



ICONFOOD'24

3RD INTERNATIONAL CONGRESS ON FOOD RESEARCHES

Future of Food



ABSTRACT BOOK

EDITORS

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Prof. Dr. Özlem Pelin Can

Assoc. Prof. Dr. Emre Hastaoğlu

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3RD INTERNATIONAL FOOD RESEARCH CONGRESS

October 16-17-18, 2024 / Sivas, Turkiye

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A handwritten signature in blue ink, appearing to read "Meryem Göksele Saraç".

Assoc. Prof. Dr. Meryem GÖKSEL SARAÇ
Chair of Congress / Kongre Başkanı



T.C.
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Sayı : E-30182376-051-474040
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ICONFOOD'24 3rd International Congress on Food Researches
16-18 Ekim, 2024
Sivas Cumhuriyet Üniversitesi, Sivas, Türkiye

Askorbik Asit Mikrokapsüllerinin Fizikokimyasal Özellikleri ve Antioksidan Aktivitesinin Değerlendirilmesi
Evaluation of the Physicochemical Properties and Antioxidant Activity of Ascorbic Acid Microcapsules

Doç. Dr. Tuğça BİLENLER KOÇ¹
Öğr. Gör. Ülkühan BAĞIŞ²
Prof. Dr. İhsan KARABULUT³

¹Sivas Cumhuriyet Üniversitesi, Mühendislik Fakültesi, Gıda Mühendisliği Bölümü, Sivas, Türkiye
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Participants: H1-Fundalga E.B.M., H1-Özlem..., H1-Dilekhan BAĞIŞ, H1-Ercan TAYAN, H1-Moderatör-Doç.Dr. Mağ..., H1-AYŞE AYAYDIN, H1-Tuba SARI, H1-Hayriye Göknur ADOĞAN, Aşhan Özcan H1

