

Biochemical Effect Mechanism of Probiotics in Gut and Evaluation of Their Effect on Allergies

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BIOCHEMICAL EFFECT MECHANISM OF PROBIOTICS IN GUT AND EVALUATION OF THEIR EFFECT ON ALLERGIES

PROBİYOTİKLERİN BAĞIRSAKTAKİ BİYOKİMYASAL ETKİ MEKANİZMASI VE
ALERJİ ÜZERİNE ETKİLERİNİN DEĞERLENDİRİLMESİ

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Abstract

Probiotics are natural members of the gut microbiota. In order to be effective, they must first pass through the intestinal tract alive by showing resistance to gastric acidity and bile salts, and finally colonize the cell surfaces of the intestinal epithelium. The limitation of allergy treatment methods has paved the way for the use of probiotics for the development of alternative treatment applications. However, in order for probiotics to be used in the treatment of allergic diseases, first of all, the biochemical effect mechanism in the gastrointestinal system (GIS) should be fully understood and a hypothesis consisting of three steps has been proposed for this purpose. The first step of the mechanism is that probiotics reduce the number of pathogenic bacteria and they do this by producing antimicrobial metabolites as a result of their activities in the GIS and showing antagonistic effect against other microorganisms. The second step of the mechanism is competition for nutrients, colonization sites and adhesion to intestinal epithelial tissue. The third step of the mechanism is that they change the enzymatic activity, and they do this by producing digestive system enzymes and thus contributing to the epithelial barrier functions of the intestinal tissues. Some people's immune system may also react to substances that are not normally harmful, and IgE antibodies are formed against these allergens, especially as a result of the system's repeated encounters with these allergens, and the findings of this hypersensitivity process indicate allergies. Probiotics act on the GIS by providing intestinal modulation with their dominant colonies in the intestines and stimulate mucosal immunity. They enhance the host immune system and the mucus barrier system by interacting with immune cells in the small intestine and large intestine. Both systemic and local-mucus immune systems can be regulated by probiotics in the GIS. In conclusion, probiotics show beneficial effects by regulating the microbial balance of the GIS.

Keywords: Probiotics, Biochemical Effect Mechanism, Allergy, Gastrointestinal System, Gut microbiota

Özet

Probiyotikler gut mikrobiyatanın doğal üyeleridir. Etkili olmaları için ilk olarak mide asitliğine ve safra tuzlarına dayanıklılık göstererek bağırsak kanalına canlı olarak geçmeleri ve son olarak bağırsak epitelyum hücre yüzeylerinde kolonize olmaları gerekmektedir. Alerji tedavi yöntemlerinin kısıtlı olması alternatif tedavi uygulamalarının geliştirilmesi için probiyotiklerden yararlanılmasının önünü açmıştır. Ancak

probiyotiklerin alerjik hastalıkların tedavisinde kullanılabilmesi için öncelikli olarak gastrointestinal sistemdeki (GIS) biyokimyasal etki mekanizmasının tamamen anlaşılması gerekmektedir ve bu amaçla üç adımdan oluşan bir hipotez önerilmiştir. Mekanizmanın birinci adımı probiyotiklerin patojen bakterilerin sayılarını azaltmasıdır ve bunu GIS'deki faaliyetleri sonucu antimikrobiyal metabolitler üretmeleri ve diğer mikroorganizmalara karşı antagonistik etki göstermeleri ile gerçekleştirirler. Mekanizmanın ikinci adımı ise besin öğeleri, kolonizasyon bölgeleri ve bağırsak epitel dokusuna yapışma rekabetidir. Mekanizmanın üçüncü adımı enzimatik aktiviteyi değiştirmeleri olup bunu da sindirim sistemi enzimlerini üretmeleri ve böylece bağırsak dokularının epitel bariyer fonksiyonlarına katkı sağlamaları ile gerçekleştirirler. Bazı insanların bağırsak sistemi normalde zararlı olmayan maddelere karşı da reaksiyon gösterebilmektedir ve özellikle bu alerjenlerle sisteminin tekrarlayan karşılaşmaları sonucunda bunlara karşı IgE antikorları oluşur ve bu aşırı duyarlılaşma sürecinin bulguları alerjiyi işaret eder. Probiyotikler bağırsaklardaki baskın kolonileri ile bağırsak modülasyonunu sağlayarak GIS'e etki eder ve mukazal bağırsıklığı uyarır. İnce bağırsak ve kalın bağırsaktaki immün hücreler ile etkileşime girerek konakçı immün sistemini ve mukus bariyer sistemini güçlendirirler. Hem sistemik hem de lokal-mukus immün sistem GIS'teki probiyotikler tarafından ayarlanabilmektedir. Sonuç olarak probiyotikler bağırsak sisteminin mikrobiyal dengesini düzenleyerek yararlı etkilerini göstermektedirler.

Anahtar Kelimeler: Probiyotikler, Biyokimyasal Etki, Alerji, Gastrointestinal Sistem, Gut mikrobiyata

1. INTRODUCTION

Probiotics are natural members of the human intestinal microflora and are usually lactic acid producing bacteria. They can prevent the presence of pathogenic bacteria by forming a colony. By adhering to the intestinal surface, they play a role in preventing the adhesion and proliferation of pathogenic microorganisms. It is reported that adhesion to human intestinal cells is due to the mechanism consisting of different combinations of proteins and carbohydrates on the bacterial surface, and thus they adhere to the human intestinal system and form a barrier (Timmerman et al., 2004). It has been reported that the intestinal barrier is associated with allergic diseases, especially eczema and atopic dermatitis (Penders et al., 2007). As the biochemical effect mechanisms of probiotics in the GIS are understood, alternative methods will be suggested for preventive treatment of diseases (Doğan, 2012). Since allergy treatment methods are limited, probiotics can be used in the development of alternative treatment applications. However, in order for probiotics to be used in the treatment of allergic diseases, first of all, the biochemical mechanism of effect in the GIS should be well understood. Such microorganisms perform fermentation for energy recovery in the GIS, and lactic acid and acetic acid are formed as fermentation products. Thus, they lower the pH of the environment and negatively affect the growth of pathogenic bacteria. Lactic acid, acetic acid, bacteriocin, protein complexes, fatty acids and similar metabolites formed as a result of biochemical reactions strengthen the colonization of probiotics in the GIS and prevent the presence of pathogenic bacteria. The fact that probiotics activate regulatory T cells, increase the production of IgA, increase

the release of IL-10, TGF- β and PGE2 provide stimulation of the immune system. In this sense, regulation of the immune system is beneficial in the treatment of allergic diseases (Singh and Ranjan, 2010).

