,000		1,308	1,101	1,514

Çalışmanın heterojenlik testi sonuçlarına bakıldığında öncelikli olarak sabit etkiler modeline bakılmıştır. Sabit etkiler modelinde yer alan grup içi heterojenlik testi anlamlılık düzeyi ( $p < 0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın heterojenlik testi Q istatistiksel değeri incelendiğinde 134,222 ve serbestlik derecesi 27 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 40,113 değeri aralığındadır. Hesaplanan Q istatistiksel değeri 134,222 ( $p < 0,05$ ) ile 27 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değeri aştığı görülmüştür. Buradan yola çıkarak çalışmalar kendi içinde aynı yaygın etkiye sahiptir denilmekte veya çalışmalar kendi içinde beklenenden yüksek dağılıma sahiptir denilmektedir.

Elde edilen bulgular sonucuna göre karışık etkiler modeline geçilmiştir ve gruplar arası (between-group) heterojenlik testine göre p değeri hesaplanmıştır. Testin anlamlılık düzeyi ( $p = 0,000$ ) < ( $p = 0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın heterojenlik testi



Q istatistiksel değerine bakıldığında 6,231 ve serbestlik derecesi 3 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95

anlamlılık düzeyindeki kritik değeri 7,815 değeridir. Hesaplanan Q istatistiksel değerine bakıldığında 6,231 ( $p < 0,05$ ) ile 3 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değerin altında olduğu görülmüştür. Ayrıca p değeri 0.000 olarak hesaplanmış ve anlamlı bir değer olmadığı sonucuna ulaşılmıştır. Bu durumda sınıf düzeyleri açısından fen eğitiminde laboratuvar destekli öğrenmenin akademik başarıdaki etki büyüklükleri arasında anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

### 3.4 Coğrafi Bölge Değişkenine Göre Moderatör Analizi

Yapılan meta-analiz çalışmasındaki alt problemlerden ‘ Fen eğitiminde laboratuvar destekli öğretime coğrafi bölgeler (İç Anadolu, Doğu Anadolu, Güney Doğu Anadolu, Akdeniz, Karadeniz, Marmara, Ege) açısından incelendiğinde akademik başarı açısından etki büyüklükleri arasında fark var mıdır?’ sorusuna cevap aranmıştır.

Fen eğitiminde laboratuvar destekli öğrenmenin öğrencilerin öğrenim gördüğü coğrafi bölgeye ait akademik başarıları açısından etkililik dereceleri, karşılaştırmalı etki büyüklük değerleri ile belirlenmiştir. Çalışmalar Türkiye’deki yedi coğrafi bölge olmak üzere 7 farklı gruba ayrılmıştır. Ancak dahil edilme kriterlerine uygun çalışmalar içinde coğrafi bölge için frekans tablosunda (Tablo 16) verildiği gibi, Güney Doğu Anadolu bölgelerinde gerçekleştirilen çalışma olmadığından moderatör için 6 adet kategori oluşturulmuştur. Yapılan analiz sonuçları aşağıda verilmiştir.

**Tablo 16. Coğrafi Bölge Moderatörünün Akademik Başarı Değişkenine Göre Etki Büyüklük Değerleri**

Coğrafi Bölge	Çalışma Kodu	Etki Büyüklüğü	%95 Güven Aralığı		P
			AltLimit	ÜstLimit	
AKDENİZ	GOKTURK,2017 a	1,546	0,973	2,119	0,000
AKDENİZ	GOKTURK,2017 b	1,461	0,914	2,007	0,000
AKDENİZ	BATIR,2018	2,098	1,345	2,851	0,000
AKDENİZ	GULER,2018	0,713	0,323	1,103	0,000
<b>Sabit Etkiler</b>	<b>Akdeniz</b>	<b>1,221</b>	<b>0,960</b>	<b>1,481</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Akdeniz</b>	<b>1,404</b>	<b>0,818</b>	<b>1,989</b>	<b>0,000</b>
DOGUANAD.	ARSLAN, 2015	2,111	1,438	2,784	0,000
DOGU ANAD.	SOSLU,2010	3,532	2,727	4,338	0,000
DOGU ANAD.	ALTINOK,2011	1,424	0,695	2,152	0,000
DOGU ANAD.	KAYA,ORAL,2013a	0,644	0,174	1,114	0,007
DOGU ANAD.	KAYA,ORAL,2018 b	1,858	1,298	2,418	0,000
DOGU ANAD.	BİLEN KAYA,2012 a	0,443	-0,016	0,903	0,058
DOGU ANAD.	BİLENKAYA,2012 b	0,862	0,367	1,357	0,001
DOGU ANAD.	DASDEMİR	0,806	0,079	1,533	0,030
DOGU ANAD.	DOYMUŞ,2012	0,662	0,059	1,265	0,032
<b>Sabit Etkiler</b>	<b>DoguAnadolu</b>	<b>1,141</b>	<b>0,948</b>	<b>1,334</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Dogu Anadolu</b>	<b>1,338</b>	<b>0,773</b>	<b>1,904</b>	<b>0,000</b>
EGE	DEMİR,2018	0,479	-0,086	1,044	0,097
EGE	UNAL,2010	2,677	2,021	3,332	0,000
EGE	DUMAN	2,063	1,204	2,923	0,000
EGE	AKPULLUKÇU	1,298	0,794	1,802	0,000
<b>Sabit Etkiler</b>	<b>Ege</b>	<b>1,455</b>	<b>1,149</b>	<b>1,760</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Ege</b>	<b>1,607</b>	<b>0,665</b>	<b>2,549</b>	<b>0,000</b>
KARADENİZ	KARA, 2010	1,040	0,640	1,439	0,000
KARADENİZ	KIZILAY, 2016	0,185	-0,885	0,755	0,524
KARADENİZ	İNCE,GÜVEN,2010	1,091	0,649	1,533	0,000
KARADENİZ	TOPRAK,2011 a	1,544	0,941	2,148	0,000
KARADENİZ	TOPRAK,2011b	0,986	0,397	1,576	0,001
KARADENİZ	BİLİR,2019	1,768	0,999	2,586	0,000
KARADENİZ	MERAL,2018	0,276	-0,226	0,778	0,281
<b>Sabit Etkiler</b>	<b>Karadeniz</b>	<b>0,926</b>	<b>0,728</b>	<b>1,123</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Karadeniz</b>	<b>0,956</b>	<b>0,565</b>	<b>1,347</b>	<b>0,000</b>
İÇ ANADOLU	O.ATICI T.ATICI, 2012	1,486	1,076	1,896	0,000
İÇ ANADOLU	KARACALI,ÖZKAN,2021	0,689	0,063	1,314	0,031
İÇ ANADOLU	YUCEL,2019	1,075	0,459	1,691	0,001
<b>Sabit Etkiler</b>	<b>İç Anadolu</b>	<b>1,206</b>	<b>0,907</b>	<b>1,506</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>İç Anadolu</b>	<b>1,131</b>	<b>0,655</b>	<b>1,607</b>	<b>0,000</b>
MARMARA	OYMAK,2018	1,521	1,035	2,007	0,000
MARMARA	AKSAKAL,KARATAŞ, 2011	1,009	0,410	1,608	0,001
MARMARA	ŞAHİN,SAĞLAMER,2010	1,673	1,193	2,153	0,000
MARMARA	YILDIZ,2010	0,488	0,042	0,934	0,032
<b>Sabit Etkiler</b>	<b>Marmara</b>	<b>1,158</b>	<b>0,911</b>	<b>1,405</b>	<b>0,000</b>
<b>Rastgele Etkiler</b>	<b>Marmara</b>	<b>1,172</b>	<b>0,606</b>	<b>1,738</b>	<b>0,000</b>
<b>Tümü</b>	<b>Sabit Etkiler Modeli</b>	<b>1,141</b>	<b>1,044</b>	<b>1,238</b>	<b>0,000</b>
<b>Tümü</b>	<b>Rastgele Etkiler Modeli</b>	<b>1,176</b>	<b>0,959</b>	<b>1,393</b>	<b>0,000</b>

Yapılan analiz sonucunda her iki modele göre etki büyüklükleri hesaplanmıştır. Coğrafi bölge farklılıklarının akademik başarıya olan etkisi için genel etki büyüklüğünü hesaplarken yorumlayabilmek için hangi istatistiksel modelin seçileceğini belirlemek amacıyla heterojenlik testi yapılmıştır. Testin sonuçları aşağıda verilmiştir.

**Tablo 17.** Coğrafi Bölge Moderatörünün Akademik Başarıya göre Heterojenlik Testi

Coğrafi Bölge	N	Standart Hata	Q	Heterojenlik		Genel Etki Büyüklüğü	%95 Güven Aralığı		
				df	P		Alt Sınır	Üst Sınır	
						I <sup>2</sup>			
Akdeniz	4	0,133	13,7110	3	0,003	78,118	1,221	0,960	1,481
Doğu Anadolu	9	0,099	66,326	8	0,000	87,938	1,141	0,948	1,334
Ege	4	0,156	27,107	3	0,000	88,933	1,455	1,149	1,760
İç Anadolu	3	0,153	4,594	2	0,101	56,464	1,206	0,907	1,506
Karadeniz	7	0,101	22,444	6	0,001	73,267	0,926	0,728	1,123
Marmara	4	0,126	15,471	3	0,001	80,639	1,158	0,911	1,405
Total Within									
(Sabit Etkiler Modeli)			149,652	25	0,000				
Total Between									
(Karışık Etkiler Modeli)			2,951	5	0,708		1,176	0,959	1,393

Çalışmanın heterojenlik testi sonuçlarına bakıldığında öncelikli olarak sabit etkiler modeline bakılmıştır. Sabit etkiler modelinde yer alan grup içi heterojenlik testi anlamlılık düzeyi ( $p < 0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın heterojenlik testi Q istatistiksel değeri incelendiğinde 149,652 ve serbestlik derecesi 25 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 37,652 değeri aralığındadır. Hesaplanan Q istatistiksel değeri 149,652 ( $p < 0,05$ ) ile 25 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değeri aştığı görülmüştür. Buradan yola çıkarak çalışmalar kendi içinde aynı yaygın etkiye sahiptir denilmekte veya çalışmalar kendi içinde beklenenden yüksek dağılıma sahiptir denilmektedir.

Elde edilen bulgular sonucuna göre karışık etkiler modeline geçilmiştir ve gruplar arası (between-group) heterojenlik testine göre p değeri hesaplanmıştır. Testin anlamlılık

düzeyi ( $p=0,708$ ) > ( $p=0,05$ ) olarak hesaplanmıştır. Ayrıca çalışmanın heterojenlik testi Q istatistiksel

değerine bakıldığında 2,951 ve serbestlik derecesi 5 olarak hesaplanmıştır.  $\chi^2$  tablosunun %95 anlamlılık düzeyindeki kritik değeri 11,070 değeridir. Hesaplanan Q istatistiksel değerine bakıldığında 2,951 ( $p<0,05$ ) ile 5 serbestlik derecesindeki ki-kare dağılımında belirlenmiş olan kritik değer altında olduğu görülmüştür. Ayrıca p değeri 0.708 olarak hesaplanmış ve anlamlı bir değer olmadığı sonucuna ulaşılmıştır. Bu durumda coğrafi bölgeler açısından fen eğitiminde laboratuvar destekli öğrenmenin akademik başarıdaki etki büyüklükleri arasında anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

#### 4. TARTIŞMA VE SONUÇ

Fen eğitiminde laboratuvar destekli öğretimin öğrencilerin akademik başarısına olumlu yönde etkisi var mıdır? Sorusuna cevap aramak amacıyla meta analizi yapılan 31 çalışmanın etki büyüklüğü değerine bakılmıştır. Yapılan meta analiz sonucunda etki büyüklüğü analizine bakıldığında etki büyüklüğü değerinin en küçük yönde olduğu çalışmanın Kızılay (2016) 'a ait olduğu ve "0,185" etki büyüklüğü değerine sahip olduğu görülmektedir. Akademik başarı için etki büyüklüğü pozitif yönde (sıfırdan büyük) en büyük olan çalışmanın ise Soslu (2010) 'a ait olduğu ve "3,532" etki büyüklüğü değerine sahip olduğu görülmektedir. Analize dahil edilen çalışmaların geneline bakıldığında çalışmaların tamamı pozitif yönde etki göstermektedir. Çalışmaların çoğunluğunun pozitif yönde etki göstermesi fen eğitiminde laboratuvar destekli öğretimin programda ön görülen öğretim yöntemine göre akademik başarı değişkeninde pozitif yönde bir etkiye sahip olduğu söylenebilir. 31 çalışmanın etki büyüklükleri hesaplanmış Cohen (1988) ve Thalheimer ve Cook (2002) sınıflaması yapılmıştır. Cohen (1988) etki büyüklüğü sınıflamasına göre çalışmaların %64,51'inin 'geniş etki' büyüklüğüne sahip olduğu ve Thalheimer ve Cook (2002) etki büyüklüğü sınıflamasına göre çalışmaların %45,16'sının 'muazzam' etki büyüklüğüne sahip olduğu görülmektedir.

Meta analizi yapılan çalışmaların dağılımını incelemek için uygulanan Heterojenlik testi sonucunda elde edilen Q istatistiksel değeri 158,861 ( $P < 0,05$ ) ve serbestlik derecesi 30 bulunmuştur. Serbestlik derecesindeki ki-kare dağılımına bakıldığında belirlenmiş olan

kritik değeri aşmış olduğu görülmüştür. Buradan yola çıkarak çalışmaların heterojen bir dağılım gösterdiği sonucu elde edilmiştir. Fen eğitiminde laboratuvar destekli öğretime dayalı öğrenmenin akademik başarıya olan etki büyüklüğü pozitif yönde ve 1,239 olarak bulunmuştur. Elde edilen bu değerlerin etki büyüklüğü cohen (1998) sınıflandırmasındaki karşılığına bakıldığında ‘geniş düzey’ olarak ifade edilmiştir.

İncelemeler sonucunda laboratuvar destekli öğretime dayalı öğrenmenin akademik başarıya olan etkisi programda ön görülen öğretim yönteminin akademik başarıya olan etkisinden daha fazladır sonucuna ulaşılmıştır.