ERZİNCAN TULUM PEYNİRİ VE RAF ÖMRÜ ÇALIŞMALARINI İZİNFOOD'24, SİVAS

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PHOTO GALLERY

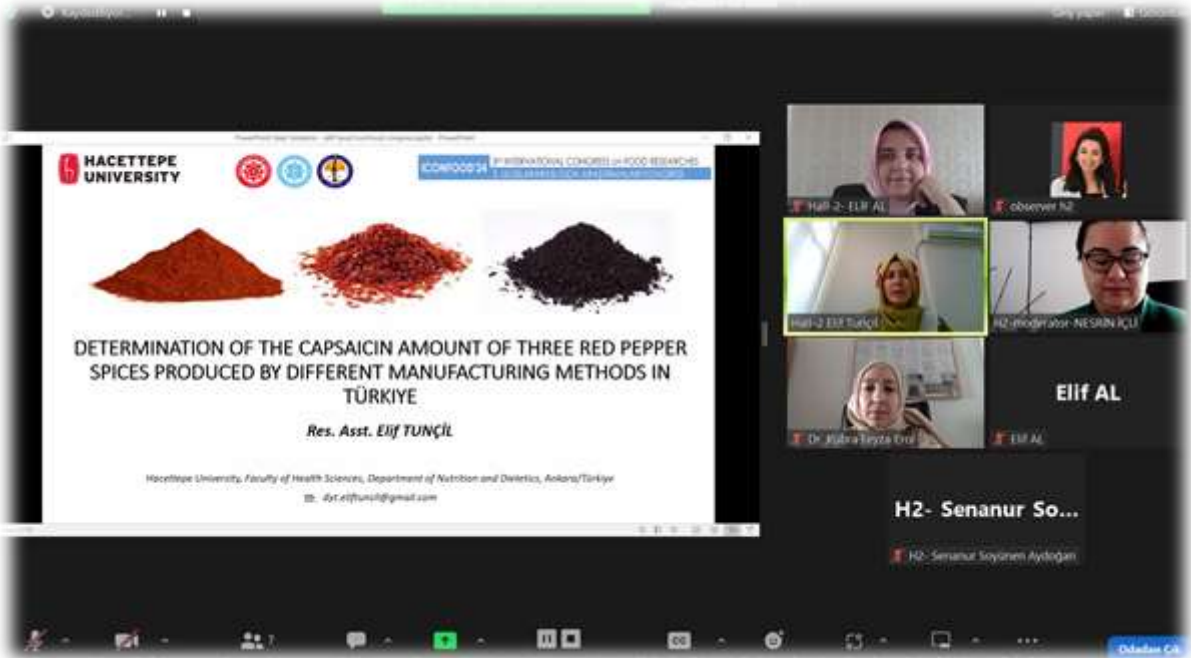


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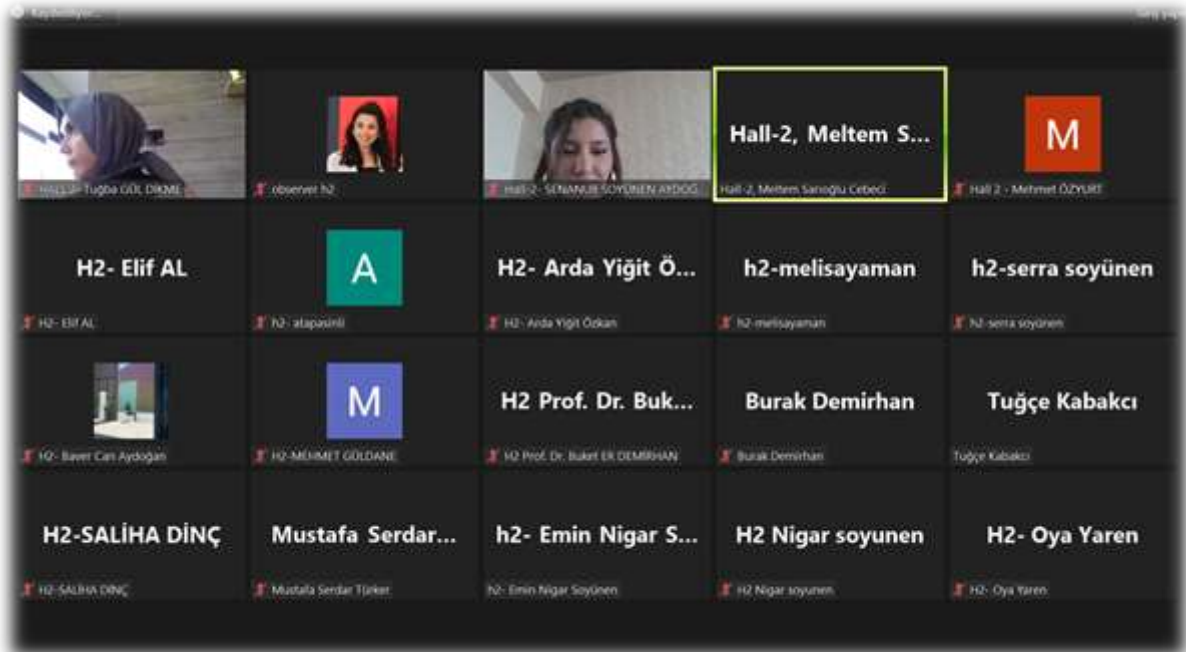
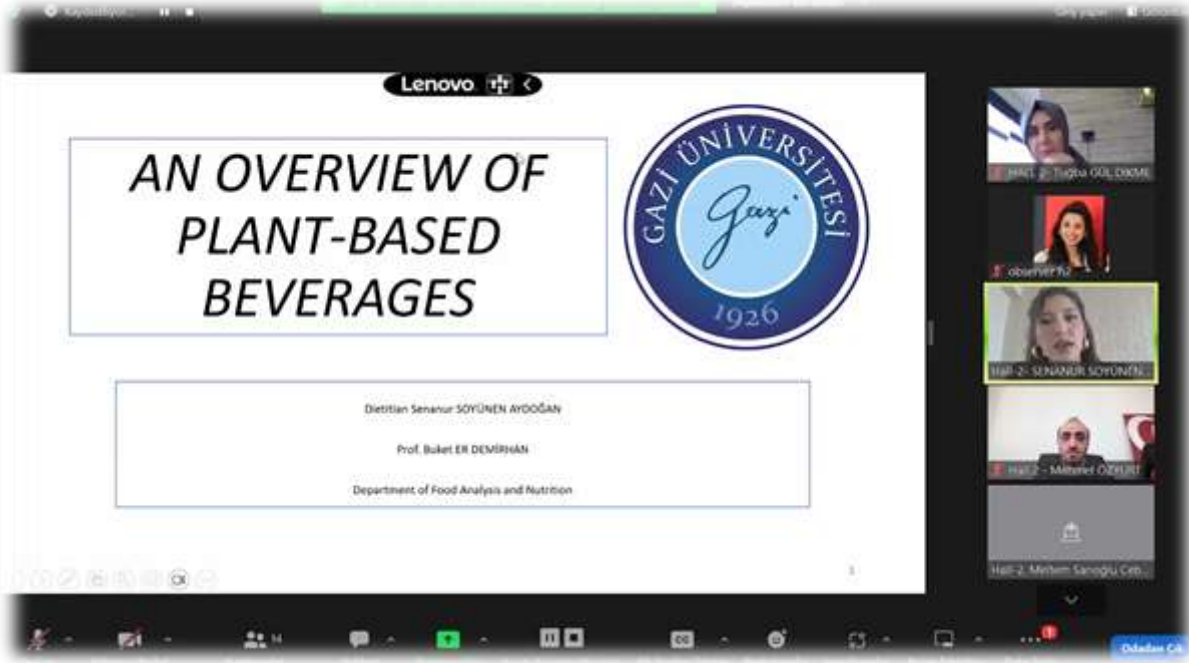


PHOTO GALLERY

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide with the following content:

YENİ BİR FONKSİYONEL İÇECEK OLARAK FERMENTE SEMİZOTU (PORTULACA OLERACEA L.) SUYU

Tuğba Gül DİKME
Öğr. Gör. Dr. Harran Üniversitesi, Siverek MYO, Gıda Teknolojisi Programı, Şanlıurfa, Türkiye.

Hakiye ASLAN
Dr. Öğr. Üyesi, Bingöl Üniversitesi, Gıda Tarım ve Hayvancılık MYO, Gıda İşleme Bölümü, Bingöl, Türkiye.

On the right side of the Zoom window, there is a list of participants:

- HALL 2- TUĞBA GÜL DİKME
- obierwP2
- Hall-2- SENAN...
- Hall-2- SENANER SOYON...
- Hall-2, Meltem...
- Hall-2, Meltem Sarıoğlu...
- H2-Hakiye ASL...
- H2-HAKIYE ASLAN

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide with the following content:

Gıda Güvensizliğinin Nedenleri

Gıda güvensizliğinin nedenleri arasında ekonomik faktörler, iklim değişikliği ve sosyal eşitsizlikler ön plandadır. Artan gıda fiyatları ve düşük gelir, bireylerin sağlıklı ve yeterli gıdaya erişimini sınırlamaktadır (Hadley et al., 2009). Göçmen hananeler ve kırsal kesimde yaşayan bireyler, gıda fiyatlarındaki dalgalanmalardan en çok etkilenen gruplardır (Loopstra, 2014).

Pandemi, gıda güvensizliğini artıran önemli bir faktör olmuştur. Örneğin, Kanadada gıda güvensizliği oranları pandemi öncesine göre belirgin bir şekilde artmıştır (Pitukky & Garrigue, 2022). İklim değişikliğinin de tarımsal üretim üzerinde olumsuz etkileri bulunmaktadır ve bu durum özellikle kırsal bölgelerde gıda güvensizliğini artırmaktadır (Salinas Socas et al., 2022).

On the right side of the Zoom window, there is a video feed of a participant:

Hall 2 - Meltem ÖZVU02

PHOTO GALLERY



ver Hall... Hall-4 Serap...

