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January 5-6, 2023
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SSD JOURNAL

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Hall-1, Session-1
05.01.2023, Thursday

13^{00}-15^{30}
• Turkey Local Time

ID: 864 0866 0803
Passcode: 050505

MODERATOR: Prof. Dr. Fatih MENGELOĞLU

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Assist. Prof. Dr. Ramazan SELVER Yusuf Can AKAR Mustafa BAŞEKİN	*Süleyman Demirel University (Türkiye)*	EFFECT OF HUMP RATIO OF THE WINGS ON AERODYNAMIC PARAMETERS
Cengizhan TÜZÜN Prof. Dr. Ahmet YÜKSEL Prof. Dr. İbrahim CAN	*Sivas Cumhuriyet University (Türkiye)*	THE STRATEGIC ANALYSIS OF THE HISTORY AND CLASSIFICATION OF UNMANNED COMBAT VEHICLES AND THEIR IMP ACT ON THE BATTLEFIELD
Mohamed MILOUDI Mohamed MANKOUR Houcine MILOUDI Abdelkader GOURBI Abdelber BENDAOUD Abdelkader RAMI Nassireddine BENHADDA	*Relizane University (Algeria)* *UDL University (Algeria)* *ABB University (Algeria)*	EMI / EMC ISSUES IN SWITCH MODE POWER SUPPLIES
Mustafa Şükrü KURT Gonzalo Vallejo Fernandez	*University of York (UK)*	EFFECT OF DEPOSITION THICKNESS OF ANTI-FERROMAGNETIC MnN LAYER ON THE MAGNETIC PROPERTIES OF Ta/MnN/CoFe EXCHANGE BIAS SYSTEMS
Furkan KOCABAŞ Prof. Dr. Fatih MENGELOĞLU	*Sütçü İmam University (Türkiye)*	THE EFFECT OF COMPATIBILTY ANHANCING MATERIAL ON THE PROPERTIES OF WOOD PLASTIC COMPOSITES
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Turhan SARAÇ Assist. Prof. Dr. Mahmut ÜNALDI	*Selçuk University (Türkiye)*	COOLING PERFORMANCE OF R290 REFRIGERANT IN COMMERCIAL CABINETS

Hall-2, Session-1
05.01.2023, Thursday

13^{00}-15^{30}
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MODERATOR: Dr. Abdullah YILMAZ

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Assoc. Prof. Dr. Demet AYDIN Dr. Yasin ALTINIŞIK	*Sinop University (Türkiye)*	A REPARAMETERIZATION OF THE GEOMETRIC REGRESSION WITH DIFFERENT ESTIMATION TECHNIQUES TO COPE WITH OUTLIERS IN COUNT DATA
Dr. Yasin ALTINIŞIK	*Sinop University (Türkiye)*	MODEL SELECTION USING BAYES FACTOR IN THE PRESENCE OF OUTLIERS FOR COUNT DATA
Prof. Dr. Sait Erdal DİNÇER Kadir YILDIZ	*Marmara University (Türkiye)*	PREDICTION OF EMPLOYEE ATTRITION WITH STATISTICAL METHODS AND ATTRITION OPTIMIZATION WITH SALARY ADJUSTMENTS
Abdulrahman ALSABBAGH Prof. Dr. Necati OLGUN	*Gaziantep University (Türkiye)*	WHAT IS 'NEUTRO' IN MATHEMATICS?
İbrahim KERTMEN Esin ÇEVİK	*Yildiz Technical University (Türkiye)*	INVESTIGATION OF THE EFFECT OF THE SPECTRTUM ON WAVE OVERTOPPING ON BREAKWATERS
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Dr. Abdullah YILMAZ	*Kırıkkale University (Türkiye)*	SKEW-SYMMETRIC HYPERBOLIC SECANT-NORMAL DISTRIBUTION

Hall-3, Session-1
05.01.2023, Thursday

13^{00}-15^{30}
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MODERATOR: Dr. Cengiz ERTEKİN

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Ana BARATI Ayan HUSEYNZADE	*Khazar University (Azerbaijan)* *Istanbul University (Türkiye)*	METAL NANOPARTICLES FABRICATED BY GREEN SYNTHESIS AND POLYMERIC NANOPARTICLES FOR DRUG DELIVERY SYSTEMS IN THE TREATMENT OF MALARIA
Dr. Cengiz ERTEKİN	*Sakarya University (Türkiye)*	EVALUATION OF THE EFFECTS OF CSA-131 - HYDROGEL COATED SILICONE IMPLANTS ON THE DEVELOPMENT OF BIOFILM AND CAPSULAR CONTRACTURE IN RATS
Dr. Cengiz ERTEKİN	*Sakarya University (Türkiye)*	EVALUATION OF THE EFFECTS OF CSA-131 - HYDROGEL COATED SILICONE IMPLANTS ON THE DEVELOPMENT OF BIOFILM AND CAPSULAR CONTRACTURE IN RATS
Ansar Bilyamin ADAM Aminu Ado KAUGAMA Garindo BORO Aboh Mbo JOSEPH Jabir Abdullahi MUHAMMAD Salisu SULEİMAN Mohammed HALADU	*Federal University Wukari (Nigeria)*	PHYTOCHEMICAL AND ANTIBACTERIAL ANALYSIS OF LEAVES EXTRACT OF PISTIA STRATIOTES

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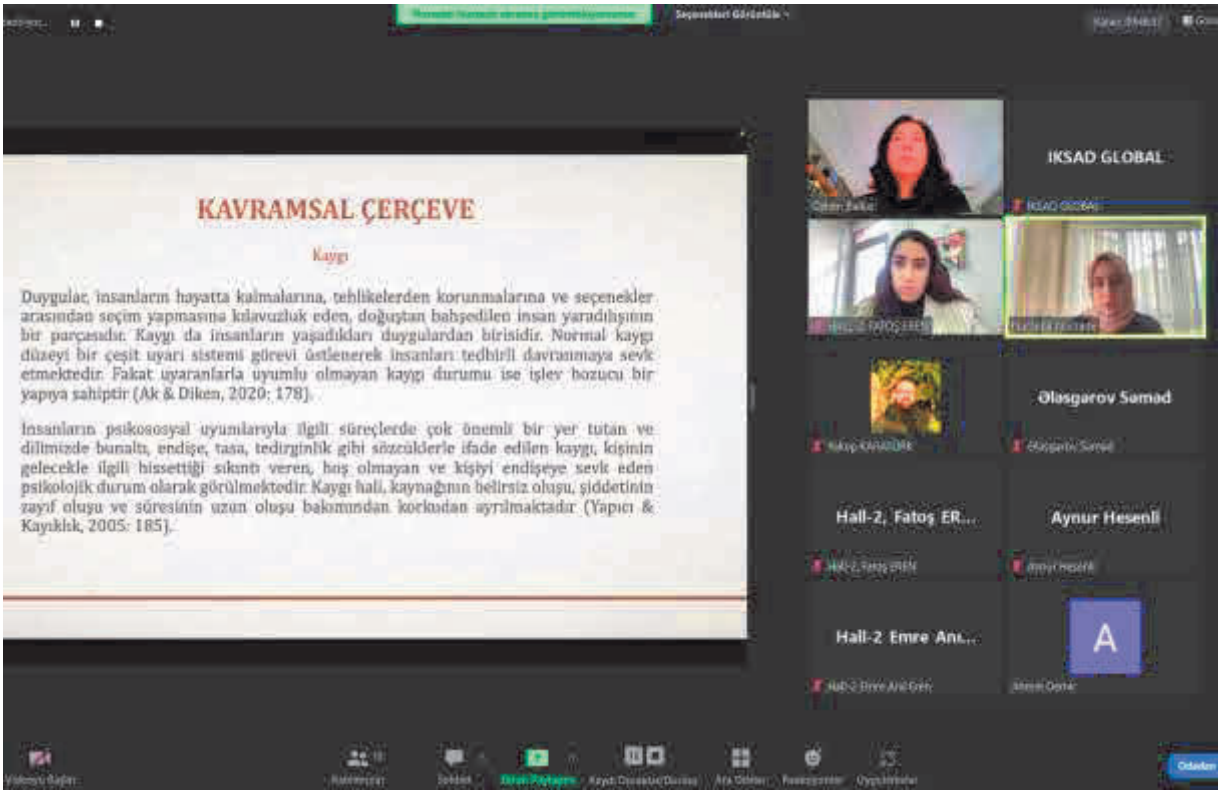

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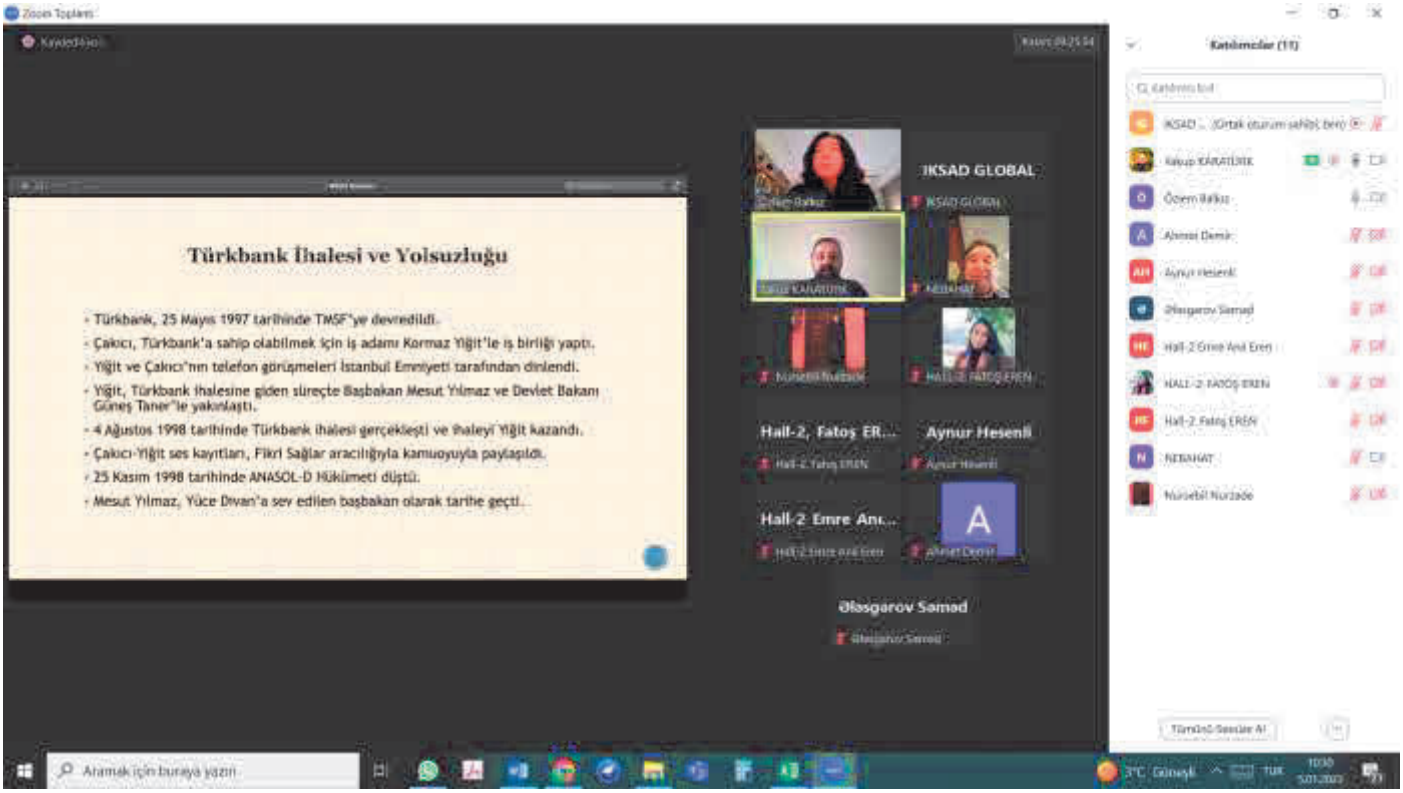

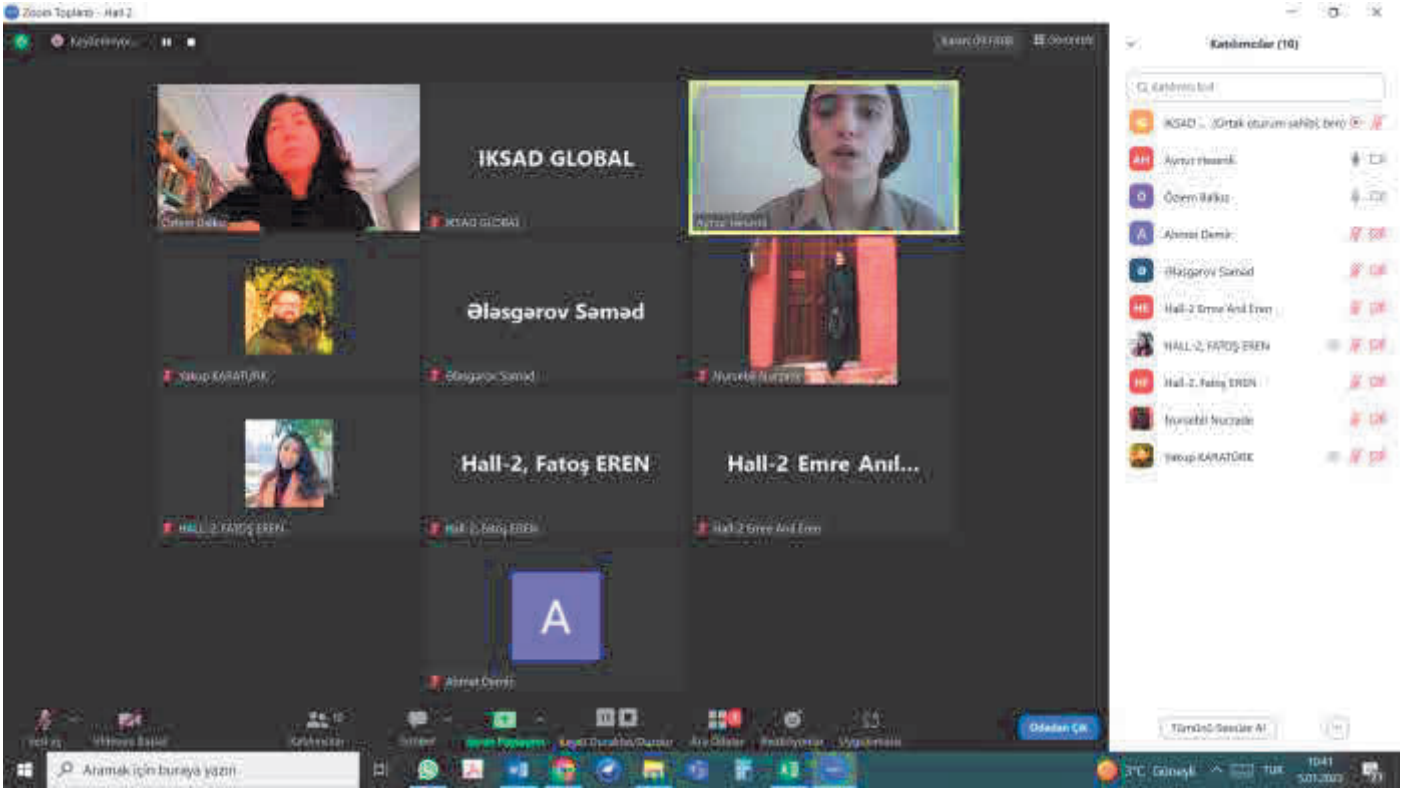

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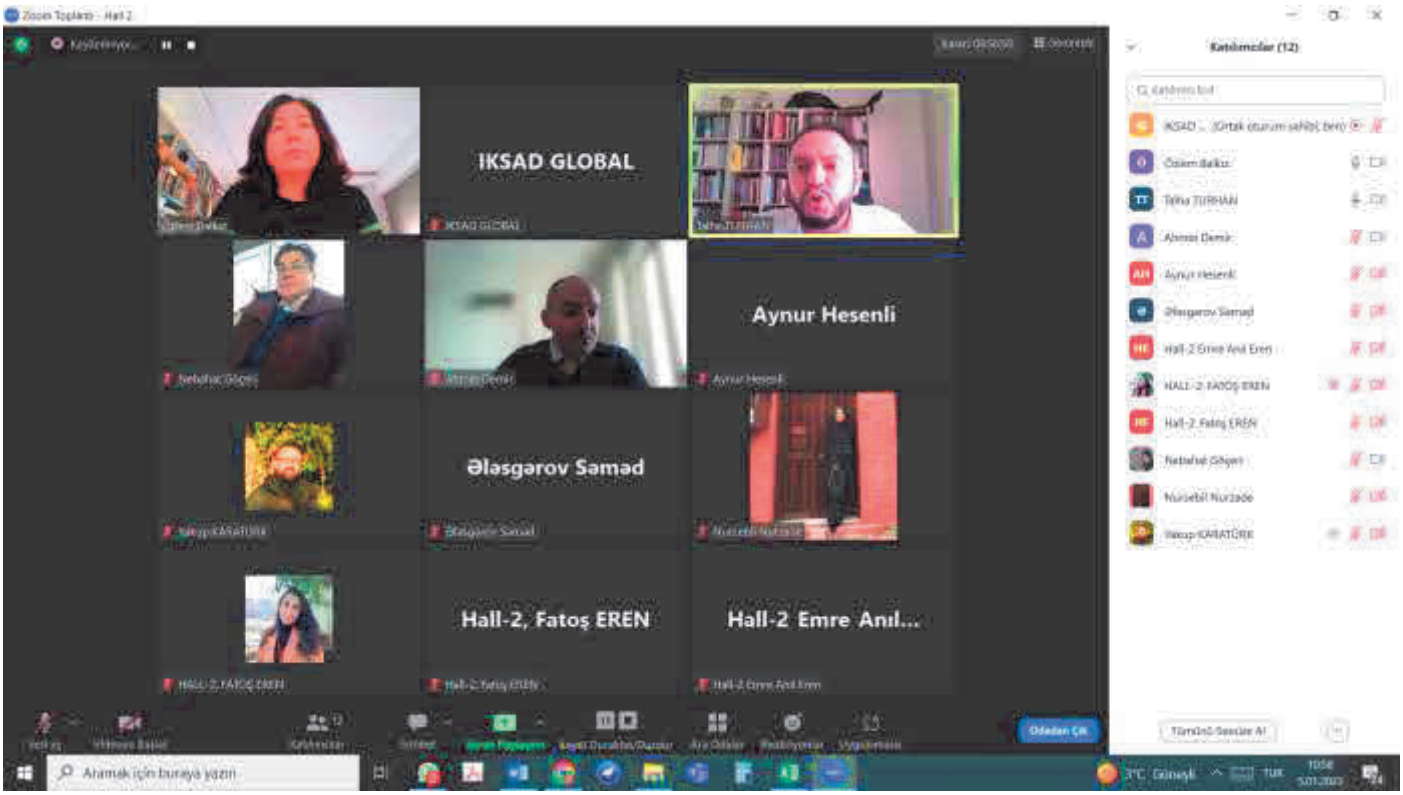

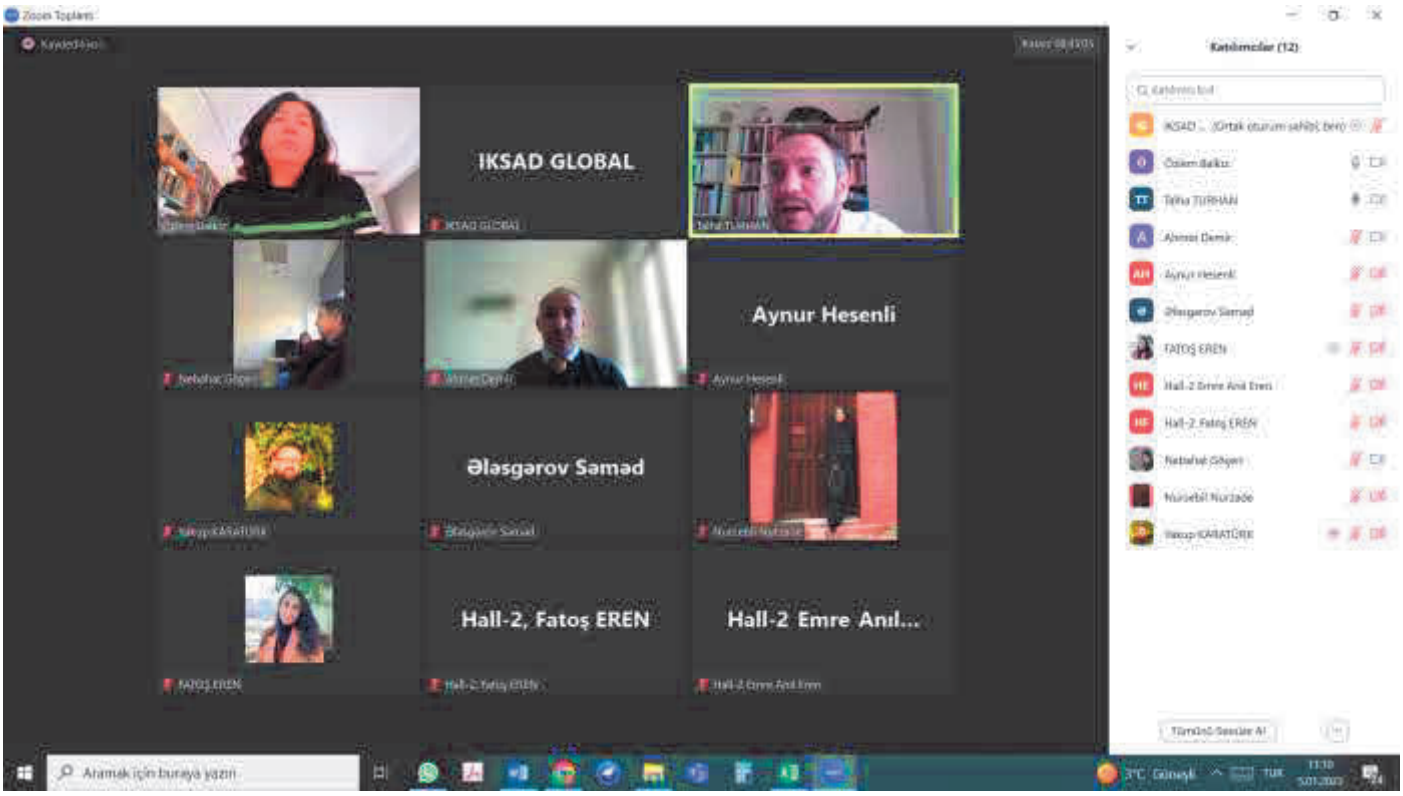

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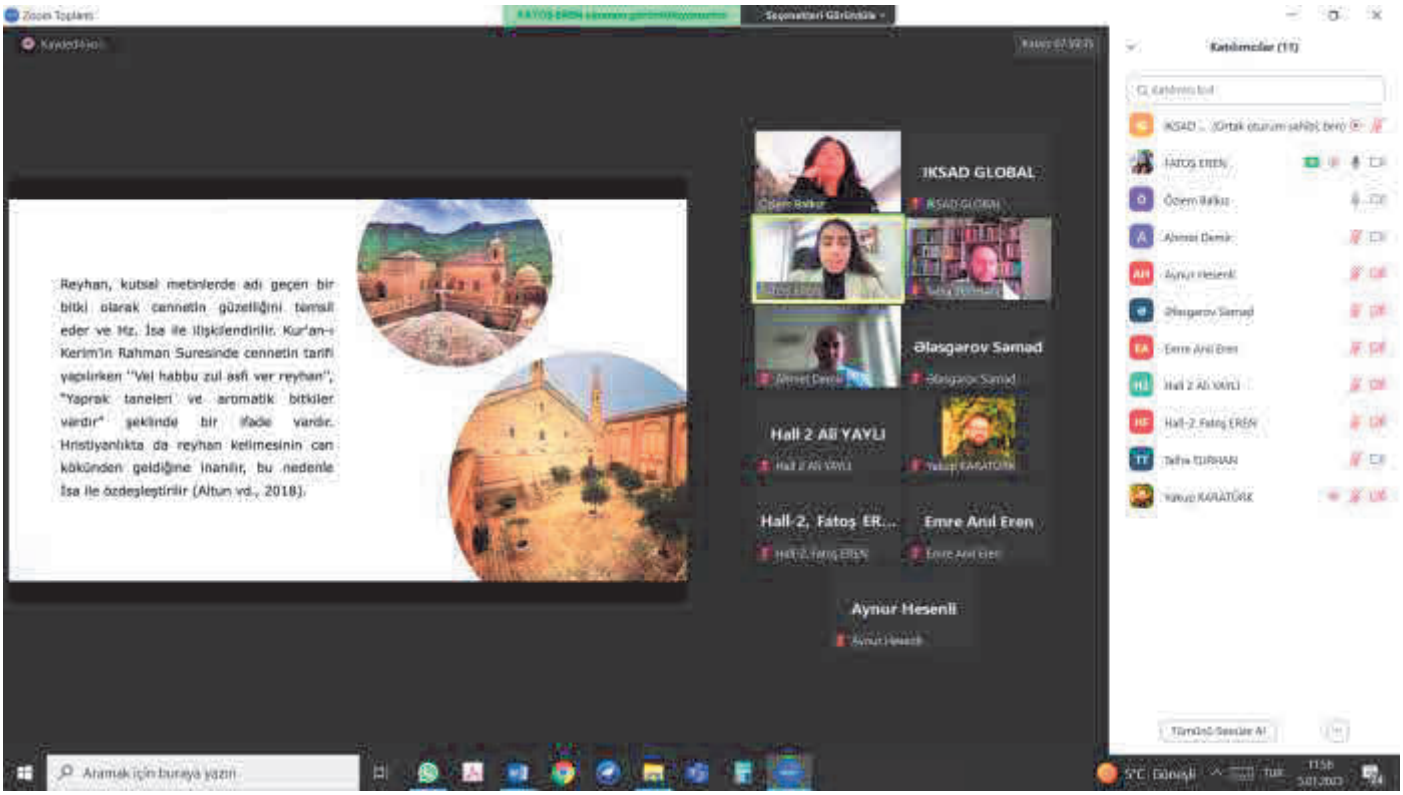

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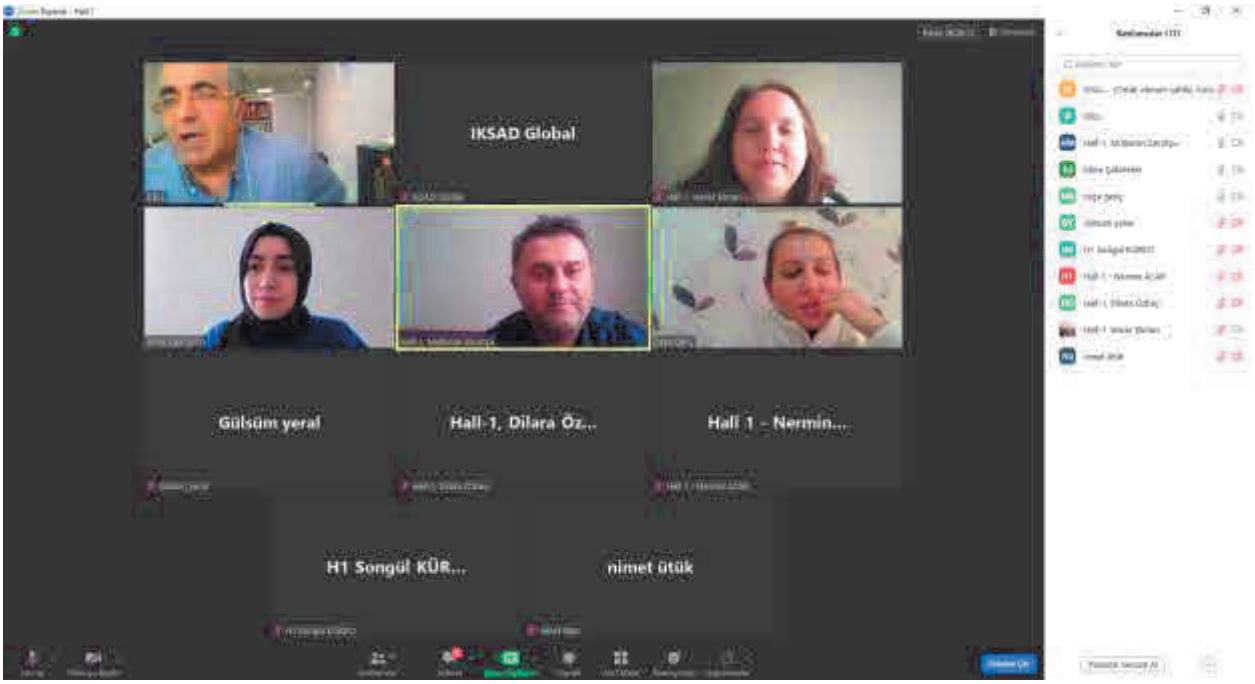