Yapılan literatür taraması sonucunda görülmüştür ki fen eğitiminde laboratuvar destekli öğretim ile ilgili gerçekleştirilen meta analiz çalışmaları sayısı yok denecek kadar azdır. Yapılan çalışmalarda daha çok geçmiş yılları kapsamaktadır. Ancak laboratuvar destekli öğretime dayalı öğrenmenin akademik başarı üzerindeki olumlu etkisini gösterecek bireysel çalışmalar mevcuttur (Arslan, 2015; Duman ve Avcı, 2016; Soslu, 2010; Açışlı ve Alkan&Koçak, 2014; Göktürk, 2018; Batır, 2018; Karacalı ve Özkan, 2021).

Fen eğitiminde konu alanında gerçekleştirilen çalışmaların akademik başarı üzerindeki etkisi incelenirken fen, fizik, kimya ve biyoloji alanlarındaki etkilerine de bakılmıştır.

Çalışmaların etki büyüklükleri hesaplanmış ve incelemeler yapıldığında etki büyüklükleri arasında anlamlı farklılıklar görülmemiştir. Ayrıca çalışmaların etki büyüklüğü değerleri pozitif yöndedir. Etki büyüklüğü değerlerine bakıldığında etki büyüklüğü en fazla olan 2,067 ile fizik alanı olarak bulunmuştur. En az etki büyüklüğüne sahip olan alan ise 0,947 etki büyüklüğü değeri ile fen alanı olmuştur. Çalışmaların genel etki büyüklüklerine bakıldığında gruplar arasında anlamlı bir fark görülmemiştir. Buradan yola çıkarak konu alanlarının akademik başarı açısından bir farklılık bulunmamaktadır. Literatür incelendiğinde benzer sonuçların bulunduğu görülmektedir ( Koca, 2019; Kural, 2020; Özer, 2019).

Fen eğitiminde sınıf düzeyi moderatör olarak alınmıştır. Sınıf düzeyinde gerçekleştirilen çalışmaların akademik başarı üzerindeki etkisi incelenirken ilkokul, ortaokul, lise ve üniversite alanlarında ki etkilerine de bakılmıştır.

Çalışmaların etki büyüklükleri hesaplanmış ve incelemeler yapıldığında etki büyüklükleri arasında anlamlı farklılıklara rastlanmamıştır. Ayrıca çalışmaların etki büyüklüğü değerleri pozitif yöndedir. Etki büyüklüğü değerleri incelendiğinde etki

büyüklüğü en fazla olan 1,645’le lise düzeyi olarak bulunmuştur. En az etki büyüklüğüne sahip olan düzey ise 0,972 etki büyüklüğü değeri ile ortaokul düzeyi olmuştur. Çalışmaların genel etki büyüklüklerine bakıldığında gruplar arasında (ilkokul-ortaokul-lise ve üniversite) anlamlı bir fark görülmemiştir. Buradan yola çıkarak sınıf düzeylerinde akademik başarı açısından bir farklılık bulunmamaktadır. Literatür incelendiğinde benzer sonuçların bulunduğu görülmektedir ( Koca, 2019; Kural, 2020; Özer, 2019).

Fen eğitiminde gerçekleştirilen çalışmaların akademik başarı üzerindeki etkisi incelenirken yaşanan coğrafi bölgenin etkilerine de bakılmıştır. Çalışmaların etki büyüklükleri hesaplanmış ve incelemeler yapıldığında etki büyüklükleri arasında çok büyük farklılıklar görülmemiştir. Ayrıca çalışmaların etki büyüklüğü değerleri pozitif yöndedir. Etki büyüklüğü değerleri incelendiğinde etki büyüklüğü en fazla olan coğrafi bölge 1,455 ile ege bölgesi olarak bulunmuştur. En az etki büyüklüğüne sahip olan bölge ise 0,926 etki büyüklüğü değeri ile Marmara bölgesi olmuştur. Çalışmaların genel etki büyüklüklerine bakıldığında gruplar arasında anlamlı bir fark görülmemiştir. Buradan yola çıkarak coğrafi bölgelerde akademik başarı açısından bir farklılık bulunmamaktadır. Literatür incelendiğinde benzer sonuçların bulunduğu görülmektedir ( Koca, 2019; Kural, 2020; Özer, 2019).

## **5. ÖNERİLER**

- Yapılan bu çalışmada laboratuvar destekli öğretimin geleneksel yöntemlere kıyasla öğrencinin akademik başarısını arttırmada daha etkili olduğu sonucuna varılmıştır. Bu nedenle Fen eğitiminde öğretmenin rehber konumunda bulunduğu ve deneyleri öğrencilerin aktif katılım göstererek kendilerinin yaptığı laboratuvar ortamlarının oluşturulması gerekmektedir.
- Yapılan bu meta-analiz çalışmasında laboratuvar destekli öğretim yönteminin fen eğitiminde öğrencilerin akademik başarısına, tutumuna ve bilimsel süreç becerilerine etkisi araştırılmıştır. Yapılan meta analiz çalışmasında laboratuvar destekli öğretim yönteminin öğrencilerin akademik başarısı, tutumu ve bilimsel süreç becerileri üzerinde

etkili olduğu görülmüştür. Diğer araştırmacıların da bu alanlarda meta analiz çalışması yapması önerilmektedir.

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**EKLER**

**Ek 1. Meta Analiz Kodlama Formu**

- Çalışmanın adı:..... Ülke:.....
1. Çalışma No :.....
2. Yazar / Yazarlar :.....
3. Yayın Yılı :.....
4. Yayın Kaynağı:.....
5. Yayın türü: ( ) yüksek lisans tezi ( ) doktora tezi ( ) makale ( ) diğer
6. Dersin adı :.....
7. Dersin konusu :.....
8. Çalışmanın uygulandığı öğrenci grubunun öğrenim düzeyi:  
( ) İlkokul ( ) Ortaokul ( ) Lise ( ) Lisans
9. Çalışmanın uygulanma süresi :.....
10. Deneyi yapan kişi:( ) araştırmacının kendisi ( )diğer.....
12. Deney ve kontrol grupları öntest puanları açısından eşitlenmiş mi? ( )evet ( ) hayır
13. Deney ve kontrol grupları başarı testi tanımlayıcı istatistikler;

	DENEY GRUBU	KONTROL GRUBU
ÖRNEKLEM BÜYÜKLÜĞÜ		
ORTALAMA		
STANDART SAPMA		

## SIİRT BASIN TARİHİNDEN BİR YAPRAK: SİYASİ MİZAH GAZETECİLİĞİ

**Resul BABAOĞLU\***  
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### ÖZET

Siirt'te yerel basının ilk örneği olan Siirt gazetesinin 1937 yılında ilk sayısının yayınlanmasının ardından giderek canlanan yerel basın, kentin siyasal ve kültürel nabzının tutulduğu bir sosyal mecra halini almıştır. Genel itibarıyla Türkiye'de basın hayatında görülen gelişmelere paralel olarak bir gelişim gösteren Siirt basın hayatında tam bir canlanma görülmesi 1950'li yıllara tekabül etmektedir. Çok partili demokratik düzene geçildiği bu dönemin liberal ve görece özgürlükçü ruhunun basın hayatına olumlu yansımaları olmuştur. Siyasetin kiteselleştiği bu dönemde taşrada siyasal hayatın önemli unsurlarından biri haline gelen gazetelerin yerel tarih çalışmalarında kaynak değeri oldukça yüksektir. 1950'li yıllarda Siirt'te yayınlanmaya başlayan Yeni Siirt, Siirt Postası, Siirt Sesi gibi gazetelere ek olarak siyasi mizah alanında yayınlanan ve elimizde ilk sayıları bulunan Sırf Dedikodu, Yılbaşı ve Kelle Koltukta adlı mizah gazeteleri bu alanın ilk örnekleri olarak karşımıza çıkmaktadır. Siirt yerel tarih çalışmalarına yeni bir bakış sunabileceği düşünülen bu gazeteler, dönemin yerel siyasetinde öne çıkan şahsiyetlerin tanıtılması, iktidar ve muhalefet grupları arasındaki ilişkinin mahiyeti gibi konularda dikkate değer bir içeriğe sahiptir. Bunun yanı sıra, 1950'li yıllarda taşra siyasetinin hangi temalar ekseninde yürütüldüğü, çevre-merkez etkileşimi ve dönemin yerel siyasal aktörlerinin siyasete yaklaşımları gibi konular mizah gazetelerinin bir fikir verebileceği konular arasındadır. Bu çalışma kapsamında, nitel araştırma yöntemlerinden betimsel analiz yaklaşımıyla incelenen sözü edilen mizah yayınlarında yer alan haber ve yorum metinleri bütünlüklü bir veri haline getirilerek döneme ilişkin tespitler yapılmıştır.

**Anahtar kelimeler:** Siirt, yerel basın, Kelle Koltukta, Yılbaşı, Sırf Dedikodu

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**A LEAF FROM SIİRT PRESS HISTORY: POLITICAL HUMOR JOURNALISM**

**ABSTRACT**

After the publication of the first issue of the "Siirt" newspaper, which is the first example of the local press in Siirt, in 1937, the local press, which has been gradually revived, has become a social channel where the political and cultural pulse of the city is kept. In general, a complete revival in the press life of Siirt, which showed a development in parallel with the developments in the press life in Turkey, corresponds to the 1950s. The liberal and relatively libertarian spirit of this period, in which the multi-party democratic order was passed, had positive reflections on the press life. Newspapers, which have become one of the important elements of political life in the provinces in this period when politics became massive, have a high resource value in local history studies. In addition to newspapers such as Yeni Siirt, Siirt Postası, Siirt Sesi, which started to be published in Siirt in the 1950s, the humor newspapers called Sırf Dedikodu, Kelle Koltukta and Yılbaşı, which were published in the field of political humor and have the first issues, appear as the first examples of this field. These newspapers, which are thought to offer a new perspective in Siirt local history studies, have a remarkable content on topics such as the introduction of prominent personalities in the local politics of the period and the nature of the relationship between the ruling and opposition groups. In addition, topics such as the themes on which provincial politics were carried out in the 1950s, the interaction of the periphery-centre and the approaches of the local political actors of the period to politics are among the topics that humor newspapers can give an idea about. Within the scope of this study, the news and commentary texts in the mentioned humor publications, which were examined with the descriptive analysis approach, one of the qualitative research methods, were turned into a holistic data and determinations were made regarding the period.

**Keywords:** Siirt, local press, Kelle Koltukta, Sırf Dedikodu, Yılbaşı

## GİRİŞ

Osmanlı Devleti'nde basın faaliyetlerinin gelişim çizgisi ile matbaanın Osmanlı/Müslüman toplumundaki kullanımı arasında tam bir paralellikten söz etmek mümkündür. Yazılı basın faaliyetlerinin Batılı ülkelerdeki ilk örnekleri 16. yüzyıla kadar geri götürülebilirken Osmanlı Devleti'nde gayrimüslimlerin öncülüğü ile bu alandaki ilk örnekler 1700'lü yılların son çeyreğinde adından söz ettirmiştir. Fransa'nın Osmanlı Devleti'nde kurmak isteği kültürel nüfuz ve ticari faaliyetlerin bir çıktısı olarak 1786 yılında Türkiye'deki Fransız Elçisi Choiseul le Gauffier elçilikte Arap harfleriyle baskı yapan bir matbaa kurmuştur.<sup>54</sup> Osmanlı Devleti'nde ilk olarak Fransızların başlattığı basın faaliyetlerine kısa bir zaman sonra Ermeni, Rum, Bulgar ve Yahudi milletlerinin iştahla katılacakları bilinmektedir. 1 Kasım 1831 tarihinde ilk sayısı çıkan *Takvim-i Vekayi* ile Padişah II. Mahmud'un başlattığı reform programının bir parçası olarak resmi gazete Osmanlı basın hayatını başlatmış oldu. Ortaylı'nın değerlendirmesine göre, 19. yüzyıl reformlarının küresel bir kesişme hamlesi sayılabilecek bu adımın Rusya'daki izdüşümü ise Büyük Petro'nun *Vedemosti* adlı gazete ile basın faaliyetlerini başlatması olmuştur.<sup>55</sup> Osmanlı ve Rus modernleşmelerinin basın alanındaki zamansallık ve zihniyet açısından şaşırtıcı düzeyde aynı ritimde ilerlemesine ek olarak her iki devlette bu alanda görülen gelişmelerde devlet elitlerinin merkezi rolde yer almaları da dikkat çekmektedir. Daha somut bir ifadeyle, Osmanlı Devleti'nde basın alanındaki gelişmeler uzun bir dönem boyunca devletin çizdiği sınırlar içinde ilerleyebilmiştir. 1860'lı yıllardan itibaren yerel idare reformlarının bir uzantısı olarak taşra merkezlerinde yayımlanmaya başlayan vilayet gazeteleri yerel basının ilk örnekleri olarak kabul edilebilir.<sup>56</sup> Merkezi idarenin önemli katkılarının olduğu bu gazeteler sayesinde Anadolu'da birçok yöre ilk kez gazete ile tanışmıştır.<sup>57</sup> Bunun yanı sıra, her ne kadar vilayet gazeteleri gazeteciliğin en basit ve yalın halinin örnekleri olarak kabul edilse de Osmanlı Devleti'nde basın faaliyetlerini İstanbul'un tekelinden çıkarmış olduğu gerçeği bu gazeteleri önemli kılmaktadır.<sup>58</sup>

<sup>54</sup> Ali Budak, "The French Revolution's Gift to the Ottomans: The Newspaper The Emergence of Turkish Media", *International Journal of Humanities and Social Science*, Vol. 2 No. 19 [Special Issue – October 2012], p.p.157-169.

<sup>55</sup> İlber Ortaylı, *Batılılaşma Yolunda*, Merkez Kitaplar, İstanbul, 2007, s.37.

<sup>56</sup> O. Fırat, "Türkiye'de Yerel Basının Gelişmesi Üzerine Notlar", *Kebikeç*, S. 2 (1995), s. 161.

<sup>57</sup> Aynı yer.