DONDURMA-SÜTLÜ... - bu bilgisayar konumuna kaydedildi

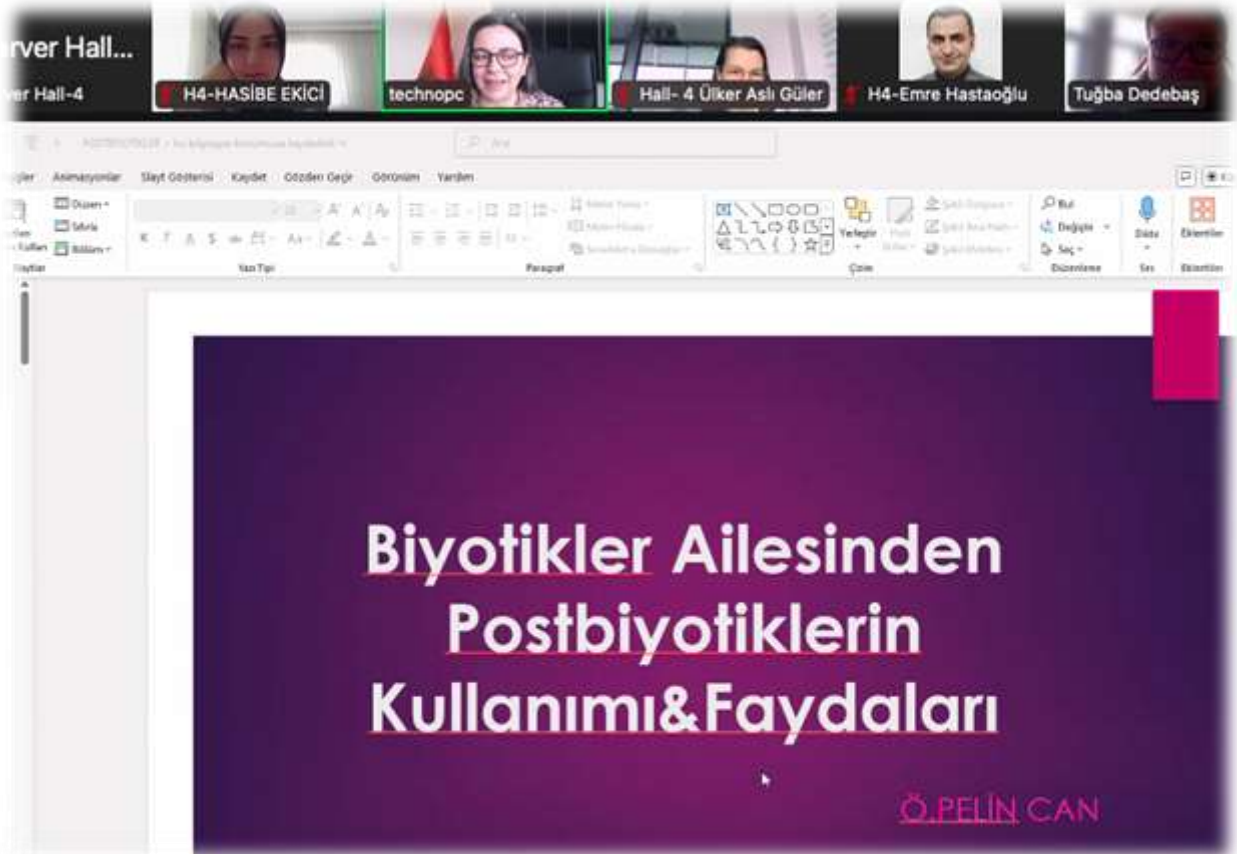
Arta

Çiz Tasarım Geçişler Animasyonlar Slayt Gösterisi Kaydet Gözden Geçir Görünüm Yardım Kaydet Teams de Sun

Slaytları Yeniden Kullan Slaytlar Yanı Tipi Paragraf Çizim Şekiller Yerleştir Düzeltme Dikte Eklenir Tasarım Ses Eklenir

GİRİŞ

- Türk Gıda Kodeksi Yönetmeliği kapsamında 2005 yılında yürürlüğe giren Dondurma Tebliği'nde, dondurma şu şekilde tanımlanmaktadır: "Dondurma karışımı, tat ve çeşidine göre süt ve/veya süt ürünleri, içme suyu, şeker ve izin verilen katkı maddelerini içerir. Ayrıca isteğe bağlı olarak salep, yumurta ve/veya yumurta ürünleri, aroma maddeleri ve çeşni maddeleri gibi bileşenler de eklenebilir. Karışım, pastörizasyon sonrası uygun tekniklerle işlenip dondurularak, yumuşak veya sertleştirilmiş halde tüketiciye sunulan üründür." (Anonim, 2005).
- Dondurma, özellikle sıcak yaz günlerinde serinlemek için herkes tarafından beğenilerek tüketilen bir süt ürünü olmasının yanı sıra,



ver Hall... ver Hall-4 H4-HASİBE EKİCİ technopc Hall- 4 Ülker Aslı Güler H4-Emre Hastaoğlu Tuğba Dedebaş

Arta

Çizim Animasyonlar Slayt Gösterisi Kaydet Gözden Geçir Görünüm Yardım Düzeltme Şekiller Yerleştir Çizim Dikte Eklenir Tasarım Ses Eklenir

Biyotikler Ailesinden Postbiyotiklerin Kullanımı&Faydaları

Ö.PELİN CAN

PHOTO GALLERY



Giriş

Et, insan beslenmesinin temel unsurlarından biridir. Farklı kültürler, dini inançları ve coğrafi konumları doğrultusunda çeşitli hayvan türleri tüketilmektedir.

Türk toplumları, tarihsel süreç içerisinde yerleşik hayata geçişle birlikte sığır eti tercih etmiş, zamanla küçükbaş hayvan ve kanatlı etler de popülerlik kazanmıştır. Ç



Turizm Sektörü

Yüksek Hızlı

Turizm sektörü, gelişmiş ve hızla büyüyen ülkelerde en hızlı büyüyen sektörlerden biridir.