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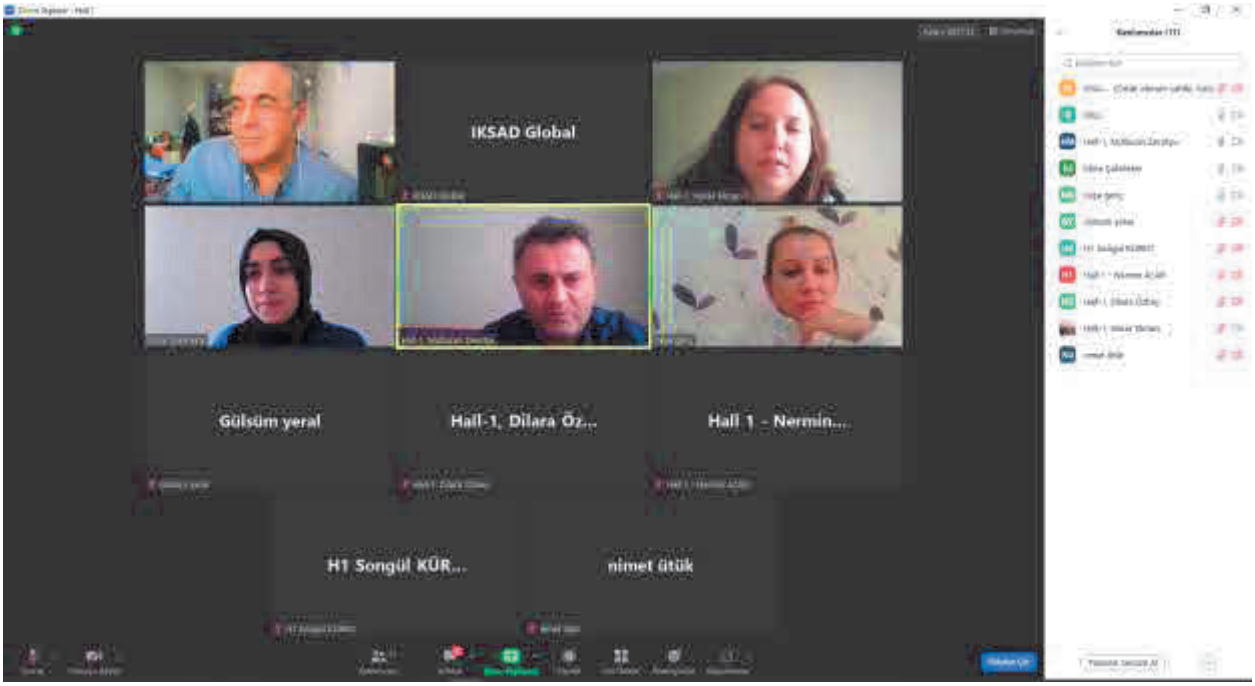

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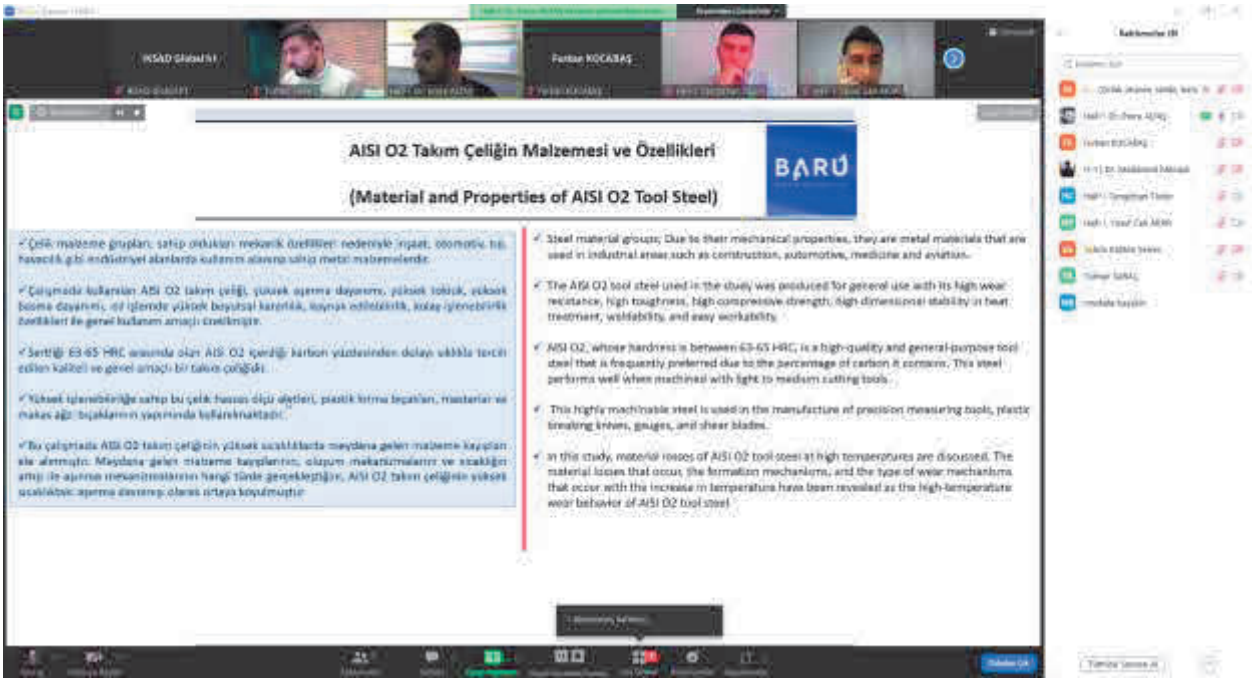

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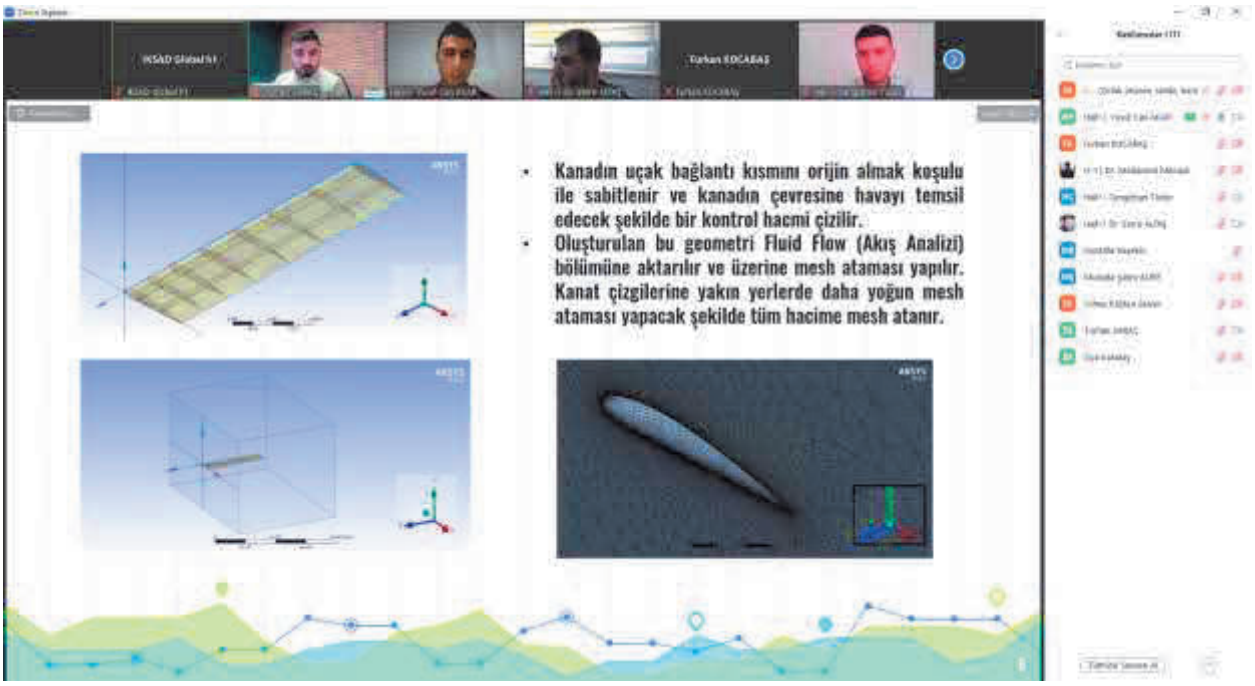

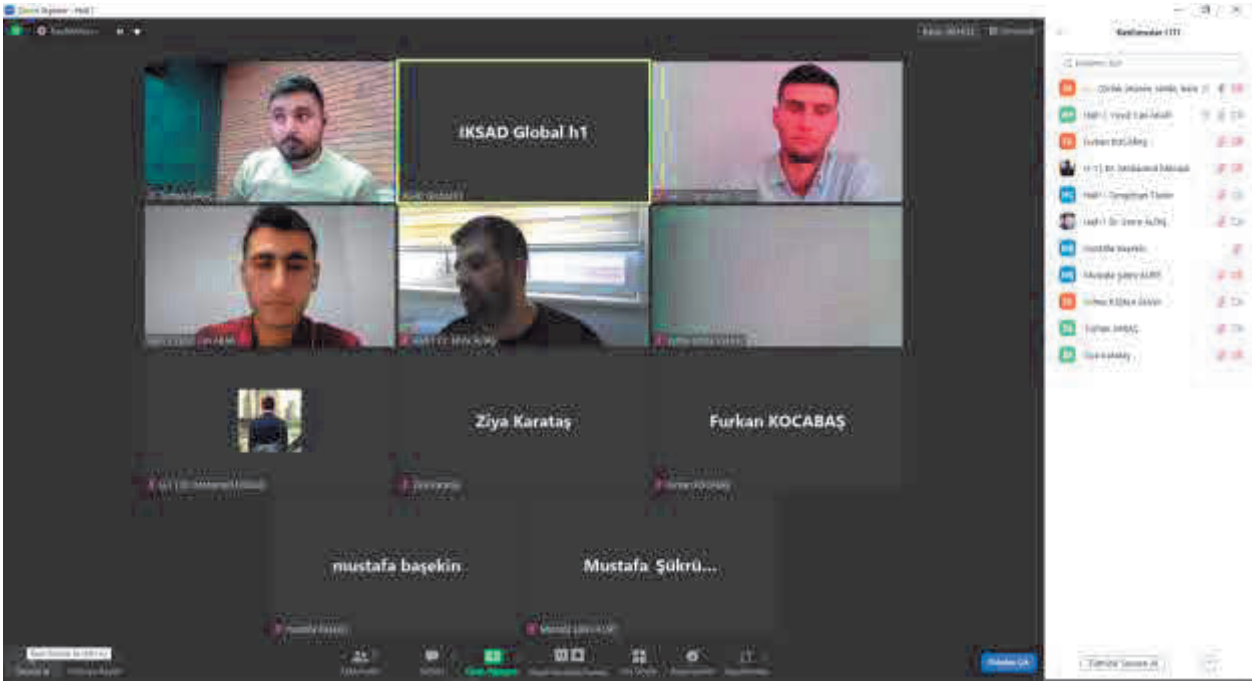

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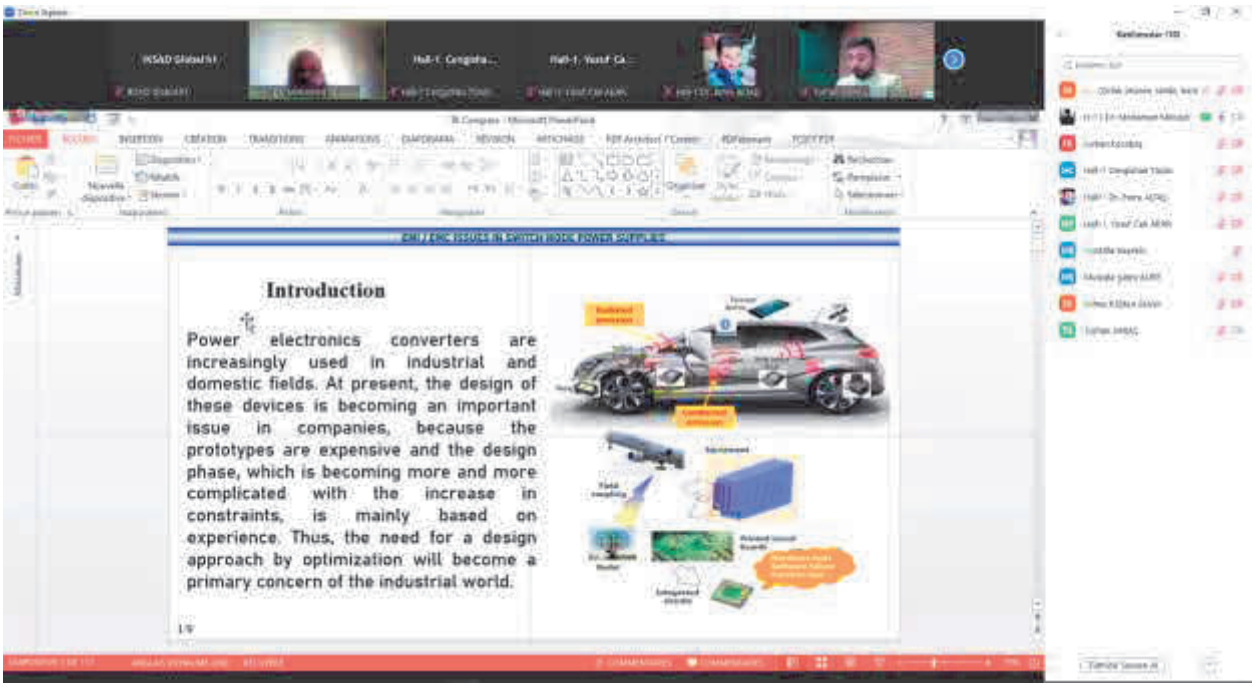

CONTENT

WHAT IS 'NEUTRO' IN MATHEMATICS?

ABDULRAHMAN ALSABBAGH1 AND NECATI OLGUN1*

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Abstract

We introduce in this paper the meaning of neutro in mathematics, specially according to the perspective of algebra with a simplified and quick historical review of the development of mathematical logic rules and tools over time.

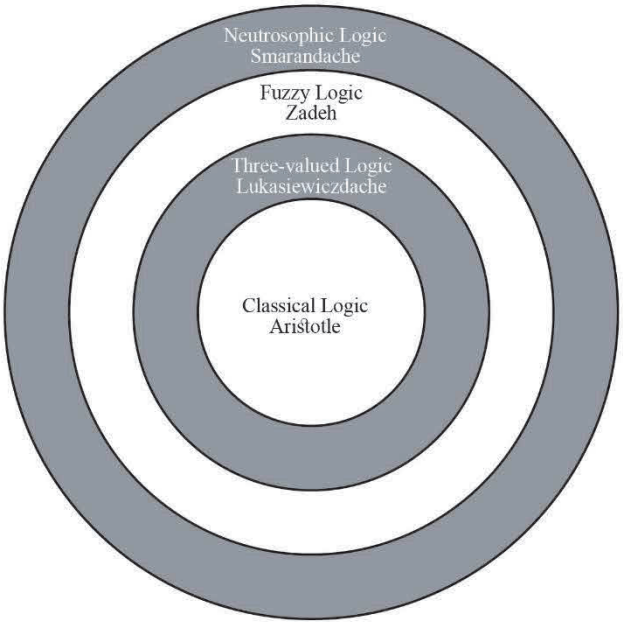
1. Introduction

Since Aristo built logic rules and named it Analytiques – Analytic in English – the scientists and researchers who works in this field tried to develop rules or devise new logical rules. Researchers have tried to find mechanisms and rules for logic through which scientific and cosmic phenomena can be explained. Therefore, mathematical logic has gone through many stages. According to Charles Ashbacher [1], mathematical logic passed by four main phases.

1. Aristotle logic, and in math its name became Classical logic: As we know, Aristo putted three important rules\Laws as an axiom for the human mind
    a. Identity law: x is x
    b. Un contradiction law: if A is one issue, and its opposite is B then, if x is one event, it has to hold either A or B and it is impossible hold both
    c. The excluded middle law: It means, for any issue there are two Prospects for one statement, either holds it or hold its opposite. That last rule is the cornerstone of Aristotelian logic, and follows that logical propositions are either totally true or totally false. Although, as a mathematicians can note these rules aligns with discreet mathematics.
2. Three-valued logic of the scientists Lukasiewicz and Bochvar: This phase can be considered as the first step in violating the principle of excluded middle.
3. Fuzzy logic: It is considered a transition from logics that uses discrete values to logic that uses continuous mathematics, and this logic is the bedrock of the types of logics that use continuous values. It has two main branches of it, intuitionistic logic, and paraconsistent logic.
4. Neutrosophic logic: Fuzzy logic that employs an indeterminate value is combined or extended in Neutrosophic Logic, which was developed by Florentin Smarandache in 1995. Every logical variable x in neutrosophic logic is simply described by an ordered triple. Therefore, [2] defines this logic as a

set of rules where each statement is projected to have a certain proportion of truth in a subset T, a certain percentage of indeterminacy in a subset I, and a certain percentage of falsity in a subset F, where T, I, and F are specified above. We can also express and clarify the previous information by looking at the following figure which show the extension each logic from other.

FIGURE1. EVOLVING LOGIC



2. Fuzzy Logic

Between 1965-1969, at the University of California, Lotfi A. Zadeh [3], a professor in the Department of EE/CS, devised an expansion of the classical and multivalued logics known as fuzzy logic. The scheme used one idea which is consider a basic idea in probability where an event can have a value as its happened probability between 0 and 1. Gradations of truth are produced by applying this likelihood grading to this logic. Fuzzy logic was initially developed to help with knowledge representation issues and is a more rational method of forecasting future events. For instance, we will be able to give the statement "It will rain tomorrow" a value of T or F the day after tomorrow. Today, we lack this confidence, but we can still make predictions based on past events and our understanding of weather patterns, such as "There is an 80% likelihood that it will rain tomorrow."

3. Neutrosophic Logic

It was created for each element of intuitionistic fuzzy logic to be an element of neutrosophic logic. In the Neutrosophy, which is a generalization of both dialectics and yin-yang philosophy [1], the dynamics of opposites as well as their neutrals are studied. For example, the triple (A, NeutA, AntiA) is regarded as studying item "A" in neutrosophic logic, where "A" is an item, "AntiA" is its opposite, and "NeutA" is their neutral (indeterminacy between them). It is important to remember that neutro is a component of one neutrosophic system. So, if we ask ourselves, what is the concept which added from the neutro? In fact, before we can respond to the issue, we must point out that the Laws of Composition on a given set are well-defined in all classical algebraic structures. However, this is a limited example because there are many more instances in science and in any field of knowledge where a law of composition defined on a set may only be partially defined (or partially true) and partially undefined (or partially false). For this reason, Smarandache coined the terms neutro-defined and antidefined, respectively, and took into account the significance of neutro coming from the fact that it accurately reflects our reality. He originally described them in 2019 however. He later merged various algebraic structures and the neutro idea in 2020.

4. Definition of Neutrosophic Triplet Axioms

Consider Ψ is universe of our studying, and consider some of well-defined laws defined over Ψ, S is a nonempty set of Ψ over α is an issue. Then

- α is classical issue if all S's elements verify it
- α is anti-axiom if all S's elements do not verify it
- α is neutro issue if some of S's elements verify it, and the others do not verify it.

5. Comparing between classical, anti and neutro

Firstly, we will compare operation's law. Consider ® is an operation between two elements belong to one nonempty set i.e., S, ∀ x, y ∈ S, and ∃ a, b, c, d ∈ S then.

Law	**Classical**	**Anti**	**Neutro**
Well Defined	x ® y ≠ 2 answers x ® y = x ® y	x ® y either undefined, or = at least 2 answer	c ® d is classical, and a ® b is anti
Closed	x ® y ∈ S	x ® y ∉ S	c ® d ∈ S and a ® b ∉ S

Table1. comparing operation's law

If the operation holds two previous axiom it called binary operation, so there is binary classical operation, it also can write as binary operation. There is binary-anti operation and there is binary neutro operation.

Example 4.1 Look at the following tables:

+	x	c	v	@	b	n	m	#	r	t	y
x	c	v	x	b	q	w	e	R	t	y	u
c	v	x	c	n	q	q	w	T	r	t	y
v	x	c	v	m	w	w	w	Y	t	r	y

Table2. Different three operations

The operation + is binary operation 'classical' because it holds both Well-defined and closed, and it's important to note if it was hold just one of them then it isn't binary classical operation. While the operation @ is binary antioperation because it isn't closed. It's important to note that any operation to being binary antioperation must be neither well defined nor closed. The last # is binary neutro operation because it is neutro closed. We can note if the operation either neutro Well-defined or neutro closed it will be binary neutro operation. In general, we can say, A NeutroAlgebra is an algebra which has at least one Neutro-operation or one Neutro-Axiom (axiom that is true for some elements, indeterminate for other elements, and false for the other elements). While an AntiAlgebraic Structure is an algebraic structure that has at least one Antiaxiom

Now, we will compare relation's law, consider ® is an operation between two elements belong to one nonempty set i.e., S, ∀ x, y, z ∈ S, and ∃ a, b, c, v, n, m ∈ S, then.

Law	**Classical**	**Anti**	**Neutro**
Commutativity	x ® y = y ® x	x ® y ≠ y ® x	n ® m = m ® n and, a ® b ≠ b ® a
Associativity	x ® (y®z) = (x ® y) ® z	x ® (y®z) ≠ (x ® y) ® z	v ® (n®m) = (v ® n) ® m and, a ® (b®c) ≠ (a ® b) ® c
Identity element	∃ e∈ S: x ® e = x = e ® x	Either ∃ e∈ S: x ® e ≠ e ≠ e ® x, or [∃ e, i ∈ S: a ® e = a = e ® a and a ® i = a = i ® a	∃e∈ S: a ® e = e = e ® a, and {[b ® e or e ® y] is indeterminate or b ® e ≠ e ® b ≠ b}
Invers element	∃ x˜∈ S: x ® x˜ = e = x˜ ® x	either ∄ x˜∈ S: x ® x˜ = e = x˜ ® x, or	∃ a˜∈ S: a ® a˜ = e = a˜ ® a and,

		$\exists\, y^{\sim}, z^{\sim} \in S: x \circledR y^{\sim} = e = y^{\sim} \circledR x$ and $x \circledR z^{\sim} = e = z^{\sim} \circledR x$	{[either $\nexists\, b^{\sim} \in S: b \circledR b^{\sim} = e = b^{\sim} \circledR b$], or $\exists\, y^{\sim}, z^{\sim} \in S: c \circledR y^{\sim} = e = y^{\sim} \circledR c$ and $v \circledR z^{\sim} = e = z^{\sim} \circledR v$}

Table3. comparing relation's law

For more examples or definitions for those concepts, we refer to [4].

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İNSANSIZ MUHAREBE ARAÇLARININ TARİHÇESİ SINIFLANDIRILMASI VE MUHAREBE SAHASINA ETKİLERİ ÜZERİNE STRATEJİK ANALİZ

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ÖZET

İnsansız muharebe vasıtalarının sınıflandırılarak muharebe sahasında amaca uygun olarak nasıl seçilebileceği muharebe sahasında karşılaşacağı olumlu ve olumsuz etkileri belirleyerek olumsuz etkileri varsa nasıl giderilebileceği olumlu etkilerini ise nasıl geliştireceği bu araçların kullanım ile elde edilen siyasi ve askeri kazanımların askeri harp üzerine etkilerinin tarihsel değişimi incelenerek stratejik bir analiz ortaya koymayı amaçlamaktadır. Konunun tarihçesinin çıkartılması için literatür ve okuma yapılarak geçmiş ve günümüzdeki durum ortaya konulmuştur. Uygulama örnekleri üzerinden vaka analizi yapılarak geçmişten günümüze açığa çıkan insansız muharebe araçlarının sınıflandırılması ve nitelikleri incelenmiştir. Bu yönle dünyada devam eden gelişmeler incelenecek ve bu araçların kullanımının meydana getireceği avantaj ve dezavantajları üzerinden ülkemiz, NATO ve diğer ülkeler adına bir analiz yapılmıştır.

İnsansız muharebe araçların kullanılması sonucu muharebe ortamında kullanılan personel sayısının azalması ile zırhlı araçların sahada yavaş ilerlemesi, sabit duran savunma sistemleri ve bunların etkili bir hedef haline gelmesi yakın gelecekte muharebe ortamının yeniden şekillenmesinin kaçınılmaz bir gerçek olarak karşımıza çıkmıştır.

İnsansız muharebe araçlarının tasarlanması ve geliştirilmesi ile birlikte askeri birlikler görevlerinin icrası kapsamında farklı bir yetenek kazanmış, daha zorlu tip görevleri yapmak için de fırsat sahibi olmuştur. Gelişen durumlar ülkelerin bu araçları sürekli bir geliştirme çabası içerisinde olmasını zorunlu kılmaktadır.

Anahtar Kelime: Muharebe, İMA, Savunma Sanayi

THE STRATEGIC ANALYSIS OF THE HISTORY AND CLASSIFICATION OF UNMANNED COMBAT VEHICLES AND THEIR IMP ACT ON THE BATTLEFIELD

ABSTRACT

The aim of this study is how to classify unmanned combat vehicles and select them for the purpose on the battlefield by determining the positive and negative sides which will face on the battlefield.In addition,in this study we also discuss if there are any negative effects how to eliminate them and how to improve the positive effects.It also aims to present a strategic analysis by examining the effects of the political and military gains obtained by the use of these tools on military warfare.

In order to make the chronology of the subject, research has been carried out,and it shows past and present situations.By making case analysis through application examples, the classification and qualifications of unmanned combat vehicles that have emerged from past to present will be examined. In this direction, the ongoing developments in the world will be examined and an analysis of the the advantages and disadvantages of the use of these tools, will be made on behalf of our country, NATO and other countries.

As a result of the use of unmanned vehicles the number of the personnel used in the battle environment decreased.Therefore,because of this, the slow progress of armored vehicles in the field, fixed defense systems and their becoming an effective target have emerged as an inevitable reality of the reshaping of the combat environment in the near future.

Military units have gained a different ability within the scope of the fulfilling their duties and have also had the opportunity to perform more challenging type tasks with the design and development of unmanned combat vehicles. Developing situations oblige countries to be in a continuous effort to develop these tools.

Keywords: Combat, İMA, Defense İndustry

METAL NANOPARTICLES FABRICATED BY GREEN SYNTHESIS AND POLYMERIC NANOPARTICLES FOR DRUG DELIVERY SYSTEMS IN THE TREATMENT OF MALARIA

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Objective: According to the research of the World Health Organization (WHO), more than 3 million people die from malaria every year. According to the latest report of Malaria, 245 million cases of malaria were detected in 2020, and 247 million cases in 2021. The reason for the rise is assumed to be linked to the COVID-19 pandemic. The main reasons for this widespread disease in the world are the formation of resistance to antimalarial drugs, malaria parasites especially P.falciparum, and vectors to insecticides. Today, developments in nanotechnology lead development to new approaches in parasitology by including malaria as in other fields. This paper aims to examine the literature on nanotechnology applications in the fight against malaria and to determine future strategies.

Method: For this purpose, more than 150 articles were reviewed. These include various nanoparticles such as metallic, polymeric nanocarrier systems, solid lipid nanoparticles, nanostructured lipid carriers, nanoemulsions, and containing antimalarial drugs. We had chosen green chemistry and utilization of green routes for the production of metal NPs, and polymeric nanoparticles as antimalarial agents which we judge capable of being more easily adapted to malaria pathophysiology.