<sup>58</sup> Bülent Varlık, "Yerel Basının Öncüsü: Vilayet Gazeteleri", *Tanzimat'tan Cumhuriyet'e Türkiye Ansiklopedisi*, C. 1, Yay. Yön. Fahri Aral, İletişim Yayınları, (t.y.), İstanbul, s. 102.



Tanzimat dönemi boyunca ağır aksak ilerleyen basın faaliyetlerinde II. Meşrutiyet'in 1908'de ilan edilmesiyle birlikte belirgin bir canlılık görülecektir. Her şeyden önce sansür uygulamasının son bulunduğu bu dönemde gazeteciler üzerindeki baskı da ortadan kalkmıştır. Meşrutiyet'in ilanından kısa bir süre sonra gazete çıkarmak için imtiyaz almak isteyen yüzlerce kişi ilgili yerlere başvurmuştur. Meşrutiyet dönemi boyunca yayınlanan toplam gazete sayısının 1000 civarında olduğunu öne süren Orhan Koloğlu, bu dönemde yaşanan gelişmeleri "basın patlaması" olarak tanımlamaktadır.<sup>59</sup> Basın organlarındaki niceliğin arttığı bu toplumsal vasatta Meşrutiyet yönetimin geniş kesimlerce sınırsız bir hürriyet ile eşitlenmesi beraberinde asayişsizlik ve kaos ortamını getirmiştir. İttihat ve Terakki iktidarında 1909'da çıkarılan Basın Kanunu ile gazetecilik faaliyetleri görece sınırlandırılmıştır.<sup>60</sup>

Meşrutiyet döneminde basın faaliyetlerinde görülen canlanmanın niceliksel yönü bir kenara bırakılacak olursa Milli Mücadele dönemi yerel basın açısından oldukça verimli bir ortam yaratmıştır. Milli Mücadele yıllarında Anadolu'nun özellikle işgale uğramamış olan bölgelerinde bağımsızlık yanlısı gazeteler yayın faaliyetlerine bulunurken işgalci güçlerin baskısı ya da başka bazı gerekçelerle Milli Mücadele karşıtı gazeteler de yayın hayatında yer bulmuştur.<sup>61</sup> Tek partili dönemde siyasal hayatta liberal bir ortamı hedefleyen *Serbest Cumhuriyet Fırkası* ve *Terakkiperver Cumhuriyet Fırkası* deneyimlerinin başarısızlıkla sonuçlanması basın hayatını da içine alan genel bir baskı ortamı ile sonuçlanmıştır. 1925 yılında çıkarılan *Takrir-i Sükûn Kanunu* ile basın özgürlüğü daraltılmıştır. Serbest Cumhuriyet Fırkası'nın üç ay süren siyasal hayatından sonra ülke idaresinin ulusçuluk ideolojisi doğrultusunda yeniden biçimlendirilmeye çalışıldığı bir ortamda kurulan Halkevleri bir yönüyle basın hayatının gidişatına etki edecek sonuçlar doğurmuştur. Anadolu'da kurulan Halkevleri bünyesinde yayın hayatına başlayan Halkevi dergileri yerel basın unsurlarından sayılabilir.<sup>62</sup> Tahmin edilebileceği gibi resmi çevrelerce çıkarılan ve doğal olarak içeriği de resmi sınırlara sahip olan Halkevi dergileri sivil bir basın hayatına tekabül etmemektedir.

<sup>59</sup> Orhan Koloğlu, **1908: Basın Patlaması**, Bas-Haş Gazeteciler Cemiyeti Yayınları, İstanbul 2005.

<sup>60</sup> Necla Odyakmaz, "Osmanlı'da Anayasal Düzenlemeler ve Basına Etileri", **İstanbul Üniversitesi İletişim Fakültesi Dergisi**, (2003), S. 16, ss. 211-233.

<sup>61</sup> Fırat, a.g.m., s. 162.

<sup>62</sup> Fırat, a.g.m., s. 162.

1931 yılında çıkarılan Matbuat Kanunu tek partili dönemin liberal olmayan siyaset ve yönetim anlayışının basın-yayın faaliyetleri üzerindeki tezahürünü yansıtmaktaydı. Hükümetin basın üzerindeki ağır yetki ve denetleme gücünün dışında 1940'lı yılların savaş ortamında

uygulamada olan sıkıyönetim kanununun da basın özgürlüğünü sınırlayıcı bir etkide bulunduğunu söylemek mümkündür.<sup>63</sup> İkinci Dünya Savaşı boyunca basın hayatında gözlenebilecek çok sesliliğin savaşın son yılına doğru yerini ihtiyatlı bir basın politikasına bıraktığı bir ortamda gazeteciler mihver veya müttefik devletler yanlısı bir yayım politikası geliştirmişlerdir. Savaş sonrası dönemde dünya ölçeğinde görülen gelişmelerin Türkiye’de yarattığı dönüşümün siyasi hayattan sonra en fazla etkilediği alanların başında basın gelmiştir. Batılı demokratik devletlerin savaş sonunda kurmayı planladıkları küresel düzene uyum sağlama niyetini iyiden iyiye belli eden Türkiye’nin basın politikalarında radikal bir değişim görülecektir.

### SIİRT’TE YEREL BASININ GELİŞİMİ

Osmanlı idaresi altındaki son yıllarda Bitlis Vilayeti’ne bağlı bir sancak olan Siirt’te herhangi bir basın faaliyetinden söz etmek mümkün değildir. Ancak bu dönemde Bitlis Vilayet Gazetesi’nde Siirt’i de içine alan bazı haberlere rastlayabilmek olasıdır.<sup>64</sup> Milli Mücadele döneminde Siirt’te bağımsızlık yanlısı bir kamuoyu oluşmasına rağmen bu minvalde bir basın faaliyeti ise henüz ortaya çıkmamıştır.<sup>65</sup> Ne ilginçtir ki Cumhuriyet’in ilk yıllarında özellikle yerel basın alanında hatırı sayılır bir kıpırdanmayı doğuracak olan Halkevlerinin de Siirt’te basın alanında bir gelişmeye zemin hazırlamadığı görülmektedir. 24 Şubat 1934 tarihinde Siirt’te açılan Halkevi şubesi çatısı altında yürütülen yoğun kültürel faaliyetlerin içinde gazete ya da herhangi bir süreli yayına rastlanmaz.<sup>66</sup> Cumhuriyet yönetiminin kültür devrimini hayata geçirme çabalarının bir unsuru olarak Anadolu’da teşkilatlanan Halkevlerinde çeşitli adlarla süreli yayınlar çıkarılmasına rağmen Siirt Halkevi’nde bu alanda yalnızca merkez tarafından gönderilen süreli yayınların halka ulaştırılması ile yetinilmiştir. Bu dönemde CHP Genel

<sup>63</sup> Cemil Koçak, “Milli Şef döneminde Yönetim ve Basın Hayatı”, **Kebikeç**, S. 2, (1995), s. 150.

<sup>64</sup> Abdurrezzak Çelik, **Tanzimat’tan Cumhuriyet’e Siirt**, Emin Ofset, Siirt, 2019, s. 22.

<sup>65</sup> Ömer Obuz, “Milli Mücadeleye ‘Şark’tan Bir Destek: Siirt Örneği”, **Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi**, S. 27, (Mayıs 2017), ss. 264-276.

<sup>66</sup> Said Olgun, “Siirt Halkevi ve Faaliyetleri”, **History Studies, International Journal of History**, Vol. 5, Issue 2, A Tribute to Prof. Dr. Halil İnalçık, (2013), s. 290.

Sekreterliği'ne gönderilen bir yazıda *Ar* isimli güzel sanatlar mecmuası ve *Her Ay* isimli bir derginin Siirt Halkevi şubesine düzenli bir şekilde gönderildiği bilgisi yer almaktadır.<sup>67</sup> Bununla birlikte Siirt'te ilk gazetenin yayınlanması 1937 yılında gerçekleşmiştir. *Siirt* adıyla yayınlanan bu gazete, Mehmet Emin Kılıççıoğlu tarafından çıkarılmış olup *Haftalık Cumhuriyet*

*Siyasal Gazete* sloganı ile yayın hayatına başlamıştır.<sup>68</sup> Gazetenin ilk sayısında *Gayemiz ve Yolumuz* başlığıyla yer alan yazıda takip edilecek olan yayın politikasından bahsedilerek şu ifadelerle başvurulmuştur: *Ulu kurtarıcı Atamızın yapmak ve yaşatmak için bize armağan ettiği Altı Oku'un birleştiği amaca doğru metanet, sadakat ve gayretle varmak, vardurmak azmımızdan doğmadır.*<sup>69</sup> Kuşkusuz bu ifadeler dönemin siyasal havasından derin izler barındırmaktadır.

Siirt'in ilk yerel gazetesi olma özelliğine sahip olan Siirt gazetesi, tek partili siyasal sistemin çizdiği sınırlar içinde yayın faaliyetlerini sürdürmüş olup genel itibarıyla siyasal iktidarın gönüllü bir propaganda aygıtı olmuştur. Gazetenin ilk sayfalarında genellikle dönemin Siirt valilerinin beyanatlarına yer verilmiş, dış basından haber seçkileri ve CHP parti müfettişlerinin Siirt'e yapmış oldukları ziyaretler haberleştirilmiştir.<sup>70</sup> 1940'lı yılların sonlarından itibaren Türkiye'de siyasette esen liberal havanın da etkisiyle Siirt gazetesinin de bu siyasal dönüşüme ayak uydurduğu görülmüştür. Cumhurbaşkanı İnönü'nün meşhur 12 Temmuz Beyannamesi'ni manşete taşıyan Siirt gazetesi İnönü'nün siyasette başlattığı uyum dalgasını *Siyasi havayı yumuşatan bir iyilik olmak üzere, dertleri bilenlerin, kendilerinden, karşı tarafı teskin edici tedbirler alacakları ümidi uyandırmıştır* şeklinde yorumlamıştır.<sup>71</sup>

Türkiye'de 1945 yılından itibaren yeni partilerin kurulması ve 1946 seçimlerinin çok partili esasa göre düzenlenmesi gibi gelişmeler ülke sathında siyaseti ılımlı bir havaya sokmuştur. Bu dönemde halk siyasal süreçlerde ilk kez eşit katılımcı statüsü elde etmiştir.<sup>72</sup> Ülke genelinde yaşanan bu siyasal canlanmaya koşut bir şekilde Siirt'te de yerel siyasette iktidar ve muhalefet grupları arasında hatırı sayılır bir rekabet ortamı

<sup>67</sup> BCA, Fon Kodu: 490.01.22.109.17; BCA, Fon Kodu: 490.01.22.109.2.1.

<sup>68</sup> BCA, Fon Kodu: 490.01.1285.273.1.

<sup>69</sup> Siirt, 7 Ağustos 1937.

<sup>70</sup> Siirt, 8 Mart 1947.

<sup>71</sup> Siirt, 19 Temmuz 1947.

<sup>72</sup> Gavin Brockett, *Ne Mutlu Türküm Diyene, Türk-Müslüman kimliğinin Müzakeresi*, Çev. Özgür Balkılıç, Foll Kitap, Ankara, 2022,s. 145.

oluşmaya başlamıştır.<sup>73</sup> Siyasetin kitleleştiği bu dönem, kaçınılmaz olarak siyasal partilerin ve siyasal elitlerin kamuoyu oluşturma araçlarına büyük bir ehemmiyet vermeleri sonucunu doğurmuştur. Bu dönüşümün Siirt'te yerel basın üzerinde bariz yansımaları görülmektedir. 1950'li yıllarla birlikte Siirt'te yayınlanan gazetelerin sayısında hızlı bir artış gözlenmektedir. Bu dönemde yayın hayatına başlayan Yeni Siirt (1948), Demokrat Siirt (1948), Siirt Postası (1953), Siirt Sesi (1953), Demokrat Eruh (1954), Yeni Kurtalan (1954), Demokrat Şirvan (1955), Siirt Ekspres (1957), Şarkın Sesi (1963) ve Mücadele (1964) gazeteleri dönemin çok sesli basın hayatında yer alan basın organlarıdır.<sup>74</sup> Çoğulcu demokrasiye geçiş yıllarını içine alan bu dönemde Siirt'te yayınlanan Kelle Koltukta (1953) ve Sırf Dedikodu (1954) adlı mizah dergileri ile 1956'da yayınlanan Botan adlı kültür dergisi dönemin ruhunu anlamak açısından zikre değer süreli yayınlar arasındadır.<sup>75</sup>

### KISSADAN HİSSE: SİİRT'TE MİZAH DERGİCİLİĞİ

Türkiye'de mizahın gelişim evreleri içinde 1950'li yıllar ayrı bir öneme sahiptir. Cumhuriyeti kuran tek partinin kendi içinden çıkan bir partiye iktidarı bırakması ve muhalefete geçmesiyle siyasal ortam çoksesli bir renge bürünmüştür. Buna paralel bir şekilde mizah yayıncılığı da son derece renkli ve çeşit bolluğu gösterecektir. Denilebilir ki 1950'li yıllarda en ufak bir ima veya bir ifade halk üzerinde mizahın büyük etkisini sağlayabiliyordu. Ferit Öngören'e göre bu yıllar Cumhuriyet dönemi mizah basınının en etkili yıllarıdır.<sup>76</sup>

Siirt'te yayınlanan ilk mizah gazetesi olarak tespit ettiğimiz *Kelle Koltukta* adlı süreli yayın 22 Kasım 1953 tarihinde *Haftalık Mizah Ceridesi* başlığıyla yayın hayatına başlamıştır. Derginin ilk sayısında yayının sahibi olarak dönemin önemli simalarından Haydar Koyuncu ismi verilirken yazı işleri müdürlüğünden ise Şevket Özkanlı sorumlu

<sup>73</sup> Yunus Özduygün, "Çok Partili dönemde Doğu Anadolu'da Seçimlere Bir Örnek: Siirt Seçimleri ve Demokrat Parti'nin Kalkınma Faaliyetleri (1950-1960)", *Uluslararası Sosyal Araştırmalar Dergisi*, C. 9 S. 45, (Ağustos 2016), ss. 288-301.