2. THE IMPORTANCE OF GIS and GUT MICROBIOTA

There are many microorganisms in a symbiotic relationship in human GIS and maintain their vitality, and it is inevitable that various diseases will occur in their deficiencies. In the human intestinal system, there are microorganisms 10-20 times the number of eukaryotic cells. GIS of healthy people is one of the most important entry routes for systemic or local infections. However, the anatomical, chemical and biological barriers of the GIS are the most important defense mechanisms that prevent the formation of infection and prevent the development of infection by direct and indirect ways (Noverr and Huffnagle 2004).

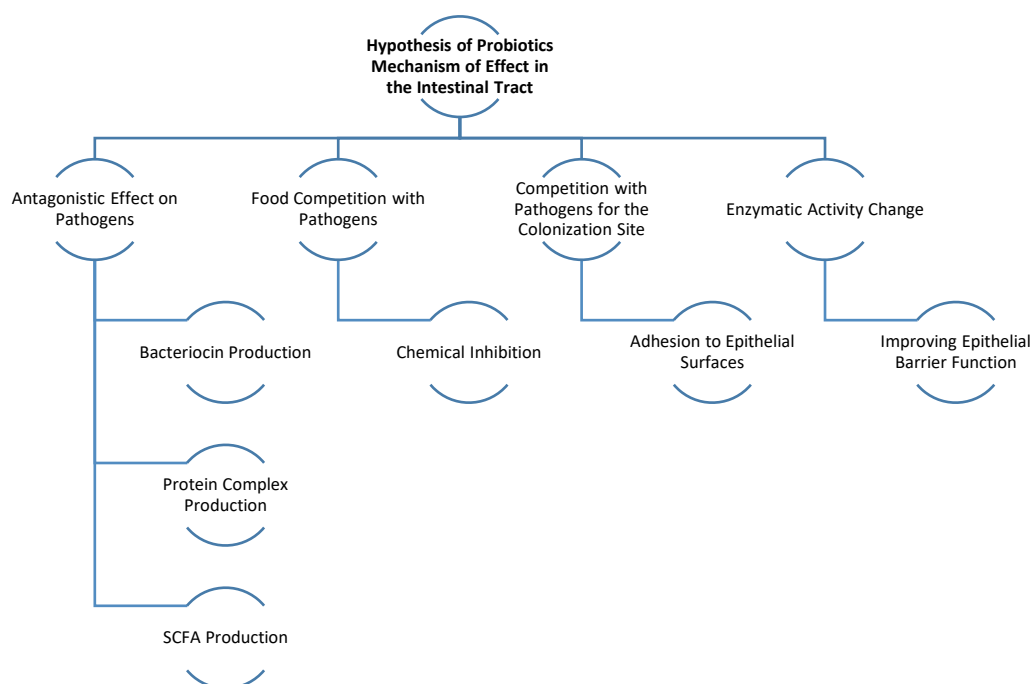
GIS are gut microorganisms that affect the immune system, and it has been proven that the immune system cannot function normally without them. It is reported that probiotics achieve this by reducing the risk of colonization of pathogenic bacteria. Local pH or redox potential changes, hydrogen sulfide and short-chain fatty acids, which occur as a result of the metabolism of gut microflora, provide pathogens inhibitory properties. The gut microflora, in which there are particularly intense and different bacteria in GIS, affects many biochemical, physiological and immunological properties of the host (Ly et al., 2011).

3. PROBIOTICS

Probiotics are living microorganisms that regulate the balance of gut microbiota, regulating mucosal and systemic immunity and beneficially affect the host. There are between 400 and 500 different types of microorganisms in the gut microbiota flora, among which there are both pathogenic and health-beneficial microorganisms (Timmerman et al.2004). Probiotics are predominant in a healthy human GIS, and in order for them to be effective in GIS, they must first pass through the intestinal tract alive by resisting gastric acidity and bile salt, and colonize the cell surfaces of the intestinal epithelium (Ouwehand and Salminen 2003).

3.1. THE BIOCHEMICAL EFFECT MECHANISM OF PROBIOTICS IN THE GIS

A hypothesis summarized below has been proposed for the biochemical mechanism of effect of probiotics in the intestinal tract (Figure 1).



The effects of probiotics occur through three mechanisms. The first of these is to reduce the number of pathogens, and as a result of the activities of probiotics in the intestinal tract, they produce antimicrobial substances (bacteriocin etc.), release them into the colon and show antagonistic effect against other microorganisms. In addition, the protein complexes and Short-chain fatty acids (SCFA) produced by them are the reasons for the antagonistic mechanism of effect for other species. Second, they compete with other microorganisms for nutrients and colonization sites. Therefore, the mechanism of effect of probiotics can be explained by chemical inhibition against other intestinal microflora members, competition for adhesion to nutrients and intestinal epithelial tissue. Third, it changes the enzymatic activity. This is because it produces enzymes that regulate GIS and thus contributes to the epithelial barrier functions of the intestinal tissues. As a result, probiotics show beneficial effects by regulating the gut microbiota balance of the intestinal system of humans and animals (Fooks and Gibson 2002).