Result: Nanotechnology could solution against malaria drug resistance by introducing the control of drug release at the nanoscale or building active nanoparticles to be used against the parasite also Nano vector-mediated delivery systems of vaccines offer an opportunity to augment the antibody and cell-mediated immune responses. Nanoparticles make a vaccine more efficient in selectively targeting cell surface receptors to induce protective immunity. In addition, among all the nanoparticles, silver nanoparticles (AgNPs) by use of green synthesis are more effective because of their broad-spectrum antimalarial activities, this effect may be attributed to the presence of phytochemicals conferring protective and anti-oxidative activity against oxidative stress induced in the host parasitized red blood cells by the malarial parasites.

Conclusion: The scrutinization of records by us has proven the success of nanoparticles and the future need for new and efficient therapeutic and prophylactic strategies against malaria. However, despite their advantages and affordability nanoparticles in treating malaria, needs a long-term study.

Keywords: Malaria**,** metallic nanoparticles**,** polymeric nanoparticle, green chemistry

PHYTOCHEMICAL AND ANTIBACTERIAL ANALYSIS OF LEAVES EXTRACT OF PISTIA STRATIOTES

BY

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Medicinal plants serve as important source of natural products or chemical substances which are produced by living organisms. In this research phytochemical analysis of leaves extracts of *Pistia Stratiotes* for antibacterial activity against four selected bacterial isolates: *Staphyloccus Aureus; Salmonella Typhi; Escherichia coli; Klebsiella* pneumonia were carried out. It was discovered that ethanolic extract of *Pistia stratiotes* plant shows positive reaction for secondary metabolites like alkaloids, flavonoid, Steroids. While compounds like Carbohydrates, Saponins, and Tannins shows negative response. The results from all the extracts possess anti-bacterial activity against three (3) isolates of bacteria *Staphylococcus Aureus, Salmonella* typhi and E. coli. The methanol and ethanol extract are more active on *Staphylococcus Aureus* and *Salmonella typhi*. But chloroform extract are more active on *Escherichia* coli followed by *Staphylococcus Aureus*. However, Methanol and Ethanol extract used in this study did not demonstrate any inhibitory activity on *Klebsiella* pneumonia. This shows that the plant is broad-spectrum antibacterial agent. Hence, the plant can be utilized to augment the service of Primary Health Care.

A RETROSPECTIVE STUDY OF THE EFFECTIVENESS OF VACCINATION AGAINST SARS-COV-2 IN AZERBAIJAN

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Abstract.
The novel coronavirus SARS-CoV-2, a severe acute respiratory syndrome that emerged in China in December 2019, has become a pandemic as a result of epidemic outbreaks. The main reasons for the rapid spread of Covid-19 in the world are the lack of specific medicines against this disease, the lack of vaccines in the first period of the pandemic, and the insufficient effectiveness of the vaccines used against the virus in later periods. The main fight against the SARS-CoV-2 virus began after the introduction of vaccines in different countries of the world. There are different information about the effectiveness of vaccines applied in different countries of the world. Various

vaccines against SARS-CoV-2 virus such as AstraZeneca, Moderna, Pfizer Biontec, Sputnik V have been applied in Azerbaijan for the purpose of immunoprophylaxis.Therefore, the aim of this study is to retrospectively study the efficacy of vaccination against SARS-CoV-2 in individuals vaccinated with Sinovac and Pfizer.

Keywords: *SARS-CoV-2, retrospective, Covid 19, infection, research*

Material and method.

In the research, the medical histories of 172 patients who were treated in the intensive care unit of the New Clinic (Azerbaijan, Baku) in 2022 were retrospectively reviewed. Information about the effectiveness of the vaccine in patients was collected according to various parameters (the course of the disease, the dose of the vaccine, concomitant diseases).

Results.

As a result of the researches, among the patients receiving treatment in the intensive care unit, the most observed symptoms were weakness, fever, cough, hard breathing, and in some of them, "ground-glass" was found in the lungs. 84 of the patients were women (48.84%), 88 were men (51.16%). 66 women (78.57%) were vaccinated, 42 women (21.43%) were not. 56 men (63.64%) were vaccinated, 32 men (36.36%) were not. It was also investigated how many doses of vaccine the vaccinated received. Research shows that 52 (78.79%) of the vaccinated women received 2 doses, 10 (15.15%) received 1 dose, and 4 (6.06%) received 3 doses. The results obtained by the retrospective method show that the clinical course of the disease in patients infected with SARS-CoV 2 is milder in vaccinated individuals than in non-vaccinated ones.

A REPARAMETERIZATION OF THE GEOMETRIC REGRESSION WITH DIFFERENT ESTIMATION TECHNIQUES TO COPE WITH OUTLIERS IN COUNT DATA

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ABSTRACT

This study investigates the fitting performance of a reparameterization of the Geometric regression, namely, Poisson-Exponential (PE) regression, with a set of different estimation techniques. The PE regression model better deals with outliers in count data compared to the usual Poisson regression model which may suffer from distorted standard errors and unreliable test statistics when the data contain outliers. In the study, we first introduce the distributional features of the PE distribution such as its probability and mass functions, the values of mean and variances, moment generating and survival functions etc. Then, we use the PE distribution to formulate our proposed PE regression model in the context of generalized linear models. The log link function is used to relate a count outcome with linear predictors in the design matrix. Subsequently, the model is used to deal with outliers in the count data with different estimation techniques. The estimation techniques used in this sense are the methods of maximum likelihood (ML), least square (LS), weighted least square (WLS), least absolute deviation (LAD), weighted least absolute deviation (WLAD), Cramer-von Mises (CVM), and expectation-maximization (EM) algorithm. A simulation study is carried out to compare the fitting performance of the PE regression with the estimation techniques with and without outliers. It has been shown that the ML estimation is often superior than other estimation methods when the count data do not contain outliers. However, obtaining the maximum likelihood estimates using the EM algorithm outperforms other estimation methods in the presence of outliers in the count data. A real-life application is used to exemplify our solutions to the count data with outliers.

Keywords: Poisson-Exponential model, count data, outliers, maximum likelihood estimation, expectation-maximization algorithm

SKEW-SYMMETRIC HYPERBOLIC SECANT-NORMAL DISTRIBUTION

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ABSTRACT

In this study, a new probability distribution that can be used in modeling skewed data is introduced. One tail of a skewed probability distribution is longer than the other. In a symmetrical distribution, on the other hand, the two halves of the probability distribution are mirror images of each other around the expected value. Data observed in real life often follows a skewed distribution. In this regard, it is important that probability distributions used in modeling skewed observations contain a skewness parameter.

Skew-symmetric distributions are a class of probability density functions that contain skewness parameters. Combining a symmetrical probability density function with a skewing function yields the probability models in this family. This approach is based on constructing a new probability density function with $f(x)\Psi\big(g(x)\big)$, where f is a symmetrical probability density function around zero, g is an odd and continuous function, and Ψ is a function that satisfies $\Psi(x)+\Psi(-x)=1$ and $0\leq\Psi(x)\leq 1$. In this study, we take f is the pdf of Hyperbolic Secant distribution and $\Psi\big(g(x)\big)=\Phi(\lambda x)$ and obtain a new skewed distribution called skew-symmetric hyperbolic secant normal distribution (SSSN), where Φ is the cdf of standard normal distribution . The skewness of the SSSN distribution can be adjusted by the parameter $\lambda\in R$. The characteristic functions and moments of the SSSN(λ) distribution have been studied. Although explicit analytical expressions cannot be obtained, mathematical forms that can be easily calculated by computer algorithms have been obtained. Our numerical analysis has shown that the even moments of the distribution are related to the secant (Zig) numbers. According to the results obtained, the skewness of the distribution varies between -1.8 and 1.8, and the kurtosis varies between 4.7 and 7.98. The maximum likelihood function of the parameter λ is reduced to an equation that numerical methods will maximize. Thus, parameter estimation can be made by numerical methods such as Newton's method. In the study, the location-scale extension of the SSSN distribution was also studied, so a flexible three-parameter ($\mu\in\mathbb{R}$: location, $\sigma>0$: scale, $\lambda\in R$: shape/skewness) distribution that could be used in real life was obtained. With the Monte-Carlo simulation study, it was observed that the maximum likelihood estimates of the parameters of the SSSN(μ,σ,λ) distribution were asymptotic unbiased, and consistent. In the last section, SSSN(μ,σ,λ) distribution was applied to two real-life data sets. The first one is the 100 athletes' data, which is frequently used to demonstrate modeling performance in studies on skewed distributions. For comparison, the

Skew Normal (SN) distribution given by Azzalini was used. Kolmogorov-Smirnov (KS) test statistics were obtained as 0.0455 for SSSN distribution, 0.0748 for SN distribution, AIC values as 702.055 for SSSN, and 706.607 for SN. Accordingly, the goodness of fit of both distributions cannot be rejected ($p>0.05$). However, when the KS and AIC values are considered, it is understood that the success of modeling this data set of SSSN distribution is better than the SN distribution. In the second application, we used the average wind speed data recorded by the Istanbul Büyükada Meteorology Station in January 2020. As a result of the analysis, the KS statistic and p-value were obtained as 0.029 and 0.53, respectively. It is also obtained as log-likelihood 1798.64, AIC=3603.39, and BIC=3617.21. The results obtained from this study showed that the obtained SSSN distribution is a suitable probability model for modeling skewed data, especially with the help of computer programs.

Keywords: Skew distribution, Symmetric distribution, Hyperbolic secant, Wind speed.

MODEL SELECTION USING BAYES FACTOR IN THE PRESENCE OF OUTLIERS FOR COUNT DATA

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ABSTRACT

The Bayes factor is an approximation method that can be used to evaluate a set of models formulated based on theories in the literature. In this study, we applied the Bayes factor in the context of count data. The Poisson regression is the most commonly used statistical technique in the literature that can be used to predict a count outcome. This technique assumes that the mean and variance of the outcome in the data are equal to each other. However, overdispersion problem may arise due to outliers in the count data where the difference between variance and mean adds an extra variation to the data. The problem of overdispersion in count data can cause an incorrect model to be selected as the best model in a set of candidate models because this problem distorts the standard errors of parameter estimates. This study uses another technique in conjunction with the Bayes factor to better cope with outliers in count data, namely, the Poisson Exponential (PE) regression model. With this way, we aim to obtain a better evaluation of the models under consideration compared to the use of the usual Poisson regression with the Bayes factor. The Bayes factor requires the estimates of model parameters and their covariance matrix for model selection. In this study, parameter estimation in the Poisson and PE regression techniques is performed using the method of maximum likelihood. A comprehensive simulation study is conducted on the comparison of the usual Poisson regression and PE regression techniques with the Bayes factor in the presence of overdispersion due to outliers. A real data example illustrates the model selection using the Bayes factor in the context of count data with outliers.

Keywords: Model selection, Bayes factor, Poisson Exponential model, count data, outliers

INVESTİGATİNG OF HEAT STRESS ON HSP70 LEVELS İN POULTRY: *İN-SİLİCO* ANALYSİS OF HSP70 GENES

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ABSTRACT

The synthesis of specific proteins, called heat shock proteins, is rapidly increased in the cell when environmental conditions change. These proteins are referred to as heat shock proteins. Although they are named as heat shock proteins, their expression increases under all stress conditions. Their DNA sequences are highly conserved in organisms, which also describes their protective and important role in the process of cell survival. Heat shock proteins are classified into families according to their molecular weight, e.g., Hsp110, hsp90, hsp70, and small molecular weight Hsps. Members of the hsp70 family contribute to processes involved in normal cellular functions during cell stress. Therefore, hsp70 is also involved in the mechanism of thermotolerance. Since ambient temperature is one of the key factors for homeostasis of chickens in hot climates, determining the effects of heat stress on hsp70 and the relationship between thermotolerance and gene expressions could be an important factor in breeding studies.

The aim of this study was to investigate the effect of heat stress on heat shock protein 70 (Hsp70) levels in broiler chickens from old breeders and to evaluate *in silico* analysis of Hsp70 genes using bioinformatics tools.

Keywords: broilers, heat conditioning, hsp70 protein, hsp70 genes, thermotolerance, bioinformatic analysis

INTRODUCTION

When cells are exposed to altered environmental conditions, the synthesis of specific proteins called heat shock proteins is rapidly increased in the cell. Although these proteins are usually referred to as heat shock proteins, their expression increases in response to all types of stressors such as high or low ambient temperatures, hypoxia, irradiation, chemical agents, heavy metals, alcohol, or feed restriction (Hahn et al., 1991; Givisiez et al., 1999; Zulkifli et al., 2002; Ozer et al., 2002; Saydam et al., 2003).

Heat shock proteins are classified into families according to their molecular weight, e.g., Hsp110, hsp90, hsp70, and small molecular weight Hsps. Heat shock proteins have highly conserved DNA sequences among living organisms. Members of the hsp70 family not only play a key role in cell survival during stress but are also involved in processes that are part of normal cellular functions (Hightower, 1993; Feder and Hofmann, 1999).

[1] This study included data from pH.D thesis of the first author.

In the presence of environmental stressors, cells either cease or reduce their normal functions. Transport, DNA transcription, and RNA translation are postponed, and synthesis of heat shock proteins is increased under these restrictive cellular conditions. The cellular stress response is one of the most conserved genetic systems in organisms (Lindquist and Craig, 1988; Csermely and Yahara, 2002). The cellular stress response in cells was first noted or termed the "heat shock response" by Ritossa (1962) because it was exhibited after cells were subjected to heat treatment. After the discovery of the heat shock response, the resulting proteins of increasing gene expression were identified as heat shock proteins (Tissieres et al., 1974).

The heat shock proteins help prevent protein aggregation or misfolding when cells are exposed to stress and interact with the other cellular proteins by fulfilling their role as molecular chaperones. Depending on their expression, heat shock proteins can be divided into two groups: constitutive hsps and inducible hsps. The constitutive hsps were constant in cells before stress, but their expressions increased by the stressor; however, the expressions of inducible hsps were increased only after the stress conditions and were transient (Yahav, 1997).

The protective role of heat shock proteins is due to their ability to prevent injury. In both prokaryotes and eukaryotes, various environmental stress factors cause increased expression of one or more hsps in cells. This increased expression protects cells from damage and apoptosis (Jolly and Morimoto, 2000).

The thermal neutral zone or comfort zone is the range of ambient temperature in which living organisms can perform their normal physiological functions with minimal effort. If the ambient temperature exceeds the upper limit of the thermal neutral zone, the balance between heat loss and current body heat is disturbed. This situation leads to heat stress in organisms, including broilers. Adaptation to changes in ambient temperature in living organisms is referred to as thermotolerance (Hightower, 1993; Feder and Hoffman, 1999)

Several factors can affect body temperature in chickens, including age, sex, breed, and activity. Because of the absence of sweat glands and a higher body temperature than other livestock, broilers are sensitive to elevated ambient temperatures. In addition, fast-growing broiler chickens used in the industry have rapid metabolism and produce more heat. In broiler chickens, increased ambient temperature results in a reduction in performance traits such as growth rate, feed efficiency and live weight gain. Broiler chickens currently used in the poultry industry are derived from breeds that have been subjected to selection for rapid growth, lower feed consumption, and higher yields. Breeding programs developed under optimal environmental conditions and genotype X environment interactions are not considered by broiler producers, leaving modern breeders with only intended production performance under optimal environmental conditions. Stress factors such as high environmental temperatures negatively affected broiler production (Etches et al., 1995; Yaman, 1995; Yalçın et al., 1997; Deeb and Cahaner, 2000; Yegenoglu, 2007).

With the rapid growth of the poultry industry, standard breeders which are sensitive to changes in environmental conditions have been introduced worldwide. Because these genotypes were developed for rearing under optimal environmental conditions, they are limited in hot climates such as the tropics and subtropics. Fast-growing broilers in hot climates may not produce the expected yield performance (Yalçın et al., 1997; Deeb and Cahaner, 2000).

However, heat tolerance can be improved by thermal manipulation at early ages in the life of broilers, and broilers have physiological mechanisms to adapt to high ambient temperatures (Arjona et al., 1990; Yahav and Hurwitz, 1996; Yahav et al., 1997). Previous studies have shown that exposing broiler chickens at an early age to mild heat stress induces future thermotolerance and increases survival (Arjona et al., 1988, Arjona et al., 1990; Yahav and Hurwitz, 1996). Yalçın et al. (2005) investigated the effects of conditioning during incubation and growth on heat tolerance, live weight, physiological response, and asymmetry in broiler chickens from young and old breeder ages. They found that conditioning treatment can help manage heat stress during the growth period and that breeder age is an important factor. Arjona et al. (1988), Arjona et al. (1990), and Yahav and Hurwitz (1996) showed that thermal conditioning on day 5 (36 ºC, 24 h) increased broiler survival at lethal ambient temperature on day 42.

Thermotolerance and the correlation of hsp, particularly hsp70, with this mechanism were investigated in early studies. When exposed to nonlethal heat shock in an in vitro environment or in cell cultures, cells acquire resistance to severe heat stress to which they may be exposed in the future. Even if the organism is exposed to a slightly elevated ambient temperature in the first place, it is much more resistant to higher temperatures later on, and the protective mechanism may have to do with heat shock proteins and their functions (Feder and Hoffmann, 1999; Hightower, 1993; Lindquist, 1986).

Based on the demonstrated relationship between high ambient temperatures and increased expression of heat shock proteins in cells, the role of hsps in the mechanism of thermotolerance was studied. It was found that cells lacking heat shock protein genes exhibit lower stress tolerance, and it was mentioned that the induced thermotolerance might be related to the expression of hsps (Solomon et al., 1991; Krebs and Bettencourt 1999). The expression of heat shock proteins has been studied in detail at the protein and mRNA levels and their role in thermotolerance in prokaryotes and eukaryotes.

The correlation between environmental temperature and hsp levels was determined in different tissues and ages in broiler chickens under different temperature conditions. (Einat et al, 1996; Yahav et al, 1997; Givisiez et al, 1999; Leandro et al, 2004).

Guerriero and Raynes (1990) reported that an increase in ambient temperature also increased Hsp70 protein levels in lymphocytes from chickens, sheep, horses, and cows. Wang and Edens (1993) and Wang and Edens (1998) found that heat conditioning chickens and turkeys increased Hsp mRNA expression. Gabriel et al. (1996) discovered that Hsp70 mRNA

expression increased over time at 35 ºC for 5 h in liver tissue of broilers exposed to acute heat stress.

Einat et al (1996) studied the effects of high environmental temperature (37.2 ºC) on broilers for 4 h on day 42 Hsp70, Hsp90, and Hsp27 mRNA synthesis in lung and heart tissues after heat stress. Synthesis of Hsps increased and a small new heat shock protein of 29 kDa was found. Yahav et al (1997) investigated the relationship between heat shock proteins and thermal conditioning practices. Acute heat stress was applied to broilers divided into a control group and a heat conditioned group. Hsp70 mRNA synthesis in heart and lung was examined. Hsp70 gene expression was found to correlate with hyperthermia, but no correlation was found between thermotolerance and enhanced Hsp70 response.

Mazzi et al. (2002) examined the effects of increased ambient temperature from 28ºC to 36ºC on cloacal temperature, weight loss, and Hsp70 protein in three genotypes of bare neck broilers (Na/Na, Na/na, and na/na). The study reported that the change in cloacal temperature and weight loss were significantly lower in naked-necked heterozygous animals (Na/na), but there was no association between genotype and Hsp70.

To investigate the structure of the Hsp70 gene in chickens, Mazzi et al. (2003) studied the polymorphism in the Hsp70 gene. They examined the promoter and coding regions of the Hsp70 gene using PCR-SSCP analysis and discovered two polymorphic regions in the coding region of the Hsp70 gene. They reported that the polymorphic regions did not cause any change in the amino acid sequence of the Hsp70 protein and that the promoter region was identical in all broiler lines. As a result of the study, the chicken Hsp70 gene was found to have three alleles (Hsp70-1, Hsp70-2, Hsp70-3).

Zhen et al (2006) evaluated the Hsp70 gene expression in chicken tissues under normal growth and acute heat stress conditions. They stated that the relationship between Hsp70 gene expression in haplotypes, genotypes, and thermal conditions resulted in differences. The highest level in brain tissue was found to be present during acute heat stress, and Hsp70 mRNA synthesis was expressed in a tissue- and allele-dependent manner.

The bioinformatic analysis of chicken hsp70 genes was performed by Ginting and Basyuni (2019) and evaluated 8 hsp70 genes downloaded from the NCBI database. The study characterized the downloaded genes and determined their roles and subcellular localizations.

Kennedy et al. (2022) examined the polymorphism of Hsp70 in chickens raised in different climates in Kenya. Their analysis revealed the polymorphism in indigenous chickens in Kenya, the study found three haplotypes (GC, AC, and AG), and the dendrogram presented the ancestral dominant haplotype of GC in the Turkana type.

The objectives of the study were twofold: First, to determine Hsp70 protein levels in broiler chickens exposed to heat stress and heat conditioning during the incubation period and growth period and then exposed to elevated ambient temperature during the growth period. Eggs for incubation were from old breeders (58 weeks old). The second objective of the study was to describe the Hsp70 genes in chickens using bioinformatics tools.

The aim of this study was to investigate the effects of heat stress on heat shock protein 70 (Hsp70) levels in broiler chickens from old breeders and to evaluate the *in silico* analysis of Hsp70 genes using bioinformatics tools.

RESEARCH and FINDINGS

Material and Method

A. Description of Hsp70 genes in chickens

Hsp70 genes in *Gallus gallus* were downloaded from the NCBI database and uploaded to CLC Genomic Workbench. PFAM domain searches and BLAST (using zebrafish as a model organism) were performed with the same software (NCBI, 2022; CLC Genomic Workbench 20 (Qiagen), 2022). Multiple Sequence Alignment (ClustalW) was performed using MEGA11 (Tamura, Stecher, and Kumar 2021). Maximum likelihood tree constructed using MEGA11. Motifs were found using MEMESuite (Bailey et al., 2015).

B. Determination of Hsp70 protein levels in broilers

B.1. Animal Material

Eggs from old breeders (58 weeks) were divided into two incubation groups: Standard incubation (37.8 ºC) and High incubation (eggs were heated to 39.6 ºC for 6 hours between 10 and 18 days of incubation). Chick/incubation temperature/breeder age were divided into 3 groups for rearing temperature treatments. These were divided as follows:

(a) Control; in this group, the standard incubation temperature was used.

(b) Heat conditioned; chicks were conditioned at 34 ºC for 24 h on day 5 and then subjected to daily heat stress between 10:00 and 17:00 from day 21 to 49.

(c) Heat stress; broilers were subjected to daily heat stress from day 21 to 49 at 34 ºC between 10:00 am and 5:00 pm. (Yalçın et al., 2003, Yalçın et al. 2005; Yegenoglu, 2007)

B.2 Homogenization of samples, spectrophotometry and SDS -PAGE

After brain samples were collected, they were immediately placed in liquid nitrogen and frozen at -80 ºC until laboratory study. Homogenization was performed according to Givisiez et al (1999), and total protein levels were determined with Lowry et al. (1951) method. A calibration curve was constructed using the concentrations of 0.1%, 0.08%, 0.06%, 0.04%, 0.02%, and 0.01% bovine serum albumin as standards. Spectrophotometric analysis of both standards and samples was performed with two replicates. After determination of total protein amounts by spectrophotometer, electrophoresis was performed according to the method of Laemmli (1970) under denaturing conditions for detection and separation of proteins. Pre-stained protein marker (BioRad) were loaded in the first lane of each gel to determine the molecular weight of the bands.

B.3. Western Blotting

Transfer of proteins from the SDS -polyacrylamide gel to a nitrocellulose membrane was carried out using the method described byTowbin et al. (1979) (66 V, +4 ºC, overnight). (The monoclonal anti-heat shock protein 70 clone BRM-22 (H-5147, SIGMA) was used as the primary antibody and the anti-mouse IgG whole-molecule alkaline phosphatase conjugate (A-3562, SIGMA) as the secondary antibody.

After incubation with the antibodies, the membranes were washed four times for 5 minutes in cold 1 X TBST. Membranes were stained with 10 ml of ready BCIP/NBT solution (premixed, SIGMA). Color reaction was stopped with 10% trichloroacetic acid. Membranes were dried, scanned with scanner and recorded for later determination of hsp70 amount.

B.4. Evaluation of the Hsp70 protein level

Pure Hsp70 protein (recombinant rat Hsp70 protein, SPP -758, Stressgen, 0.85 mg/ml) was used to determine the amount of Hsp70 in brain samples. Hsp70 concentrations were diluted with 4X sample loading buffer and the final concentration was 100 nanograms per µl. Western blotting analysis was performed for pure Hsp70 samples. To determine the amount of Hsp70 in the samples of the material, prepared dilutions of pure Hsp70 were used and a standard curve was constructed. Hsp70 amounts were calculated from this curve in ng/µg total protein using BioOne D++ (Vilber Lourmat, France).

Statistical analyzes of the obtained data were performed using the package program JMP (Ver 6.0, JMP User's Guide, 2005). Tukey's test was used for the comparisons ($p < 0.05$).

FINDINGS

A. Description of Hsp70 Genes in Chicken

A total of 13 Hsp70 genes in *Gallus gallus* were described using CLC Genomics Workbench 20 (Qiagen). Chromosomal position identification revealed that Hsp70 genes are located on chromosomes 1, 4, 5, 13, and 24, respectively. Table 2 shows the NCBI identification, Hsp70 genes, and chromosomal positions.