<sup>74</sup> Resul Babaoğlu-Said Olgun, "Siirt Basın Tarihi: Bibliyografik Bir Döküm", *Turkish Studies: International Periodical for the Languages, Literature and History of Turkish or Turkic*, Vol. 10/5 (Spring 2015), ss. 57-78.

<sup>75</sup> Aynı yer.

<sup>76</sup> Ferit Öngören, *Cumhuriyet'in 75. Yılında Türk Mizahı ve Hicvi*, Türkiye İş Bankası Kültür Yayınları, 1983, (y.y.), s. 93. Ayrıca bkz. Yasin Kayış, *Demokrat Parti Döneminde Siyasi Karikatür*, Libra Kitap, İstanbul, 2009.

olmuştur. Derginin ilk sayısında yer alan bir köşe yazısında *Neden Kelleyi Koltuğa Aldık* başlıklı yazı ile mizahi bir dil kullanılarak takip edilecek olan yayın politikasından söz edilmiştir. Derginin mizanpaj dizilimine bakıldığında sayfanın tamamında kullanılan ifadelerin mizahi karakter taşıdığı görülmektedir. *Pazartesiden Önce Cumartesiden Sonra Çıkar*, fiyat kısmında da *On Kuruşun Yarı* şeklindeki yazılar dikkat çekmektedir. Diğer yandan, derginin yayınlanma nedenleri konusunda da; *Millet-vatan ve hak yolunda canımız, kanımızı: analarımızın ak sütü gibi helal ettiğimiz için, partizanları, baskıcıları, sütü bozuk ve harcanmışları birer birer tanıtacağız. Okurlara, okutacağız. Okurlara, okuyup yazmayanlara... açıklamalarına yer verilmiştir.*<sup>77</sup> Yine derginin ilk sayısında *Mühim İşaat* başlığıyla dönemin valisine bir sataşmada bulunulduğu

anlaşılmaktadır: *Vali Paşa, bir dakika sonra burnunu her işe sokan muhabirimize şu beyanatı verecektir. C.H.P.'li olduğum yolundaki D.P.'lilerin iddiasına kargalar bile güler. Yalnız şunu söyleyeyim ki seçimlere üç ay kala istifa ederek adaylığımı Millet Partisi'nden milletvekilliği için koyacağım. Şayet o güne kadar Millet Partisi açılmazsa iş tamamen değişir.*<sup>78</sup> Derginin siyasal gelişmeleri alaycı bir yaklaşımla ele aldığı örneklerden bir diğeri de Gümrük ve Tekel ve İşletmeler Bakanı Sıtkı Yırcalı'nın Siirt'e gerçekleştirdiği ziyaretin konu edildiği espridir. *Kim Geldi?* Başlıklı yazıda *işlemeyen belediyemizi işletmek için İşletmeler Bakanı Sıtkı Yırcalı dün şehrimize gelmiştir* ifadesi kullanılmıştır. Dönemin valisi Tevfik Okyavuz'a da zaman zaman sataşmalarda bulunulan derginin ilk sayfasında *Vekiller Heyeti Vali C. Tevfik Okyavuz'un başkanlığında toplandı* başlığıyla bir oksimoron yaratılmıştır. *Vali Cavit Tevfik Okyavuz'un başkanlığında açılan toplantıda Emniyet Müdür Vekili 5 km mesafeden sesi işitilen düdüklere bekçilere alınması için bütçeye ödenek konmasını istedi. Nafia Müdür Vekili tesviyeyi turabiye olarak yapılan ilçe yollarının yağıştan bozulmaması için Müftü Vekili tarafından dua edilmesi için teşebbüse geçilmesini istedi.*<sup>79</sup>

1954 yılının hemen başında yayınlanan derginin dördüncü sayısında *Yeni Yıl Herkese Mübarek Olsun* başlıklı yazıda esprili bir dille okuyucuların yeni yılı kutlanmıştır: *Geç çıktığımızdan herkesin yeni yılını geç kutluyoruz. Kabahat ne bizde ne de*

<sup>77</sup> Kelle Koltukta, Nu.1, 22 Teşrinisani 1953.

<sup>78</sup> Kelle Koltukta, Nu.1, 22 Teşrinisani 1953.

<sup>79</sup> Kelle Koltukta, Nu.1, 22 Teşrinisani 1953.

okuyucularımızda. Bir kabahat varsa yılbaşının pazara veya pazarın yılbaşına tesadüf etmemesindedir. Pazar veya yılbaşı yerine özür diler, herkesin yeni yılını kutlarız.<sup>80</sup> Derginin içeriğine bakıldığında yer yer siyasi mizaha da yer verildiği dikkat çekmektedir. D.P. den İhraç Edildi başlığıyla verilen yazıda: Her işe burnunu sokan açığız muhabirimizden aldığımız malumata göre D.P. il idare kurulu dün Ziraat Müdürünün başkanlığında toplanarak encümen azası ve D.P. kurucularından Sadi Yaşar'ın ihracına karar verildi ifadeleri kullanılmıştır.<sup>81</sup> Derginin ilk sayfalarında sayı bilgisine yer verilmesine rağmen yayın yılının belirtilmemesi zamansal bir karmaşaya yol açmaktadır. Haftalık çıkan bu derginin sayı/numara bilgisinden yola çıkılarak tarihsel bir çıkarımda bulunmak mümkündür.



<sup>80</sup> Kelle Koltukta, Nu.4, 29 Teşrinisani 1953.

<sup>81</sup> Kelle Koltukta, Nu.4, 29 Teşrinisani 1953.

Derginin 44. sayısında Demokrat Parti'nin Siirt il teşkilatını konu alan esprilere yer verilmiştir. *Kongrede şarkı söyleyen D.P. delegeleri bir haftadan beri ağlıyor* başlığı altında Demokrat Parti üyeleri alaya alınmıştır: *D.P. ilk kongresinde bütün ilçe yollarının yapıldığı iddia ederek kongrede şarkı söyleyen D.P. delegeleri bir haftadan beri yolsuzluktan ilçelerine gidememekte ve hüüngür hüüngür ağlamaktadırlar. Gazetemiz idarehanesine gelen delegelerden bir kısmı ilçelerine gitmek için İşletmeler Bakanından bir helikopter istemektedirler. Gönderilemediği takdirde kongrede yalan söylediklerini itiraf edecektir.*<sup>82</sup> Dergide yer verilen eleştiri mahiyetindeki bölümlerden bir diğeri de ilde görev yapan bir idare amirinin resmi bir araç ile özel işlerini yaptırmasına ilişkin haberdır. *İLAN* başlığı altında yer verilen haberin alt başlığı ise *Toprak Tevzi Komisyon Başkanlığından* şeklindedir. *Müdürlüğümüze ait resmi araba odun taşımaya pek elverişli olduğundan odunlarını taşımak isteyenlerin müessesemize müracaatları ilan olunur. Not: resmi arabanın taşımaya elverişli olduğu Başkanımızın evine yapılan odun nakliyatından öğrenilmiştir.*<sup>83</sup> Derginin eleştirilerinden Ziraat Bankası da nasibini almıştır.

Bankanın DP teşkilat üyelerine verdiği kredileri eleştiri konusu yaptığı anlaşılan derginin aynı sayısında *Yağma Hasan'ın Böreği* başlığı altında zehir zemberek bir yazı kaleme alınmıştır. *Ziraat Bankası DP mensuplarına yağma Hasan'ın böreği gibi papel dağıtıyor. Her Allah'ın sabahı bankanın önü bir mahşer hatta dün bir CHP'li DP'lilere verilen papellerden aklını oynatarak deyre\* gönderildi. Parayı alanlar gülüyor. Veren memurlar da ağlıyor bu zavallı memurlara da birkaç kuruş yok mu ağızları ağızdan koku diyeceğimiz geliyor. DP yok diyor bunlar nasıl olsa reylerini bizim partiye verecekler. Hülasayı kelim her şey rey için.*<sup>84</sup>

Derginin üçüncü sayısında *Vali Konağında Yapılan Toplantıyı İfşa Ediyoruz* şeklinde haberleştirilen bir espriye yer verilmiştir. *Yarı inanılır kaynaklardan aldığımız malumata göre, Cumartesi akşamı vali konağında Millet Partililer bir toplantı yaparak milletvekili mevzuunu görüşmüşlerdir. Toplantıda ne konuşulduğu hakkında vali tarafından yemin ettirilmişse de sızan malumata göre Millet Partisi pek yakında*

<sup>82</sup> Kelle Koltukta, Nu.4. 29 Teşrinisani 1953.

<sup>83</sup> Kelle Koltukta, Nu.4, 29 Teşrinisani 1953.

\* Deyr, Siirt'in Gökçebağ köyü sınırları içerisinde bağlar bölgesi olarak da bilinen bir bölgeyi ifade etmektedir.

<sup>84</sup> Kelle Koltukta, Nu.4, 29 Teşrinisani 1953.

*açılmadığı takdirde Millet Partililer tarafından Siirt'e köylü partisi kurulacak ve Cavit Tevfik Okyavuz da seçimlere üç ay kala istifa ederek köylü partisine iltihak edecektir Görüldüğü gibi dergide değinilen konular dönemin siyasi havasına ışık tuttuğu gibi, son derece köşeli eleştirilerle de dönemin mülki erkân ve siyasal parti üyelerine eleştiriler yöneltilmiştir.<sup>85</sup>*

*Kelle Koltukta* adlı dergide yer verilen mizah içeriğinin şaşkırtıcı derecede eleştirel ve dokundurucu olması ister istemez akla bazı soruları getirmektedir. Her şeyden önce dönemin basın politikalarına bakıldığında muhalif medyaya yönelik katı tutumun nasıl oldu da *Kelle Koltukta* dergisi için işletilmediği sorusunun cevabı derginin yedinci sayısında yer bulmaktadır. Derginin yöneticilerine göre, *Kelle Koltukta besleme değildir. Resmi ilan almaz. Okuyucunun 5 geçer akçesiyle geçinir... Adnan Menderes ne yaparsa yapsın Kelle Koltuğun kılına kimse dokunamaz. Çünkü Kelle Koltuğa dokunacak babayiğit bu dakikaya kadar anasından doğmamıştır. Böyle bir yiğidin doğması anasına pek büyük sancılara mal olacak. Çünkü böyle bir adam anasından beş altını sancıyla doğamaz. Hülasayı kelim bizim matbaa Adnan Menderes'in beş kuruşluk pul üzerine imza edip CHP'si Genel Sekreterliğinden aldığı 147 bin lirayla alınmamıştır.<sup>86</sup>*

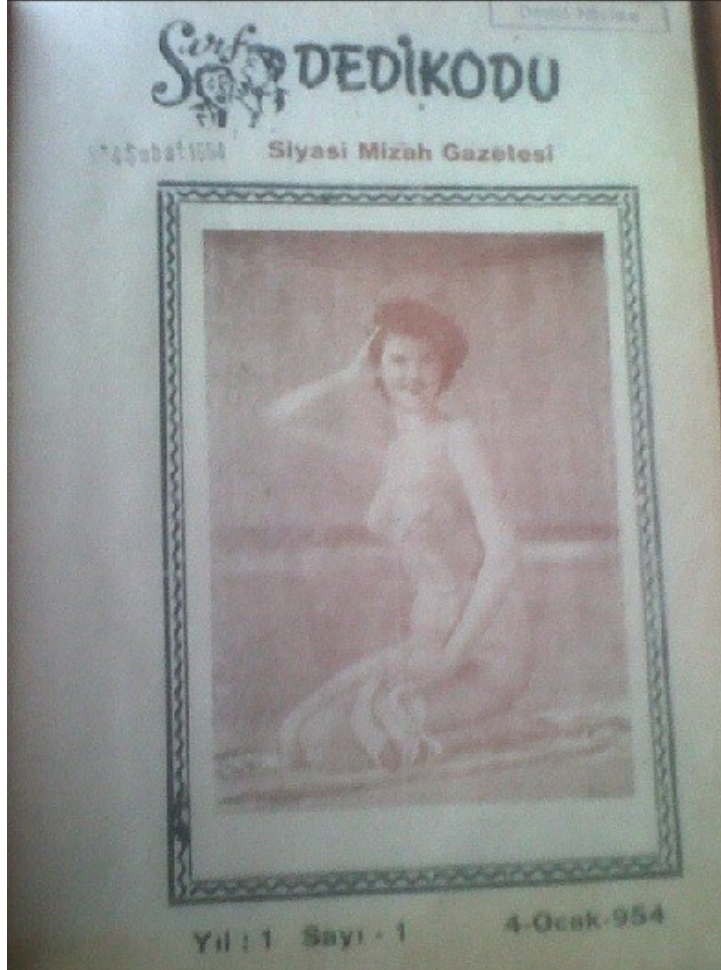
İlk sayısı 4 Ocak 1954 tarihini taşıyan bir diğer mizah dergisi de *Sırf Dedikodu* adıyla yayım hayatına başlamıştır. Sahip ve neşriyatı idare eden Selim Çerkeşlioğlu olduğu belirtilen derginin basıldığı yer ise Yazgan Matbaası'dır. Derginin elimizde bulunan ilk ve tek sayısı *Makalecik* başlığıyla çıkmıştır. *Her sayıda mini mini bir Makalecik sunacağız. Tabii başmakale olduğunu anladınız! Efendim, günlerden beri bir milletvekili namzedi gibi kafanızı şişirdik. Şöyle olacak, böyle olacak çıkaracağımız Matrak. Bir apandisit iltihabı geçiren Matrak müdahale edecek bir operatör bulunmadığından Milletvekillerimizin güzel hatırı için komşu dünyayı boyladı. Allah gani gani rahmet eyliye, Sağlık Bakanlığına da sıhhat ve afiyetler dileriz. Vadimizi yerine getirmek için komşudan bir çocuk kiraladık. Ekseriyetin teklifi ve tasvibi üzerine*

<sup>85</sup> *Kelle Koltukta*, Nu. 7, 20 Kânunuevvel 1953.