Toplumsal Etkileşim

Turizm, toplumların etkileşiminde önemli rol oynamaktadır.

Küresel Etkilenme

Turizm sektörü, küresel ve bölgesel olumsuzluklardan en hızlı etkilenen sektörlerdendir.



PHOTO GALLERY

Hall... H-4-Hamma... **Hall-4 Dr V. H...** Nikita Sharma Hall-4 Dr. Na... Dipali Sharma
H-4 H-4-Hammadi amina Hall-4 Dr V. H. Badiye Nikita Sharma Hall-4 Dr. Nayyab Ma... Dipali Sharma



Red Weaver Ants

Species

- ❖ *Oecophylla smaragdina**
- ❖ Widespread across Asia, Australia
- ❖ Traditional use in Indigenous cultures
- ❖ Known for nest-building and aggressive behavior

Dr V. H. Badiye



er Hall... Hall-4 Dr V. H... **Hall 5, Jayeoba Olakunle** Hall-4 Dr. Na...
Hall-4 Beghdadi fedwa Hall-4 Dr V. H. Badiye Hall-4 Dr. Nayyab Ma... Faiz Shaikh

Jayeoba Olakunle - PowerPoint

DESIGN TRANSITIONS ANIMATIONS SLIDE SHOW REVIEW VIEW

Layout* Reset Section* Slides Font Paragraph Drawing Editing

INTRODUCTION

- ▶ Around 80% Of the global population uses plant-based traditional medicine, with 25% of modern drugs derived from plants (WHO, 2014).
- ▶ An estimated 250,000 to 500,000 plant species exist, vital for disease management in traditional systems (Borris, 2018; Alves *et al.*, 2016).
- ▶ Herbal mixtures in Nigeria use plant-based ingredients like leaves, roots, and seeds from local medicinal plants for their healing properties (Okoli *et al.*, 2010).

PHOTO GALLERY

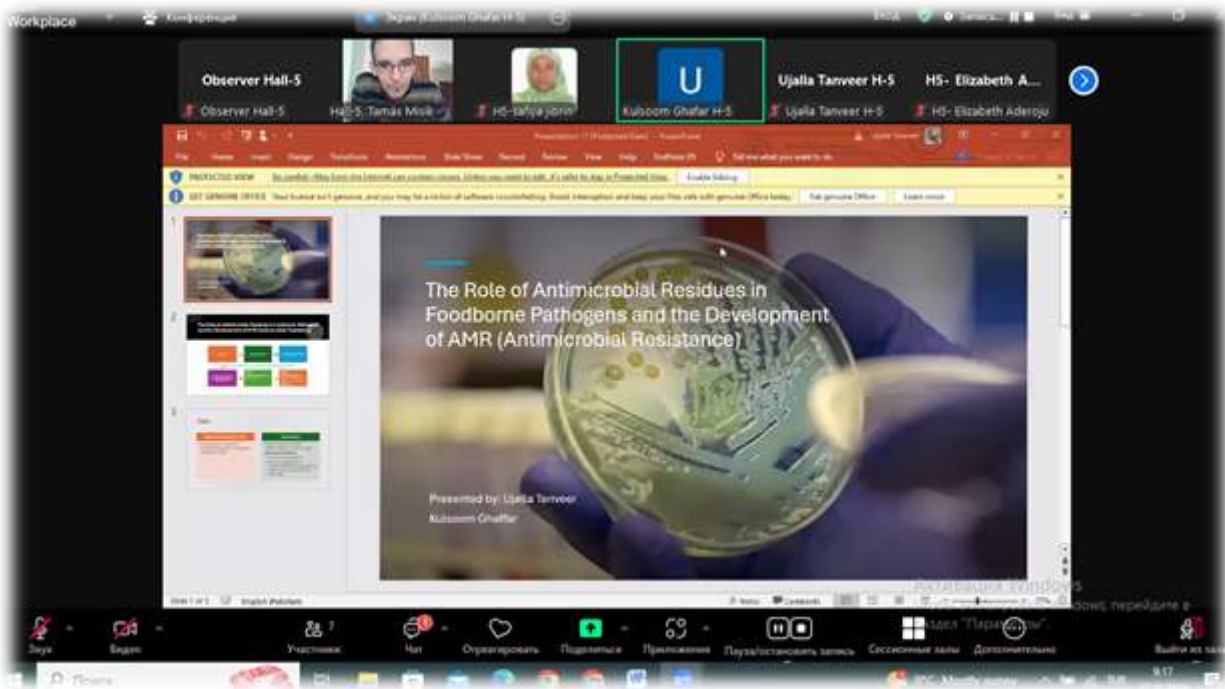
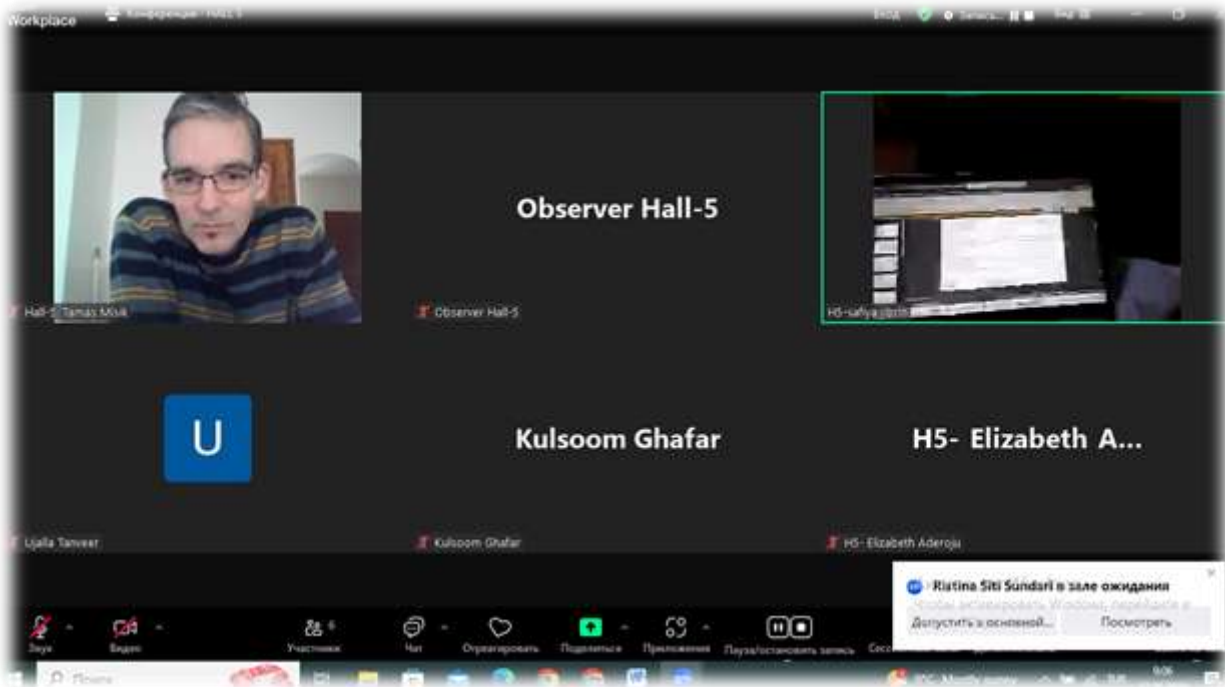