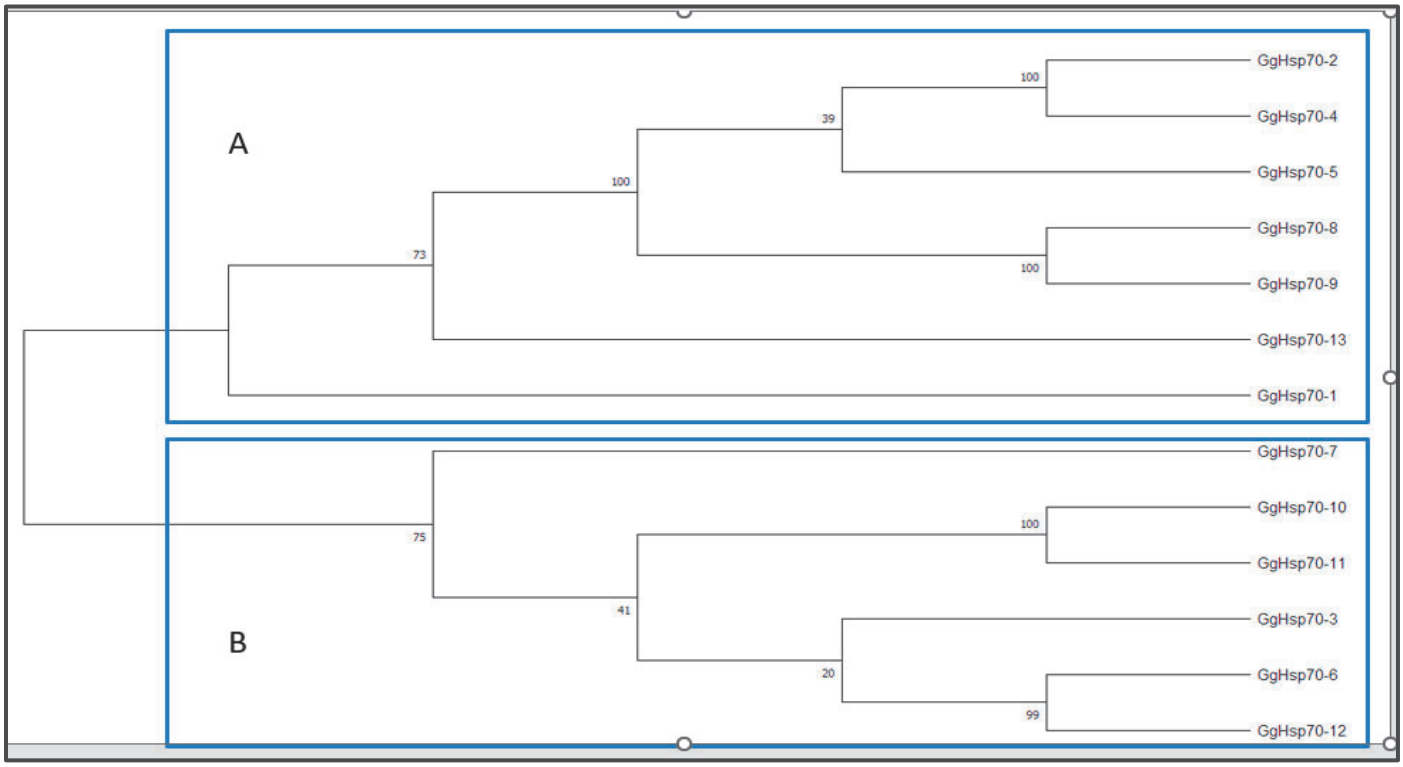
Table 2. NCBI ID's, Hsp70 Genes and Chromosome locations

	NCBI ID	Hsp70 Gene	Chromosome
1	NP_001383360.1	GgHsp70-1	1
2	NP_001153170.1	GgHsp70-2	1
3	NP_001025964.3	GgHsp70-3	1
4	XP_015133410.2	GgHsp70-4	1
5	NP_001012594.2	GgHsp70-5	4
6	NP_001006686.1	GgHsp70-6	5
7	NP_001006147.2	GgHsp70-7	13
8	XP_046756373.1	GgHsp70-8	13
9	XP_414655.2	GgHsp70-9	13
10	NP_990822.1	GgHsp70-10	17
11	XP_040504914.1	GgHsp70-11	17
12	NP_990334.2	GgHsp70-12	24
13	NP_001382913.1	GgHsp70-13	24

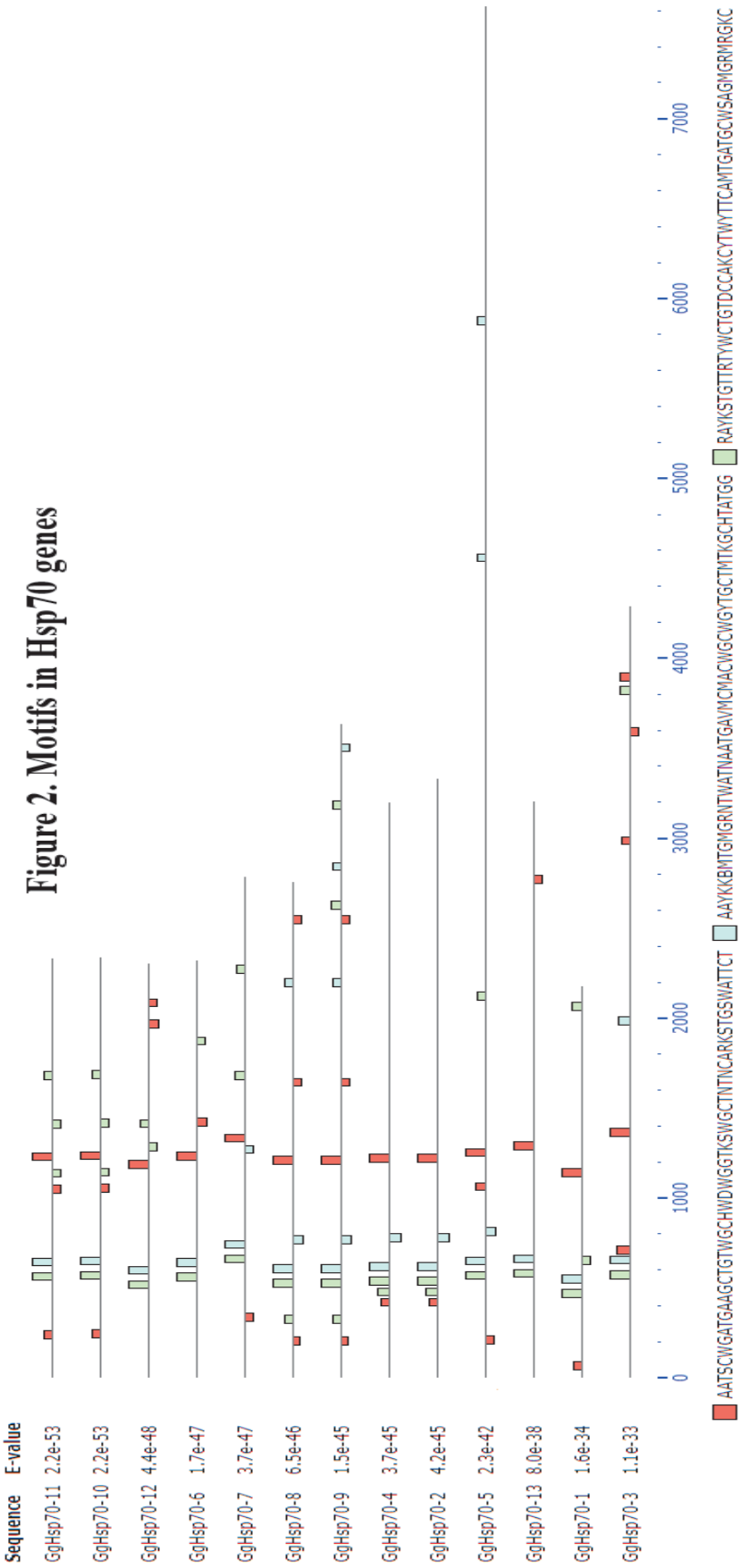
The maximum likelihood dendrogram of the described Hsp70 genes shows two main clusters (Figure 1). Cluster A included GgHsp70-2, GgHsp70-4, GgHsp70-5, GgHsp70-8, GgHsp70-

9, GgHsp70-13, and GgHsp70-1. In cluster A, GgHsp70-2 and GgHsp70-4 were similar with GgHsp70-8 and GgHsp70-9, whereas GgHsp70-2 and GgHsp70-1 formed a single branch. Cluster B consisted of two smaller groups, including GgHsp70-7, GgHsp70-10, GgHsp70-11, GgHsp70-3, GgHsp70-6, and GgHsp70-12. In cluster B, GgHsp70-10 and GgHsp70-11, GgHsp70-6, and GgHsp70-12 formed a single cluster similar to GgHsp70-7.

Figure 1. Maximum Likelihood Dendrogram



The results of motifs search with MemeSuite determined that there were 3 conserved motifs in Hsp70 genes. Figure 2 shows the motifs and these motifs's aminoacid sequences.



[1] This study included data from pH.D thesis of the first author.

B. Evaluation of Hsp70 protein levels in broiler brains

The mean squares and standard errors of the effects of incubation temperature and rearing period temperatures on Hsp70 levels in broiler chickens obtained from old breeders on day 49 are shown in Table 3.

Table 3. Mean squares and standard errors of the effects of incubation temperature and rearing period temperatures on Hsp70 level in broiler chickens obtained from old breeders on day 49.

	Hsp70	
Rearing Temperature[2]	**Incubation Temperature[1]**	
	Normal	**Heat**
Control	61.95 ± 4.50 [b]	75.67 ± 4.50 [a]
Heat Conditioning	61.63 ± 4.50 [b]	55.16 ± 4.50 [b]
Heat Stress	73.98 ± 4.50 [a]	51.23 ± 4.50 [b]
	Significancy Level (P≤0.05)	
Incubation Temperature	0.1766	
Rearing Temperature	0.0936	
Incubation Temp X Rearing Temp	0.0029*	

1 Incubation temperature; control (37,8 °C), high (eggs were heated at 39.6 ºC for 6 h between 10 and 18 days of incubation).

2 Rearing temperature; C (standard rearing temperature), HC&HS (36 ºC for 24 hours on day 5 and then exposed 34 ºC between 10.00-17.00 h daily from day 21 to 49), HS (34 ºC between 10.00-17.00 h daily from day 21 to 49).

When the effects of incubation temperature and rearing temperature on the amount of Hsp70 in the samples were examined, it has been found to be insignificant for broilers originating from old breeders; however, the interaction between these effects (incubation temperature X rearing temperature) was significant ($p \leq 0.05$).The effect of interaction between incubation temperature and rearing temperature on Hsp70 amount for the individuals coming from old breeders at day 49 and heat conditioning at day 5 for the control incubation group made no difference on Hsp70 content by control and heat conditioning groups for growth temperature, whereas it increased in heat stressed group.

For the samples from heat incubation, heat conditioning on day 5 and heat stress during the rearing period did not result in any visible change in the individuals compared to the control group; however, for the individuals from high incubation, the Hsp70 content in the brain was decreased by both heat conditioning and heat stress during the rearing period compared to the control individuals.

When the mean values of Hsp70 protein levels in individuals from normal incubation temperature and heat incubation temperature were compared, it was found that the amount of Hsp70 protein was higher in the control groups during heat incubation, but lower in the heat acclimation and heat stress groups than in the same groups at normal incubation temperature.

Gabriel et al. (1996) reported that the increase in Hsp70 mRNA synthesis in chicken liver tissue was time-dependent, as in mammals. They reported that Hsp70 transcription rate peaked within 1 hour after thermal shock, whereas Hsp70 mRNA rate continued to increase for a while and then remained constant throughout the heat treatment.

Yahav et al. (1997), in their study examining the relationship between heat acclimation practices on the fifth day and acute heat stress on the 42nd day, reported that no stimulation of Hsp70 mRNA synthesis was observed in cardiac tissue samples collected during the first, second, fourth, and 24th days of heat acclimation. Rectal temperatures fluctuated within their normal ranges during heat acclimation and was no increase in the amount of Hsp70 with mRNA synthesis. They reported that this resistance to high temperatures on day 6 may be related to the fact that the mechanism of temperature regulation (thermoregulation) is not yet fully developed and may be related to the higher housing temperature requirements of chicks at this age.

Zulkifli (2002) noted that neonatal stress may have stimulated Hsp70 mRNA expression, but the transcripts may not have been translated until the stress effect occurred in the future. Some researchers suggest that there is a relationship between heat resistance and Hsp70 synthesis rate and that this relationship may not be related to the actual Hsp70 concentration in the cell (Lee and Dewey, 1987; Lazlo, 1988).

Nagao et al. (1990) found that Hsp70 synthesis was not stimulated when cells exposed to severe heat stress were subjected to a recovery period at normal temperature for a period of time and when they were exposed to a milder stress. However, they reported that a stress response occurred when the second heat shock after the recovery period was more severe than the first heat stress, and they determined that a cell could respond to heat stress only when it exceeded the temperature level at which it had previously shown a stress response and the cell was attuned to that response (Zulkifli, 2002). Yalcin et al. (2005) stated the adaptation to heat in broiler chickens derived from young breeders occurred on day 49.

It was found that the control and conditioning groups had a similar effect on the amount of Hsp70 in individuals from old breeders and normal incubation, while it was higher in the stress group in the study. It was reported that the live weights of animals derived from old breeders and normal hatching and exposed to heat during the chick period were higher than those of the stress group (Yalçın et al., 2005). Heat acclimation on the fifth day has a positive effect on the more heat-sensitive individuals of older breeders, who do not perceive heat stress as a stress factor during the rearing period, so there is no increase in the amount of Hsp70.

It can be concluded that exposure to high temperatures during incubation also reduces sensitivity to heat during the breeding period in heat-incubated individuals, and because the amount of Hsp70 did not increase, individuals did not show a stress response when confronted with heat stress.

Ginting and Basyuni (2019) studied the bioinformatic analysis of chicken hsp70 genes. They evaluated 8 hsp70 genes downloaded from NCBI database. In the present study, 13 Hsp70

genes in *Gallus gallus* were described using CLC Genomic Workbench and compared with the model organism zebrafish. The Hsp70 gene polymorphism studies examined the relationship between these polymorphisms and thermotolerance. They also pointed out the conserved nature of Hsp70 genes; in this study, 3 motifs were identified in Hsp70 genes.

Various heat acclimation practices to reduce the effects of heat stress due to high ambient temperatures in broiler chickens are expected to increase survival at lethal ambient temperatures in the future and positively influence thermotolerance. The results of the studies that investigated the relationship between Hsp70, heat resistance, and heat stress were conducted in many different tissues (liver, brain, lung, heart muscle, etc.), at different ages (incubation period, chicks, slaughter age, etc.), and at different heat stress applications and durations. Results have varied from study to study.

The fact that Hsp70 levels in the heat acclimation group have a similar effect as in the control group in old breeders and individuals from standard incubation suggests that individuals have gained experience with the effects of high ambient temperatures through heat acclimation on the fifth day and do not perceive it as a stressor in future heat stress, at the cellular level. This may indicate that they are not responding. On the other hand, it can be concluded that the application of heat acclimation on the fifth day may have positive effects in chicks derived from old breeders.

CONCLUSION

Heat stress is an important issue in the poultry industry, especially in hot climates during the summer season. Because of the physiological structure of broilers, they are very sensitive to high ambient temperatures. Heat stress leads to death of the birds and loss of productivity. Global climate change also affects regional average temperatures and the length of seasons in each zone. This poses an additional challenge to agricultural production, as the negative effects of abiotic stressors (heat stress) lead to low yields, physiological and metabolic problems, and disease. This presents a new difficulty for food security and agricultural sustainability.

Members of the hsp70 family contribute to processes involved in normal cellular functions during cell stress. Therefore, the studies suggest that hsp70 may also be involved in the mechanism of thermotolerance.

Since ambient temperature is one of the key factors for homeostasis in chickens in hot climates, determining the effects of heat stress on hsp70 and the relationship between thermotolerance and gene expressions may be an important factor in breeding studies using bioinformatics.

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INVESTIGATION OF THE WEAR PERFORMANCES OF AISI O2 TOOL STEEL AT HIGH TEMPERATURES

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Abstract

In this experimental study, the effect of high temperature on the dry-sliding wear behavior of AISI O2 tool steel was investigated. Wear tests were carried out on a 25x25x10 mm workpiece material at three different temperatures (room temperature, 100 and 300 °C) and two different loads (5N and 10N) under dry sliding conditions using a pin-on disc type wear device. A 3D-optical microscope was used to determine the surface profiles of the wear marks obtained from the wear tests and to determine the volume losses. The morphology of the wear surfaces of the materials on the machined surface of the workpiece and the wear mechanisms were determined by taking images with a scanning electron microscope (SEM-Scanning Electron Microscopy). As a result of the experimental studies, an increase in volume losses was obtained in the samples due to the effect of increasing load. In the wear tests carried out at 100 °C, the volume loss rates were lower compared to all other samples. The highest volume losses were obtained by using experiments carried out at 300 °C. As a result of the dry-sliding process, the predominant wear mechanisms on the surfaces of AISI O2 tool steel were observed to be delamination and oxidation-type wear mechanisms.

Keywords: AISI O2, Dry sliding wear, High temperature wear behavior

1. INTRODUCTION

Steel material groups; They are metal materials that are used in industrial areas such as construction, automotive, medicine, and aviation due to their developable mechanical properties. Changing their chemical composition or changing their structure by applying heat treatment; causes the expansion of the usage areas of steel material. Tool steels are steel groups containing high alloys and high strength. Tool steels with high wear resistance and hardness are used for shaping metallic and non-metallic materials. They are subjected to heat treatment to ensure that their properties are suitable for their areas of use and to provide the expected performance [1,2].

Cold work tool steels constitute a special class of materials used in the manufacture of various mold components and tools. These materials exhibit the desired high strength, impact

resistance, good hardenability, and high wear resistance properties with their special alloys [3]. The AISI O2 tool steel used in the study was produced for general use with its high wear resistance, high toughness, high compressive strength, high dimensional stability in heat treatment, weldability, and easy workability. AISI O2, whose hardness is between 63-65 HRC, is a high-quality and general-purpose tool steel that is frequently preferred due to the percentage of carbon it contains. This steel performs well when machined with light to medium cutting tools. This highly machinable steel is used in the manufacture of precision measuring tools, plastic breaking knives, gauges, and shear blades [4].

In the manufacturing sector, heat-treated and hardened materials are preferred due to their high strength [5]. Generally, tool steels are used to shape other steel and metal materials. Fulfilling the requirements of working conditions and meeting these features for a long time is one of the greatest features of these materials [4]. Tool steels, which are frequently encountered in the industry, are high-alloy steels used in machining and chipless production, which can form hot or cold workpieces with one or more of the forging, cutting, and compression methods [6].

Wear at the interface between the tool steel and the workpiece is one of the most important factors limiting the service life of the tool steel. The factors affecting wear in a tribological system are; properties of the main material (microstructure, surface hardness, heat treatment, etc.), properties of the opposite material, and ambient atmosphere such as temperature-humidity. In addition to all these, some properties of the materials depending on the service conditions (the type of loading exposed, etc.) have a great effect on the wear mechanism [7]. Wear, which affects tool life, occurs through a variety of mechanisms. The most important of these are abrasive and adhesive wear. Some ways to prevent wear; using lubricants, increasing the surface hardness by various processes such as coatings, purifying the microstructure from inclusions, and refining its various properties [8].

In this study, material losses of AISI O2 tool steel at high temperatures are discussed. The material losses, the formation mechanisms, and the type of wear mechanisms that occur with the increase in temperature have been revealed as the high-temperature wear behavior of AISI O2 tool steel.

2. EXPERIMENTAL MATERIAL AND METHOD

In this study, dry-slip wear tests of AISI O2 tool steel were carried out at room conditions, at 100 ºC and 300 ºC, using a 6 mm diameter wolfram carbide (WC) ball using a pin on-disc tribometer device. 25x25x10 mm samples prepared from AISI O2 tool steel were placed on the turntable of the test device and fixed. Wear tests were carried out at 200 rpm under 5N and 10N loads. In order to obtain accurate and valid results from the experiments, each experiment was performed 3 times and the average value was taken in order to increase its validity. A 3D-optical microscope was used to determine the surface profiles of the wear

marks obtained from the wear tests and to determine the volume losses. In determining the morphology of the wear surfaces of the materials on the machined surface of the workpiece, the wear mechanisms were determined by taking images with a scanning electron microscope (SEM-Scanning Electron Microscopy). The cross-sectional surface of 4 regions in total at 90 degree angles was taken from the circular cross-section trace formed by the abrasive ball on the sample, and their average value was used in the volume loss calculation

3. EXPERIMENT RESULTS AND DISCUSSION

When the volume loss values obtained as a result of the experiments carried out at room temperature were examined (Fig. 1), it was observed that the volume losses in the samples increased with the increase in the load. If this situation is evaluated depending on the load, it is thought that the increase in the normal force on the abrasive ball will cause the abrasive to sink into the sample more. The actual contact area of materials is always much less in the visible contact area. In this case, the surface area that the abrasive ball contacts will decrease, but the pressure applied per unit area will increase. Accordingly, since the abrasive will plastically deform more material, the volume loss will be greater. In addition, the formation of the oxide layer on the surface of the abraded material at low temperatures is more difficult and late, which will cause the formation of the layer, which acts as a protective and load carrier, to take longer. The results obtained are similar to the literatüre [9,10].

When the dry-slip wear test results performed at 100 °C in Figure 1 are examined, it can be said that this temperature is at a transition temperature for AISI O2 material. This results in a decrease in volume losses compared to the previous samples. In other words, it was observed that the samples treated at 100 °C exhibited lower volume loss compared to 23 °C. The volume loss was observed in the sample subjected to the etching process at the lowest 100 °C. While it is expected that the volume loss will increase with the increase in temperature, the opposite situation occurs, according to the related author Pauschitz et al.[11] stated in their studies as follows. They stated that a "Glazed layer" is formed on the surface of the materials at high temperatures, depending on the temperature, load, and shear rate. The researcher also suggested that the nature of this layer may vary depending on different characteristics. For example, wear conditions, and abrasive and abrasive material pairs have indicated that they play an important role in the formation of this layer. These layers also stated that they play a decisive role in determining the coefficient of friction and wear rates.

In the abrasion tests carried out at 300 °C, it is seen that there is a sudden increase in the volume losses again. It is thought that this is due to either the rapid shedding of the oxide layer formed or the inability of this layer to adhere sufficiently to the substrate. In addition, since the yield strength of the materials will decrease at this temperature and some carbides will dissolve and cause a change in the microstructure of the material, this situation is thought to cause a decrease in the wear resistance of the material.

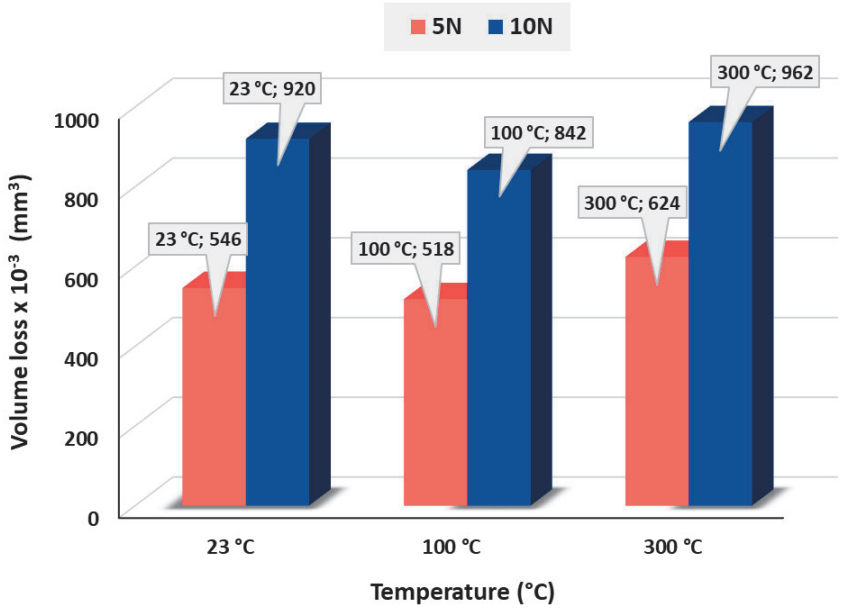
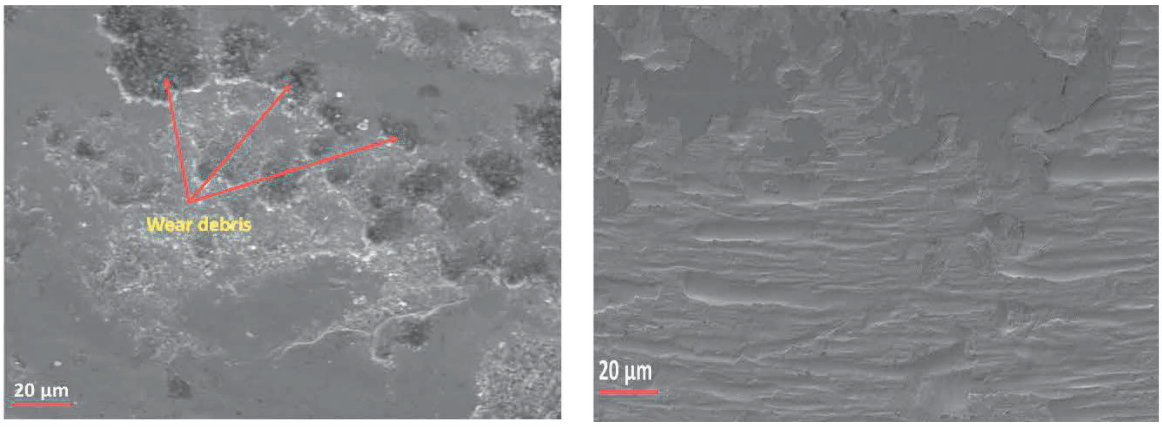


Figure 1. Notation of volume loss values of samples at different loads and temperatures

In Figure 2a, the SEM wear trace image of the sample subjected to dry-slip abrasion treatment under 5N load and room temperature is given. Especially in dry-slip wear tests performed at high temperatures, it is thought that abrasive-type wear is in question, while some of the wear particles are removed overtime on the contact surfaces, some of them are stuck in the wear track channels on the surface with the effect of fracture and plastic deformation. The superimposed debris is also oxidized. The oxidized debris is sintered by the effect of high temperature, and as a result, the hardness and density increase on the contact surface, resulting in a thin layer with low surface roughness called the “glaze layer”. A similar situation was observed on the surface as a result of dry-slip wear tests performed at room temperature.

SEM wear trace image of the samples subjected to dry-slip wear tests under 10N load at room temperature Fig. 2b is given. It was determined that the formation of an oxide layer on the surface decreased due to the increase in the load, and accordingly, no oxide layer was found on the sample surface after the experiments carried out under a load of 10 N (Fig. 2b). It is observed that deep pits are formed as a result of micro-cuts in these regions where oxides do not form or form and break off and act as an abrasive. At high loads (10N- Figure 2b), however, as mentioned before, oxides form and break very quickly, an oxide layer to protect the surface cannot be formed, and the oxides formed in a short period have a much higher hardness in the volume hardness of the material and become abrasive by being trapped between the abrasive WC ball and the surface. As a result of its effect, pits due to micro-cutting are seen on the surface. When the wear mechanisms occurring on the wear surfaces after the etching process applied to the samples are examined, it is understood from the SEM wear trace images that the oxidation and delamination mechanisms are dominant at low loads (5N) at room temperature (Fig.2).



a) b)

Figure 2. SEM images of AISI O2 tool steel surface subjected to the abrasion test at room temperature a) at 5N load (mag.250x) b) at 10N load (mag. 250x).

When Fig. 3 is examined, the mechanism of the formation of submicron-sized wear particle wastes is seen. First of all, it is the ruptures that occur due to the stresses and the transformation of these ruptures into wastes. However, it is thought that the increase in the wear resistance of this sample and some of these abrasion particle wastes stay in the system and form a protective layer by sinking to the surface due to the load on them, which is softer than itself. This is thought to be a material transfer from the W Abrasive ball to the AISI O2 tool steel surface (Fig.3).

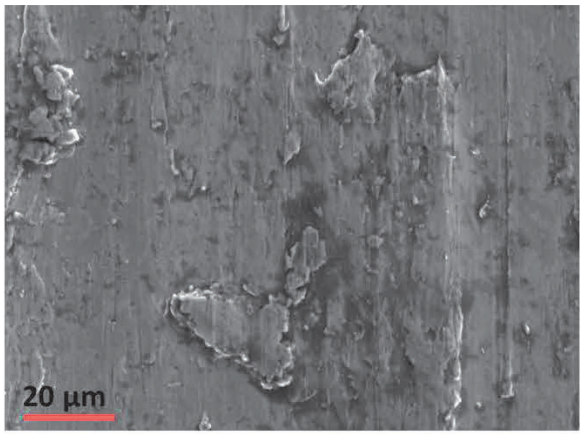


Figure 3. SEM surface image of the sample subjected to abrasion test at 300 °C and 10N load (mag.250x).