3.2. ADHESION OF PROBIOTICS TO THE INTESTINAL EPITHELIAL SURFACES

Adhesion and colonization of probiotics to intestinal epithelial surfaces is a prerequisite for stimulation of the immune system and antagonistic effect against pathogens, and therefore adhesion is one of the main criteria for probiotic selection (Ouwehand and Salminen 2003). Mucus is a gel-like structure secreted by the mucosal glands and goblet cells lining the intestinal tract epithelium. The structural composition of mucus is large molecules, such as the polymer of mucin and highly glycolyzed protein monomers linked together by disulfide bonds. Probiotics must be able to pass through the acidic environment of the stomach to reach the adhesion surfaces in the intestinal tract. The first contact surface of probiotics that can reach the intestine is the mucus layer and must

adhere to it in order to colonize the epithelial surfaces. Probiotics that colonize the surface of the intestinal tract after adhesion form a barrier against pathogenic microorganisms. It has been reported that with antimicrobial metabolites produced by colonized probiotics, it reduces the colonization of pathogens on the surface of the intestinal system, modulates the immune system and benefits the healing of damaged mucosa (Ringot-Destrez et al, 2018).

3.3. SUBSTANCES PRODUCED BY PROBIOTICS

Probiotics produce vitamins (vitamin K, folic acid, biotin, B1, B2, B12, Niacin and pnydoxin), enzymes (amylolytic, proteolytic and lipolytic) and essential fatty acid (Timmerman et al., 2004). In addition, they also produce metabolites such as lactic acid, hydrogen peroxide, bacteriocin, conjugated linoleic acid, diacetyl and acetaldehyde, galacto-oligosaccharide (GOS). Lactic acid destroys the substrate carrying ability of the cell by disrupting the membrane structure and has a negative effect on microorganisms. It has been determined that hydrogen peroxide formed by probiotics has an inhibitory effect on many microorganisms. It has also been reported that it produces diacetyl as a defense mechanism to compete with other microorganisms. Bacteriocins are protein or protein complexes and are potential antimicrobial agents produced by some bacterial species. Many microorganisms such as *Lactococcus*, *Lactobacillus*, *Pediococcus*, *Leuconostoc*, *Staphylococcus* and *Enterococcus* can produce bacteriocins. Conjugated linoleic acid (CLA) is a fatty acid synthesized by gut microorganisms. It has been determined that it is anticarcinogenic, antiatherogenic, antidiabetic, stimulating the immune system, regulating the composition of body fat, muscle and mineral substances. The Beta-Galactosidases enzyme produced by probiotics enables the production of GOS and is indigestible in human and animal metabolism, but they show prebiotic properties (Timmerman, et al.2004).

4. PROBIOTICS AND ALLERGY

The immune system, which protects against diseases, may also react to substances that are not normally harmful in some people. In allergic people, IgE-type antibodies are formed against allergens as a result of repeated encounters with the immune system. This process is called "hypersensitivity" and after the sensitization process is completed, after each contact with the allergen, allergic disease symptoms appear in the person in a short time. It develops through mediators secreted by a group of cells called mast cells and basophils carrying allergen-specific IgE antibodies. With the effect of these mediators (a group of biochemical substances, mainly histamine), allergy symptoms occur in target organs (such as eyes, nose, respiratory tract). Allergens are antigens that cause allergies, and most allergens that react with IgE and IgG antibodies are often carbohydrate side-chain proteins, although in some cases it has been hypothesized that pure carbohydrates may also be allergens (Johansson et al., 2004). It is known that there are a large number of microorganisms in the human intestine that survive with a symbiotic effect. The gut microbiota, especially the GIS flora, which contains very dense and different bacteria, can affect many biochemical, physiological and immunological properties of the host (Manichanh et al., 2012).

Probiotics provide intestinal modulation in the intestinal tract with dominant colonies and stimulate mucosal immunity by acting on GIS. As a result, they interact with immune cells in the small intestine and large intestine to strengthen the host's immune system and mucus barrier system. Both systemic and local-mucus immune systems can be regulated by probiotics in the gut. It is reported that the barrier antigen formed by probiotics in the intestinal system is effective in preventing the passage of metabolites to the circulatory system. Many recent studies report that probiotics have a role in the treatment and prevention of atopic dermatitis, eczema, allergic rhinitis, asthma and other allergic diseases. Studies suggest that the regulation of gut microbiota helps prevent allergic diseases (Kukkonen et al., 2010).

It has been established that there is a close relationship between eczema and intestinal permeability or cavities of the intestinal wall in the digestive tract. It is reported that eczema occurs when large food particles are mixed into the blood without being completely digested and breaking down into small particles. When large molecules enter the blood, they attach to various cells in any part of the body and defense factors begin to move around these molecules.

In this case, inflammation increases and histamine increases due to the IgE antibody, and these chemicals cause an itchy and scaly eczema allergy. Probiotics break down these allergen-causing macromolecules in the intestinal tract into smaller non-allergen molecules. Thus, allergens are prevented from entering the blood in the system (Niers et al., 2009). The therapeutic and preventive mechanism of probiotics in allergy is briefly given in Table 1.

Table 1. The therapeutic and preventive mechanism of probiotics

Mechanism of Effect	Pathway of Mechanism of Effect
Immune System Modulation	Probiotics help regulate the immune system by affecting the GIS biochemically and physiologically. Thus, regulation of immunity positively affects allergy treatment.
Strengthening the Intestinal Mucosa	Probiotics strengthen the protective mucous barrier in the intestines. Thus, they prevent allergic substances from entering the blood by reducing intestinal permeability.
Breakdown of Allergenic Substances	Allergenic substances broken down in GIS by probiotics are reduced to non-allergenic substances. For example, the reduction of proteins (protein hydrolysis) down to the smallest units (amino acids) can reduce the occurrence of allergic events.
Suppressing IgE Production	When the body encounters allergens, too much IgE antibody is produced, which causes the release of histamine that causes allergic responses, and probiotics can control this excessive IgE production.
Increase of IL-10 Production	It stimulates the prevention of allergy and decrease in inflammation with the increase of IL-10 production.
Increase of IgG Production	Probiotics stimulate the increase in the level of IgG antibody, which plays a protective role against allergies.

5. RESULT AND DISCUSSION

It can be hypothesized that probiotics are beneficial against infections by forming a dominant flora in the intestinal tract. However, it would be a wrong assumption to conclude that it has a direct effect on allergic diseases. The effect of probiotics on allergic diseases can be explained by the conversion of allergic substances entering the intestinal system into smaller non-allergenic substances. It is also the case that probiotics improve the barrier function of the intestinal mucosa and reduce the antigen passage through the mucosa. We can argue that the source of all allergic diseases is the malfunctioning of the human immune system. In addition, we can say that probiotics are beneficial against allergic diseases by regulating the natural immune system. The regulation of the natural immune system begins with the regulation of the intestinal mucosal immune system. This mucosal immune regulation that occurs later provides the stimulation of the entire immune system (Tang 2009).