<sup>86</sup> *Kelle Koltukta*, Nu.3. 22 Teşrinisani 1953.



ismini *Sırf Dedikodu* koyduk. 15 günde bir amcalarının, abelerinin, abla, hala, hısım ve taallukatının elini öperek ve yüz görümlüğü olarak 25 kuruş isteyecektir.<sup>87</sup>



Kelle Koltukta ile kıyaslanınca *Sırf Dedikodu* adlı derginin siyasi mizaha bir nebze daha fazla ağırlık verdiği söylenebilir.<sup>88</sup> Hatta ulusal çapta siyasi aktörler ve olaylar epeyce bu dergi sayfalarında yer bulmuştur. Dönemin Cumhuriyet Halk Partisi yöneticileri arasında var olduğu bilinen çekişmelere çeşitli şekillerde vurgu yapıldığı dergide İnönü, Erim ve Gülek için yakıştıırılan şarkı sözlerine yer verilmiştir.

İNÖNÜ

Dönülmez akşamın ufkundayız vakit çok geç

Bu son faslıdır ey ömrüm nasıl geçersen geç

Cihana bir daha gelmek hayal edilse bile

<sup>87</sup> *Sırf Dedikodu*, Nu. 1, 4 Ocak 1954.

<sup>88</sup> Derginin sloganı, *On Beş Günde Bir Çıkar Siyasi Mizah Gazetesi* şeklindedir.

Avunmak istemeyiz böyle bir teselli ile

GÜLEK

Ne kadar bekledi gönlüm kazanırım diyerek

Ağladım maizi andıkça içim titreyerek

Sızladım seçimle yandım kaç günler inleyerek

Ağladım seçimi andıkça içim titreyerek

ERİM

Geçti muhabbet demi ağla gönül yan gönül

Ağla gönül, mihnete katlan gönül

Dökme sakın gözyaşı kopmaya tufan gönül

Ağla gönül yan gönül mihnete katlan gönül

Görüldüğü gibi, CHP parti teşkilatında genel sekreterlik koltuğunda bulunan Kasım Gülek ile Genel Başkan İnönü ve Nihat Erim arasındaki parti içi rekabet Sırf Dedikodu dergisinde mizahi bir açıdan ele alınmıştır.<sup>89</sup> Mayıs ayında yapılacak olan 1954 seçimlerinin Siirt'te de siyasi kulisleri harekete geçirdiği kolayca tahmin edilmektedir. Dönemin yerel basın organlarında olduğu gibi mizah basınında da siyaset konusu iştahları kabartan konular arasındaydı. *Valimiz Okyavuz'un önümüzdeki seçimde Siirt'ten milletvekili seçilmesi için, bazı hareketler ve kıvılcıklar kaydedildiği bildirilmektedir. DP baş başkanı Veysi Oran'ın milletvekili seçilmediği takdirde bir valilik kovalayacağı söylenmektedir. Az vadeli Siirt'in tesadüfi milletvekili Bahri Erdem'in adam bulunmadığı takdirde Berlin vilayetine bir küçük elçi olarak yollanacağı inanılmaz kaynaklardan bildirilmiştir. CHP'nin müdafaa edecek tarafı*

*kalmadığından Allahısmarladık demeden terk etmeğe karar veren İ.H. Özcanlı'nın etrafında CHP'liler fır dönüyorlar. Kararının kati olduğunu söylemektedir.*<sup>90</sup>

1960 senesinde Siirt'te yayınlanan mizah gazetelerinden bir diğeri de *Yılbaşı Gazetesi*'dir. Basıldığı yer kısmında gazetenin yayın türüne uygun bir şekilde *Sana ne*, hangi tarihler arasında basılacağı kısmında da *Canı istediği zaman çıkar* bilgisi yer almakta, slogan olarak da *Sulu Saf Matrak Gazete* ifadesi tercih edilmiştir.<sup>91</sup> Bu derginin Demokrat Siirt gazetesinin bir eki olarak ya da sözü edilen gazetenin matbaasında

<sup>89</sup> Sırf Dedikodu, Nu. 1, 4 Ocak 1954.

<sup>90</sup> Sırf Dedikodu, Nu. 1, 4 Ocak 1954.

<sup>91</sup> Yılbaşı Gazetesi, Sayı 1, Sene 1960.

basıldığı anlaşılmaktadır. Derginin ilk sayısında *Teşekkür* başlığı altında *Askeri gazinomuzun sempatik müdavimlerinden olup Siirt'in en çok sevilen aydınlarından Demokrat Siirt Gazetesi sahibi Bay Fuat Yazgan'a Yılbaşı Gazetesi'nin çıkmasında gösterdikleri samimi alaka ve yardımlardan dolayı gazete heyetimiz teşekkürlerini sunar* ifadelerine yer verilmiştir.<sup>92</sup> Yılbaşı Gazetesi'nin çıkış amacına uygun bir şekilde yer bulan bir mizah haberi, *Türkler Topluca Katlediliyor* başlığıyla verilmiştir. *Malumalileri hindi İngilizce Turkey diye yazılır* açıklamasıyla da mizahın altı doldurulmuştur.<sup>93</sup>

## SONUÇ

Siirt'te yerel ölçekteki basın faaliyetlerinin 1930'lu yılların sonlarında tezahür ettiği gerçeği bölge kentleriyle kıyaslandığında Siirt yerel basınının nispeten erken bir tarihsel kesitte ortaya çıktığı anlaşılmaktadır. Tek partili yılların siyasal ikliminden fazlasıyla etkilenmiş olarak basın hayatına katılan ve Siirt'in ilk yerel gazetesi olma özelliğini taşıyan Siirt gazetesi CHP iktidarının yarı resmi bir parti aygıtı hüviyetini de taşımıştır. Dönemin monist siyasal karakterinin bir uzantısı olarak sür git devam eden yerel basının murakabe etme özelliğinden ziyade tek parti iktidarının sözcülüğü işleviyle hareket ettiği görülmüştür. Bu çerçevede bir değerlendirme yapmak gerekirse Türkiye'de basının kontrol, eleştiri ve haber verme işlevlerini tam anlamıyla yerine getirmeye başladığı dönem II. Dünya Savaşı'nın sona ermesiyle başlayan siyasal liberalleşme dönemidir. Faşist Nazi Almanyası'na karşı zafer ilan eden demokratik batılı devletlerin dünya ölçeğinde kuracakları yeni düzene uyumlu bir şekilde Türkiye'de başlayan demokratikleşme çabaları doğal olarak basın faaliyetlerinde de inkâr edilemez bir serbestliği getirmiştir. Çok partili siyasal düzenin kuruluş yıllarında basın alanında görülen çok

sesliliğin taşradaki en bariz yansıması gazete sayısındaki hızlı artış olmuştur. Anadolu'daki büyük kent merkezlerinde görülen bu gelişmenin bir uzantısı olarak Siirt basınında da belirgin bir canlanma gözlenmiştir. Bir anlamda, gazetelerin iktidar ve muhalefet partilerinin sözcülüğünü üstlendiği bu yeni dönem, basının kamuoyu oluşturma ve siyasal propaganda aracı olarak işlevselleştirilmesiyle anılabilir. Özellikle 1950'li yıllarda Siirt'te sayısı iyice artan gazetelerin haber içerikleri incelendiğinde,

<sup>92</sup> Yılbaşı Gazetesi, Sayı 1, Sene 1960.

<sup>93</sup> Yılbaşı Gazetesi, Sayı 1, Sene 1960.

gazetelerin neredeyse bütünüyle siyasal konulara hasredildiği anlaşılmaktadır. Böyle bir ortamda Anadolu'nun ücra bir kentinde yayın hayatına başlayan siyasi mizah gazeteleri renkli içerikleri ve cesur eleştirel yayın politikalarıyla dikkati çekmektedir. *Sırf Dedikodu*, *Kelle Koltukta* ve *Yılbaşı* gibi siyasal mizah dergilerinin gerek taşıdıkları son derece özgün adlar gerekse de ele aldıkları konuların çeşitliliği bakımından oldukça göz doldurucu basın organlarıdır. Demokrat Parti iktidarının 1954 yılında yürürlüğe soktuğu yeni basın kanununun eleştirel gazeteciliği sınırlayan hükümler içerdiği düşünüldüğünde Siirt'te yayınlanan sözü edilen mizah dergilerinin hakikaten kelleyi koltuğa aldıkları anlaşılmaktadır. Kanımızca bu durum iki nedene dayanıyor olabilir. Öncelikle bu dönemde ulusal çaptaki basın politikalarında başvurulan sert uygulamalara rağmen, taşrada cılız bir etki yarattığı bilinen yerel basının bilinçli bir şekilde bu politikaların dışında tutulması bu noktada akla gelen ilk husustur. Bunun yanı sıra, sınırlı bir okuyucu kitlesine hitap eden bu tür yayınlar sayesinde halkın dönemin iktidarının uygulamalarına ilişkin hoşnutsuzluklarının bir ölçüde izale edilmesi de bir kenarda tutulması gereken yaklaşım olarak öne çıkmaktadır. Ancak her koşulda, bu araştırmada yer verilen basın organlarının nükteli ve dokundurucu mizah anlayışıyla yerel ölçekteki siyasal gelişmeleri okuyucuya aktarması, basın faaliyetlerinin hakkıyla yapıldığını ortaya koymaktadır. Dönemin popüler deyimlerinden biri olan *besleme basın* kategorisine hiçbir şekilde dâhil edilemeyecek olan söz konusu mizah dergileri, günlük süreli yayınların takip ettikleri ölçülü ve otokontrol mekanizmasıyla dengelenen içeriğine nazaran muhatabını sert söylemlerle hırpalayan bir yayın diline sahip olmuştur. Bu dönemin siyasete meraklı valisinden resmi hizmete mahsus aracını özel işleri için kullanan kurum amirlerine ve siyasal partilerin il teşkilatlarına varıncaya kadar oldukça geniş bir yelpazedeki kişi ve grupların mizah gazetelerine konu olduğu görülmektedir. Dönemin Siirt toplumuna ayna tutan bu dergilerde yer verilen içerikler yerel tarih araştırmaları, basın çalışmaları ve basının tarihsel gelişimi gibi alanlarda ufuk açıcı veriler sunmaktadır.

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Demokrat Şirvan

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Mücadele

Sırf Dedikodu

Siirt

Siirt Ekspres

Siirt Postası

Şarkın Sesi

Yeni Kurtalan

Yeni Siirt

Yılbaşı Gazetesi

**DROUGHT AT *MEDİCAGO* SPP: A REVIEW**

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**ABSTRACT**

Among the natural hazards, droughts possess certain unique features. Periodic droughts occur because of global temperature cycles in the oceans and atmosphere. A deep and proliferative root system helps extract sufficient water and nutrients under these stress conditions. The cultivation of legumes shows promise for the development of sustainable agriculture, but yield instability remains one of the main obstacles for its adoption. Under drought, symbiotic nitrogen fixation is one of the physiological processes to first show stress responses in nodulated legumes. Despite its primary value as animal feed, alfalfa also diversifies farming production risks, provides a source of biologically fixed nitrogen for rotational crops, reduces soil erosion, cleans land and water contamination. Alfalfa is an important forage crop that is often grown in areas that frequently experience drought and water shortage.

**Keywords:** Feed, drought, legumes, *Medicago* spp.

#### **4. INTRODUCTION**

Owing to the rise in water demand and looming climate change, recent years have witnessed much focus on global drought scenarios. Drought is best described as a natural hazard by a variety of climatological and hydrological characteristics (Mishra & Singh, 2010). Droughts have been more common in recent years, and their effects have been made worse by the increase in water demand and the fluctuation of hydro-meteorological variables brought on by climate change (Mishra & Singh, 2011). Drought is a stochastic natural hazard that develops when there is a severe and ongoing lack of precipitation. Following a first meteorological event, further effects on agriculture and hydrology are observed. Among the natural disasters, droughts have certain distinctive characteristics. In addition to delayed consequences, droughts can vary in a number of dynamic dimensions, such as severity and duration, which makes it challenging to classify them. In order to manage drought, drought characterization is essential, enabling both retrospective analyses (e.g., severity versus impacts analysis) and prospective planning (e.g., risk assessment). The adaptation of a simplified method by drought indices has facilitated drought characterization for various users and entities (Zargar et al., 2011).

Drought has long been a scourge of humanity and a factor in war and conflict. The current crisis in Syria, for example, comes in the wake of one of its worst ever droughts. Cycles in the ocean and atmosphere's overall temperature produce periodic droughts. But even if we have a greater understanding of the underlying factors, the weather continues to be unpredictable. There is an additional motivation to improve when climate change caused by human activity is included. It is projected that the greenhouse effect will increase temperatures and lengthen droughts. It is predicted that many agricultural pests will prosper. Fresh water supplies are being squeezed by all of these demands. Farmers must learn how to produce more while consuming less of this priceless resource. Research is contributing. In-development crop cultivars may withstand greater temperatures and use less water. Computer models that can better predict when and where droughts will hit would help farmers plan—although running these more complicated models is straining computing resources (Grayson, 2013).



Present food production requires an estimated  $6800 \text{ km}^3 \text{ yr}^{-1}$  of consumptive green water ( $5000 \text{ km}^3 \text{ yr}^{-1}$  in rain-fed agriculture and  $1800 \text{ km}^3 \text{ yr}^{-1}$  from irrigated crops). Without considering water productivity gains, an additional  $5800 \text{ km}^3 \text{ yr}^{-1}$  of water is needed to feed a growing population in 2050 and eradicate malnutrition. It is shown that the bulk of this water will be used in rain-fed agriculture (Rockström, 2003).

Stresses from drought, salt, and heat are three main environmental conditions that have an impact on where plants grow in nature, reduce agricultural plant yield, and jeopardize food security (Zhu, 2016). Two well-studied signaling molecules that serve as priming agents and control how plants react to stressful situations are nitric oxide and hydrogen sulfide (Antoniou et al., 2020). An significant developmental and agronomic characteristic, root system architecture is crucial for plant productivity and adaptation in water-scarce situations. Under these stress-related circumstances, a deep and proliferating root system aids in extracting enough water and nutrients (Ye et al., 2018).

## **5. LEGUMES**

The cultivation of legumes shows promise for the development of sustainable agriculture, but yield instability remains one of the main obstacles for its adoption (Prudent et al., 2020). Legume crops present important agronomical and environmental advantages mainly due to their capacity to reduce atmospheric  $\text{N}_2$  to ammonium via symbiotic nitrogen fixation. This process is very sensitive to abiotic stresses such as drought, but the mechanism underlying this response is not fully understood (Gil-Quintana et al., 2015).