4. CONCLUSIONS

In this study, the high temperature wear behavior of AISI O2 tool steel was investigated. The wear tests were carried out at three different temperatures (room temperature, 100 and 300

°C) and under two different loads (5N and 10N) in a dry environment, overcoming the effects of high temperature on wear, and the following results were found

- An increase was observed in the volumetric losses of the samples depending on the increasing load.
- In experiments performed at 100 °C, the volumetric loss rates were lower compared to all other samples.
- The maximum volume losses were obtained in experiments performed at 300 °C.
- The change in temperature caused the wear mechanism to change.
- As a result of the dry-sliding process, it has been observed that the dominant wear mechanisms on the surfaces of AISI O2 tool steel are delamination and oxidation-type wear mechanisms

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ODUN PLASTİK KOMPOZİTLERİN ÖZELLİKLERİ ÜZERİNE UYUMLAŞTIRICININ ETKİSİ

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Özet

Termoplastik polimerlerin içerisine çeşitli odun unları, lignoselülozik ve tarımsal atıkların ilavesi edilmesi malzemeye yenilenebilirlik, düşük maliyet, hafiflik, yüksek aşınma direnci gibi çeşitli özellikler kazandırmakta ve odun plastik kompozit olarak adlandırılmaktadır. Günümüzde odun plastik kompozitler,mimari uygulamalar dış mekan zemin kaplamaları ,mobilyalar gibi birçok çeşitli alanlarda tercih edilmektedir. Endüstrinin büyümesine bağlı olarak kullanım yerleri de artmaktadır. Üretilen kompozitler mekanik ve fiziksel özelliklerinden ötürü peyzaj alanlarında çiçek parselasyonlarının sınırlandırılmasında ve çocuk oyun alanlarında oluşturulan kum havuzlarının sınırlandırıcı kompozit kullanımına olanak sağlayacaktır. Bu durum odun plastik kompozitlerin daha fazla özelliği bünyesinde bulundurması ile kolaylaşabilir. Yapılan çalışmalarda farklı oranlarda lignoselülozik dolgu maddesi oranları kullanılarak çeşitli odun plastik kompozitler üretilmiştir. Odun plastik kompozitlerde farklı yapılara sahip olan polimer malzeme ile lignoselülozik malzeme arasındaki uyumu sağlamak için birçok çalışma yapılmıştır. Bu çalışmada odun plastik kompozitlerin özellikleri üzerine uyumlaştırıcı malzemenin etkisi incelenmiştir. Matris elemanı olarak polipropilen lignoselülozik dolgu maddesi olarak ise meşe odun unu kullanılarak odun plastik kompozitler pres kalıplama yöntemi ile üretilmiştir. Meşe odun unları Wiley değirmeni yardımıyla un haline getirilerek lignoselülozik dolgu maddeleri üretilmiştir. Üretilen malzemelerin performansları üzerinde dolgu maddelerinin boyutlarının etkili olması sebebiyle un halindeki lignoselülozik dolgu maddeleri sarsak elek yardımıyla sınıflandırmaya tabi tutulmuştur. Sınıflandırılacak olan lignoselülozik dolgu maddeleri daha sonra etüvde 103±2°C olacak şekilde 24 saatlik kurutma işlemine tabi tutulmuştur. Meşe odun unu ve polimer oranı ağırlıkça eşit olacak şekilde (1:1) kullanılmıştır. Hidrofobik polimer malzeme ile hidrofilik odun unu arasındaki uyumu iyileştirmek amacı ile maleik anhidrit graftlanmış polipropilen kullanılmıştır. Üretilen odun plastik kompozitlerin fiziksel özelliklerinden yoğunluk, mekanik özelliklerinden ise çekme direnci, çekmede elastikiyet modülü, kopmada uzama, eğilme direnci, eğilmede elastikiyet modülü ve darbe direnci belirlenmiştir. Elde edilen sonuçlara göre PP kompozitlere maleik anhidrit graftlanmış polipropilen ilave edilmesi kompozit malzemelerin çekme direnci, çekmede elastikiyet modülü, kopmada uzama, eğilme direnci ve eğilmede elastikiyet modülü değerlerini artırmıştır. Ancak kompozit malzemelerin yoğunluk ve darbe direnci değerlerinde önemli bir değişiklik meydana gelmemiştir.

Anahtar Kelimeler: Polipropilen (PP), mekanik özellikleri, fiziksel özellikler, termal özellikler, taramalı elektron mikroskobu (SEM).

THE EFFECT OF COMPATİBİLTY ANHANCİNG MATERİAL ON THE PROPERTİES OF WOOD PLASTİC COMPOSİTES

Abstract

Wood-plastic composites (WPCs) are materials made by combining wood fibers or wood flour, lignocellulosic fillers, and thermoplastic polymers. Mixing these materials to the polymer gives the material several useful properties, such as renewable source, low cost, light weight, and high wear resistance. WPCs are often used in a variety of usage such as architechtural and outdoor floor applications and outdoor furniture. As the growth of the industry increases, the use of composites in landscaping and children's play areas increases. The composites produced have mechanical and physical properties that allow for the use of composite materials around flower beds and sand pools in children's play areas. This can be facilitated by wood-plastic composites having more features. In studies, various wood-plastic composites were produced using different proportions of lignocellulosic filler material. Many studies have been carried out to ensure the compatibility between the different polymer materials and lignocellulosic materials in wood-plastic composites. In this study, the effect of compatibility-enhancing material on the properties of wood-plastic composites was investigated. Wood-plastic composites were produced using a press molding method with polypropylene as the matrix element and oak wood particles as the lignocellulosic filler material. The oak wood flour was grounded into wood flour using a Wiley mill to produce the lignocellulosic filler materials. The performance of the produced materials was affected by the size of the filler materials, given that the lignocellulosic filler materials were classified by using sieve. The lignocellulosic filler materials to be classified were then subjected to a 24-hour drying process at 103 ± 2°C in an oven. Oak wood flour and polymer were used in a 1:1 ratio by weight. Maleic anhydride grafted polypropylene was used to improve the compatibility between the hydrophobic polymer material and the hydrophilic wood flour. The physical properties of the produced wood-plastic composites were determined by density test and the mechanical properties were determined by tensile strength, tensile modulus, elongation at break, flexural strength, flexural modulus, and impact resistance tests. According to the results, the addition of maleic anhydride grafted polypropylene to PP composites improved the tensile strength, tensile modulus, elongation at break, flexural strength, and flexural modulus of the composite materials.

Keywords: Polypropylene, Flexural strength, Mechanical properties, Tensile strength, Physical properties

MEVCUT BETONARME BİNALARIN DEPREM RİSKLERİNİN BİRİNCİ DERECE YÖNTEMLER İLE BELİRLENMESİ VE P25 YÖNTEMİ İLE KARŞILAŞTIRILMASI

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ÖZET:

Son yıllarda, ülkemizde yıkıcı deprem riskinin artması, mevcut yapı stokumuzun deprem güvenirliğinin irdelenmesi gerekliliğini göstermektedir. Meydana gelen depremlerde yaşadığımız kayıplar göz önüne alındığında, olması muhtemel bir deprem öncesinde ne gibi önlemler alınması gerektiği yönünde yapılan çalışmalar, özellikle son yıllarda, ivme kazanmıştır. Mevcut yapı stokumuzun büyük bir kısmının olası yıkıcı bir deprem sonucunda yeterli kapasiteye sahip olmadığı bir gerçektir. Genellikle az- ve orta-katlı yapılardan oluşan stokumuzun büyük bir çoğunluğu tasarım ve imalat aşamasında mühendislik hizmeti görmemiş veya inşa edildikleri tarihte yürürlükte bulunan deprem yönetmeliği kuralları çerçevesinde tasarlanmamıştır. Bu sebeple özellikle deprem riski yüksek olan mevcut yapıların deprem güvenirliğinin hızlı bir şekilde belirlenmesi, yaşanabilecek hem maddi hem manevi kayıpların önüne geçilmesi açısından oldukça önemlidir. Fakat ülkemiz yapı stokunun, mevcut deprem yönetmeliği çerçevesinde değerlendirilebilmesi için ne maddi kaynak ne de yeterli zaman bulunmamaktadır. Dolayısıyla öncelikle, öncelikli alanların belirlenmesi, sonrasında detaylı inceleme yapılması gerekmektedir. Öncelikli alanların belirlenebilmesi için sokaktan gözlem ile oldukça hızlı bir şekilde sonuç alınabilen yöntemler mevcuttur.

Bu çalışmada, Sakarya ili, Adapazarı ilçesinde mevcut yapı stokumuzun genel özelliklerini yansıttığı düşünülen, az- katlı betonarme yapılardan oluşan bir yapı grubu seçilmiştir. Bu yapı grubu öncelikle Sucuoğlu – Yazgan Yöntemi, Aydınoğlu Yöntemi ve Riskli Yapıların Tespit Edilmesine İlişkin Esaslar-2019 Ek-2'de tanımlanan birinci derece yöntem ile incelenmiştir.

Çalışmanın son bölümünde mevcut yapılardan projesi bulunanlar, ikinci derece değerlendirme yöntemi olan P25 Yöntemi ile değerlendirilmiş ve elde edilen yapı skorları karşılaştırılmıştır. Yapılan bu çalışmayla birinci derece değerlendirme yöntemlerinin birbirleriyle tutarlı sonuçlar verip vermediği ve ülkemizde kullanılabilirliği araştırılmıştır.

ANAHTAR KELİMELER: Mevcut Betonarme Binalar, P25 Yöntemi, Birinci Derece Hızlı Değerlendirme Yöntemleri, RYTEİE-2019, Aydınoğlu Yöntemi, Sucuoğlu-Yazgan Yöntemi

DETERMINATION OF EARTHQUAKE RISKS OF EXISTING REINFORCED BUILDINGS WITH FIRST DEGREE METHODS AND

COMPARISON WITH P25 METHOD

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SUMMARY:

The increase in the risk of destructive earthquakes in our country in recent years shows the necessity of examining the earthquake reliability of our existing building stock. Considering the losses we have experienced in the earthquakes that occurred, studies on what precautions to take before a possible earthquake have accelerated, especially in recent years. It is a fact that a large part of our existing building stock does not have sufficient capacity as a result of a possible destructive earthquake. Most of our stock, which consists of low- and mid-rise buildings, did not receive engineering services during the design and manifacturing phase or were not designed within the framework of the earthquake code rules in force at the time of the their construction. For this reason, it is very important to quickly determine the earthquake reliability of existing structures with high earthquake risk, in order to prevent both material and moral losses that may occur. However, there is neither financial resources nor sufficient time to evaluate the building stock of our country within the framework of the current earthquake regulation. Therefore, first of all, it is necessary to determine the priority areas and then make a detailed examination. In order to determine the priority areas, there are methods that can be obtained very quickly by observation from the street.

In this study, a building group consisting of low-rise reinforced concrete structures, which is thought to reflect the general characteristics of our existing building stock in the Adapazarı district of Sakarya province, was selected. This building group was primarily examined with the first-degree method defined in the Sucuoglu-Yazgan Method, Aydınoglu Method and RYTEİE 2019.

In the last part of the study, the existing buildings with a project were evaluated with the P25 Method, which is a second-degree evaluation method, and the building scores obtained were compared. With this study, it was investigated whether the first degree evaluation methods give consistent results with each other and their usability in our country.

KEY WORDS: Existing Reinforced Concrete Buildings, P25 Method, First Degree Rapid Evaluation Methods, RYTEİE-2019, Aydınoglu Method, Sucuoglu-Yazgan Method

INVESTIGATION OF THE EFFECT OF THE SPECTRTUM ON WAVE OVERTOPPING ON BREAKWATERS

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Abstract

The calculation of wave overtopping is critical when designing coastal structures. Since wave overtopping is one of the most important criteria for both the functional efficiency of coastal and port structures and the safety of their structural design. The performance of coastal structures is measured by the amount of overtopped wave the structure. However, it is an extremely complex process as there are many parameters that affect the overtopping. Various parameters such as the geometry of the structure, the properties of the material used in the protective layer, its permeability, the porosity of the structure, the crest freeboard, the wave breaking properties, the water depth at which the structure is located affect the overtopping. For this reason, a lot of work has been done on wave overtopping in the world and is still being done. The wind waves to which these structures are exposed are stochastic and irregular. It has not yet been investigated whether the energy distributions of these irregular storms also have an effect on wave overtopping. Therefore, the effect of the storm type on overtopping on the breakwater was carried out with a series of tests made in the model established in Yıldız Technical University, Civil Engineering Department, Coastal and Hydraulic Engineering Laboratory. The model used to determine the overtopping effect of the wave with different energy distribution on the structure is a 1/1.5 slope rubble mound breakwater consisting of cube blocks arranged in double rows in the armour layer and was established at 65 cm water depth with a 15 cm crest freeboard. The effect of different energy distributions with the same significant wave height and mean wave period on the overtopping was investigated in this study. Irregular waves were produced in the form of JONSWAP spectrum, but the effect of wave energy variation with frequency was investigated by changing the spectrum peak enhancement factor, gamma(γ).

Keywords: Wave overtopping, Breakwater, Wave Spectrum, Peak Enhancement Factor

DALGAKIRANLARDA DALGA AŞMASINA SPEKTRUMUN ETKİSİNİN ARAŞTIRILMASI

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ÖZET

Kıyı yapıları tasarlanırken dalga aşmasının hesabı kritik öneme sahiptir. Çünkü dalga aşması kıyı ve liman yapılarının hem fonksiyonel verimliliği hem de yapısal tasarımının emniyeti için en önemli kriterlerden birisidir. Kıyı yapılarının performansı yapıdan aşan dalga miktarı ile ölçülmektedir. Bununla birlikte dalga aşmasına çok sayıda parametre etkili olduğundan son derece de karmaşık bir işlemdir. Yapının geometrisi, koruyucu tabakada kullanılan malzemenin özellikleri, geçirimliliği, yapının porozitesi, kret hava payı, dalga kırılma özellikleri yapının bulunduğu su derinliği gibi çeşitli parametreler dalga aşmasını etkilemektedir. Bu nedenle dünyada dalga aşması ile ilgili çok fazla çalışma yapılmış ve halen yapılmaktadır. Bu yapıların maruz kaldığı rüzgâr dalgaları stokastik ve düzensizlerdir. Bu düzensiz fırtına dalgalarının enerjilerinin dağılımlarının da dalga aşması üzerine etkisi olup olmadığı henüz araştırılmamıştır. Bu nedenle fırtına tipinin dalgakıranda aşma üzerine etkisi Yıldız Teknik Üniversitesi, İnşaat Mühendisliği Hidrolik ve Kıyı Liman Mmühendisliği laboratuvarında kurulan dalgakıran modelinde yapılan bir seri deney ile gerçekleştirilmiştir. Farklı enerji dağılımına sahip fırtınanın yapı üzerindeki aşma etkisinin belirlenmesi için kullanılan model koruma tabakasında çift sıra düzenli dizilmiş küp bloklardan oluşan 1/1.5 eğimli taş dolgu dalgakıran olup 65 cm su derinliğinde 15 cm kret hava payına sahip olacak şekilde kurulmuştur. Aynı belirgin dalga yüksekliği ve ortalama dalga periyoduna sahip ancak farklı enerji dağılımlarının aşma üzerindeki etkisi bu çalışmada araştırılmıştır. Düzensiz dalgalar JONSWAP spektrumu formunda üretilmiş ancak spektrum diklik parametresi gama (γ), değiştirilerek dalga enerjisinin frekansa göre farklı yayılımlarının etkisi incelenmiştir.

Anahtar Kelimeler: Dalga Aşması, Dalgakıran, Dalga Spektrumu, Diklik Parametresi

EMI / EMC ISSUES IN SWITCH MODE POWER SUPPLIES

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Abstract

Electromagnetic compatibility (EMC), as well as electric, thermal, and mechanical considerations, should be taken into account while designing electronic energy systems. This work provides a strategy for detecting electromagnetic interference (EMI) in a power supply switching mode. This study provides a characterization technique. However, when these devices are ill-planned and/or poorly built, substantial electromagnetic interference arises, causing difficulties both within and beyond the grid. Because of advancements in computer-aided software and device design, exact waveform mimicking in switched-mode power supplies is now attainable. As a result, modeling approaches may be used to predict the realized levels of forwarding interference. Thus, EMI tests were performed utilizing the two separate switching topologies, and mitigation measures are now in place to reduce these electromagnetic emissions and the sensitivity of Switch-Mode Power Supplies (SMPs).

This study offers a viable method for predicting the EMI of a forward converter using a microelectronics switch. This research outlines a mechanism for anticipating both components (CM and DM noise). Although it is commonly understood that EMI is an issue that must be addressed, it is not often evident why EMI is a problem. Two distinct switching topologies were employed in EMI testing; parasite components have a key influence in the creation of EMI noise. This simulation approach might help designers with filter design, external SMPS filter optimization, and filter suppression quantification.

Keywords: common-mode (CM), differential-mode (DM), electromagnetic compatibility (EMC), electromagnetic interference (EMI), converter.

ORGANİK VE İNORGANİK KATKILI BETONLARIN SÜLFAT DAYANIMLARININ İNCELENMESİ

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ÖZET

Beton agrega, çimento, su ve gerektiğinde katkı malzemeleri kullanılarak meydana gelmektedir. Sahip olduğu özellikler bakımından en çok kullanılan yapı malzemesi grubundadır. Bu çalışmada mısır sapı külü, buğday sapı külü, çınar yaprağı külü ve ayçiçeği sapı külü (organik kül) ile kolemanit, diatomit, yüksek fırın cürufu, zeolit, bazaltik pomza ve uçucu kül (inorganik mineral) katkıları kullanılarak beton üretimi amaçlanmıştır. Üretilen beton numunelerinde organik katkılar çimento yerine %10-30-50 oranlarında, inorganik katkıların da agrega yerine %10-20-30 oranlarında ikame edilerek betonların sülfat etkisine karşı dayanımları incelenmiştir. Çalışma sonucunda organik küllerin çimento yerine alternatif olarak kullanılabileceğini ve inorganik katkılarında agrega yerine kullanılması ile betonun dayanım-dayanıklılık özelliklerine katkı sağladığı belirlenmiştir.

Anahtar Kelimeler: Tarımsal atık, Organik katkı, İnorganik mineral, Dayanıklılık

ABSTRACT

Concrete is formed by using aggregate, cement, water and additives when necessary. It is in the most used building material group in terms of its properties. In this study, it was aimed to produce concrete using corn stalk ash, wheat stalk ash, sycamore leaf ash and sunflower stalk ash (organic ash) and additives of colemanite, diatomite, blast furnace slag, zeolite, basaltic pumice and fly ash (inorganic mineral). In the produced concrete samples, 10-30-50% of organic additives were substituted for cement and 10-20-30% of inorganic additives were substituted instead of aggregates, and the resistance of concretes to sulfate effect was investigated. As a result of the study, it was determined that organic ash can be used as an alternative to cement and that it contributes to the strength-durability properties of concrete by using it instead of aggregate in inorganic additives.

Keywords: Agricultural waste, Organic additive, Inorganic mineral, Durability

1.GİRİŞ

Beton, çimento, ince-iri agrega, su ve gerektiğinde katkı malzemelerinin eklenmesiyle meydana gelen kompozit bir yapı malzemesidir [1-2]. Üretim kolaylığı, dayanım-dayanıklılık özellikleri, ekonomikliği ve hizmet ömrünün uzun olması gibi avantajları barındırdığı için en çok kullanılan yapı malzemesidir [3]. Yapılar fiziksel, kimyasal, biyolojik kökenli hasarlara uğramaktadır. Bu etkilere karşı betonun dayanım ve durabilite özelliklerinin yüksek olması beklenmektedir.

Betonun dayanım ve durabilite özelliklerini agresif sulardan sülfat etkisi önemli derecede etkilemektedir. Sülfat etkisinin şiddetini iç ve dış faktörler belirlemektedir. İç faktörleri; S/Ç oranı, çimento tipi, katkı türü, kürlenme süresi ve geçirgenlik olarak saymak mümkündür [4]. Dış faktörleri ise; tuzun bölgesel göçü, kuru çevrim olarak sayılmaktadır [5].

Beton sülfat etkisine karşı daha yüksek performans gösterebilmesi için çimento yerine ya da karışıma puzolanik kökenli mineral katkıların eklenmesi mümkün görünmektedir. Karışıma eklenen katkıların arasında atık malzemelerin bulunması ve değerlendirilmesi hem çevre kirliliğinin önüne geçebilir hem de ekonomik olarak değerlendirilmesine olanak sağlamaktadır [6-11].

Bu çalışmada da laboratuvar ortamında üretilen organik küllerle (mısır sapı külü, buğday sapı külü, çınar yaprağı külü ve ayçiçeği sapı külü) ve inorganik mineral katkılarla (kolemanit, diatomit, yüksek fırın cürufu, zeolit, bazaltik pomza ve uçucu kül) üretilen betonlarda sülfat dayanımına karşı performanslarının incelenmiştir.

2.MATERYAL

2.1.Buğday Sapı Külü

Buğday, ıslah işlemleri yapılmış tek yıllık otsu bir bitkidir. Buğday hasat işlemlerinin ardından tarlada kalan ve anız olarak adlandırılan atık malzemedir. Buğday sapları uygun bir şekilde toplanarak laboratuvar şartlarında 600°C'de üç saat yakılmıştır. İki gün süre boyunca soğumaya bırakılan kül tane boyutu 1 mm'nin altında olacak şekilde öğütülmüş ve eleklerle elenerek çimento boyutunda kullanılmıştır. Kullanılan buğday sapı külü Şekil 1'de, kimyasal analizi Çizelge 1'de verilmiştir.

Şekil 1. Buğday Sapı Külü

2.2.Mısır Sapı Külü

Mısır, nemli bölgelerde yetişen tek yıllık tarım bitkisi olarak adlandırılmaktadır. Mısır hasatı sonunda geriye kalan geriye kalan mısır saplarının içerdiği yüksek silis oranı nedeniyle çimento ve beton katkı numunesi olarak değerlendirilmesi ve ekonomiye kazandırılması büyük önem içermektedir. Mısır sapları kuralına uygun toplanarak laboratuvar şartlarında 600°C'de üç saat yakılmıştır. İki gün süre boyunca soğumaya bırakılan kül tane boyutu 1 mm'nin altında olacak şekilde öğütülmüş ve eleklerle elenerek çimento boyutunda kullanılmıştır. Kullanılan mısır sapı külü Şekil 2'de, kimyasal analizi Çizelge 1'de verilmiştir.

Şekil 2. Mısır Sapı Külü

2.3.Ayçiçeği Sapı Külü

Ayçiçeği, çekirdek ve yağ üretimi için ekimi yapılan tarım bitkisidir. Dünya ve Türkiye için önemli bir yağ bitkisidir. Ayçiçeği sapları kuralına uygun toplanarak laboratuvar şartlarında 600°C'de üç saat yakılmıştır. İki gün süre boyunca soğumaya bırakılan kül tane boyutu 1 mm'nin altında olacak şekilde öğütülmüş ve eleklerle elenerek çimento boyutunda kullanılmıştır. Kullanılan ayçiçeği sapı külü Şekil 3'te, kimyasal analizi Çizelge 1'de verilmiştir.

Şekil 3. Ayçiçeği Sapı Külü

2.4.Çınar Yaprağı Külü

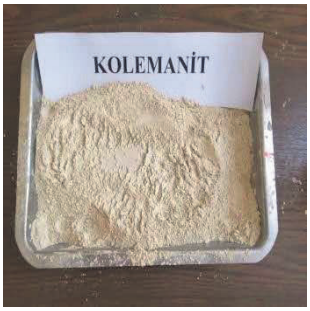
Çınar yaprağı, çok yıllık ağaç yaprakları olarak tanımlanmaktadır. Sonbaharda yaprakların dökülmesiyle cadde ve sokaklarda çok miktarda bulunmaktadır. Çınar yaprakları kuralına uygun toplanarak laboratuvar şartlarında 600°C'de üç saat yakılmıştır. İki gün süre boyunca soğumaya bırakılan kül tane boyutu 1 mm'nin altında olacak şekilde öğütülmüş ve

eleklerle elenerek çimento boyutunda kullanılmıştır. Kullanılan çınar yaprağı külü Şekil 4'te, kimyasal analizi Çizelge 1'de verilmiştir.

Şekil 4. Çınar Yaprağı Külü

2.5.Kolemanit

Bor mineralleri içerisinde en yaygın olanı kolemanittir. Türkiye'de özellikle Emet, Bigadiç ve Kestelek yataklarında bulunmaktadır. Sertliği 4-4.5, özgül ağırlığı 2.42 g/cm^3'tür. Kolemanit genellikle beyaz, şeffaf camsı parlaklıkta ve renksizdir. Çalışmada kullanılan kolemanit Şekil 5'te, kimyasal analizi Çizelge 2'de verilmiştir.



Şekil 5. Kolemanit

2.6.Pomza

Pomza volkanik kökenli silikat esaslı camsı bir özelliğe ve gözenekli bir yapıya sahip olan hafif yapı elemandır. Genelde açık renkli olup beyazdan, kreme, mavi, griye kadar değişen renklerde olur, ancak yeşil, kahverengi ve siyah da olabilir. Çalışmada kullanılan pomza Şekil 6'da, kimyasal analizi Çizelge 2'de verilmiştir.

Şekil 6. Pomza

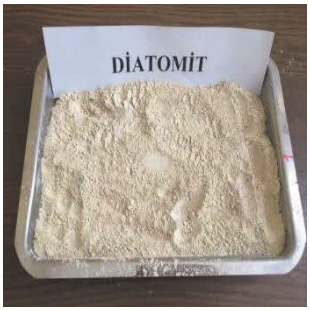
2.7.Zeolit

Zeolit eski zamanlardan beri inşaatta katkı malzemesi olarak kullanılan aluminasilikat kristal ailesi içinde yer alır. Zeolitler, silikon-oksijen (SiO_4) ve alüminyum-oksijen (AlO_4) üç boyutlu bir ağı içeren geniş iç ve dış yüzey alanlara sahip iyi tanımlanmış mikro gözenekli yapıda katılardır. Çalışmada kullanılan zeolit Şekil 7'de, kimyasal analizi Çizelge 2'de verilmiştir.

Şekil 7. Zeolit

2.8.Diatomit

Diatomit yüksek seviyede natural amorf silika (silikondioksit SiO_2) içeren puzolonik malzemedir. Çalışmada kullanılan diatomit Şekil 8'de, kimyasal analizi Çizelge 2'de verilmiştir.



Şekil 8. Diatomit

2.9.Yüksek Fırın Cürufu

Yüksek fırın cürufu (YFC), demir-çelik tesislerindeki yüksek fırınlarda demir üretimi esnasında açığa çıkan bir yan üründür. Çalışmada kullanılan yüksek fırın cürufu Şekil 9'da, kimyasal analizi Çizelge 2'de verilmiştir.

Şekil 9. Yüksek fırın cürufu

2.10.Uçucu Kül

Kömürle çalışan termik santrallerde baca gazları ile taşınan ve mekanik-elektrostatik yöntemlerle biriktirilerek çevreye yayılması engellenen atık malzemelere uçucu kül denir. Çalışmada kullanılan uçucu kül Şekil 10'da, kimyasal analizi Çizelge 2'de verilmiştir.

Şekil 10. Uçucu kül

Çizelge 1. Kullanılan Organik Küllerin Kimyasal İçerikleri

Bileşenler	Mısır Sapı Külü	Buğday Sapı Külü	Çınar Yaprağı Külü	Ayçiçeği Sapı Külü
SiO_2	35,60	43,53	20,65	4,98
Al_2O_3	9,58	0,26	5,62	1,23
Fe_20_3	3,67	0,58	3,4	0,63
CaO	19,66	5,19	38,15	19,54
MgO	2,23	0,99	1,72	4,22
MnO	0,09	0,05	0,07	0,03
K_2O	1,62	14,82	1,05	34,68
TiO_2	0,81	0,13	0,47	0,38
Cr_20_3	0,02	0,002	0,02	0,003
SO_3	0,04	0,39	0,13	0,92
Na_2O	0,25	0,97	0,3	0,26
Kk				
Diğer				

Çizelge 2. Kullanılan Mineral Katkıların Kimyasal İçerikleri

Bileşenler	Zeolit (%)	Yüksek F. Cürufu (%)	Kolemanit (%)	Uçucu Kül (%)	Diatomit (%)	Pomza (%)
SiO_2	62,17	42,35	4,0	56,8	79,56	41,41
Al_2O_3	9,76	11,26	0,4	24,1	6,54	12,97
Fe_2O_3	2,02	1,0	0,08	6,8	2,76	11,41
CaO	1,43	33,09	26,00	1,04	2,45	13,73
MgO	0,75	7,99	3,00	2,4	0,79	7,76
MnO		1,99		-		
K_2O	3,72	1,44	0,17	0	0,69	
TiO_2		0,66		1,2		
Cr_2O_3		1,92		1,92		
SO_3	0,07	0,39		2,9	0,48	
Na_2O	0,46		0,18		2,63	
B_2O_3			40			
Kk			24			
Diğer				4,04		

2.11.Agrega

Beton agregası; beton veya harç yapımında kullanılan ve taneli durumda olan inorganik malzemelerdir. Kum, çakıl ve kırmataş, beton yapımında kullanılan en çok kullanılan agrega türleridir. Çalışmada kullanılan agrega Şekil 11'de, agrega fiziksel özellikleri Çizelge 3'te verilmiştir.

Şekil 11. Agrega

Çizelge 3. Agrega fiziksel özellikleri

Özellik	İnce Agrega	İri Agrega
Su emme kapasitesi (%)	1,19	0,64
Özgül Ağırlık	2,67	2,71
Sıkısık Birim Ağırlık	2,03	1,93
Gevsek Birim Ağırlık	1,85	1,68
İncelik Modülü	4,41	2,99
Aşınma 100 Devir	-	3,32
Aşınma 500 Devir	-	12,92

2.12.Çimento

Deneysel çalışmalarda, Çimsa Çimento Sanayi A.S. Mersin Çimento fabrikasında üretilen CEM I 42,5 R Portland Çimento kullanılmıştır. Çalışmada kullanılan çimentonun kimyasal özellikleri Çizelge 4'te verilmiştir.