There is a Hygiene Hypothesis regarding the occurrence of allergic diseases. According to the Hygiene Hypothesis, children are raised in sterile environments in many industrialized countries and the natural immune system of children raised in sterile environments is not well developed. In addition, the mechanism that needs to be used in different defense areas in the body reacts to what the body should perceive as harmless. For these reasons, it is assumed that allergic sensitivity occurs. In summary, the hygiene hypothesis suggests that allergic sensitivity is due to the wrong positioning of the immune system. From this point of view, it can be argued that probiotics have a positive effect in preventing and treating allergic diseases by regulating the immune system (Isolauri et al., 2009).

In recent years, interest in the complex microbial ecosystem in the human gastrointestinal tract has increased. The most important reasons for this increase are related to the attachment of probiotics to the mucosal surfaces in the intestine, which hosts microbial ecosystem colonies, their antagonistic activity to pathogens and thus stimulation of the immune system. Natural bacteria of the human intestinal microflora can be composed of probiotics, but today's stress, malnutrition and environmental pollution have disrupted this structure. We suggest that many more in vivo studies should be conducted to fully correlate the gut microbial population and their biochemical effects (Bangerter et al.2020).

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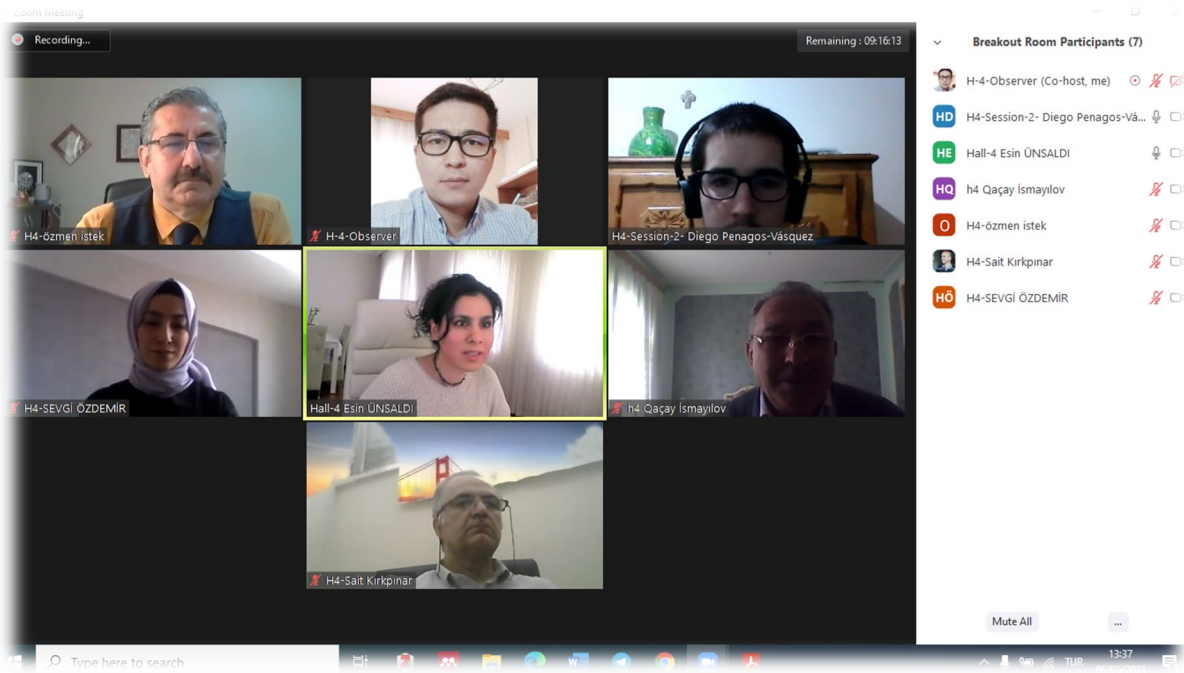
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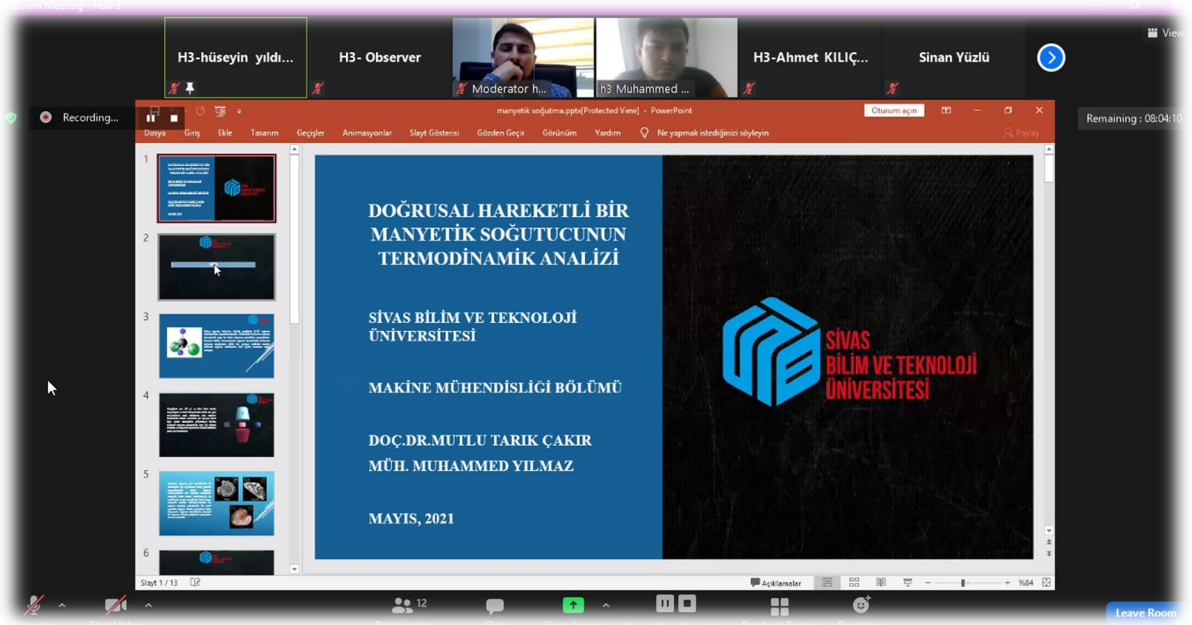
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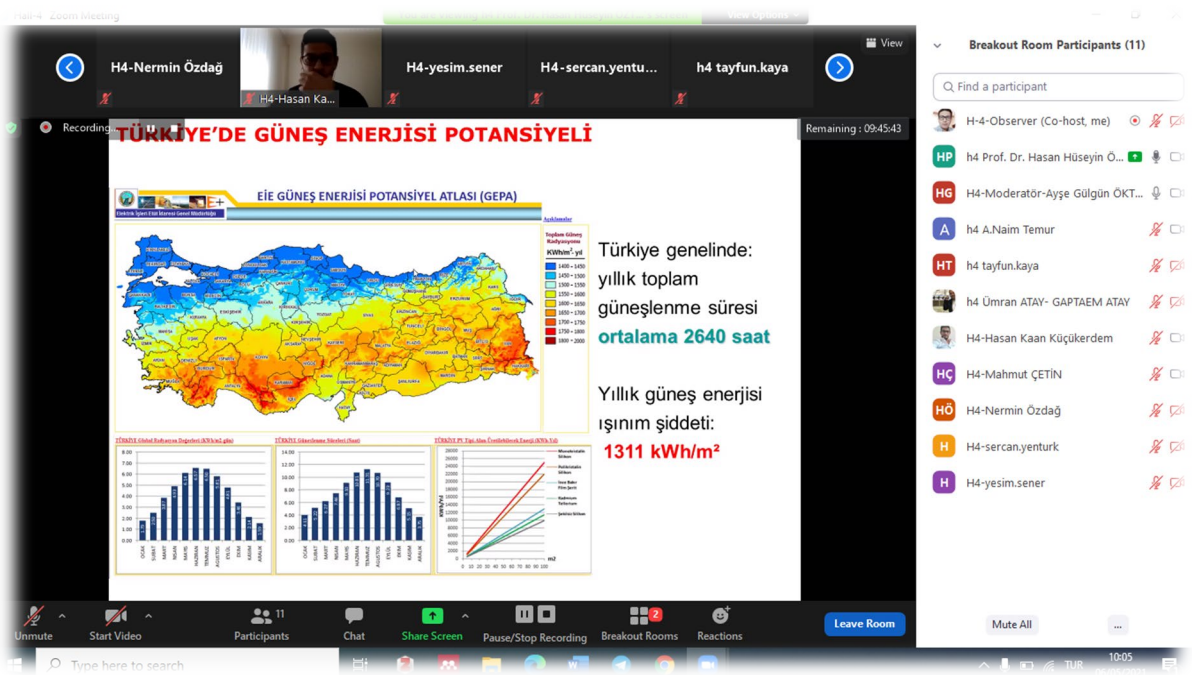
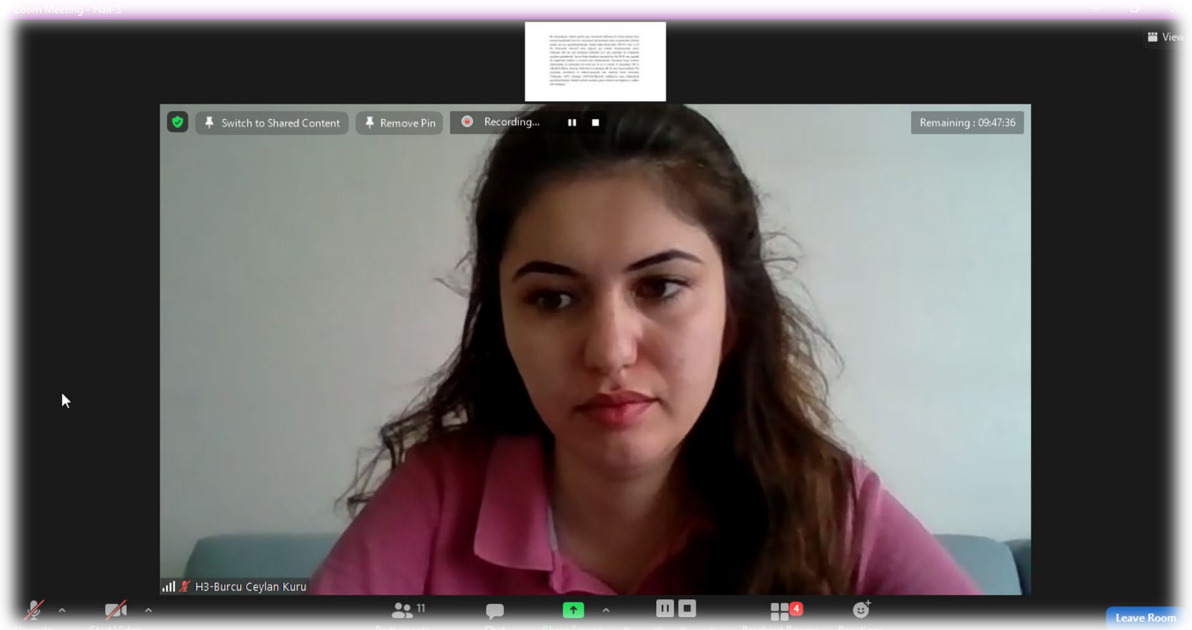
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- ❖ Moderatör – oturumdaki sunum ve bilimsel tartışma (soru-cevap) kısmından sorumludur.