PHOTO GALLERY

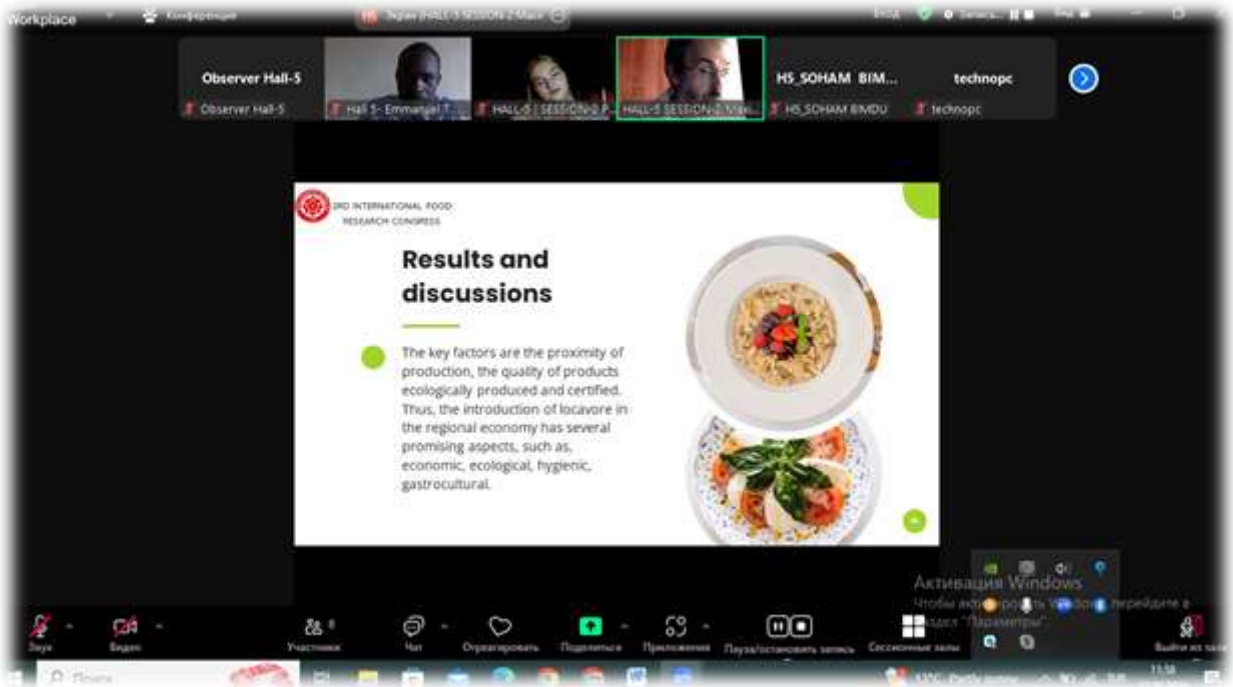


PHOTO GALLERY

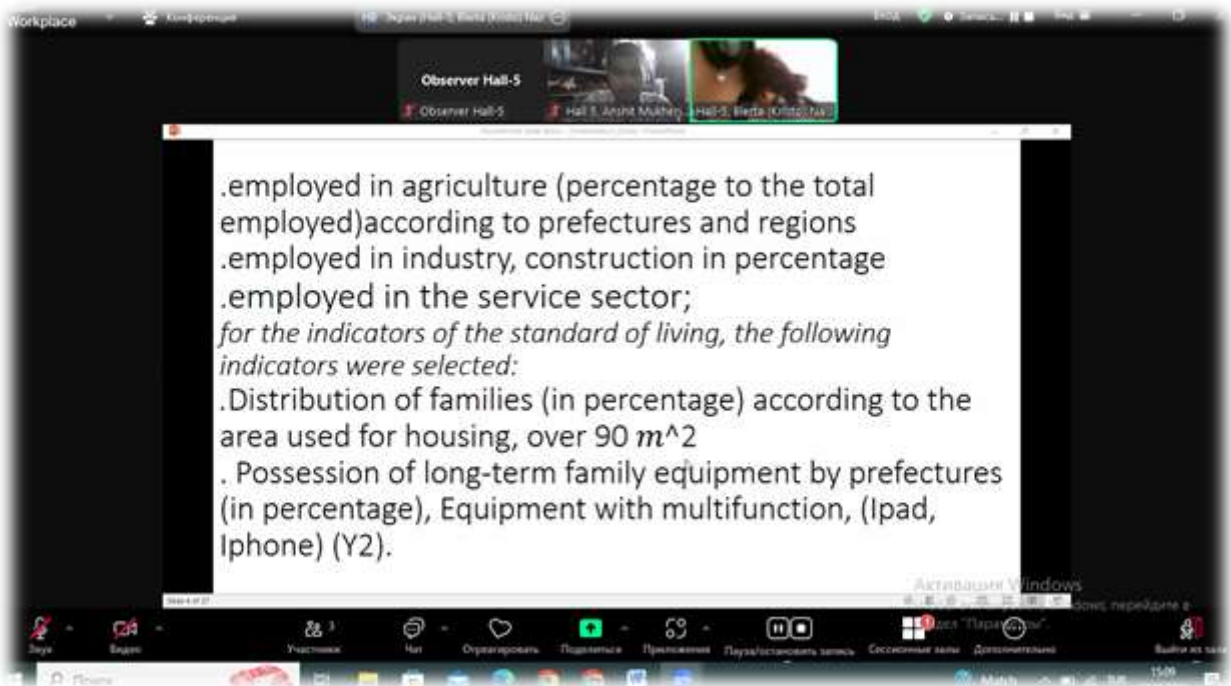
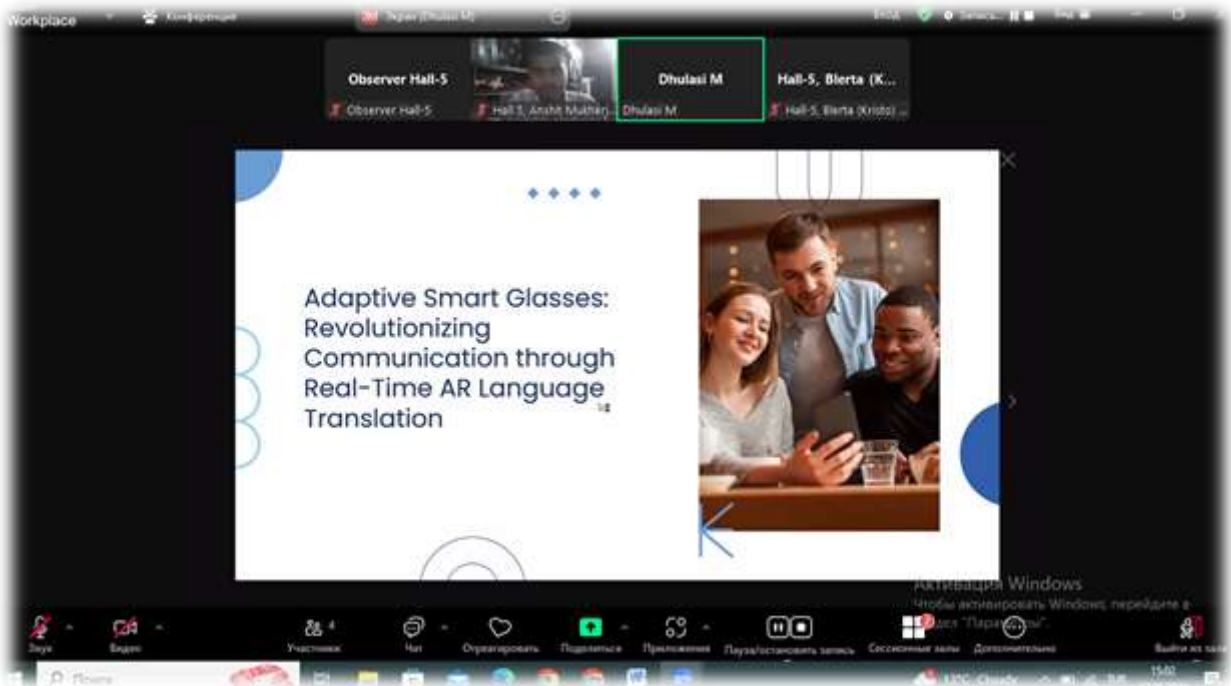


PHOTO GALLERY

Observer Hall-5

HS 52 - Mercy Robles

HS 52 - Dr. Mark Anth...

HS-AMRITHA LI

AASHISH DHIMWY

Dr. Tejalina Maribel

DOMAIN OF INQUIRY 03

1. What do the key informants think about money?
2. What are the key informants' practices in budgeting their money?
3. What are the saving habits of the key informants?
4. What are the spending patterns of the key informants?
5. What are the debt repayment practices of the key informants?
6. What are the retirement schemes of the key informants?
7. What recommendation can be proposed?

Observer Hall-5

HS 52 - Dr. Mark Anth...

HS 52 - Mercy Robles

HS-AMRITHA LI

AASHISH DHIMWY

Dr. Tejalina Maribel

RESULT AND DISCUSSION

The Extent of Implementation and the Compliance of Green Marketing Strategy

Items	Overall Mean	Descriptive Equivalent
Green Design	3	Implemented
Green Positioning	2.93	Implemented
Green Pricing	2.90	Implemented
Green Packaging	2.85	Implemented
Green Disposal	3.04	Implemented
Grand Mean	2.94	Implemented

Legend: 3.25-4.00-Fully Implemented; 2.50- 3.25 -Implemented; 1.75 - 2.50-Less Implemented; and 1.00 - 1.75- Not Implemented

PHOTO GALLERY

er Hall...   **sadaf rashidi**  Hall5/Session...
Hall-5 H-5 moderator Irina... Marianys Neves sadaf rashidi Hall-5 Areej Tanveer Hall5/Session3 Noe...

comproscipite - PowerPoint sadaf rashidi


Transitions Animations Slide Show Record Review View Help Tell me what you want to do

Font Paragraph Drawing

What are Molecular Sieves

Molecular sieves are materials with highly porous structures that can selectively adsorb small molecules like water vapor. They include materials like zeolites, MOFs, and carbon molecular sieves, which are used in various applications due to their high adsorption efficiency.



er Hall...  **Dr Oluwabus...** **sadaf rashidi**  Hall5/Session...
Dr Oluwabus... sadaf rashidi Areej Tanveer Hall5/Session3 Noe...