Çizelge 4. Çimento kimyasal özellikleri

Bileşenler (%)	Çimento
SiO_2	20,03
Al_2O_3	4,84
Fe_2O_3	2,42
CaO	62,45
MgO	2,61
Na_2O+K_2O	1,14
SO_3	3,55
Serbest CAO	0,91
Kızdırma Kaybı	2,98

3.METOT

3.1. Beton Karışımların Hazırlanması

TS 802'ye uygun olarak yapılan beton karışımında kum yerine mineral katkılardan (Pomza, Zeolit, Kolemanit, Diatomit ve Yüksek fırın cürufu) % 10, %20 ve % 30 oranlarında, organik küllerden (Mısır sapı külü, Buğday sapı külü, Ayçiçeği sapı külü ve çınar yaprağı külü) ise kütlece %10, %30 ve %50 oranlarında çimentodan ikame edilmiştir. Çimento içinde

% 2 veya daha fazla kolemanit katılması halinde çimento fiziksel özelliklerinde istenilmeyen bozukluklar meydana geldiği literatürdede belirtilmiştir. % 2 kolemanit katkılı betonları priz süresi gecikmekte, basınç dayanımında %28'e varan azalmalar olmaktadır. % 5'ten daha fazla kolemanit içeren çimentolar ise hem priz süresi hem de dayanım değerleri bakımından standart dışı kalmaktadır. Kolemanit ikamesi diğerlerinden farklı olarak % 1 ve % 3 olarak seçilmiştir. Karışım tasarımı Çizelge 5'te verilmiştir.

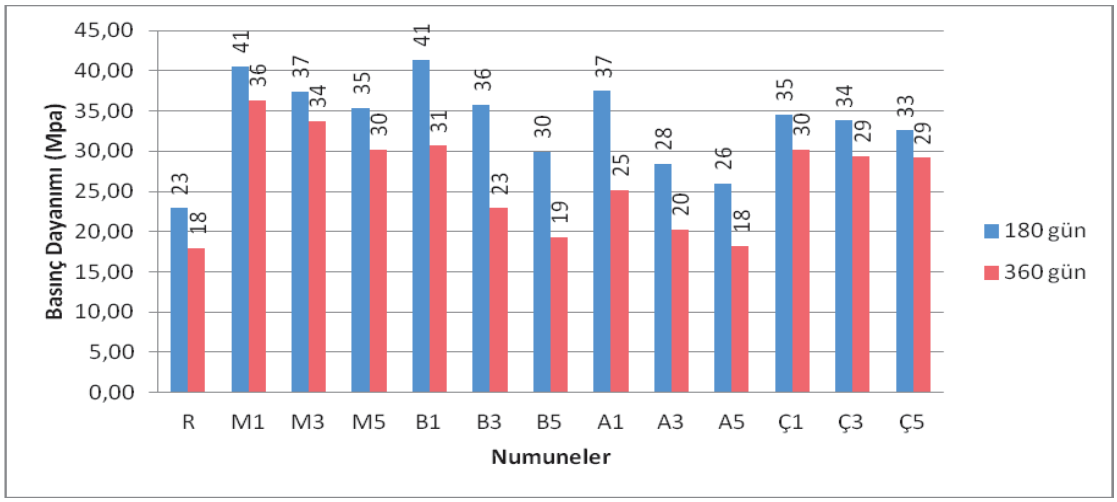
Çizelge 5. Karışım tasarımı

Örnek Adı	Beton Bileşenleri (C30)							
	Çimento (kg/m³)	Su (kg/m³)	Kum (kg/m³)	Çakıl (kg/m³)	Kül (kg/m³)	Mineral Katkı (kg/m³)	Mineral katkı ismi	Organik kül ismi
R	397	200	671	1006	-	-	-	-
M10	397	200	603,9	1006	67,1		-	Mısır Sapı Külü
M20	397	200	536,8	1006	134,2			
M30	397	200	469,7	1006	201,3			
U10	397	200	603,9	1006	-	67,1	Uçucu Kül	
U20	397	200	536,8	1006	-	134,2		
U30	397	200	469,7	1006	-	201,3		

4. ARAŞTIRMA BULGULARI

4.1. Beton Numunelerin Sülfat Dayanımı

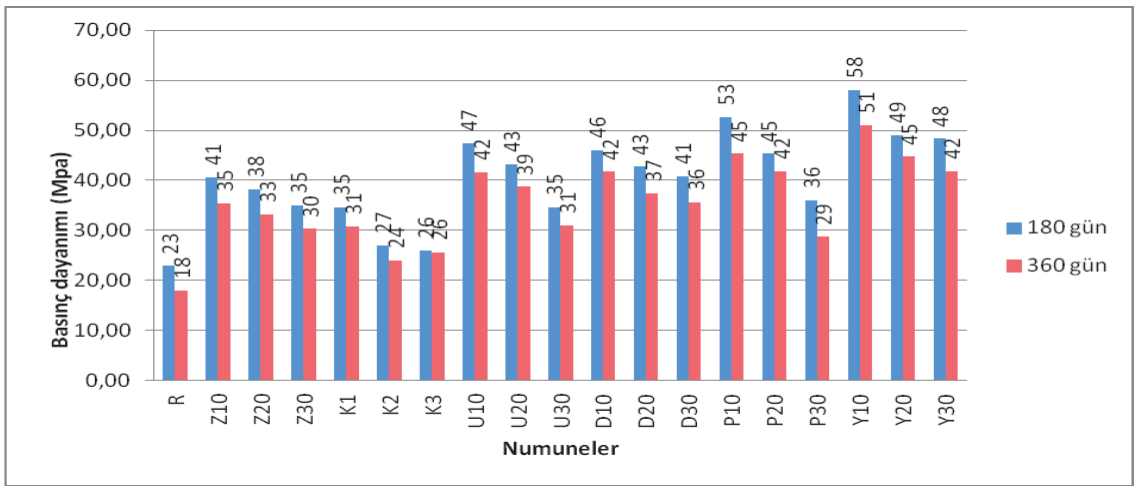
Organik küllerle üretilen tekli karışımların % 10 Na_2SO_4 çözeltisinde bekletilen beton numunelerden 180 ve 360 günlük veriler alınmıştır. Şekil 12'de 180 ve 360 günlük sülfat çözeltisinde bekletilen beton numunelerin basınç dayanımları verilmiştir.



Şekil 12. Farklı yaşlarda organik küllerle üretilen numunelerin sülfat çözeltisindeki basınç dayanımları

Organik küllerle üretilen tekli karışımlar 180 ve 360 günlük süre boyunca sülfat etkisine maruz bırakılmış ve bu süre sonunda betonların basınç dayanım değerleri incelenmiştir. 180 günlük basınç dayanımları dikkate alındığında en düşük basınç dayanımını referans numune verirken organik küllerle üretilen tüm numunelerin sülfat ortamındaki basınç dayanımı referans numunesinden yüksek çıkmıştır. 180 günlük en yüksek basınç dayanımını ise M1(mısır sapı külü) ve B1 (buğday sapı külü) kodlu numuneler vermiştir. 360 günlük basınç dayanımları incelendiğinde ise, sülfat ortamında en düşük basınç dayanımı referans numunesi göstermiştir. Diğer organik küllerle üretilen numunelere bakıldığında tüm numunelerin basınç dayanımları refarans numunesinden yüksek çıkmıştır. 360 günlük sülfat ortamında en yüksek basınç dayanımı M1 (mısır sapı külü) katkılı numune vermiştir. Sülfat ortamında basınç dayanımı yüksek çıkan numunelerin normal ortamda da basınç dayanımları yüksek çıkması dayanımı yüksek olan numunelerin sülfat ortamından daha az etkilendiğini desteklemektedir.

Minerallerle üretilen tekli karışımların % 10 Na_2SO_4 çözeltisinde bekletilen beton numunelerden 180 ve 360 günlük veriler alınmıştır. Şekil 13'te 180 ve 360 günlük sülfat çözeltisinde bekletilen beton numunelerin basınç dayanımları verilmiştir.



Şekil 13. Farklı yaşlarda minerallerle üretilen karışımların sülfat çözeltisindeki basınç dayanımları

Minerallerle üretilen tekli karışımlar 180 ve 360 günlük süre boyunca sülfat etkisine maruz bırakılmış ve bu süre sonunda betonların basınç dayanım değerleri incelenmiştir. Yüksek fırın cürufu katkısı sülfat etkisine karşı dayanıklı olmasıyla bilinir. Numunenin sülfat etkisine karşı dirençli olması aynı zamanda basınç dayanımı direkt olarak etkilemiştir. Sülfat ortamından daha az etkilenen numunelerin basınç dayanımları daha yüksek bulunmuştur. Bu durum önceki çalışmalarla paralellik göstermiştir [12-14]. 180 ve 360 günlük sülfat ortamındaki basınç dayanımları dikkate alındığında Y10 numunesinin sülfat etkisi sonrası basınç dayanımı değeri seçilen numuneler arasında en yüksektir. Minerallerle üretilen tekli karışmaların hepsinin 180 ve 360 günlük sülfat sonrası basınç dayanımı referans

numunesinden yüksek çıkmıştır. Pomza, Uçucu kül, Zeolit, Kolemanit ve Diatomit katkılı numuneler de sülfat etkisine karşı puzolanik olması sebebiyle bir miktar direnç göstermiştir ancak bu direnç yüksek fırın cürufu katkısının direnci kadar etkili olmamıştır.

5.SONUÇ

Karışımların sodyum sülfat direnci;

Organik kül katkılı ve minerallerle üretilen tekli karışımların tüm oranlarında sodyum sülfata karşı dirençleri referans numunesine oranla yüksek çıkmıştır. Sülfata karşı dirençte reaksiyonun gelişimini, sülfatlı ortamın şiddeti, betonun geçirimliliği, betonda kullanılan çimentonun kimyasal yapısı ve suyun varlığı etkilemektedir.

Organik kül ve minerallerle üretilen tüm karışımlarda sodyum sülfat saldırısı sonucu basınç kaybı az olan numunelerde pH değerinin 6,5 in üzerinde olduğu ya da geçirimliliğinin az olmasından kaynaklandığı için basınç kaybı düşük olduğu öngörülmektedir.

AÇIKLAMA

Organik Küller ve İnorganik Minerallerle Üretilen Betonların Durabilite Özelliklerinin Araştırılması başlıklı doktora tezinden türetilmiştir.

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EFFECT OF DEPOSITION THICKNESS OF ANTI-FERROMAGNETIC MnN LAYER ON THE MAGNETIC PROPERTIES OF Ta/MnN/CoFe EXCHANGE BIAS SYSTEMS

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Abstract

Exchange bias (H_E) is a shift of the magnetic hysteresis loop that occurs when a ferromagnetic (F) layer is grown in contact with an anti-ferromagnetic (AF) layer. The structure and magnetic properties of CoFe (F) and MnN (AF) films with Ta seed layer and capping layer ($Ta_{(10nm)}/MnN_{(dx)}/CoFe_{(2.5nm)}/Ta_{(10nm)}$) through annealing at 250 °C temperatures were studied. Various thicknesses (5nm, 10nm, 15nm, 20nm, 30nm and 40nm) of MnN were grown to investigate such properties. It has been observed from the XRD analyses that, excepting 5 nm MnN, the structure of all other samples mainly consists of distinct θ-MnN(002) phases around 43° 2θ-degree, and also the structure of Ta consists of two different Ta and TaN phases. The phase compositions of Ta and MnN layers are related to the diffusion of N from the MnN layer to the Ta layer and the compounding of Ta with N. The increase of H_E with increasing MnN layer thicknesses is related to the promoted crystallinity and stress relaxation of the θ-MnN phase, but there was no any H_E obtained for the 5 nm MnN sample because there is no θ-MnN phase observed for this sample. Although it is difficult to determine magnetisation values due to the two different phases of the hysteresis loops for higher than 15 nm thichness of AF layer, the highest coercivity (H_C) and exchange bias field (H_E) were obtained for the 30 nm MnN sample with values of 584 Oe and 218 Oe, respectively. Also, the squareness (M_R/M_S) is highest for the 10 nm MnN sample with a value of 78%, and it gradually decreases as the thickness of the AF layer increases. The findings in this study provide valuable information for fabricating an exchange bias system using θ-MnN layer as an alternative AF material.

Keywords: Exchange bias, Magnetic, CoFe, MnN, Ferromagnetic (F), Anti-ferromagnetic (AF)

ANTİ-FERROMAGNETİK MnN TABAKASI BÜYÜTME KALINLIĞININ Ta/MnN/CoFe DEĞİŞ-TOKUŞ ETKİLEŞİMLİ SİSTEMLERİN MANYETİK ÖZELLİKLERİ ÜZERİNDEKİ ETKİSİ

Özet

Değiş-tokuş etkileşimi (H_E), bir ferromanyetik (F) katmanın bir anti-ferromanyetik (AF) katmanla temas halinde büyüdüğü zaman meydana gelen manyetik histerezis döngüsünün bir kaymasıdır. 250°C sıcaklıkta tavlanan CoFe (F), MnN (AF), ve Ta çekirdek ve yüzey kaplama tabakasından oluşan ($Ta_{(10nm)}/MnN_{(dx)}/CoFe_{(2.5nm)}/Ta_{(10nm)}$) filmlerin yapısı ve manyetik özellikleri incelenmiştir. Bu özellikleri araştırmak için çeşitli kalınlıklarda MnN (5nm, 10nm, 15 nm, 20 nm, 30 nm ve 40nm) büyütülmüştür. XRD analiz sonuçları, 5 nm MnN hariç, diğer tüm numunelerin yapısının ağırlıklı olarak 43^o 2θ-derece civarında iki farklı θ-MnN(002) fazlarından oluştuğu, ve ayrıca Ta'nın yapısının iki farklı Ta ve TaN fazlarından oluştuğu görülmüştür. Ta ve MnN katmanlarının faz bileşenleri, N'nin MnN katmanından Ta katmanına difüzyonu ve Ta'nın N ile birleşmesinden kaynaklanmaktadır. Artan MnN katman kalınlıkları ile H_E değerinin artması, θ-MnN fazının kristalliğinin artması ve stres gevşemesi ile ilgilidir, ancak 5 nm MnN numunesi için H_E elde edilmemiştir çünkü bu numune için θ-MnN fazı gözlenmemiştir. AF tabakasının 15 nm'den daha kalın olduğu değerler için histerezis döngülerinin iki farklı fazından dolayı manyetizasyon değerlerini belirlemek zor olsa da, en yüksek koersivite (H_C) ve değiş-tokuş etkileşimi alanı (H_E), sırasıyla 584 Oe ve 218 Oe değerleri ile, 30 nm MnN numunesi için elde edilmiştir. Ayrıca, karelik (M_R/M_S) %78 değeri 10 nm MnN numunesi için en yüksektir ve AF tabakasının kalınlığı arttıkça kademeli olarak azalmaktadır. Bu çalışmadaki bulgular, alternatif bir AF malzemesi olarak θ-MnN katmanı kullanılarak değiş-tokuş etkileşimli sistemler üretmek için değerli bilgiler sağlamaktadır.

Anahtar Kelimeler: Değişim eğilimi, Manyetik, CoFe, MnN, Ferromanyetik (F), Anti-ferromanyetik (AF)

SAĞLIK REKREASYONU KAPSAMINDATERAPÖTİK REKREASYON ÇALIŞMALARI

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Özet

Rekreasyon kavramının sınırları çok geniştir ve sağlık alanı dahil birçok alanla bağlantılıdır. Yapılan bu çalışma ile sağlık rekreasyonu kapsamında özel bir uygulama alanına sahip terapötik rekreasyon kavramı hakkında uluslararası yazında yapılan yayınların ne durumda olduğunun tespit edilmesi amaçlanmıştır. Bu amaç doğrultusunda 5 Eylül 2022 tarihinde Web of Science (WoS) veri tabanında yer alan ve başlığında, özetinde veya anahtar kelimelerinde "therapeutic recreation" ifadesi içeren 435 çalışma incelenmiştir. Bibliyometrik analizi gerçekleştirmek ve verileri görselleştirmek amacıyla "VOSviewer" yazılımında "ortak yazarlılık" ve "birlikte bulunma" analizleri yapılmıştır. Gerçekleştirilen bibliyografik analiz sonucunda, Wos veri tabanında terapötik rekreasyon konusunda en fazla çalışmanın 2019 yılında elde edildiği, "Therapeutic Recreation Journal" adlı derginin 203 yayınla en fazla çalışmaya yer veren kaynak olduğu, çalışmaların %62.52'sinin Amerika Birleşik Devletleri tarafından yayınlandığı ve Türkiye'nin listede yer almadığı saptanmıştır. Konu ile ilgili yapılan çalışmaların %56.32'sinin rehabilitasyon alanında olduğu ve Lorna Moxham isimli yazarın en fazla çalışmaya (22 yayın) sahip olduğu bulunmuştur. Ağ haritası incelendiğinde "therapeutic recreation" kelimesinin en fazla kullanılan anahtar kelime olduğu, "leisure" kelimesinin ikinci sırada yer aldığı, görülmüştür. Ülke ve kurum iş birliğinde bağlantı gücü en yüksek ülkenin Amerika Birleşik Devletleri ve kurumun ise "University of New Hampshire" olduğu belirlenmiştir. Çalışma sonucunda elde edilen verilerin, terapötik rekreasyon kavramına yönelik araştırmaların mevcut durumunun belirlenmesi ve bu alanda çalışma yapmak isteyen araştırmacılar için önemli bilgiler sağlaması hedeflenmiştir.

Anahtar Kelimeler: Terapötik Rekreasyon, Bibliyometri, Web of Science

THERAPEUTIC RECREATION STUDIES WITHIN THE SCOPE OF HEALTH RECREATION

Abstract

The concept of recreation has very broad boundaries and is related to many fields, including health. The purpose of this study is to ascertain the status of publications in the international literature concerning the concept of therapeutic recreation, which has a specific application area within the scope of health recreation. 435 studies with the phrase "therapeutic recreation" in their titles, abstracts, or keywords that were included in the Web of Science (WoS) database on September 5, 2022, were examined for this purpose. "Co-authorship" and "co-existence" analyses were performed in the "VOSviewer" software to perform the bibliometric

analysis and visualize the data. According to the bibliographic analysis, the most studies on therapeutic recreation in the Wos database were obtained in 2019, the "Therapeutic Recreation Journal" was the source that included the most studies with 203 publications, 62.52% of the studies were published by the United States, and Turkey was found to be excluded from the list. It was discovered that 56.32% of the studies on the subject were in the field of rehabilitation, and the author Lorna Moxham had the most studies (22 publications). When the network map was examined, it was discovered that the word "therapeutic recreation" was the most frequently used keyword, with the word "leisure" coming in second. The country with the highest connectivity in country and institution cooperation has been determined to be the United States of America, and the institution is the "University of New Hampshire." It is desired that the study's findings will determine the current state of research on the concept of therapeutic recreation and provide important information for researchers interested in working in this field.

Key Words: Therapeutic Recreation, Bibliometrics, Web of Science

SIÇANLARDA CSA-131 İÇEREN HİDROJELLE KAPLANMIŞ SİLİKON İMPLANT KULLANIMININ BİYOFİLM VE KAPSÜL KONTRAKTÜRÜ GELİŞİMİ ÜZERİNDE ETKİLERİNİN DEĞERLENDİRİLMESİ

EVALUATION OF THE EFFECTS OF CSA-131 - HYDROGEL COATED SILICONE IMPLANTS ON THE DEVELOPMENT OF BIOFILM AND CAPSULAR CONTRACTURE IN RATS

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ÖZET

Kapsül kontraktürü, estetik ve rekonstruktif meme cerrahisi sonrası sık görülen komplikasyonların başında gelmekte ve tedavisi için sıklıkla sekonder operasyonlar gerekmektedir. Günümüzde, birçok teori öne sürülmüş olmasına rağmen kapsül kontraktürü etiyolojisi henüz tamamen anlaşılamamıştır. Öne sürülen teoriler arasında biyofilm tabakasının oluşumuna bağlı subklinik enflamatuvar süreç literatürde öne çıkmaktadır.
Bu çalışmada bir ceragenin alt tipi olan ve *in vivo* çalışmalarda güçlü antimikrobiyal etki gösteren CSA-131'in implant çevresinde biyofilm ve subklinik enflamasyon gelişimi üzerindeki etkilerini ortaya koyulması ve dolaylı olarak kapsül kontraktürünü önlemede etkinliğinin gösterilmesi amaçlanmıştır. Bakteriyel kontaminasyonun biyofilm oluşumuna etkileri ek olarak araştırılmıştır.
Çalışmada 34 adet Sprague Dawley türü dişi sıçanlar kullanıldı. Sıçanlar 5 farklı grupta deneye tabi tutuldu. Her bir sıçanın sırt bölgesinde oluşturulan iki subkutanöz pakete 1.2 ml hacimli hidrojel ile kaplanmış implantlardan yerleştirildi. 1. grupta paketlere steril implantlar yerleştirildi. 2. grupta steril ve hidrojel kaplamasında CSA-131 içeren implantlar kullanıldı. 3. grupta 106 cfu/ml *Stafilokokus epidermidis* ile inokülasyonu sonrası steril ve CSA-131 içeren implantlar paketlere yerleşirildi. 4. grupta bakteri inokülasyonu sonrası steril implantlar kullanıldı. 5. grupta bakteri inokülasyonu sonrası, antibiyotikli solüsyon (sefazolin, gentamisin ve betadin)f ile paket irrigasyonu yapıldı ve ardından steril implantlar yerleştirildi. Tüm gruplardaki sıçanlar 12. haftanın sonunda sakrifiye edildi. Makroskopik değerlendirme Baker evrelemesi ile, biyofilm oluşumları sonikasyon ve koloni sayım yöntemi ile, kapsül histolojisi Hematoksilen Eozin boyama sonrası kapsül kalınlığı ve Jansen evrelemesi ile değerlendirildi.

Sonikasyon ve koloni sayımı ile elde edilen verilere göre steril şartlarda yerleştirilen ve CSA-131 içeren hidrojelle kaplanan 2. grupta 12 hafta sonunda hiçbir numunede koloni saptanmamıştır. İnoküle edilmeyen gruplar karşılaştırıldığında CSA-131 biyofilme karşı istatiksel anlamlı etkinlik göstermiştir ($p<0,001$). Kapsül kalınlıkları karşılaştırılmasında biyofilm sonuçlarıyla paralel olarak Grup 1 ve Grup 2 karşılaştırıldığında, CSA-131 içeren implantların kapsüllerinin anlamlı olarak daha ince olduğu saptanmıştır. Biyofilm ve kapsül kalınlığı ilişkisi değerlendirildiğinde iki parametre arasında kuvvetli ilişki tespit edilmiştir. *S.epidermidis* ile inoküle edilen gruplar arasında kapsül kalınlığı, biyofilm değerleri ve Jansen total skorları karşılaştırıldığında anlamlı farklılık görülmemiştir. Baker evrelemesine göre alınan skorlar değerlendirildiğinde Grup 2'deki implantların anlamlı olarak daha düşük kontraktür evrelemesine sahip olduğu tespit edilmiştir. Bakteri inokülasyonu uygulanan gruplarda erken dönemde görülen implant kayıplarının, bu gruplar arası yapılan karşılaştırmaların istatistiksel verilerini etkilediği düşünülmüştür.
Sonuç olarak CSA-131 içeren hidrojel kombinasyonu planlı bakteri inokülasyonu yapılmadığında biyofilm oluşumunu engellemiş ve daha ince kapsül oluşumu ile sonuçlanmıştır. Kapsül kontraktürünün önlenmesinde CSA-131 hidrojel kombinasyonu umut vadedici olup, ileri çalışmalarla bu veriler desteklenerek klinik çalışmaların önü açılabillir.

ABSTRACT

Capsular contracture is one of the most common complications after aesthetic and reconstructive breast surgery and secondary operations are often required for its treatment. Today, although many theories have been proposed, the etiology of capsular contracture is not yet fully understood. Among the proposed theories, the subclinical inflammatory process related to the formation of the biofilm layer stands out in the literature.
In this study, it was aimed to reveal the effects of CSA-131, a subtype of antimicrobial ceragenin, on the development of biofilm and subclinical inflammation around the implant. Another purpose of the study is to show CSA-131's effectiveness in preventing capsular contracture. The effects of bacterial contamination on biofilm formation were additionally investigated.
34 female Sprague Dawley rats were used in the study. The rats were divided into 5 different groups. Hydrogel-coated 1.2 ml implants were placed in two subcutaneous pockets formed in the dorsal region of each rat. In the 1st group, sterile implants were placed in the pockets without any antimicrobial. In group 2, sterile implants containing CSA-131 with hydrogel coating were used. In group 3, pockets were inoculated with 106 cfu/ml *Staphylococcus epidermidis* and subsequently CSA-131 coated implants were placed in pockets. In group 4, sterile implants were used after bacterial inoculation. In group 5, after bacterial inoculation, package irrigation was performed with antibiotic solution (cefazolin, gentamicin and betadine) and then sterile implants were placed. Rats in all groups were sacrified at the end of the 12th week. Macroscopic evaluation was evaluated with Baker scores. Biofilm formations were evaluated by sonication and culturing . Capsule histology was evaluated by Hematoxylin Eosin staining, capsule thickness and Jansen staging.

According to the data obtained by sonication and colony counting, after 12 weeks, no colonies were detected in any sample of the second group, which includes sterile implants coated with hydrogel containing CSA-131. In comparison of Group 1 and 2, CSA-131 (Group 2) showed statistically significant activity against biofilm ($p<0.001$) . Capsule thicknesses of Group 1 and Group 2 showed correlation with biofilm results. The capsules of the implants containing CSA-131 were found to be significantly thinner. When the relationship between biofilm and capsule thickness was evaluated, a strong relationship was found between the two parameters. There was no significant difference between the groups inoculated with *S.epidermidis* when the capsule thickness, biofilm values and Jansen total scores were compared. Baker scores were evaluated and it was found that the prostheses in Group 2 had a significantly lower contracture grades. It was thought that the early implant losses in the inoculated groups affected the statistical data of the comparisons between these groups.
As a result, the combination of hydrogel containing CSA-131 prevented biofilm formation under sterile conditions and resulted in thinner capsule formation. The combination of CSA-131 hydrogel is promising in the prevention of capsular contracture and further studies can support these data and lead to clinical trials.

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İSTATİSTİKSEL YÖNTEMLER İLE ÇALIŞANIN İŞTEN AYRILMASININ TAHMİNLENMESİ VE ÜCRET BELİRLENMESİ İLE İŞTEN AYRILMANIN OPTİMİZASYONU

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ÖZET

Ticari nitelikli şirketler süreçlerini kolaylaştırmak, kayıplarını en az seviyeye indirmek ve kazançlarını da yükseltmek için veri toplama, veriyi kullanılabilir hale getirme, veriden fayda yaratma amacıyla çalışmalara yıllar önce başlamışlardır. Özellikle de bankacılık, finans, fintech, telekomünikasyon, e-ticaret gibi verinin yoğun ve müşteri portföyünün büyük olduğu sektörlerde bu çalışma şekli görülmektedir. Bunun yanında, yıllar içerisinde kullanılan verilerin çeşitliliği ve teknolojiler de gelişmektedir. İlk yıllarda, veri sadece gerçekleşmiş olayları izlemek ve raporlamak için kullanılırken artık geleceği tahminlemek, buna göre aksiyonlar belirlemek ve hatta gelecekte verilecek kararları optimize etmek için de veriden faydalanılmaktadır.