Dikkat Edilmesi Gerekenler- TEKNİK BİLGİLER

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CONGRESS LANGUAGES: Turkish and all dialects, English, Russian

~Opening Ceremony~

06.05.2021



09⁴⁰-10⁰⁰

• **Turkey Local Time**

Head of Organizing Committee

Dr. Hüseyin ERİŞ

Harran University

Participants Countries:

Turkey, Colombia, Azerbaijan, Algeria, Pakistan

DATE
06.05.2021

HALL-3
SESSION-1

ANKARA TIME
10⁰⁰-12³⁰

MODERATOR: Dr. Harun KOÇAK

Yıldırım ÖZÜPAK	Dicle Üniversitesi	YÜKSEK GERİLİM SİSTEMLERDE İLETİM HATLARINDA MEYDANA GELEN ELEKTRİK ALANININ ANALİZİ
Yıldırım ÖZÜPAK	Dicle Üniversitesi	YÜKSEK GERİLİM GÜÇ HATLARININ MANYETİK ALAN ANALİZLERİ
Dr. Öğr. Üyesi Fatih ÖZBAĞ Burcu CEYLAN KURU	Harran Üniversitesi	EVANS FONKSİYONU İLE TERS YÖNDE İLERLEYEN DALGALARIN SPEKTRUM ANALİZİ
M. Tarık ÇAKIR Bekir YELMEN	Sivas Bilim ve Teknoloji Üniversitesi Adana Büyükşehir Belediyesi	ISI GİDERİ İLE SOĞUTMANIN CFD ANALİZİ
Sinan YÜZLÜ Prof. Dr. Şule UĞUR	Gazi Üniversitesi	XIn 2 O 4 (X = Mg, Zn, Cd) BİLEŞİĞİNİN YAPISAL, ELASTİK, ELEKTRONİK VE FONON ÖZELLİKLERİ: YOĞUNLUK FONKSİYONEL TEORİSİ LDA VE GGA HESAPLAMALARI
Zeynep KIZILIRMAK Prof. Dr. Şule UĞUR	Gazi Üniversitesi	XIn 2 S 4 (X = Mg, Zn, Cd) SPİNEL BİLEŞİKLERİNİN İLK İLKE HESAPLAMALARI İLE YAPISAL, ELASTİK, ELEKTRONİK ve FONON ÖZELLİKLERİ
Ezgi MAMAN Prof. Dr. Gökay UĞUR	Gazi Üniversitesi	X 2 MgS 4 (X = Sc, Y, Cd) SPİNEL BİLEŞİKLERİNİN YAPISAL, ELEKTRONİK, ELASTİK VE FONON ÖZELLİKLERİ: DFT ÇALIŞMASI
Hüseyin YILDIRIM	Karabük Üniversitesi	Ir-Au NANOALAŞIMLARININ YAPISAL, ENERJİK ve ERİME ÖZELLİKLERİNE KOMPOZİSYON ETKİSİ
Muhammed YILMAZ Mutlu Tarık ÇAKIR	Sivas Bilim ve Teknoloji Üniversitesi	DOĞRUSAL HAREKETLİ BİR MANYETİK SOĞUTUCUNUN TERMODİNAMİK ANALİZİ
Öğr. Gör. Dr. Harun KOÇAK	Gazi Üniversitesi	HAVACILIKTA KULLANILAN DOLU GÖVDELİ PERÇİNİN ŞEKİLLENDİRİLMESİNDE BASKI KUVVETİNİN ARAŞTIRILMASI
İrem FİNCAN Selin ÖZDEMİR Özgür ÇOPKUR Mustafa BİRİCİKÖZCAN	Sanem Plastik Tasarım Merkezi	PVC MASA ÖRTÜSÜ ÜRETİMİNDE KULLANILMAK ÜZERE TEKLİ PAKET STABİLİZATÖR HAZIRLANMASI

DATE
06.05.2021

HALL-3
SESSION-2

ANKARA TIME
13⁰⁰-15³⁰

MODERATOR: Doç. Dr. Latif Onur UĞUR

Öğr. Gör. Necip Altay EREN	Gaziantep Üniversitesi	ÇELİK FİBERİN BETON KİRİŞLERİN DARBE DİRENCİNE ETKİSİ
Doç. Dr. Latif Onur UĞUR Merve ARSLAN	Düzce Üniversitesi	İNŞAAT MÜHENDİSLERİNİN MÜHENDİSLİK ETİĞİ UYGULAMALARININ DEĞERLENDİRİLMESİ
Doç. Dr. Latif Onur UĞUR İrem ÇELİK	Düzce Üniversitesi	İNŞAAT FİRMALARININ KAMU İHALELERİNE GİRİP GİRMEME KARARI VERMELERİNE YÖNELİK BİR ANKET ÇALIŞMASI
Doç. Dr. Latif Onur UĞUR	Düzce Üniversitesi	İHALEYİ KAZANACAK BİR İNŞAAT FİRMASININ GRİ İLİŞKİSEL ANALİZ YÖNTEMİ İLE BELİRLENMESİ
Gökhan ORAL	Bartın Üniversitesi	FİBER KATKILAR İLE MODİFİYE EDİLEN GEÇİRİMLİ ASFALT KAPLAMA KARIŞIMLARIN TASARIM PARAMETRELERİNİN İNCELENMESİ
Doç. Dr. Murat ALTEKİN Burak YÜCE	Yıldız Teknik Üniversitesi	ELASTİK ZEMİNE OTURAN KOMPOZİT DAİRESEL PLAKLARIN EĞİLME ANALİZİ
Dr. Öğr. Üyesi Reşit GERGER Selmin DERE	Harran Üniversitesi	GEN EKSPRESYON YÖNTEMİ İLE YAĞIŞ AKIŞ İLİŞKİSİNİN DEĞERLENDİRİLMESİ: E26A024 İSTASYONU ÖRNEĞİ
Dr. Öğr. Üyesi Nasır NARLIOĞLU	İzmir Kâtip Çelebi Üniversitesi	FARKLI ANHİDRİT MODİFİKASYONUNUN AHŞAP KAPLAMA FİZİKSEL ÖZELLİKLERİNE ETKİSİ
Usman Muhammad Gidado Muhammad Ahmad Ibrahim ABDULKADİR Sani SANI INUSA MILALA	Abubakar Tafawa Balewa University, Nigeria	CHALLENGES OF REWORK IN CONSTRUCTION PROJECT OF RECONSTRUCTIONS REHABILITATION AND RESETTLEMENT (RRR) MINISTRY BORNO STATE
Dr. of eng.sc. Rasim NƏSİB OĞLU NƏBİYEV T.f.d. Qədir İSAXAN OĞLU QARAYEV Ruslan RÜSTƏM OĞLU RÜSTƏMOV	National Aviation Academy of Azerbaijan	DETERMINATION OF HIGH SENSITIVE AUTOGENERATOR SCHEME FOR CAPACITY SENSORS
Dr. of eng.sc. Rasim NƏSİB OĞLU NƏBİYEV T.f.d. Qədir İSAXAN OĞLU QARAYEV Ruslan RÜSTƏM OĞLU RÜSTƏMOV Hafiz SAMİR OĞLU QULUZADƏ	National Aviation Academy of Azerbaijan, Anadolu University	SOFTWARE DEVELOPMENT DIFFERENTIAL CAPACITANCE DEVICE WITH TWO AUTO GENERATORS