The root characteristics of legume crops have been regarded as the most crucial characteristics enabling the plant to efficiently mine water from deeper soil layers under dry situations. There are numerous parameters linked with drought tolerance in legume crops (Vadez et al., 2008). Sustainability in agriculture is more crucial for distributing resources as inputs than for producing goods. The key to it is that it is also more significant than other biological characteristics, including the advantageous microorganisms. Legumes form an integral part of the soil microbial nexus. In order to achieve sustainability, soil biological health and legumes have recently received attention. Particularly in farming systems that rely on legumes, soil rhizobacteria are

crucial. This is because the resource constraints such as water and nutrients often limit the productivity of such systems (Sofi et al., 2018).

Millions of tons of nitrogen are introduced into agricultural areas through symbiotic nitrogen fixation in legume root nodules, and non-legume crops receive ammonia under N-deficient environments. Environmental stresses, such as drought, salt, cold, and heat stress, are inevitable while plants are growing and developing (Li et al., 2018). One of the environmental elements that has the biggest impact on crop output is drought. One of the physiological processes that

causes nodulated legumes to first exhibit stress responses during a drought is symbiotic nitrogen fixation (Larrainzar et al., 2007).

Climate change in conjunction with population growth necessitates a systems biology approach to characterize plant drought acclimation as well as a more thorough understanding of the molecular mechanisms of stress recovery. The environment that plants are exposed to is always changing. Extreme conditions, such a prolonged drought, are followed by rain. For recovery and ongoing growth, the plant must have molecular flexibility that enables drought adaptation and necessitates deacclimation mechanisms. The metabolome and proteome are regulated by a series of molecular events, including synthesis and degradation, and molecular interaction networks are a part of this regulatory mechanism during drought stress and subsequent recovery (Lyon et al., 2016).

## **6. *MEDICAGO* SPP.**

*Medicago sativa* L., also known as alfalfa, is a significant leguminous forage crop that is planted extensively worldwide. It not only provides abundant food for animals but also enhances soil fertility (Zhang et al., 2016). Albeit its primary use as animal feed, alfalfa also prevents soil erosion, cleans up land and water contamination, breaks up pest cycles of yearly rotation crops, and encourages soil carbon sequestration. It also serves as a source of biologically fixed nitrogen for rotating crops (Zhang et al., 2015). Climate change is predicted to result in an increase in the frequency and severity of extreme environmental conditions like drought, which will significantly reduce food yield and quality. *Medicago sativa* is an important crop that is relied upon as a staple source of

forage in ruminant feed. Despite its economic importance, alfalfa production is constrained by abiotic stress, including drought (Hanly et al., 2020).

Frequently grown in regions that frequently face drought and water shortage is the vital fodder crop alfalfa (Arshad et al., 2017). Drought is likely the primary abiotic environmental factor most adversely affecting alfalfa production globally since alfalfa's growth is significantly hampered by a lack of water (Zheng et al., 2017). Alfalfa requires irrigation in many places and uses a lot of water. It is imperative to create alfalfa cultivars with enhanced drought tolerance because to the steadily decreasing irrigation water supply and an increase in droughts brought on by climate change (Singer et al., 2021).

Alfalfa is an essential fodder product which has extensive and depth roots system, this advantage enables the plant to tolerate long term drought without any damage to its regrowth process (Hamidi & Safarnejad, 2010).

Drought stress hampers plant energy and biomass production. the effect of differential optimal nitrogen nutrition and root nodule symbiosis on drought stress and rehydration responses of *Medicago truncatula* was assessed by Staudinger et al., (2016). During droughts, root nodule symbiosis helps maintain leaves for a longer period of time. Bacterial strains and leaf initial N content had little impact on the outcome. However, this process also involves fundamental dietary changes. Rhizobia may cause increased translational regulation and hormonal interaction, according to a proteomics investigation. Furthermore, nodulated plants recover more quickly than non-nodulated plants. *Tetraploid medicago sativa* L. is a perennial forage legume of significant agronomic interest. Furthering the development of its drought tolerance is necessary because to the growing demand for its application in low-input systems and water-deficient environments. On the other hand, *Medicago arborea* L. is a perennial leguminous shrub, which is known as a drought-tolerant species (Tani et al., 2019).

Seed osmopriming improves plant growth, nodulation, chlorophyll fluorescence and nutrient uptake in alfalfa-rhizobia symbiosis under drought stress. Under drought, osmopriming promoted growth and nodulation in the examined symbioses. In plants under drought, osmopriming improved PSII performance and reduced stomatal conductance. In particular during droughts, rhizobia inoculation and seed osmopriming

improved drought tolerance and nutrient uptake. Seed osmopriming increased leaf nodulation and nitrogen content (Mouradi et al., 2016).

It has been reported that plant-associated beneficial bacteria, especially strains resistant to abiotic stresses that could maintain their efficiency under environmental challenging conditions, can contribute to alleviate abiotic stresses of host plants (Noori et al., 2021). Not only symbiotic plant components but also *Sinorhizobium meliloti* and *Mesorhizobium loti* bacteria residing in the root nodules of *M. truncatula* and *L. japonicus*, respectively, adjust their gene expression in response to water shortage. Although our results demonstrated that both *M. truncatula* and *L. japonicus* root nodules were susceptible to water deprivation, they indicated significant differences in plant and bacterial response to drought between the tested species, which might be related to the various types of root nodules formed by these species (Sanko-Sawczenko et al., 2019).

One of the leguminous forage crops that thrives in arid and semiarid climates is *Medicago falcata*. *M. falcata* is a widespread legume grass that is closely related to alfalfa. *M. falcata* and alfalfa produce a *Medicago* type with excellent usage value and great resilience, making *M. falcata* a crucial gene bank for alfalfa breeding with resistance features. In particular, *M. falcata* possess high drought tolerance, thus the regulatory mechanisms underlying drought stress in *M. falcata* will be useful for the breeding of drought-resistant alfalfa (Li et al., 2022).

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## AĞIR METAL STRESİNİN BİTKİLERDE SEKONDER METABOLİT PROFİLİNE ETKİSİ

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### ÖZET

Ağır metaller, toprak ve su ekosistemlerinde bulunmakla birlikte atmosferde partikül veya buhar olarak nispeten küçük oranlarda yer almaktadır. Birçok ağır metal insan ve hayvanlar için iz miktarda gerekli olan besin maddeleridir. Bitkilere yönelik ağır metal toksisitesi bitki türleri, spesifik metal, konsantrasyon, kimyasal form, toprak bileşimi ve pH'a göre değişim göstermektedir. Ağır metallerin bitkilerde sekonder metabolit profillerine önemli ölçüde etki ettiğini gösteren birçok çalışma bulunmaktadır. Sekonder metabolitler potansiyel olarak tüm bitki organlarında bulunmakta ve bitki yetiştiriciliğinden kaynaklanan atıkların değerlendirilmesi için çeşitli olasılıklar sunmaktadır. İnsan gıdalarında, hayvan yemlerinde, ekolojide ve farmasötiklerde sekonder metabolitlerin önemi ayrıntılı olarak birçok araştırmada yer almaktadır. Tarım sektöründe genellikle bitkilerin yalnızca birkaç organı hasat edilmektedir. Bu durum da tedarik zincirinin farklı seviyelerinde çok sayıda atık oluşturmaktadır. Bu bağlamda, ihmal edilen bu içeriğin biyoaktif bileşiklerinin belirlenmesine yönelik bilimsel araştırmaların ve bunların değerlendirilmesine temel oluşturmada yapılan çalışmaların önemi gün geçtikçe artmaktadır. Bitkilerde ağır metal birikiminin konsantrasyon ve maruz kalma süresinin sekonder metabolit üretimi üzerindeki etkisini etkileyen çok önemli parametreler bulunmaktadır. Şimdiye kadar bilimsel ilgi, bitki türlerine ve farklı ağır metallere maruz kalmaya bağlı olarak değişen bir eğilim göstermiş olan vitaminler, polifenoller ve karotenoidler gibi fonksiyonel moleküllerin içeriğine ayrılmıştır. Bu nedenle, gelecekteki çalışmalar için sekonder metabolit üretimini azaltabilen veya artırabilen eşik konsantrasyon değerlerini deneysel olarak belirlemeye yönelik çabalar göstermelidir. Bu derlemede bitkilerde sekonder metabolitlerin üretimini etkileyen ağır metal stresleri, yapılan birçok bilimsel deney çerçevesinde araştırılmıştır.

**Anahtar Kelimeler:** Ağır Metal, Sekonder Metabolit, Uçucu Yağlar, Aromatik Bitkiler



**EFFECT OF HEAVY METAL STRESS ON SECONDARY METABOLITE  
PROFILE IN PLANTS****ABSTRACT**

Although heavy metals are found in soil and aquatic ecosystems, they are present in the atmosphere in relatively small proportions as particles or vapors. Many heavy metals are essential nutrients for humans and animals in trace amounts. Heavy metal toxicity to plants varies with plant species, chemical form, specific metal, soil composition, concentration, and pH. Many studies show that heavy metals significantly affect secondary metabolite profiles in plants. Secondary metabolites are potentially present in all plant organs and offer several possibilities for utilizing wastes from plant cultivation. The importance of secondary metabolites in human food, animal feed, ecology, and pharmaceuticals are covered in many studies in detail. Generally, only a few parts of plants are harvested in the agricultural sector. This creates a large amount of waste at different levels of the supply chain. In this context, the importance of scientific research on the determination of the bioactive compounds of this neglected ingredient and the studies conducted to form the basis for their evaluation is increasing daily. Critical parameters affect the effect of heavy metal accumulation in plants on concentration and exposure time on secondary metabolite production. Until now, scientific attention has been devoted to the content of functional molecules such as vitamins, polyphenols, and carotenoids, which have shown a varying trend depending on plant species and exposure to different heavy metals. Therefore, efforts should be made to experimentally determine threshold concentration values that can reduce or increase secondary metabolite production for future studies. In this review, heavy metal stresses affecting the production of secondary metabolites in plants have been investigated within the framework of many scientific experiments.

**Keywords:** Heavy Metal, Secondary Metabolite, Essential Oils, Aromatic Plants

#### 4. GİRİŞ

Çinko (Zn), bakır (Cu), nikel (Ni), molibden (Mo), manganez (Mn), krom (Cr) ve demir (Fe) gibi bazı ağır metaller, büyüme ve oksidasyon dahil bitkilerde indirgeme reaksiyonları, elektron taşınması ve diğer birçok metabolik süreçler gibi birçok yapısal ve biyokimyasal fonksiyonda gerekli olan temel eser elementlerdir (Lajayer vd., 2017). Ağır metaller, toprakta bulunan, ana kayaların ayrışmasından, pedojenezden ve antropojenik faaliyetlerden kaynaklanan nadir, doğal olarak bulunan elementlerdir. Atmosferik biriktirme, yoğun tarım, ağır trafik, metal endüstrileri, madencilik ve çöp dökme gibi antropojenik faaliyetlerdeki artışlar, arsenik, cıva, kurşun ve kadmiyum gibi metallerin toprak, su ve havada bulunan seviyelerinde ciddi oranlarda artışına neden olmaktadır. Bu olayların bir sonucu olarak, bitkilerde ürün verimliliği üzerinde zararlı etkiler gözlenmektedir (Mahajan vd., 2020). Sanayi, metalurji, ağır metal içeren kimyasal gübrelerin yapılması ve kullanılması gibi çok sayıda insan faaliyeti, doğal ortamlarda ağır metal birikimine yol açmaktadır (Lajayer vd., 2017). İnsan faaliyetleri nedeniyle, artan sanayileşme, enerji üretimi, tarım faaliyetleri ve belediye atık üretimi nedeniyle topraklardaki ağır metallerin içeriği artmaya devam etmektedir (İbrahim vd., 2017).

Tarım arazilerinin ve sulama sularının inorganik kirleticiler gibi zehirli atıklarla kirlenmesi, insanlar ve hayvanlar için çevresel riskler oluşturmaktadır. Nikel, çinko, kadmiyum, krom, bakır ve kobalt gibi ağır metaller toprakta doğal olarak birikebilmekte veya endüstriyel ve madencilik süreçlerinden kaynaklı çoğalabilmektedir (Murch vd., 2003). Ağır metaller genellikle suyun özgül ağırlığının beş katı olan inorganik elementler olarak tanımlanmaktadır. Biyosfer de dahil olmak üzere hemen hemen tüm çevresel bileşenler, çeşitli kaynaklardan sürekli olarak salınan ağır metallerin aşırı kirlilik oluşturması nedeniyle sürekli olarak tehdit altındadır (Bhattacharya, 2018). Havaya, toprağa ve çevreye salınan ağır metaller, bitkiler tarafından kökler ve yapraklar yoluyla emilebilir ve ciddi bir olası insan sağlığı riskinin yanı sıra bitki metabolizmalarının bozulmasına neden olabilir (Lajayer vd., 2017). Ağır metal stresi toprakta yüksek oranlarda kontaminasyonlara sebebiyet vermekte ve bu da bitkilerin metabolik aktivitesinde istenmeyen birkaç değişikliğe neden olmaktadır. Bitkilerin ağır

metal alımı, fotosentetik pigmentleri, şekerleri, proteinleri ve protein olmayan üretimi etkileyerek bitki ölümlerine yol açabilmektedir (Mahajan vd., 2020).