İnsan kaynakları yönetimi şirketler içerisinde çalışanların işe alınması, ücret seviyelerinin belirlenmesi, çalışanların eğitilmesi, kariyer gelişim planlarının yapılması, çalışan memnuniyetinin yönetilmesi, performanslarının değerlendirilmesi, işten ayrılma süreçlerinin yönetilmesi gibi çeşitli fonksiyonları kapsamı içerisine almaktadır. Bu alan, hem düzenli veri tutulmasındaki zorluklar hem de analitik bakış açısının eksikliği gibi sebeplerle veri çalışmalarını diğer iş birimlerine göre daha geriden takip eden birimlerden biridir. Ancak son yıllarda yine de literatürde ve de uygulamada insan kaynakları alanında analitik çalışmalar yapıldığı gözlemlenmektedir. Yapılan bu çalışmada, özellikle insan kaynakları alanının seçilme sebebi bu alandaki uygulama sayısını artırmak ve daha önce yapılmamış bir şekilde kestirimci analitiğin yanı sıra insan kaynakları için bir optimizasyon uygulaması gerçekleştirmektir. Çalışma için global ve çok uluslu bir şirketin internette yayınlanmış halka açık çalışan verisi kullanılmıştır ve veri içerisinde çalışanların hem demografik hem de şirket içi bilgileri yer almaktadır. Bu veri kullanılarak öncelikle en yüksek performanslı makine öğrenmesi algoritmaları kullanılarak çalışanların bir sene içerisinde işten ayrılma olasılıkları hesaplanmaktadır. İkinci adım olarak en yüksek performans gösteren algoritmanın sonuçları baz alınarak bir optimizasyon modeli oluşturulmaktadır. Bu optimizasyon modelinde çalışanların maaş seviyeleri bir karar noktası olarak değerlendirilerek hangi maaş seviyesinde çalışanın işten ayrılma ihtimalinin daha az olacağı hesaplanmaktadır. Bu modelde, şirketin toplam maaş bütçe kısıtını aşmayacak şekilde en yüksek performanslı çalışanların işten ayrılmasının önüne geçmek amaçlanmaktadır. Çalışma sonucunda, maaşın işten ayrılma

durumunu belirleyen en önemli faktörlerden biri olduğu ve doğru bir maaş belirleme politikası ile yüksek performanslı çalışanların şirket içerisinde tutundurulabileceği gözlemlenmiştir.

Anahtar Kelimeler: İnsan Kaynakları, Optimizasyon, Analitik, Makine Öğrenmesi

PREDICTION OF EMPLOYEE ATTRITION WITH STATISTICAL METHODS AND ATTRITION OPTIMIZATION WITH SALARY ADJUSTMENTS

ABSTRACT

In companies, the use of data collection, making data available, and creating benefits from data have started years ago in order to reduce their expenditures, minimize their losses and remove their gains. Especially in most of the companies in banking, finance, fintech, telecommunications and e-commerce industries, the data is dense and customer portfolio is large which made these data operations useful. In addition, data sources and technologies used over the years are also developing. In the first years, the data was used only for results monitoring and reporting purposes, but now it is also used to predict the future, determine the actions accordingly and even optimize the decisions.

Human resources management encompasses various functions within companies such as hiring employees, determining wage levels, training, preparing career development plans, managing employee satisfaction, evaluating performance, and managing turnover processes. This field is one of the units that lag behind data studies compared to other units due to both the difficulties in keeping regular data and lack of an analytical perspective. However, in recent years, it has been observed that analytical studies have been applied in the field of human resources both in the literature and in practice. In this study, reason for choosing the field of human resources is to increase the number of applications in this field and to perform an optimization application for human resources in addition to predictive analytics in a way that has not been done before. For the study, publicly available employee data of a global and multinational company was used, and the data includes both demographic and internal information of the employees. Using this data, probability of leaving the job within a year is calculated by the optimal machine learning algorithms. Secondly, an optimization model is developed based on the results of the algorithm with the highest performance. In this optimization model, salary levels of the employees are evaluated and the optimal salary level the employee will be less likely to leave the job is defined. In this model, prevention of the highest-performing employees from leaving the job is aimed so that the total salary of the company does not exceed the budget constraint. As a result, it was observed that salary is a key factor that determines the decision of leaving the job and high-performing employees can be kept within the company with a correct salary determination policy.

Keywords: Human Resources, Optimization, Analytics, Machine Learning

KANATLARDAKİ KAMBURLUK ORANININ AERODİNAMİK PARAMETRELERE ETKİSİ

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ÖZET

Bu çalışmada farklı kamburluk oranlarına sahip 3 kanadın 500 km/h ve 700km/h hız değerlerinde analizleri yapılmıştır. Analizler Ansys programından yararlanılarak yapılmıştır. Kanatların sehim, kesme gerilmeleri, kaldırma katsayıları, sürüklenme katsayıları, moment katsayıları ve kanat verimleri kıyaslanmıştır. Düşük hızlarda kanatlarda oluşan gerilmelerin farkı yüksek hızlarda oluşan gerilme farkından daha düşük olduğu görülmüştür. Yapılan çalışmada; düşük hücum açılarında kamburluk değeri düşük olan, yüksek hücum açılarında ise kamburluk değeri yüksek olan kanadın daha verimli ve güvenli çalıştığı gözlemlenmiştir.
Anahtar kelimeler: Kanat profili, Kamburluk oranı, Hücum açısı, Nümerik analiz, Yüksek akış hızı, Aerodinamik performans.

ABSTRACT

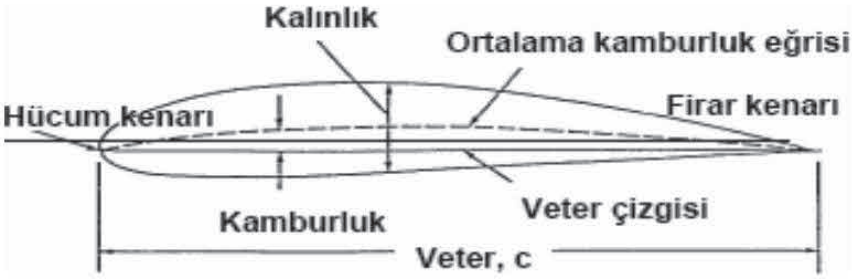
In this study, three wings with different hump ratios were analyzed at 500 km/h and 700km/h speeds. Analyzes were made using the Ansys program. Deflection, shear stresses, lift coefficients, drag coefficients, moment coefficients and airfoil efficiency of the wings were compared. It has been observed that the difference in stresses occurring in the blades at low speeds is lower than the stress difference occurring at high speeds. In the study; It has been observed that the wing with low hump value at low angles of attack and high hump value at high angles of attack operates more efficiently and safely.
Key words: Airfoil, Hump ratio, Angle of attack, Numerical analysis, High flow rate, Aerodynamic performance.

GİRİŞ

Kanatlar, taşıma kuvveti üretmek için kullanılan farklı profil yapılarına sahip sistemlerdir. II. Dünya Savaşı'nın beraberinde gelen askeri ihtiyaçların arttırdığı aerodinamik çalışmalardan biri de Amerikan Ulusal Havacılık Danışma Komitesi NACA (National Advisory Committee for Aeronautics – sonrasında NASA adını alacaktır)'nın sistemli bir şekilde kanat profilleri geliştirmeye ve test etmeye başlamasıdır. NACA sırasıyla 6-digit, 5-digit ve 4-digit Serisi dediğimiz kanat profilleri geliştirmiştir.

NACA 4-digit Serisi profillerin adlandırılmasında 4 tane rakam kullanılır (örneğin: NACA 4415 gibi). Bu sayılardan ilki veter doğrusunun maksimum kamburluk yüzdesini verir. İkinci rakam ise oluşan en yüksek kambur konumunu veter uzunluğunun yüzdesi cinsinden belirtir. Kalan iki rakam ise veter uzunluğunun yüzdesi cinsinden en büyük kalınlık değerini gösterir. NACA 4415 profilimiz için ilk iki rakamımız 4 olduğundan oluşan maksimum kamburluk

değeri %4 olup, maksimum kamburun konumu hücum kenarının en uç noktasından %40 veter uzunluğu kadar mesafede olur. Yani profilimiz kambur kanat profili olur. Sondaki 2 sayının 15 olması maksimum kalınlığın, veter uzunluğunun %15'i kadar uzunlukta olduğunu belirtir [1].



Şekil 1. Kanat profili terminolojisi [2]

Bir kanat yapısında, hava akımının ilk karşılaştığı noktaya hücum kenarı (leading edge), hava akımının ayrıldığı noktaya firar kenarı (trailing edge) adı verilmektedir. Bu iki noktayı birleştiren çizgi hattına kanat kesiti kiriş hattı (veter) denir. Üst ve alt yüzeylerin ortasından geçip ön kenar ile arka kenarı birleştiren eğriye ise kamburluk eğrisi denir [3].

Akışkanlar mekaniği ile ilgili neredeyse tüm alanlarda olduğu gibi, aerodinamikte de fiziksel büyüklüklerin boyutsuzlaştırılmasından faydalanılır. Kanat profilleri için bazı kuvvetlerin boyutsuz ve birimsiz halleri bizim için daha çok anlam ifade edebilir. Sürüklenme kuvveti, sürtünme kuvveti (kayma gerilmesi), kaldırma kuvveti, basınç ve yunuslama momentlerinin birimsizleştirilmiş halleri Tablo 1'deki gibidir [1].

Tablo 1. Aerodinamik parametrelerin boyutlu ve boyutsuz temel büyüklükleri [1]

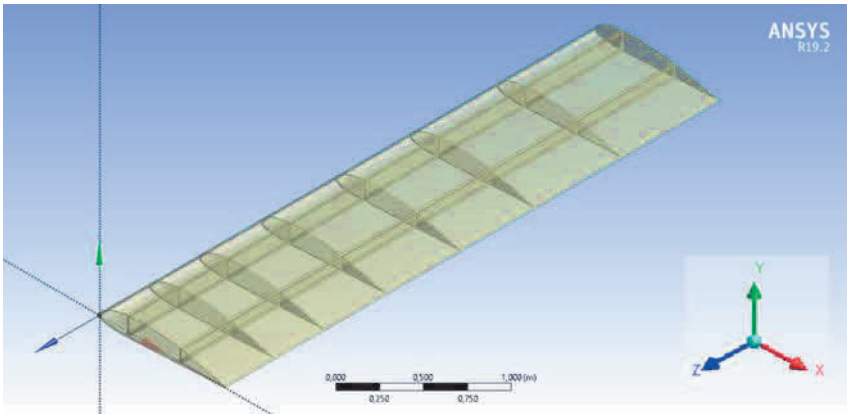
Fiziksel Büyüklükler	**Birimi**	**Boyutsuz Hali**
Sürüklenme Kuvveti (D)	N	$C_D = \frac{D}{\frac{1}{2}\rho V_\infty^2 S}$
Basınç (P)	Pa	$C_P = \frac{P - P_\infty}{\frac{1}{2}\rho V_\infty^2}$
Kayma Gerilmesi (τ)	N	$C_f = \frac{\tau_w}{\frac{1}{2}\rho V_\infty^2 S}$
Yunuslama Momenti (M)	Nm	$C_m = \frac{M}{\frac{1}{2}\rho V_\infty^2 Sc}$
Kaldırma Kuvveti (L)	N	$C_L = \frac{L}{\frac{1}{2}\rho V_\infty^2 S}$

Tablo 1'de; C_D sürüklenme katsayısını, C_P basınç katsayısını, C_f sürtünme katsayısını, C_m moment katsayısını, C_L kaldırma katsayısını gösterir. ρ yoğunluğu, V hızı, S projeksiyon alanınını gösterir.

MATERYAL VE METOT

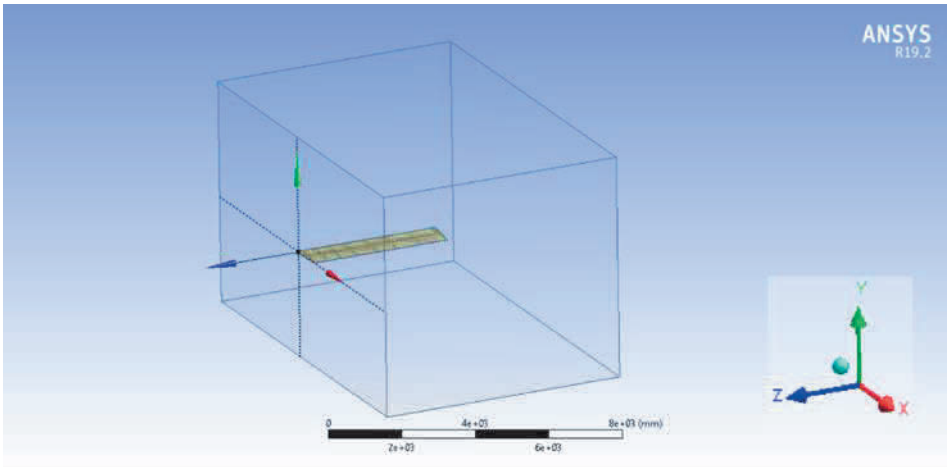
Bu çalışmada akış analizinin sayısal çözüm için ANSYS 19.2 programı 'Fluent' paketi, analiz sonuçlarının görselleştirilmesi için 'CFD-Post' paketi, statik analizler için de 'Static Structural' paketi kullanılmıştır.

İlk olarak kullanılacak olan NACA 4415 kodlu kanat profilinin koordinat değerleri internet sitesi üzerinden alınır [4]. Ardından bu koordinat değerleri kullanılarak Ansys programından geometri oluşturulur. Kanat profili ön, orta ve arka taraf olmak üzere üç bölgeye ayrılır. Kanat profilinin veter uzunluğu 1 *metre (m)* olup, bölgeler arasında 'I' profilli kirişler yerleştirilir. Kirişler 'extrude' komutu kullanılarak 4 *m* uzunluğa getirilir. Kanat boyunca her biri 10 *milimetre (mm)* kalınlığında ara profiller oluşturulur. Bu ara profiller, kanadın uçağa ana bağlantısı olduğu kısımda başlamak üzere ve bu bölgeden itibaren daha sık olmak üzere uçlara gidildikçe seyrek aralıklarla oluşturulur. İlk profilden sonra sırasıyla 0.4 *m*, 0.8 *m*, 1.3 *m*, 1.9 *m*, 2.5 *m*, 3.2 *m* ve 3.99 *m* ötelenerek diğer profiller oluşturulur. Kanadın iskeleti oluşturulduktan sonra dış kaplaması yapılır. Profilin kenarları seçilerek dışarıya doğru 10 *mm* kalınlık verilir. Kanadın son hali Şekil 2'deki gibidir



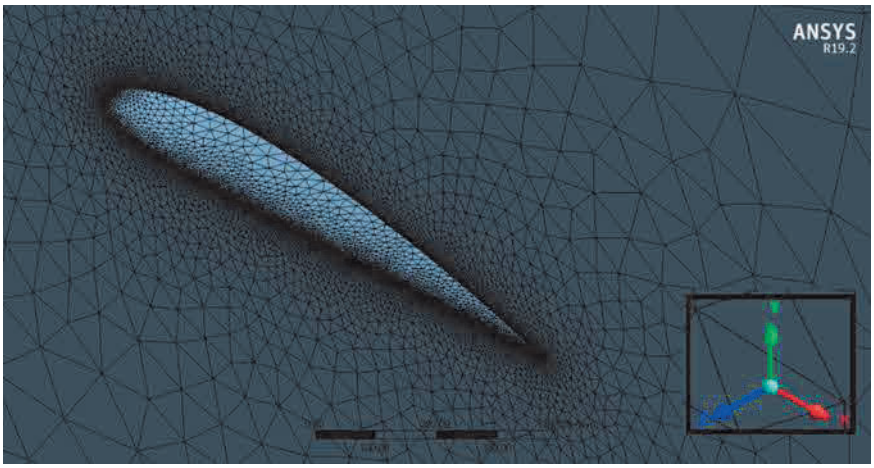
Şekil 2. NACA 4415 kanat profili

Kanadın uçak bağlantı kısmını orijin almak koşulu ile sabitlenir ve kanadın çevresine havayı temsil edecek şekilde bir kontrol hacmi çizilir. Çizilen dikdörtgenler prizması şeklindeki hacimden kanadın bulunduğu hacim çıkarılır ve geriye sadece hava akışının olduğu bölge kalır. Kontrol hacminin görüntüsü Şekil 3'teki gibidir.



Şekil 3. Havanın kontrol hacmi

Oluşturulan bu geometri Fluid Flow (Akış Analizi) bölümüne aktarılır. İlk yapılacak analizde akış analizi yapılacağı için kanat geometrisi 'suppress body' komutu ile saklanıp akışkan üzerine mesh ataması yapılır. Kanat çizgilerine yakın yerlerde daha yoğun mesh ataması yapacak şekilde tüm hacime mesh atanır. Bu mesh görüntüsü Şekil 4'te gösterilmiştir.



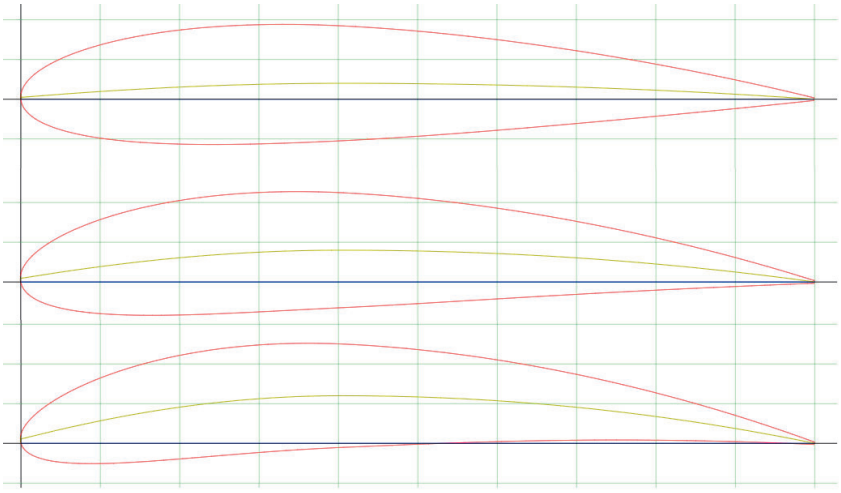
Şekil 4. Akış kontrol hacmin mesh görüntüsü

Kanat malzemesi seçilirken havacılıkta kullanım oranları araştırılıp buna göre malzeme seçimi yapılmıştır. Yüksek dayanımlı ve hafif malzeme seçilmesi tercih edilmektedir. Buna göre, maliyetler de göz önünde bulundurularak kanat malzemesi olarak Al 7075-T6 seçilmiş olup, mekanik özellikleri Tablo 2'de verilmiştir.

Tablo 2. Al 7075-T6 malzemesinin mekanik özellikleri [5]

Malzeme	**Yoğunluk (g/cm^3)**	**Yüzde uzama miktarı**	**Kesme Gerilmesi (MPa)**	**Akma Gerilimi (MPa)**	**Kopma Gerilimi (MPa)**
Al 7075-T6	2.81	%11	331	503	572

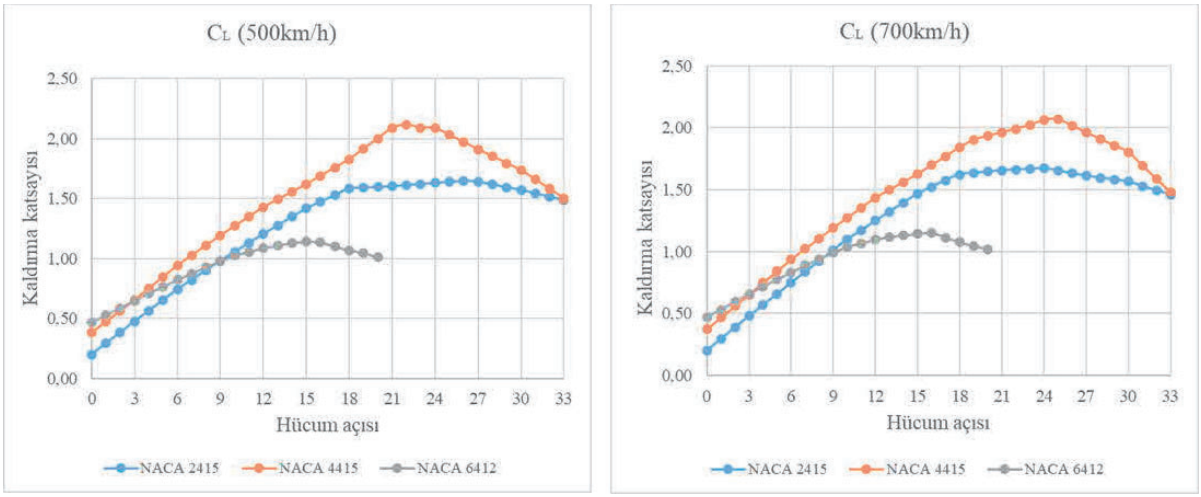
Oluşturulan bu kanat 0° ile 33° hücum açıları arasında 500 *km/h* ve 700 *km/h* değerlerinde analize sokulmuştur. Ardından tamamen aynı ölçü ve malzemeden yapılmış NACA 2415 ve NACA 6412 kanatları kıyaslama yapılması için aynı değer ve şartlarda analiz edilmiştir. Kullanılan 3 kanadın profilleri Şekil 5'te verilmiştir.



Şekil 5. Yukarıdan aşağıya sırasıyla NACA 2415, NACA 4415 ve NACA 6412 [3]

ARAŞTIRMA VE BULGULAR

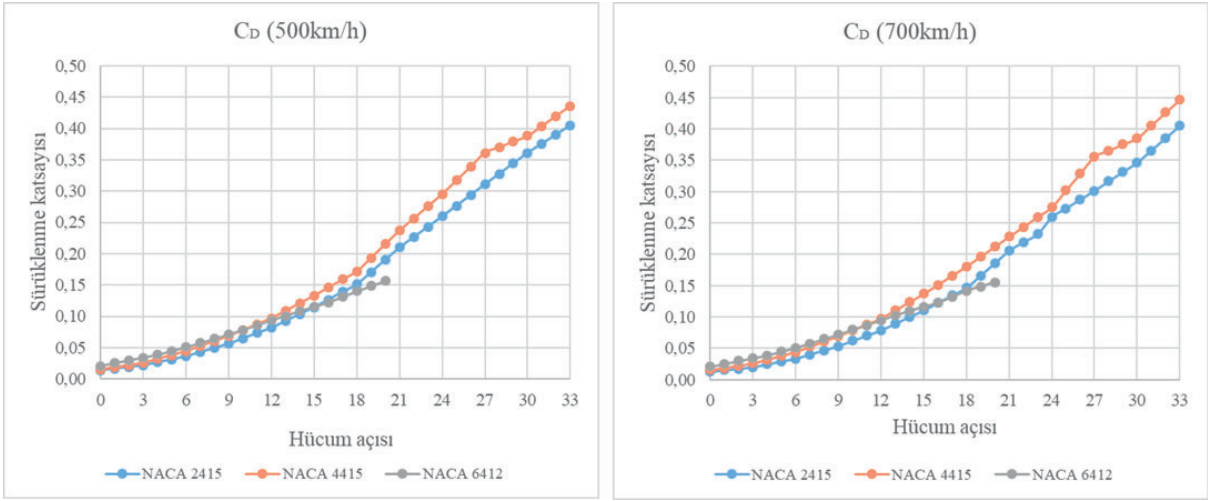
Yapılan analizler sonucunda elde edilen veriler grafik haline getirildi. Şekil 6'da kaldırma katsayılarının hücum açısına göre değişimleri verilmiştir. Soldaki grafik 500 *km/h*, sağdaki grafik ise 700 *km/h* hızdaki değerleri göstermektedir.



Şekil 6. Kaldırma katsayıları grafikleri

Şekil 6 incelendiğinde, kamburluk değeri yüksek olan kanadın hücum açısı 0° iken daha fazla kaldırma katsayısı ürettiği görülmüştür. Maksimum kaldırma katsayısı değerlerine bakıldığında en düşük kaldırma katsayısını, en yüksek kamburluk değeri olan NACA 6412'de görülmüştür. Kamburluk değeri yüksek olan kanadın hücum açısına göre kaldırma katsayısı değişimi diğer kanatlara göre daha düşüktür.

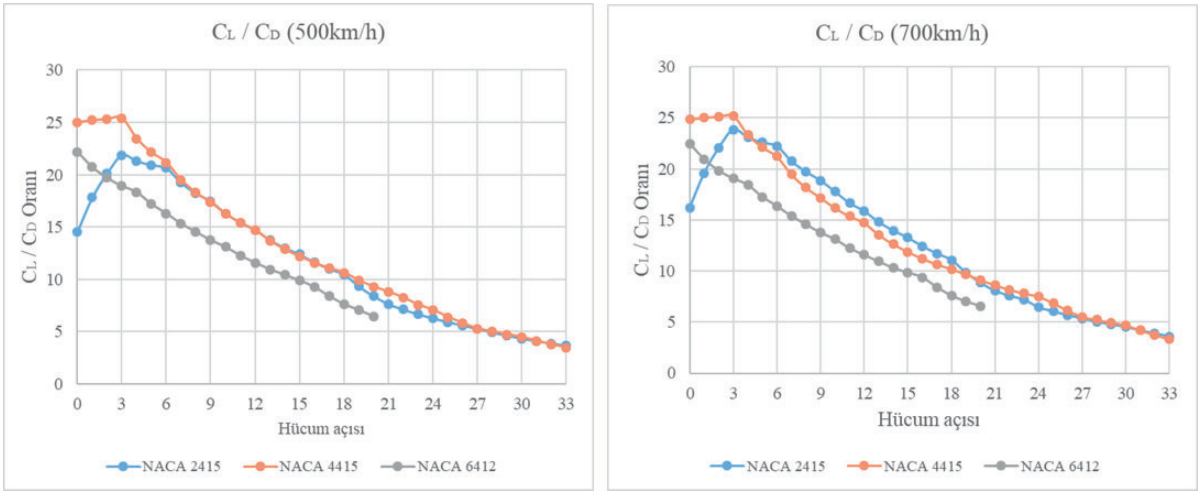
Şekil 7'de sürüklenme katsayılarının hücum açısına göre değişimleri verilmiştir. Soldaki grafik 500 *km/h*, sağdaki grafik ise 700 *km/h* hızdaki değerleri göstermektedir.



Şekil 7. Sürüklenme katsayıları grafikleri

Şekil 7 incelendiğinde 3 kanadın da 0° hücum açısında neredeyse aynı değerlerde olduğu görülmektedir. NACA 6412 kanadının hücum açısına göre sürüklenme katsayısındaki artışı diğer kanatlardan daha düşüktür.

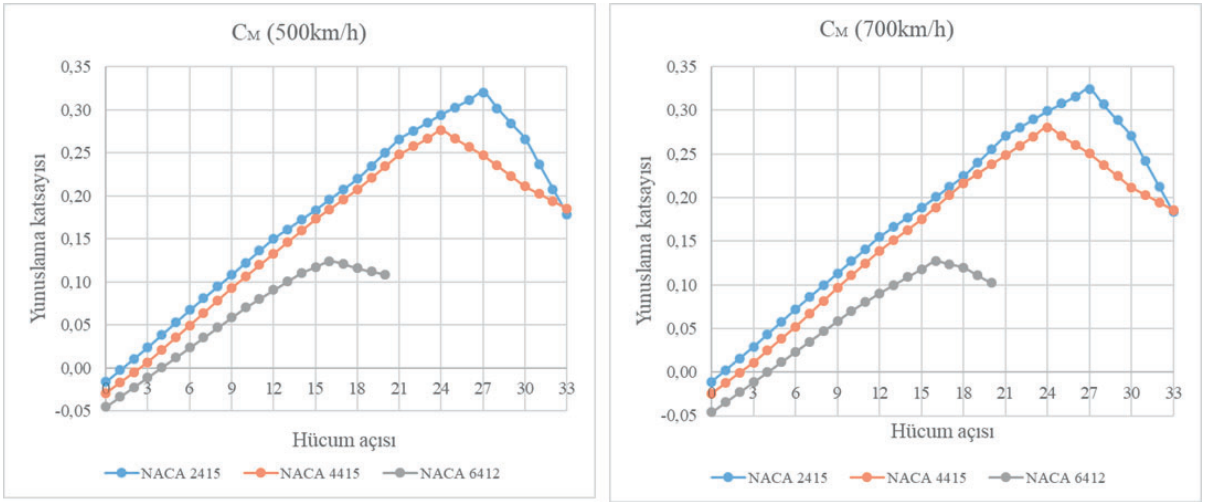
Şekil 8'de C_L / C_D değerlerinin hücum açısına göre değişimleri verilmiştir. Soldaki grafik 500 *km/h*, sağdaki grafik ise 700 *km/h* hızdaki değerleri göstermektedir.



Şekil 8. Kanat verimliliği grafikleri

Şekil 8'de başlangıç konumuna bakarsak; NACA 6412'nin düşüşte olduğunu, NACA 4415'in henüz maksimum değere ulaşmış olduğunu, NACA 2415'in ise halen maksimum değere ulaşmadığı görülmüştür. Kamburluk oranının çok fazla olmasının kanat verimliliğini düşürdüğü gözlemlenmiştir.