Desktop abstract [Compatibility Mode] - Word ana Drobot

Home Layout References Mailings Review View Help EndNote Table Design Table Layout Tell me what you want to do

Font Paragraph Styles

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ABSTRACT

The purpose of this paper is to understand Japanese traditional sweets, called in their language *wagashi*, as part of what Baciu (2012) has called the culture identity manifestations grid, including symbols, values, rituals, traditions and practices, as well as personalities. The Japanese traditional sweets clearly correlate with the rituals, traditions, and practices, once we consider those sweets which are part of *wagashi* that are served during the Japanese tea ceremony, called *namagashi*, literally translated as raw sweets. *Namagashi*, or *jo-namagashi*, indeed consist of rice flour, as well as of a sweet bean paste filling, and they are available in their raw, uncooked form. What is more these sweets are made into shapes to represent the current season, and moulded by the hand. They are moulded by hand in such a way as to look like small pieces of art. This is because the ingredients for these sweets are softer than for other types of sweets from the *wagashi* category, allowing them to take the wanted shapes. The red or white bean paste is soft, but, most of all, it is light and easily enjoyed even by those that do not have a sweet tooth. The red or white bean paste functions as part of a sweet treat for the Japanese, while in the West it is considered savory instead. Those having these treats enjoy the beauty of each season. Focusing on each season means focusing on the here and now, a practice present in Zen Buddhist meditation and in haiku poetry writing, where there should be a *kigo*, or a clue as to the season where the haiku poem is written and when nature is observed.

Keywords: Zen Buddhism, present moment, ephemeral, culinary arts.

PHOTO GALLERY



PHOTO GALLERY

Workplace

Observer Hall-6 Farhan Ahmad Hall 6, Teodora... hasna hajaj

Observer Hall-6 MAZHES Abdelhadi hall Farhan Ahmad Hall 6, Teodora Kubric Chaymae CHAFFOULL... hasna hajaj

Introduction Material and methods Results and discussion Conclusion

Winemaking and waste production

winemaking process and waste production (Botzanello et al., 2018)

Windows, перейдите в

1 неизвестный участник АКТИВАЦИЯ WINDOWS

Участники Чат Оценить Поддержать Присоединяйтесь Личная библиотека файлов Сессииные залы Дополнительно Выйти из зала

Workplace

Observer Hall-6 Farhan Ahmad Hall 6, Teodora... hasna hajaj

Observer Hall-6 Farhan Ahmad Hall 6, Teodora Kubric MAZHES Abdelhadi hall hasna hajaj Chaymae CHAFFOULL...

DEEP EUTECTIC SOLVENTS (DES)

- At the beginning of this century, deep eutectic solvents (DES) appeared as a new class of green solvents;
- DES is a combination of two or more solids that form a eutectic liquid mixture at a temperature lower than the melting point of each compound that is part of the DES;
- The intersection of the eutectic temperature and the eutectic composition gives the eutectic point

Активация WINDOWS Windows, перейдите в

Участники Чат Оценить Поддержать Присоединяйтесь Личная библиотека файлов Сессииные залы Дополнительно Выйти из зала

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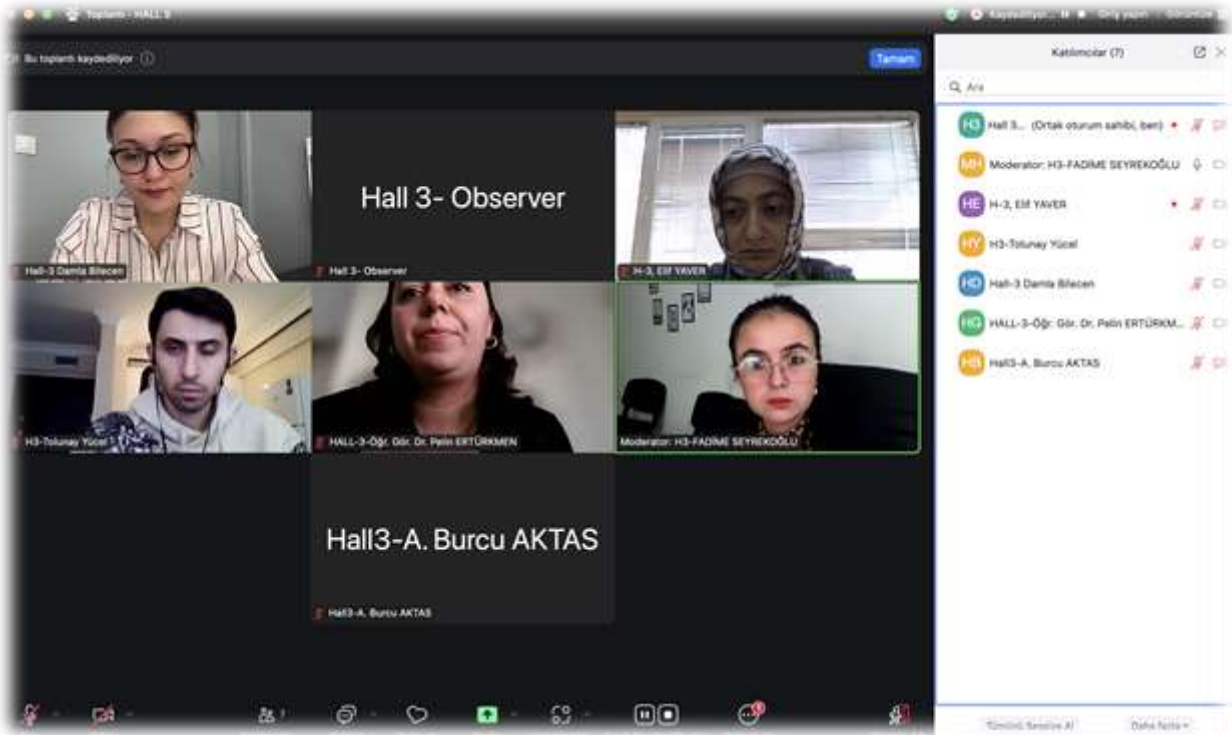