Bitkiler, ilaç geliştirme adına tıbbi değeri olan yeni ürünleri keşfetmek için temel bir kaynak olup ve bitkilerin sekonder metabolitleri, farmasötikler, gıda katkı maddeleri, tatlar ve diğer endüstriyel değerler için benzersiz kaynaklardır. Bu sekonder metabolitlerin ticari önemi, son

yıllarda üretimine ve doku kültürü teknolojisi aracılığıyla üretimlerini artırma olasılıklarının araştırılmasına büyük ilgi duyulması ile sonuçlanmıştır (Tiwari ve Rana, 2015). Tıbbi ve aromatik bitkilerde farklı kimyasal bileşenler (sekonder metabolitler), ilaç ve gıda endüstrileri yoluyla insan sağlığını iyileştirebilecek biyolojik aktivitelere sahiptir. Aynı zamanda bu bileşenler parfüm, zirai ilaç ve kozmetik endüstrilerinde temel kaynakları oluşturmaktadır (Li vd., 2020). Sekonder metabolitler genellikle biyosentetik yollara göre üç ana grupta sınıflandırılmaktadır. Bu gruplar: fenolikler, terpenler ve alkaloidlerdir. Bu fitokimyasallar, muazzam kimyasal ve biyolojik çeşitlilik ile karakterize edilmekte ve türe özgü ve organa özgü olmanın yanı sıra, üretimleri birçok biyotik ve abiyotik faktöre bağlı olmaktadır. (Chiocchio vd., 2021). Sekonder metabolitler, çevre ile bitki etkileşimlerinde önemli roller oynamaktadır (Jia vd., 2016). Bitki sekonder metabolitleri, büyüme düzenlemesinde, antioksidan aktivitede, pigment gelişiminde ve diğer süreçlerde çok önemli bir roller oynamaktadır. Küresel iklim değişikçe, artan atmosferik sıcaklıklar ve toprağın ağır metaller tarafından kirlenmesi, doğal ekosistemlerde birlikte meydana gelmekte, bu da rizosfer toprağının pH'sını değiştirmekte ve metallerin biyoyararlanımını ve hareketliliğini etkilemektedir (Zhao vd., 2016). Bitkiler, sekonder metabolitleri sentezlemek için birincil metabolitlerden daha fazla enerji harcamakta ve bu da bu sekonder metabolitlerin temel doğasını yansıtmaktadır (Jia vd., 2016).

##### **5. UÇUCU YAĞ BİLEŞENLERİNE AĞIR METAL STRESLERİNİN ETKİSİ**

Bazı tıbbi ve aromatik bitkiler, hasat edilebilir bitki örtüsündeki metal kirletici maddeleri emebilir ve biriktirebilir ve bu nedenle, uçucu yağların herhangi bir şekilde kirlenmesi olmaksızın kirli alanların iyileştirilmesi için uygun bir alternatif olarak kabul edilebilir (Lajayer vd., 2017). Sekonder metabolitlerin birikmesi genellikle, yüksek atmosferik

CO<sub>2</sub>, ağır metal stresi, UV ışığı, kuraklık, sıcaklık, mantar ve viral enfeksiyon ve diğer bitkilerin allelopatik etkileri dahil olmak üzere çevresel koşullardaki değişikliklere maruz kalan bitkilerde meydana gelmektedir (Jia vd., 2016; Zhao vd., 2016). Ağır metallerin farklı konsantrasyonlarına maruz kalan bitkilerde önemi oranlarda sekonder metabolit değişimleri, yürütülen birçok çalışma ile kanıtlanmıştır.

Nikel, lantan, öropiyum, gümüş, kadmiyum ve oksalat dahil olmak üzere metal iyonları, bazı tıbbi ve aromatik bitkilerde sekonder metabolit üretimini etkilemiştir (Zhao vd., 2001). Kadmiyum ve kobalt, çemen otunda (*Trigonella foenum-graecum*) diosgenin düzeylerini artırmıştır (De ve De, 2011). Nikel stresine bağlı olarak antosiyanin seviyelerinde

önemli bir düşüş rapor edilmiştir (Hawrylak vd., 2007). Ayrıca nikelin antosiyaninlerin birikmesini engellediği tespit edilmiştir (Krupa vd., 1996). Rai ve ark. (2004), *Ocimum tenuiflorum*'u farklı krom konsantrasyonlarına (10, 20, 50 ve 100 µM Cr) maruz bırakmıştır. Çalışma sonucunda orta derecede krom stresıyla en yüksek öjenol yüzdesinin oluştuğu bildirilmiştir.

Cu<sub>2+</sub>'ın *Amaranthus caudatus*'un kallus kültürlerinde betasiyanin birikimi üzerindeki uyarıcı etkilerini görülmüştür. Zn<sub>2+</sub> (900 uM) ilavesi de *Lepidium sativum* kültürlerinde lepidin verimini arttırmıştır (Obrenovic, 1990). Nadir toprak metali (lantanum), *Taxus sp.*'nin hücre kültüründe taksol üretimi üzerinde etkili olmuştur (Pitta-Alvarez vd., 2000). Kadmiyum ve bakır ile muamele edilen yulaf ve fasulye bitkilerinde pütresin içeriği önemli ölçüde artmıştır (Weinstein vd., 1986). AgNO<sub>3</sub> ve CdCl<sub>2</sub>, *Brugmansia candida*'nın tüylü kök kültürlerinde iki tropan alkaloidinin, skopolamin ve hiyosiyamin'in aşırı üretimini ortaya çıkarmıştır (Angelova vd., 2006). Prolin ve fenilpropanoid metabolizması, olumsuz koşullarla başa çıkmak için kadmiyum stresi altındaki *Withania somnifera* bitkilerine gerekli ozmotik ve antioksidanları sağlayarak baskın bir şekilde yukarı doğru düzenlenmiştir (Mishra ve Singh Sangwan, 2019). Fesleğen (*Ocimum basilicum* L.) bitkisinde Cd toksisitesi, savunma enzimleri ve bileşiklerinin aktivitelerini, hücre zarı oksidasyonunu ve sekonder metabolitlerin üretimini artırmıştır (Gheshlaghpour vd., 2021).

Tarla çörekotunda (*Nigella arvensis* L.) alüminyum ve nikel oksit nanopartiküllerinin büyüme ve antioksidan aktivitesi üzerine etkileri araştırılmıştır. Antioksidan aktiviteler,

sekonder metabolitlerin oluşumu, toplam antioksidan kapasite, DPPH süpürme aktivitesi ve toplam saponin içeriği gibi diğer ilgili fizyolojik parametreler, NiO nanopartikülleri 100 mg/L'ye yükseltildikten sonra inhibe olmuştur. 100–2.500 mg/L Al<sub>2</sub>O<sub>3</sub> nanopartikülleri ile muamele edilen bitkilerde toplam fenoller, saponinler, iridoidler, toplam antioksidan içerik ve DPPH süpürme aktivitesi artmıştır (Chahardoli vd., 2020). *Artemisia annua* L. bitkisinde üç gün boyunca 60 ve 120 µmol/L Cd ile muamelenin artemisinik asit, arteannuin B ve artemisinin biyosentezini önemli ölçüde iyileştirdiği tespit edilmiştir (Zhou vd., 2017).

## 6. SONUÇ

Çeşitli insan faaliyetleri ile toprağın, suyun ve havanın toksik ağır metallere kirlenmesi, hem gelişmekte olan hem de gelişmiş ülkelerde önemli bir çevre sorunudur. Ağır metaller, kontamine çevre (toprak, su ve hava kaynakları) ve kötü üretim uygulamaları yoluyla tıbbi bitki ürünlerine girebilmektedir. Ağır metalle kirlenmiş ortamlarda tıbbi bitkileri yetiştirmek, sonunda sekonder metabolitlerin biyosentezini etkileyerek bu bileşiklerin nicelik ve kalitesinde önemli değişikliklere neden olabilmektedir. Bu nedenle arzu edilen bileşenlerin hangi ağır metalin tesiri altında çoğaldığının tespitine yönelik yapılacak olan çalışmalar sekonder metabolit üretimi yapan sektörler için oldukça önem taşımaktadır.

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**INCREASING STUDENT LEARNING MOTIVATION IN CIVIC EDUCATION  
LEARNING THROUGH PROBLEM BASED LEARNING MODEL ASSISTED  
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**ABSTRACT**

The Covid-19 pandemic has had a major impact on human lifestyle, one of which is the implementation of the learning process that must be carried out remotely. The implementation of distance learning during the Covid-19 pandemic experienced several problems that resulted in low motivation for learning students. Various studies have been conducted to increase the learning motivation of students during distance learning, including this research. This study aims to 1) describe the learning process of Civic Education with a problem-based learning model assisted by the flipped classroom method in students, 2) describe the increase in student learning motivation in Civic Education learning with a problem-based learning model assisted by the flipped classroom method. This research is a class action research (PTK) consisting of two cycles. Each cycle consists of two meetings. The subjects of this study were S1 Electronic Education class A students class 2021, Yogyakarta State University, totaling 52 students with material on the rights and obligations of citizens. Data collection techniques use observation techniques, questionnaires, documentation, and tests. Based on the results of the study, 55.49% were obtained with high criteria, increased to 66.97% with high criteria in the first cycle, and increased to 80.37% with very high criteria in the second cycle. Based on these findings, it can be concluded that using a problem-based learning model assisted by flipped classroom learning methods can increase student learning motivation in remote Civic Education learning in material on the rights and obligations of citizens.

**Keywords:** student learning motivation, civic education learning, problem based learning, flipped classroom method.

## **INTRODUCTION**

The global corona virus pandemic has been sweeping the world since the end of 2019 and is still ongoing. This non-natural disaster forced the world into a new social order, including the world of education. The social change caused by the global pandemic gave birth to a policy of physical distancing, which prohibits students from studying in schools and campuses. The policy is a major challenge that must be faced by all teachers, learners, and parents of student guardians. The demands for learning that must continue under any circumstances make distance learning patterns an alternative offered by the Indonesian Ministry of Education and Culture through Circular Letter No. 15 of 2020 on Guidelines for The Implementation of Learning From Home In The Emergency Period of Spread of Corona Virus Disease (COVID-19). The Basic Law of the State of Indonesia 1945. Article 31 mandates that education is the right of every citizen. Under Article 31, the state has two obligations, namely organizing education for every citizen, and financing education for citizens. Organizing education means that the state must provide places / schools, educators, facilities and infrastructure so that teaching and learning activities can run. Financing education means that the state must provide funds / budgets so that teaching and learning activities involving educators, schools, facilities and infrastructure can be realized. The seriousness of this government is followed up by the government with Regulation of the Minister of Education and Culture Number 3 of 2020 concerning National Standards of Higher Education. In Regulation of the Minister of Education and Culture explained about the criteria for the implementation of learning in higher education units to achieve graduate competence, which is the main point is the existence of interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered learning. However, the ideal conditions do not all go as expected because of the covid-19 pandemic that demands distance learning. There are several problems that are a factor inhibiting the success of distance lessons in this covid-19 pandemic. Research conducted by Suyahman, et al (2021:74-78) found that inhibiting factors in online learning include quotas and internet connections, the implementation of learning, supporting tools that are less supportive, and the influence of online learning on learning outcomes. In addition to inhibiting factors in the form of facilities and infrastructure, it was also found that the lack of interaction between teachers and learners so that the material delivered was less maximal, the assignment was less effective as a benchmark for student knowledge, the delivery of material by teachers on online learning was less understood by learners, online learning could affect student

learning outcomes (Suyahman, et al, 2020: 64-78). Researchers made observations during civic education learning in class A of the Department of Electronic Education, Yogyakarta State University class of 2021, as well as conducting interviews with students. The finding of the interview results is that students feel bored with the learning process because they feel less interesting and less motivating. In addition, students are also lazy to pay attention to learning because of the impact of the distance learning policy. This can be proven when the teacher teaches in the class only a small part of the students pay attention to learning, while some students do other activities, such as playing cellphones, turning off the camera, not answering questions, leaving online classes, and so on. Of course, this can show the low interest and motivation of learning students in learning Civic Education which can affect the learning outcomes of the realm of student knowledge. Where as through Citizenship Education students are expected to be able to develop their potential both as individuals, members of society, nation and country and as members of the world community. In addition, students are also equipped with basic knowledge and abilities with regard to the relationship between citizens and the state and preliminary education in defense of the country. Citizenship as a course and subject directed towards efforts to improve, understand, imagine, and practice moral values rooted in Indonesian culture that is expected to be realized in the form of daily behavior of students both as individuals, as members of society, and citizens. This is in accordance with the Decree of the Director General of Higher Education of the Ministry of Education and Culture of the Republic of Indonesia Number 48/E/KPT/2020 on Guidelines for the Implementation of Compulsory Courses on the Higher Education Curriculum that citizenship education courses are education to provide an understanding of *Pancasila*, the 1945 Constitution of the Unitary State of the Republic of Indonesia and *Bhineka Tunggal Ika* and its implementation in forming students into citizens who are Have a sense of nationality and love of the homeland. The problem conditions outlined in the paragraph above are linear with theories related to factors that affect student learning conditions, namely factors that come from students (internal factors) and factors that come from outside the student (external factors) (Slameto, 2003: 74). Internal factors consist of intelligence or intelligence, attention, talent, interest, motivation, maturity, readiness, and fatigue (boredom). While external factors (factors that come from outside humans) include: (1) The family environment which includes: parental attention, the economic situation of parents, relationships between family members, home atmosphere, understanding of parents and cultural background. (2) The school

environment includes: educator factors, tool factors (learning media), building conditions, and the use of learning methods, curriculum, educator relationships with learners, student relations with learners, school discipline, school time, lesson standards above size and homework. (3) Community environment which includes: media factors (tv, radio, internet, etc.), social environment (friends, neighboring environment, activities in the community), activities of learners in the community and, community life forms. The learning motivation of learners can be measured through several indicators, namely: (1) feelings of pleasure, (2) student interest, (3) attention and (4) involvement learners (Safari, 2003: 60). If the problem is not solved, then in the future it can cause a less good impact for students, lecturers, and universities. The impact of low student motivation can cause learning achievement to decrease, because they are tired of distance learning. For lecturers, will feel failed in improving student learning outcomes, while for universities of course this will result in low quality of learning. Based on the background exposure of the problem, there is a learning model that can decipher existing problems, one of which is the flipped classroom learning model. Reporting from the page (2020), it was written that there verse classroom learning model is an emergency learning solution during the covid-19 pandemic. Flipped classroom is a learning model in which learners before learning in the classroom learn the material first at home in accordance with the tasks given by the educator. This method is also used by educators when there are learners who are not present in the classroom for something. The flipped classroom learning model combines the types of synchronous and asynchronous learning. The flipped classroom learning model can be classified as blended learning because it combines synchronous and asynchronous, traditional and online learning formats. Synchronous learning is a collaborative teaching format that involves interaction between educators and learners delivered at the same time. Asynchronous learning is the opposite of collaborative interaction activities of educators and learners delivered at different times. The application of this flipped classroom learning model was successfully applied in the United States as shown in research conducted by Bergman and Sams (2012: 77) that learners who practice this method are very high learning motivation, creativity increases, responsibility increases, learners are more active in the learning process in the classroom, and academic value is better when compared to traditional learning. Likewise, educators also feel they have more time to interact with learners. Flipped classroom is a learning method that must be combined with learning models that support students' competence to think critically. One of the

learning models that motivate the ability to think critically is the problem based learning model. Problem based learning (pbl) is an instructional learner centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to defined problem (Walker, et all, 2015:10). The constructionist view of the PBL model places students as active constructors of knowledge flexibly. Knowledge is learned in a meaningful context similar to where the learner applies the knowledge next. PBL also facilitates the development of cognitive learning skills and provides intrinsic learning motivation. In the PBL class, communication also occurs effectively, and students are able to collaborate with other students in conducting experiments (Cennamo, et all, 2011:21). The position of the lecturer as a facilitator in PBL, is tasked with helping to provide experience to students in designing to solve 5 problems related to the subject matter. Students are expected to be able to interact to produce solutions to problems. The combination of problem based learning with flipped classroom can be done by students by exploring problems and learning resources independently asynchronously and discussing the problems found and solving solutions in the classroom synchronously. Such conditions are expected to make classroom learning contain active discussions that give all students the opportunity to be active. Researchers are interested in conducting classroom action research in class A of Electronic Education of Yogyakarta State University class of 2021 by using problem based learning models assisted by the flipped classroom learning methods to increase student learning motivation in civic education learning. The novelty contained in this study when compared to previous research is that there has never been a study of class actions in civic education learning that use problem based learning models assisted by the flipped classroom learning methods.