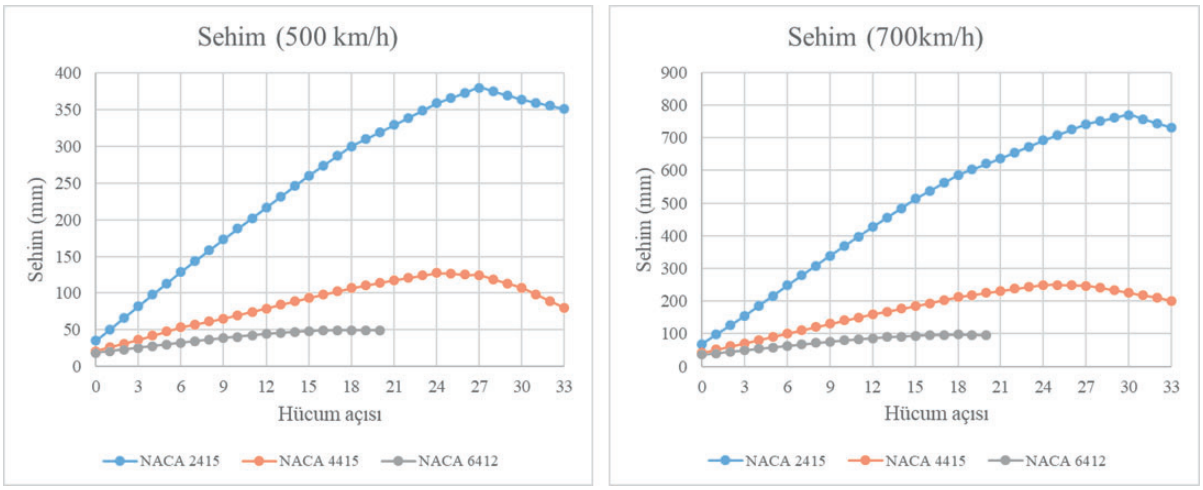
Şekil 9'da moment katsayılarının hücum açısına göre değişimleri verilmiştir. Soldaki grafik 500 *km/h*, sağdaki grafik ise 700 *km/h* hızdaki değerleri göstermektedir.



Şekil 9. Yunuslama katsayısı grafikleri

Şekil 9 incelendiğinde yunuslama momentlerinin hız değerlerine bağlı olmadığı görülmüştür. Kamburluk değeri yüksek olan kanadın yunuslama katsayısı düşüktür. Kanatlar maksimum yunuslama katsayısına kaldırma katsayısının maksimum olduğu değerde ulaşmıştır.

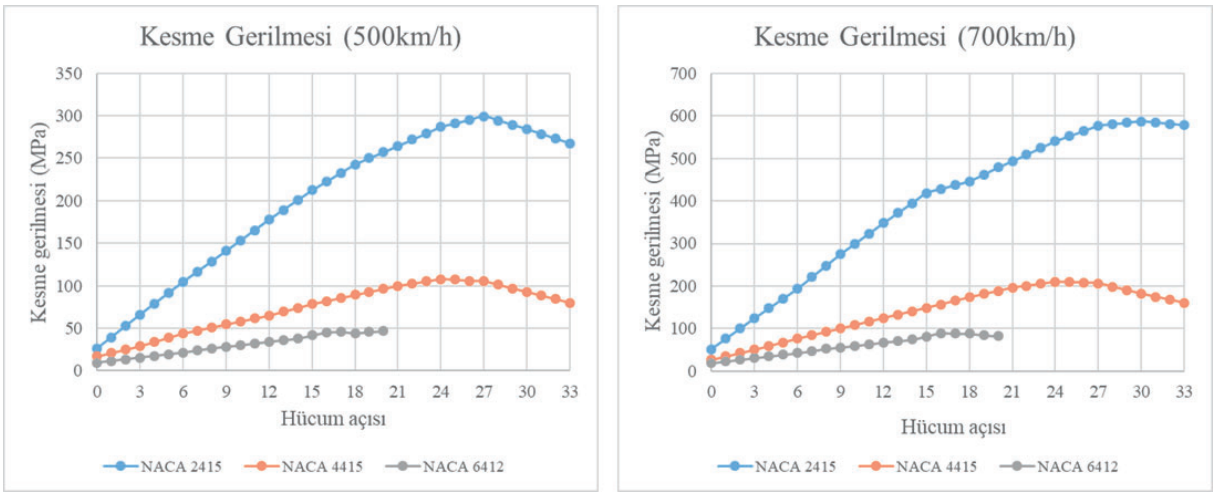
Şekil 10'da sehim değerlerinin hücum açılarına göre değişimleri gösterilmiştir. Soldaki grafik 500 *km/h*, sağdaki grafik ise 700 *km/h* hızdaki değerleri göstermektedir.



Şekil 10. Sehim grafikleri

Şekil 10'da sehim değerleri incelendiğinde kamburluk değeri arttıkça sehim değerlerinin azaldığı görülmektedir. Ayrıca hız değerinin yükselmesi, sehim miktarlarındaki değişimi arttırmıştır. Maksimum sehim değerlerine maksimum kaldırma katsayısının olduğu değerlerde ulaşılmıştır.

Şekil 11'de kesme gerilmelerinin hücum açısına göre değişimleri gösterilmiştir. Soldaki grafik 500 *km/h*, sağdaki grafik ise 700 *km/h* hızdaki değerleri göstermektedir.



Şekil 11. Kesme gerilmesi grafikleri

Şekil 11'deki grafikler sehim değerlerindeki grafikler ile benzerlik göstermektedir. Kamburluk değeri yüksek olan kanat sehim grafiklerinde olduğu gibi düşük değerlere sahiptir. Hücum açısının değişiminin NACA 6412'nin mekanik değerlerinde önemli bir değişime yol açmadığı görülmektedir.

SONUÇ

Bu çalışmada, Ansys Fluent programı ile üç farklı kanat profili modellenip, kanatların farklı hızlardaki aerodinamik parametreleri incelenmiştir. Üç kanat için de 139 *m/s* (≈500 *km/h*) ve 194 *m/s* (≈700 *km/h*) hava akış hızları uygulanmıştır. NACA 6412 0° ile 20° aralığında, diğer kanatlar 0° ile 33° aralığında tek tek analize sokulmuştur.

Kanatların 0° hücum açısında kaldırma katsayıları incelendiğinde kamburluk oranının en yüksek olduğu NACA 6412'nin en yüksek kaldırma katsayısına sahip olduğunu görürüz. Fakat hücum açısı yükseldikçe NACA 4415'in, hatta 10°'den sonra NACA 2415'in bile daha fazla kaldırma katsayısı ürettiğini görürüz. Buradan yola çıkarak; kamburluk oranının belirli bir yere kadar artmasının kaldırma katsayısını arttıracağını, o noktadan sonra kamburluğu arttırırsak kaldırma katsayısının düşeceğini söyleyebiliriz.

Sürüklenme katsayılarına bakıldığında kamburluk oranının artması sürüklenme katsayısını arttırsa da, kamburluk oranı çok olan kanadın yüksek hücum açılarında daha düşük sürüklenme katsayısı ürettiği görülmüştür.

Kaldırma ve sürüklenme katsayılarının daha iyi karşılaştırılması için kanatların verimlilik ifadeleri incelenir. Kanatların 0° ile 6° arasındaki durumlarına bakınca NACA 4415'in en verimli kanat olduğunu görürüz. Kamburluk oranı biraz daha arttırıldığında kanadın verimliliğinin düştüğünü NACA 6412'den görmekteyiz. Hücum açısı artınca grafik daha düzenli bir hal almıştır ve açı arttıkça kanatların verimliliğinin düştüğünü görülmüştür.

Moment katsayıları incelendiğinde kamburluk oranı ile moment katsayısının ters orantılı olduğunu görürüz. Yüksek kamburluk oranına sahip NACA 6412 en düşük moment katsayısına, düşük kamburluk oranına sahip NACA 2415 en yüksek moment katsayısına sahiptir.

Kaldırma, sürüklenme, moment katsayıları ve verimlilik ifadelerine baktığımızda hem 500 *km/h* hem de 700 *km/h* hız değerlerinde yaklaşık aynı sonuçların çıktığını görmekteyiz. Bu grafiklere bakarak kanadın şeklinden dolayı açığa çıkan kuvvetlerden üretilen katsayıların hava akış hızından bağımsız olduğunu söyleyebiliriz.

Kanatların sehim ve kesme gerilmelerine baktığımızda artan kamburluk oranının kanada mukavemet kazandırdığını görmekteyiz. Özellikle yüksek hücum açılarında kamburluk değeri yüksek olan NACA 6412'nin NACA 2415'ten yaklaşık 6 kat daha dayanıklı olduğu deneyle kanıtlanmıştır.

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FACTORS AFFECTING ADVERSE DRUG REACTION REPORTING AMONG HEALTH CARE PRACTITIONERS IN PRIMARY HEALTH CARE CENTRES IN KANO METROPOLIS

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ABSTRACT

Background: Spontaneous reporting of Adverse Drug Reaction (ADR) is one of the ways of ensuring safety of drugs. Primary Health Care (PHC) acts as a gateway for individuals into the Nigerian Health System. Identifying and addressing challenges to adverse drug reaction reporting among health care practitioners at this level of health care will help to improve quality of care and patient safety. **Purpose:** The goal of this study was to evaluate the factors affecting Adverse Drug Reaction reporting among health care practitioners in Primary Health Care Centres in Kano Metropolis, Kano State. **Methods:** A cross-sectional study was carried out using a structured modified adapted questionnaire from previous related studies. Two-hundred and ninety-seven healthcare practitioners from selected Primary Health Care Centres participated in the study. Multistage sampling technique was employed for this study. At the first stage, four Local Governments were randomly selected from the eight Local Governments in Kano Metropolis. At the second stage, twenty Primary Health Care Centres were selected from the total of ninety Primary Health Care Centres in the four selected Local Governments using a systematic random sampling technique. At the selected health Centres, a simple random sampling was done based on the population of the health workers in the Centres to meet up with the sample size. Selected health care practitioners include those who are involved in prescribing, dispensing and administering drugs and these include Nurse/Midwives, Community Health Officers, Community Health Extension Workers, Junior Community Health Extension Workers and Pharmacy Technicians. Data obtained was sorted and analyzed using IBM-SPSS version 28. Descriptive statistics of frequency counts and percentage was used to summarise the data obtained. **Results:** Major factors cited by the health workers as affecting Adverse Drug Reaction reporting include: difficulty in reporting ADR (155;52.2%), inadequate knowledge of ADR (150;50.5%), ADRs seen are not severe (146;49.2%), importance not attached to ADR reporting (140;47.1%) and no experience filling the form (131;44.1%). **Conclusion:** The guideline for Adverse Drug Reaction Reporting should be simplified and made known to health care practitioners at the Primary Health Centres. Also, Primary Health Care workers should be properly trained on Adverse Drug Reaction and how to fill Adverse Drug Reaction form.

Keywords: Adverse drug reaction reporting, Primary Health Care, Health Care Practitioners, Kano, Nigeria

ASSOCIATION OF ENDOTHELIAL NITRIC OXIDE SYNTHASE GENE POLYMORPHISM WITH ENDOTHELIAL DYSFUNCTION IN DIABETIC NEPHROPATHY

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Keywords: Diabetic nephropathy, eNOS gene polymorphism, flow mediated dilation

BACKGROUND. Vascular endothelial dysfunction resulting from impaired nitric oxide synthase (NOS) activity in the endothelial cells of blood vessels has been suggested as playing an important role in the pathogenesis of Diabetic nephropathy (DN). It regulates endothelial function and maintains endothelial-dependent vasodilation in multiple organs, including the kidney. The study was carried out to investigate the association of T-786C single nucleotide polymorphisms with the flow mediated dilation (FMD) in DN among type 2 diabetic subjects.

METHODS. 50 patients (25 male and 25 female) with diabetic nephropathy were recruited from Nephrology and Endocrinology departments of the Azerbaijan Medical University hospital. As a control group the results were compared with the findings in 30 healthy Azerbaijani individuals (25 males and 15 females). The study was approved by ethics committee and informed consent was obtained from all patients in written form. Brachial endothelial function was determined by brachial artery vasodilator response or brachial FMD in the dominant arm according to previously validated techniques. $T^{786}C$ polymorphism was detected using polymerase chain reaction-restriction fragment length polymorphism analysis.

RESULTS The results showed significant differences between DN group and control group regarding the genotype and allele distributions of the $T^{786}C$ single nucleotide polymorphisms. The CC genotype was significantly more frequent in diabetics nephropathy patients than in control group (42% vs. 8%, p = 0.01). FMD in allele homozygote $T^{786}C$(TT), $T^{786}C$(CC) and heterozygote $T^{786}C$(CT) were respectively 13.5 ±0.16%, 12.3±0.19%,13.9 ±0,28%. In the study groups, Azerbaijani patients showed dominance of the C allele and a mutant homozygous genotype CC of the $T^{786}C$ gene of eNOS. Subjects with the ^{786}C(CC) (n=21) showed significantly reduced FMD with those with $T^{786}C$(TT) (n=3) and $T^{786}C$(CT) (n=15) (p=0.001), whereas there was no significant difference in endothelial-independent vasodilation between these groups. Although subjects with homozygote $T^{786}C$(TT), did not show significantly reduced

levels of FMD. Who were carriers of the $T^{786}C$ allele demonstrated markedly reduced levels of FMD compared with noncarriers ($p=0.01$).

CONCLUSION The data suggest that in diabetic nephropathy, the eNOS $T^{786}C$ allele may be involved in endothelial dysfunction. Azerbaijani patients showed dominance of the C allele and a mutant homozygous genotype CC of the $T^{786}C$ gene of eNOS.

R290 SOĞUTUCU AKIŞKANININ TİCARİ DOLAPLARDAKİ SOĞUTMA PERFORMANSI

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Soğutucu akışkanların çevreye olan etkisi GWP (Küresel Isınma Potansiyeli) değerinin büyüklüğüne bağlıdır. Bu nedenden dolayı GWP değeri düşük akışkanlar çevreye etkileri dikkate alındığında soğutma sektöründe sıkça kullanılmaktadır. F gaz yönetmeliğine göre GWP değeri 150'den büyük soğutucu akışkanların kullanımı hermetik uygulamalar için 1 Ocak 2022 tarihinden itibaren kullanımı Avrupa'da yasaklanmıştır. R404A soğutucu akışkanı süpermarket dolaplarında en sık kullanılan gazdır. Bu çalışmada küresel ısınmayı olumsuz yönde etkileyen R404A soğutucu akışkanı yerine çevre dostu R290 soğutucu akışkanın teşhir amaçlı kullanılan soğutma dolabındaki performansına etkisi araştırılmıştır. Soğutma çevrimindeki sınır şartları -10 °C buharlaştırma ve +45 °C yoğunlaştırma olacak şekilde tasarlanmıştır. Testler TS EN ISO 23953-2 standardı referans alınarak sistemin performansı her iki soğutucu akışkan için karşılaştırmalı bir şekilde yapılmıştır. M paket sıcaklıkları, enerji tüketimleri, dolabın soğutma performanslarına göre karşılaştırmalar yapılmıştır. Yapılan deneyler sonucunda R290 kullanılan sistemin R404A'ya göre kondenserde ısı atma performansı daha iyi sonuçlar sergilemiştir. R290 kullanılan sistemin enerji tüketimleri ilgili standarda göre C ve D sınıfındadır.

Anahtar Kelimeler: Küresel Isınma, R290, Soğutucu Akışkan, Süpermarket, Ticari Tip Dolap.

COOLING PERFORMANCE OF R290 REFRIGERANT IN COMMERCIAL CABINETS

The impact of refrigerants on the environment depends on the magnitude of the GWP (Global Warming Potential) value. For this reason, fluids with low GWP values are frequently used in the refrigeration industry, considering their environmental impact. According to the F gas regulation, the use of refrigerants with a GWP greater than 150 is prohibited in Europe for hermetic applications as of January 1, 2022. R404A refrigerant is the most commonly used gas in supermarket cabinets. In this study, the effect of environmentally friendly R290 refrigerant instead of R404A refrigerant, which adversely

affects global warming, on the performance of the refrigerator used for display purposes was investigated.
The boundary conditions in the refrigeration cycle are designed to be -10 °C evaporation and +45 °C condensation. The tests were carried out comparatively for both refrigerants with reference to the TS EN ISO 23953-2 standard. Comparisons were made according to M package temperatures, energy consumption, and cooling performances of the cabinet. As a result of the experiments, the heat removal performance of the system using R290 in the condenser showed better results than R404A. The energy consumption of the system using R290 is in C and D classes according to the relevant standard.

Keywords: Global warming, R290, Cooler liquid, Supermarket, Commercial Type Cabinet.

ГРИБНЫЕ ЗАБОЛЕВАНИЯ, ВЫЯВЛЕННЫЕ НА РАСТЕНИЯХ ПШЕНИЦЫ И ЯЧМЕНЯ НА ПОЛЯХ ГОРОДА ШИРВАН.

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КЛЮЧЕВЫЕ СЛОВА: ПШЕНИЦА, ЗЛАКОВЫЕ РАСТЕНИЯ, ГРИБКОВЫЕ ЗАБОЛЕВАНИЯ.

РЕЗЮМЕ

Исследование проводилось в городе Ширван. В ходе исследовательской работы наблюдалось большое количество увяданий и загниваний зерновых растений. Фитопатогенные грибы были обнаружены в основном в растениях пшеницы и ячменя. Как известно, у всех растений есть свои болезни и вредители. Злаковые растения также подвержены различным заболеваниям. Первыми симптомами болезни являются появление на жилках листьев мелких, неправильной формы красно-коричневых пятен. Заболевание развивается из центра пятен пепельного цвета. В результате разрастания и слияния этих пятен весь лист покрывается пятнами. Затем на этих пятнах появляются маленькие черные точки, поэтому болезнь также известна как «полосатая пятнистость листьев». Иногда на одном и том же растении можно увидеть другие болезни листьев. По этой причине не следует путать болезни. Хотя первые симптомы болезни появляются на листьях через 14-21 день после заражения, в местах с повышенной относительной влажностью они могут проявиться и через 5-6 дней. Заболевание сначала проявляется на нижних листьях. Степень распространения на верхних листьях варьируется в зависимости от условий окружающей среды и чувствительности сорта. Когда растение созревает, тяжесть заболевания относительно низкая. При ходьбе цвет меняется с ao на верблюжий, заболевание протекает с расщеплением и растрескиванием эпидермиса. Открытая и полуоткрытая ржавчина (Ustilago nigra) ячменя наблюдается во всех районах выращивания пшеницы и ячменя. У пшеницы и ячменя семена, взятые из больных колосьев в период цветения, имеют нормальный вид, но несут болезнь. Когда эти семена посажены, болезнь систематически прогрессирует по растению. Во время цветения цветочные органы колоса превращаются в черные больные семена. Эта болезнь затем по ветру. У ячменя закрытая Растительная болезнь (Ustilagi hordei) (см. рисунок 1) отличается от открытой Растовой болезни тем, что больные колосья не сбрасываются ветром, а заражение происходит не через цветки, а через семена. При созревании желтого ячменя болезнь начинает проявляться серостью на колосе. Зараженные шипы приобретают черно-серый цвет при пожелтении и полностью отмирают.

Рисунок 1

ВВЕДЕНИЕ

Грибковое заболевание является одним из широко распространенных заболеваний. Мы часто находим его почти на каждом возделываемом поле, в цветах и в листьях деревьев. Мир грибов характеризуется разнообразием образа жизни. Они паразитируют в органах растения и снижают его продуктивность и качественные показатели. Питается готовой органикой. Основные виды грибов имеют микроскопические размеры. Имеют вегетативное тело, состоящее из мицелия, и через него питаются, размножаются и развиваются. Болезнетворные грибы делятся на экзогенные (внешние) и эндогенные (внутренние) виды в зависимости от их распространения в органах растений. В первом случае основные органы размножения и развития распространяются на верхние слои листа. Примерами таких грибов являются возбудители мучнистой росы. Они образуют покрытия и плесень на растении. Мицелий и гифы эндогенных грибов распространяются между клетками, внутри клеток, в водопроводах, в поглощающей и передающей системах корневой системы, во внутренних тканях плодов и семян. Листья, ветки, плоды и стволы имеют признаки пятен, гнили и потемнения. [4]

Грибы различаются по продолжительности жизни. Если грибковое заболевание кратковременное, оно завершает свое развитие за несколько дней. Они называются эфемеридами. Однолетники завершают свое развитие за 1 год. В эту группу входят Tilletia (см. рисунок 2), Urocystis и другие грибы, вызывающие ржавчину у зерновых растений. Существует много видов двулетних грибов, паразитирующих на культурных растениях. Они начинают свое развитие в период вегетации растения, ведут сапрофитный образ жизни на листьях и остатках растений и вновь размножаются весной второго года, образуя споры на растительных остатках. Многолетние грибы получили большее распространение благодаря своему виду и разнообразию. К ним относятся микоризы, трутовики (паразитирующие на стеблях растений), грибы, паразитирующие внутри водопроводных трубок луковиц, корневищ, клубней, стеблей, многолетних деревьев и кустарников, сорняков.

Рисунок 2

Среди зерновых культур больше всего возделываются пшеница и ячмень. Многие болезни влияют на продуктивность этих злаков, которые являются важным рационом питания человека и животных.

Заболевание чаще возникает на тяжелых и слабых почвах с недостатком кислорода. На нижних листовых влагалищах, стеблях и суставах растений появляется медовый налет. В некоторые периоды, в середине вегетационного цикла растения, происходит пожелтение и отмирание пораженных растений и вокруг них. Колосья больного растения искривлены, некоторые колосья не несут зерна. Когда условия подходят для болезни, она вызывает потерю урожая на 50% и более. Заболевание может возникать на всех стадиях развития и во всех органах растений. В силу этих причин разрушение зерен, ожог всходов, загнивание корня и корневого зева, некротические пятна в виде точек на листьях вызывают симптомы почернения зародыша в колосе и в зерносмеси. Пятна на стебле и корне болезни темного или бледно-коричневого цвета. В результате замедляется рост растений. Зараженные растения становятся фиолетовыми, лиловыми или темно-зелеными. Корневая система растений укорачивается, а корни кажутся коричневыми. По краям стеблей растений появляются овальные пятна.

Болезнь эффективна в разные периоды роста пшеницы. Поэтому у растений также встречаются ожоги рассады, корневые и стеблевые гнили. Бледные овальные пятна, являющиеся типичными симптомами болезни, появляются по краям только что созревших листьев, а позже и на стебле растения. Из этих гнилых частей растения скручиваются и изгибаются в разные стороны из-за слабости стебля. Кроме того, при уборке выделяют колосья, в которых образуются тонкие и дробленые зерна. Кроме того, при уборке выделяют колосья, где образуются тонкие и дробленые зерна. Болезнетворные агенты могут вызывать заболевание большинства зерновых культур. Среди них пшеница, ячмень, овес и рожь. [1]

Меры борьбы: Предпочтение следует отдавать выращиванию устойчивых сортов. Ранние сорта более восприимчивы к болезням, чем поздние. Почва должна быть хорошо обработана, глубина посадки и температура почвы должны быть соответствующими. Перед посадкой почву следует обработать для уничтожения зеленых насаждений и растительных остатков или удалить их с помощью гербицидов. Хорошее и сбалансированное удобрение должно обеспечить долговечность растения. В районах, где болезнь распространена, овес можно сажать рядом с растениями, не противостоящими этим факторам. Овес подвержен поражению этими факторами, но так как он очень медленно растет в овсе, эти грибы быстро исчезают.

МАТЕРИАЛЫ И МЕТОДЫ

Для получения чистых культур грибов (факультативных сапротрофов и факультативных паразитов), поддержания их жизнеспособности в целях дальнейшего изучения применяют различные питательные среды. По консистенции различают жидкие и плотные питательные среды. Выбор того или иного типа питательного субстрата зависит от потребностей грибного организма и целей проводимого эксперимента. Плотные среды готовят, добавляя к растворам солей и отварам агар (2-2,5%) или желатин (10-15 %), а, в случае необходимости, увлажняют поверхность твердых предметов (опилки и т.д.) растворами питательных веществ. Плотные среды используют для выделения грибов из естественных субстратов, получения культур из отдельных спор (моноспоровые изоляты), определения репродуктивной способности и особенностей спорообразования, дифференциации грибов по характеру роста на плотных средах, изучения влияния факторов среды и различных веществ на рост

грибов. Сыпучие среды (зерно, отруби) используют для приготовления больших количеств спорового посевного материала.

После выделения культур и своевременной их очистки от посторонних организмов следует поддерживать чистые культуры в жизнеспособном состоянии. Простейший способ поддержания – пересев их через определенное время в пробирки на косяки свежей агаризованной среды. Периодичность пересевов зависит от вида гриба и определяется временем его выживаемости. При пересевах переносят, главным образом, споры, а у неспорообразующих форм – мицелий из краевой зоны колонии. Следует учитывать, что длительное выращивание грибов на искусственных средах может привести к изменению свойств культуры, в частности, к потере патогенности, снижению агрессивности и вирулентности. Для хранения выбирают лучшие из имеющихся культур. Культуры сохраняют при комнатной температуре или в холодильнике при температуре 4 °С. Пересевы (если культура хранится в холодильнике) делают реже. [2]

ВЫВОДЫ

В ходе исследования были сделаны следующие выводы. В период развития большинства грибов минимальный температурный предел колеблется в пределах 15°С. Оптимальный диапазон большинства видов находится между 15-30С. Исследования показали, что патоген пшениц Alternaria Sp. Лучше развивается в соке ячменя с агаром при 25-30°С, образует максимальную массу мицелия и быстро созревает в период спороношения. У некоторых грибов оптимальный температурный предел ниже или может быть выше. Например, Tilletia caries Tul. максимальное развитие телиоспор наблюдается при температуре почвы 8-10°С. Предел относительной влажности при их развитии колеблется в пределах 20-100%. Этот показатель позволяет грибам распространяться и развиваться во всех средах на земле. Большинство видов грибов, патогенных на растениях, лучше растут на воздухе и при уровне 40-95% предельной влажности питательной среды. Грибы сапролегнии нормально растут даже в 100% воде. Грибы, относящиеся к порядкам Erysiphe и Uncinula, возбудители мучнистой росы, интенсивно развиваются при пониженной относительной влажности воздуха.

Как известно, болезни растений делятся на 2 группы, неинфекционные и инфекционные. Неинфекционные заболевания вызываются абиотическими факторами, которые имеют несколько причин:

1. Неблагоприятная метеорологическая
2. Почвенно-погодные условия
3. Низкая и высокая температура, недостаток воды и питательных веществ или чрезмерное использование.
4. Кислотность почвы ниже и выше нормы
5. Наличие вредных веществ в воздухе и др.

При возникновении неинфекционных заболеваний необходимо обращать внимание на абиотические факторы, вызывающие эти заболевания, и стараться адаптировать их к норме. Инфекционные заболевания вызываются патогенными организмами, к которым относятся вирусы, бактерии, грибы и микоплазмы. В борьбе с этими болезнями необходимо использовать агротехнические, механические, биологические и химические методы. Фермеры, работающие в сфере производства яблок в Азербайджане, нуждаются в дополнительной технической поддержке. По этой причине важно знать о широко распространенных в стране вирусных и бактериальных заболеваниях яблок, даже если они небольшие. [3]

Бактериальный рак или бактериальный некроз поражает все надземные органы растения. На молодых побегах появляются водяные пятна, а на листьях – пятна цвета дуба. Зараженные ветки выглядят так, как будто их обожгло огнем. Болезнь начинается ранней весной с побурения и потемнения генеративных органов, развитие которых прекращается.

Меры борьбы - В целях агротехнического контроля не допускать посева зерна в течение 2-3 лет на посевной площади, заселенной возбудителями болезней. Зерно на зараженных полях следует убирать в конце сезона. Поля, которые будут засеяны в текущем году, должны быть удалены не менее чем на 500 м от зерновых полей, которые были сильно заражены вирусами в прошлом году, и должны быть выбраны вирусоустойчивые предшественники. После уборки урожая следует очистить поле от растительных остатков, провести глубокую вспашку, перед посевом внести под плуг минеральные удобрения, содержащие калий и фосфор. [5]

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