DATE
06.05.2021

HALL-3
SESSION-3

ANKARA TIME
16⁰⁰-18³⁰

MODERATOR: Dr. Murat DOĞAN

Dr. Öğr. Üyesi Murat DOĞAN	Istanbul Gelişim Üniversitesi	PROBİYOTİKLERİN BAĞIRSAKTAKİ BİYOKİMYASAL ETKİ MEKANİZMASI VE ALERJİ ÜZERİNE ETKİLERİNİN DEĞERLENDİRİLMESİ
Arş. Gör. Mine KUÇAK Prof. Dr. M. Hamza MÜSLÜMANOĞLU	Yıldız Teknik Üniversitesi	TOLUHİDROKİNONUN KOLON KANSERİ HÜCRELERİ ÜZERİNDEKİ SİTOTOKSİK ETKİLERİNİN ARAŞTIRILMASI
Dr. Seval ZEYBEK Prof. Dr. Emine ÇIKMAN	Denizbank Güneydoğu Anadolu Bölge Müdürlüğü, Harran Üniversitesi	BAZI ABİYOTİK FAKTÖRLERİN GÜBRE BÖCEKLERİNE ETKİSİ
Dr. Emre Turgay	Istanbul University	METAGENOMİCS FOR BETTER CHARACTERIZATION OF MICROBIAL BIODIVERSITY IN AQUACULTURE
Duygu AYDIN Özlem AKSOY Burcu YUKSEL	Kocaeli Üniversitesi	Kathon CG'nin Bezelye Üzerindeki Sitotoksik Etkisi ve Sıvı Vermikompostun Düzenleyici Özelliği
Rania Kara Amor Azizi	Ferhat Abbas-Sétif 1 University, Algeria Abbes Laghrour University	ELECTROCHEMICAL CONSTRUCTION OF THIN FILM (0001)-ZnO/(111)-Cu 2 O HETEROJUNCTION DIODE WITH EXCELLENT RECTIFICATION FEATURE
Rabia Shabir Ahmad	Government College University, Pakistan	GARLIC: NUMINOUS FOOD IN HEALTH PROMOTION
Waffa Bouafia	University of Batna 2, Algeria	IN-VITRO INVESTIGATION OF BIOLOGICAL ACTIVITY OF AERIAL PART OF EPHEDRA ALTISSIMA
Dr. Muhammad Imran	Government College University, Pakistan	GENERAL CHANGES IN FOODS DURING MODERN EXTRUSION COOKING
Dos. Novruz Nasirov Guliyeva Jale	Azerbaijan State Pedagogical University	SOLUTION OF SOME INEQUALITIES INCLUDED IN THE 8TH GRADE PARAMETER
Levent BEYAZSAKAL Prof. Dr. Ahmet KILIC	Harran University	YENİ AMİN-BİS(FENOLAT) LİGANDLARI VE BUNLARIN BOR KOMPLEKSLERİNİN SENTEZİ, KARAKTERİZASYONU VE SPEKTROSKOPİK ÇALIŞMALARI
Bagirova Fidan	Azerbaijan State Pedagogical University	OPPORTUNITIES AND WAYS TO BUILD INTERDISCIPLINARY RELATIONSHIP IN THE TEACHING OF BIOLOGY RELATED TO GEOGRAPHY