## **METHOD**

The method used in this study is class action research (CAR). According to Arikunto (Afrianti, et all, 2018: 55) stated that classroom action research is conducted by educators to research or to find solutions in solving problems that occur in classes that are experienced directly in the interaction between educators and learners who are learning in more detail. CAR aims to improve and improve the quality of learning activities and student learning outcomes (Arikunto, 2017: 195). This research was conducted in class A department of Electronics Education, Yogyakarta State University Force 2021 which amounted to 52 students. This study was conducted in two cycles, each cycle was done in 2 meetings. The

stages passed in a class action research cycle are planning, implementation, observation, and reflection. The data collection techniques used in this study are observation, questionnaire, documentation and test techniques. Initial problem collection using observation and interview techniques. The observation is carried out according to the civics lesson schedule at the research site. The interview is an open-ended interview. The instruments used in this research are learning devices in the form of Semester Learning Plans (SLP) and Student Worksheets and research instruments in the form of observation sheets and questionnaires. The criteria for student learning motivation levels are measured in questionnaires as in table 1.

**Table 1.** Motivation Questionnaire Score Criteria

Answer Options	Score
Very often	4
Often	3
Infrequently	2
Very rare	1

The question item in the questionnaire consists of 25 questions that have a choice of answers as in table 1. Based on the number of questions and scores determined, the maximum score that will be achieved by students is 100 and a score of at least 25.

Student learning motivation presentation can be calculated with the formula in figure 1.

$$P_{MS} = \frac{S_k}{\Sigma m} \times 100\%$$

Information figure 1

PMS = Percentage of student motivation

Sk = Overall score obtained

Σm = Maximum number of scores

As for calculating the percentage of student motivation to learn classically by using the figure 2.

$$P_{MS} = \frac{\Sigma \text{Siswa berhasil}}{\Sigma \text{siswa dalam kelas}} \times 100\%$$

Figure 2.

The percentage criteria for student learning motivation. (Yonny, et al in Isnaeni,2013: 67) is presented in table 2.

**Table 2.** Percentage Criteria for Student Learning Motivation

Presentage	Criteria
75%-100%	Very High
50%-74,99%	High
25%-49,99%	Medium

The criteria for individual completion in this study is if the percentage of student learning motivation increases by 70% (Isnaeni, 2013: 67). This research is considered successful if 75% of the total number of students has reached the target of the indicators that have been set.

### **RESULT AND DISCUSSION**

Based on the analysis of data on the results of the implementation of learning actions using problem based learning models assisted by the flipped classroom methods in class A of Electronic Education of Yogyakarta State University Class of 2021 can be concluded to have fulfilled all aspects of the indicators of success that have been determined. Observed indicators include increased student learning motivation. Factors that affect student learning motivation, one of which is from educational institutions or educators, namely including teaching methods and learning media used by educators (Slameto,2015:66-69). Before the action is carried out by using the learning actions using problem based learning models assisted by the flipped classroom methods during learning activities carried out by lecture methods, educators or lecturers tend to only explain the material from start to finish without using learning media, and not infrequently the explanation is passed from one topic to another so that students feel bored and not interested in the learning process which results in low motivation to learn. Learning activities are more dominated by lecturers. Less interesting learning will make students feel bored and not interested in following the learning process. Many students still do not want to ask when asked to ask, when asked to respond to lecturer's questions, students are unable to respond. Based on existing problems, improvements are needed by using learning actions using problem based learning models assisted by the flipped classroom methods to increase student learning motivation. The results of observations during learning activities in the classroom before using problem based learning models assisted by the flipped classroom, researchers saw that students of class A

of Electronic Education of Yogyakarta State University class of 2021 tended to be bored and less eager in participating in the learning process. Most students of class A of Electronic Education of Yogyakarta State University class of 2021 have low motivation. This is evidenced by the results of observations and interviews on student learning motivation which shows that the average percentage of student civic education motivation is only 55.49%. Before taking action, students tend to be reluctant to respond to questions from lecturers and not ask questions. After using learning actions using problem based learning models assisted by the flipped classroom methods increased in cycle I to 66.96% and increased again in cycle II to 80.37%. This increase is evidenced by the achievement of a predetermined success indicator of 75%. Basically the concept of flipped classroom is what was traditionally done in the classroom now done at home, while what was traditionally done as homework is now done in the classroom (Bergmann & Sams, 2012: 13). This research was conducted using two cycles on the same subject matter, namely "Harmonization of Rights and Obligations of Citizens". The implementation of cycle I begins with the planning stage. At the planning stage, the lecturer make semester learning plans and learning media in the form of learning videos, student worksheets, educational books, and relevant books. Learning media, then uploaded to whats-app or learning managerial system used in supporting learning activities. The delivery of learning materials is packaged in learning media. The implementation of classroom learning is carried out by solving real problems or problems related to the material "Harmonization of Rights and Obligations of Citizens". The syntax of the problem based learning model combined with flipped classroom is as follows.

1. Orientation of students to the problem.

Students are asked to observe contextual problems on Learner Worksheets that have been shared asynchronously and ask questions of those contextual problems associated with the material to be studied

2. Organizing students to learn

Students are asked to learn teaching materials in the form of e-modules and learning videos that have been previously shared on certain platforms such as google-classroom. Students are divided into groups to discuss.

3. Guiding student investigations

Students conduct group discussions through discussion forums and are guided by teachers in working on Student Worksheets, discussion forums can use a learning managerial system or whats-app group. Discussions can be conducted asynchronously and can be



continued on synchronous activities.

4. Develop and present the work

Students present the results of the discussion in synchronous activities with online whiteboard media through video conference with teachers using google meet or zoom

5. Analyze and evaluate the problem-solving process

Students analyze and evaluate the results of work by comparing the results of the work of other groups, if there are differences teachers help clarify the correct work results together with students.

At the end of the lesson, the teacher provides an evaluation test and a learning reflection form that students do asynchronously. From the results of the reflection, students stated that they like learning with a combination of synchronous and asynchronous because students understand the material provided better than learning only through platforms without synchronous learning through video conferencing.

After a series of learning activities have been passed through reflection activities. Cycle II is carried out at the same stage as cycle I. In cycle II there is an increase in learning motivation by 13.41% from the previous cycle to 80.37%. Students begin to get used to and enjoy the learning process with the flipped classroom method when cycle II is applied. There are many indicators used in this study as follows

1. There is an interest in various problems

In pre-action in class, students tend to be silent and do not activate the camera. When the teacher asks a question, no student answers the question. This is evidenced by the percentage obtained which is only 52.81% with high criteria. Increased in cycle I to 60.31%. Increased in cycle I because lecturers have used the problem based learning model assisted by the flipped classroom method so that students have started to be interested when lecturers give assignments and hold discussions in the classroom. Learning motivation presentations increased again in cycle II to 79.68%. In cycle II students are already interested and enthusiastic in listening to the explanation given by lecturers. In accordance with learning activities, student learning motivation has increased in interest in working on problems, self-study and active discussion in the classroom. A person who has an achievement motive tends to try to complete the task completely, without procrastinating his work (Uno, 2012: 28).

2. Happy to find and solve problems.

In pre-action there are only a few students who try to do difficult tasks, which is only 51.56% of students who try to solve problems. In cycle I it increases to 60.16%, and in cycle II it

increases again to 76.95%. In cycle I and cycle II can increase because students are already interested in learning provided by lecturers. Students are trying to do a difficult task. Students do tasks by previously learning first from home and in the classroom students work on projects, solve problems together, and discuss actively, so students are more interested in doing tasks. If the learner has high motivation, he is able to overcome difficulties (solving problems) arising from every teaching and learning process faced both in the classroom and in his environment (Solikhah, 2010: 89).

3. Diligently facing the task.

The use of problem based learning model assisted by the flipped classroom method encourages students to be aware of self-study that can be done anywhere and anytime. Activities to do tasks in the classroom encourage students to be more diligent because of the time limit to finish at that time. In addition, if in doing the task, students find problems or difficulties they can directly ask the lecturer. By using such problem based learning model assisted by the flipped classroom method, make students become more diligent in doing tasks. Before using the problem based learning model assisted by the flipped classroom method on the percentage of pretindakan obtained only 53.12%. After using the problem based learning model assisted by the flipped classroom method increased to 74.68% in cycle I and increased again in cycle II to 81.56%.

4. Can express opinions and respond to the opinions of study friends.

The problem based learning model assisted by the flipped classroom method places the completion of tasks and projects in a face-to-face classroom. That way problem solving can be implemented together through active discussion. When the task or project has been done, the student will present it and other students will respond and ask questions. The percentage obtained in pre-opressant is 55.20%, increases in cycle I to 57.29%, and increases again in cycle II to 76.04%. The problem-solving process carried out with friends is effective in increasing understanding and interest in learning in students. Research conducted by Ahmad Jaenudin (2009: 40) shows that study friends can motivate students to learn, be active, and complete their tasks.

5. There are interesting activities in learning.

Interesting activities in learning are created by lecturers to increase student learning motivation. In pre-bullying only 58.85% of students overall were interested and happy with the learning provided by lecturers. In cycle I after the action, the student's learning motivation increased to 65.1%. It then increased again to 80.72%. Flipped classroom activities are a

learning method that is relatively rarely applied in Indonesia. The lack of student experience in using this method of learning previously encourages their curiosity and interest. Flipped classroom is a learning model developed by Jonathan Bergmann & Aaron Sams in 2008 based on the Theory of Mastery Learning by Bloom & Carrol which is then combined with the use of technology in education to increase the effectiveness of learning outcomes (Bergmann & Sams, 2012: 10). The use of technology to support the application of flipped classroom learning model is increasingly compatible with habit students who are generation z who tend to be familiar with technology.

Based on the above explanation, it can be concluded that using the problem based learning model assisted by the flipped classroom method can increase the motivation to learn Citizenship Education students of class A Electronic Education Of Yoyakarta State University Force 2021. The application of flipped classroom methods was also successful in Spain as was a study conducted by Jose Maria and Pedro Mirrales entitled "*Effectiveness of The Flipped Classroom Model on Students' Self- Reported Motivation and Learning During the COVID-19 Pandemic*" (2021). The results showed that most students have a positive perception of *flipped classrooms*, nothing the benefits of practical activities in the classroom, as well as increased self- autonomy in learning. The application of problem based learning model assisted by the flipped classroom method can be an alternative learning method that is suitable to be applied in the covid-19 pandemic. problem based learning model assisted by the flipped classroom method in citizenship education courses gives students independence of study. The free learning program has also become the discourse of the Ministry of Education and Culture in 2021. So that this method is very suitable to support the free-to-be program. Freedom for students to access learning resources, study materials without limited space and time, and criticize real phenomena in society can further develop student competence in civic skill, civic desposition, and civic knowledge. Students in learning every subject matter, students are encouraged to master the material well and not just graduate, although with very good grades even Pujadi (2007:76). Increasing the motivation of students in studying Citizenship Education will have an impact on their learning achievement. Rachmanita (2010: 217) in his research stated, students who excel in addition to having high motivation, also have a need for strong achievements.

## **CONCLUSION**

Based on the results and discussion, it can be concluded that by using the problem based learning model assisted by the flipped classroom method can increase student learning motivation in citizenship education courses material rights and obligations of citizens in class A Electronic Education of Yogyakarta State University Force 2021. Increased student learning motivation is obtained from questionnaires filled by students and student motivation observation sheets. Data obtained from the results of the spread of questionnaires showed that the increase in student learning motivation increased from cycle I to cycle II. Student learning motivation in pre- action was only 55.49% with high criteria increased to 66.97% I with high category and increased in cycle II to 80.37% with very high category.

### **RECOMENDATION**

Based on the results of the analysis and conclusions, the researcher gave several recommendations as follows.

1. Class action research on increasing student learning motivation in civic education learning through a problem-based learning model assisted by the flipped classroom method has a positive impact and there is an improvement in the learning process. For this reason, it is for lecturers or lecturers to develop similar research that can contribute positively and support successful learning.
2. Class action research on increasing student learning motivation in civic education learning through a problem-based learning model assisted by the flipped classroom method has positive results for improving the quality of civic education learning in higher education. For this reason, the innovation of this learning method can be applied in the learning process.
3. In connection with this study taking on limited subjects, very specific material, and simple methods, the researcher suggests to other parties to conduct further research on this topic on a broader subject, more general material, and more relevant methods so that it can be an ongoing research.

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