DATE
06.05.2021

HALL-4
SESSION-1

ANKARA TIME
10⁰⁰-12³⁰

MODERATOR: Doç. Dr. Ayşe Gülgün ÖKTEM

Prof. Dr. H. Hüseyin ÖZTÜRK Prof. Dr. Mahmut ÇETİN Ümran ATAY Ertan KAPLAN Uğur Mutluhan ORUNCAK Levent DAİ Yeşim ŞENER Fatih KAYMAK Kemal KAÇKIN Sercan YENTÜRK Nermin ÖZDAĞ	Çukurova Üniversitesi GAP Tarımsal Araştırma Enstitüsü Müdürlüğü Şanlıurfa Tarım ve Orman İl Müdürlüğü Dicle Elektrik Dağıtım A.Ş.	HARRAN OVASINDA İKİNCİ ÜRÜN MISIR ÜRETİMİNDE GÜNEŞ ENERJİLİ DAMLA SULAMA SİSTEMİ İÇİN TASARIM DEĞİŞKENLERİNİN BELİRLENMESİ
Prof. Dr. H. Hüseyin ÖZTÜRK Prof. Dr. Mahmut ÇETİN Ümran ATAY Ertan KAPLAN Uğur Mutluhan ORUNCAK Levent DAİ Yeşim ŞENER Fatih KAYMAK Kemal KAÇKIN Sercan YENTÜRK Nermin ÖZDAĞ	Çukurova Üniversitesi GAP Tarımsal Araştırma Enstitüsü Müdürlüğü Şanlıurfa Tarım ve Orman İl Müdürlüğü Dicle Elektrik Dağıtım A.Ş.	HARRAN OVASINDA PAMUK ÜRETİMİNDE GÜNEŞ ENERJİLİ DAMLA SULAMA SİSTEMİ İÇİN TASARIM DEĞİŞKENLERİNİN BELİRLENMESİ
Prof. Dr. H. Hüseyin ÖZTÜRK Prof. Dr. Mahmut ÇETİN Ümran ATAY Ertan KAPLAN Uğur Mutluhan ORUNCAK Levent DAİ Yeşim ŞENER Fatih KAYMAK Kemal KAÇKIN Sercan YENTÜRK Nermin ÖZDAĞ	Çukurova Üniversitesi GAP Tarımsal Araştırma Enstitüsü Müdürlüğü Şanlıurfa Tarım ve Orman İl Müdürlüğü Dicle Elektrik Dağıtım A.Ş.	GÜNEYDOĞU ANADOLU BÖLGESİNDE TARIMSAL SULAMA İÇİN ENERJİ TASARRUFU ÖNLEMLERİ
Dr. Öğr. Üyesi Abdül'naim Temur Hasan Bekircan Kiper	İstanbul Gelişim Üniversitesi	TÜRK TARIM SİGORTACILIĞINDA TARSİM ÖNCESİ VE SONRASI DURUM DEĞERLENDİRMESİ
Dr. Öğr. Üyesi Abdül'naim Temur	İstanbul Gelişim Üniversitesi	BİR DEN FAZLA SAĞLIK SİGORTASININ BULUNDUĞU DURUMLARDA ÇİFTE SİGORTA YASAKLARININ VEYA MÜŞTEREK SİGORTA HÜKÜMLERİNİN UYGULANACAĞI HAKKINDA ÖRNEK BİR VAK'A
Dr. Nusret MUTLU Prof. Dr. H. Hüseyin ÖZTÜRK Mustafa Ali Yurdupak Tuğçe Topaloğlu Dikbaş	T.C. Sanayi ve Teknoloji Bakanlığı GAP Bölge Kalkınma İdaresi Başkanlığı	TARIMSAL DEĞER ZİNCİRİ PAYDAŞLARI İÇİN YENİLENEBİLİR ENERJİ VE ENERJİ VERİMLİLİĞİ UYGULANABİLİRLİĞİNİN DEĞERLENDİRİLMESİ

Evrin Esen Uygun	Çukurova Üniversitesi Birleşmiş Milletler Kalkınma Programı (UNDP) Yıldız Kule	
Prof.Dr. H. Hüseyin ÖZTÜRK Arş.Gör. Hasan Kaan KÜÇÜKERDEM Dr. Nusret MUTLU Yılmaz DAĞTEKİN Mustafa AFŞAR Arzu KARAARSLAN	Çukurova Üniversitesi İğdır Üniversitesi T.C. Sanayi ve Teknoloji Bakanlığı GAP Bölge Kalkınma İdaresi Başkanlığı Birleşmiş Milletler Kalkınma Programı (UNDP) Yıldız Kule	YENİLENEBİLİR ENERJİ TEKNOLOJİLERİ İLE ELEKTRİK ÜRETİMİ İÇİN YATIRIM VE ÜRETİM MALİYETLERİ
Dr. Öğr. Üyesi Tayfun Kaya	Kırşehir Ahi Evran Üniversitesi	AKDENİZ VE MARMARA BÖLGESİNDE BAZI BEYAZSİNEK POPÜLASYONLARINDA PORTİERA İNSİDANSININ İNCELENMESİ
Muhammad Haseeb Ahmad	Government College University, Pakistan	FLUORESCENCE BASED CHARACTERİZATİON OF CEREALS FOR SENSOR DEVELOPMENT
Doç. Dr. Ayşe Gülgün ÖKTEM	Harran Üniversitesi	BAZI ATDİŞİ MISIR (Zea Mays L. indentata) GENOTİPLERİNİN YARI KURAK İKLİM KOŞULLARINDA BİYOKÜTLE VERİMİ VE ÖĞELERİNİN BELİRLENMESİ

DATE
06.05.2021

HALL-4
SESSION-2

ANKARA TIME
13⁰⁰-15³⁰

MODERATOR: Dr. Esin ÜNSALDI

Dr. Sait KIRKPINAR Prof. Dr. Mehmet Bozkurt ATAMAN	Harran Üniversitesi Selçuk Üniversitesi	KIVIRCIK IRKI KOYUNLARDA ÜREME SEZONU DIŞINDA KISA VE UZUN SÜRELİ CIDR UYGULAMALARININ BAZI FERTİLİTE PARAMETRELERİ ÜZERİNE ETKİLERİ
Dr. Esin ÜNSALDI Prof. Dr. M. Kemal ÇİFTÇİ	TOB TAGEM Selçuk Üniversitesi	FORMALDEHİT, KULLANIM ALANLARI, RİSK GRUBU, ZARARLI ETKİLERİ VE KORUYUCU ÖNLEMLER
Dr. Esin ÜNSALDI	TOB TAGEM	HASAK MELEZ KOYUN TİPİNDE NEUROCRANIUM'UN MAKROANATOMİK İNCELENMESİ
Prof. Diego Penagos-Vásquez Prof. Dr. Jonathan Graciano- Uribe	Instituto Tecnológico Metropolitano, Colombia	AKIŞKAN DİNAMİKLERİ SİMÜLASYONLARINI KULLANAN TİCARİ RADYAL AKIŞ SANTRİFÜJ POMPASININ SAYISAL ANALİZİ
Suleymanov S. Sh. İsmayilov G.K. Muradova E.M.	Azerbaijan State Pedagogical University	BIODIVERSITY AND DISTRIBUTION OF FISH FOUND IN THE SOUTHERN PART OF THE MIDDLE CASPIAN
Dr. Öğr. Üyesi Özmen İSTEK Prof. Dr. M. Cengiz HAN Dr. Arş. Gör. Murat TANRISEVER	Muş Alparslan Üniversitesi Fırat Üniversitesi	FIRAT ÜNİVERSİTESİ HAYVAN HASTANESİNE GETİRİLEN SIĞIRLARDAKİ TIRNAK DEFORMASYONLARI İLE AYAK HASTALIKLARININ RETROSPEKTİF DEĞERLENDİRİLMESİ
SEVGİ ÖZDEMİR	Harran Üniversitesi	İÇME SUYU DEZENFEKSİYONUNDA KULLANILAN BAZI YÖNTEMLER

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