PHOTO GALLERY

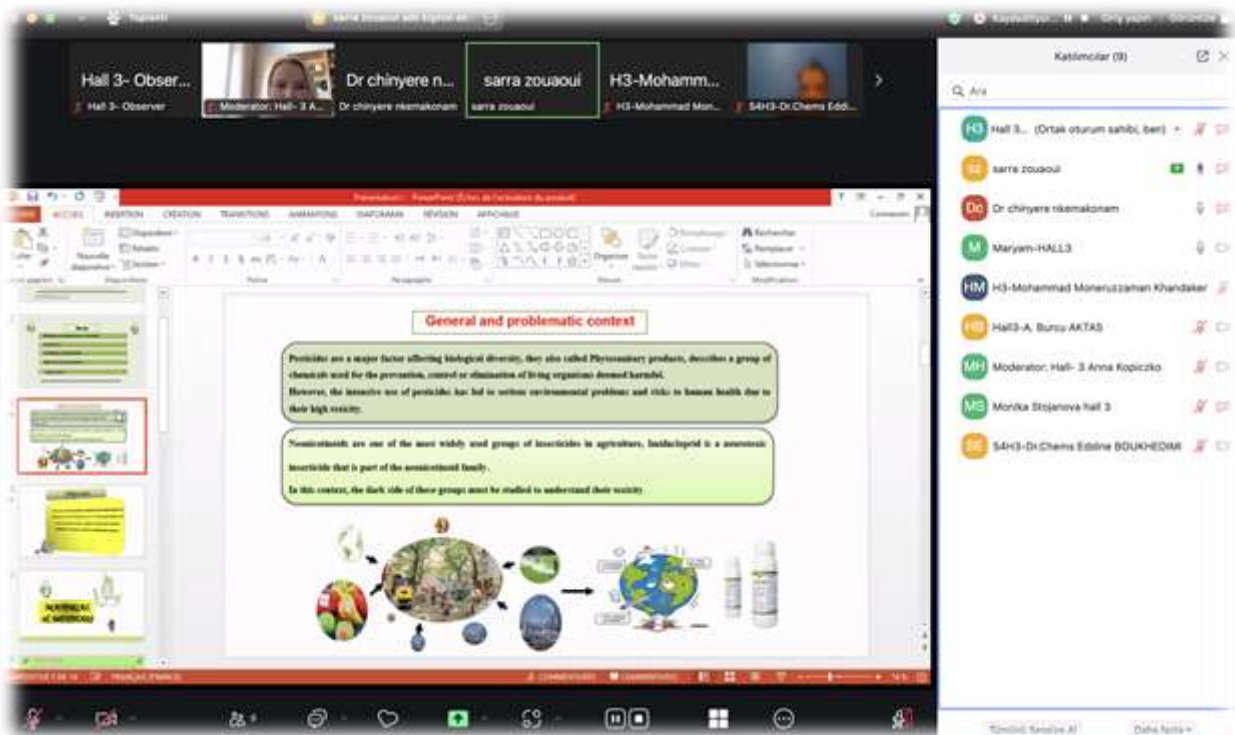
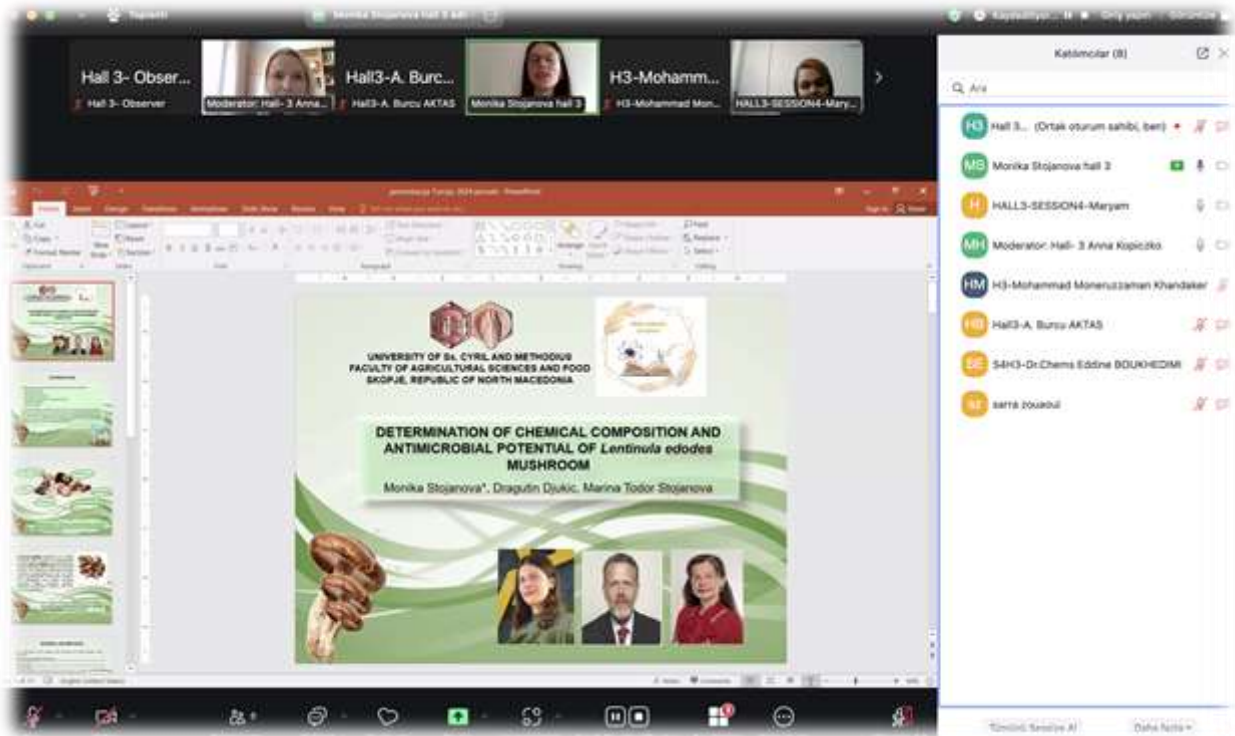
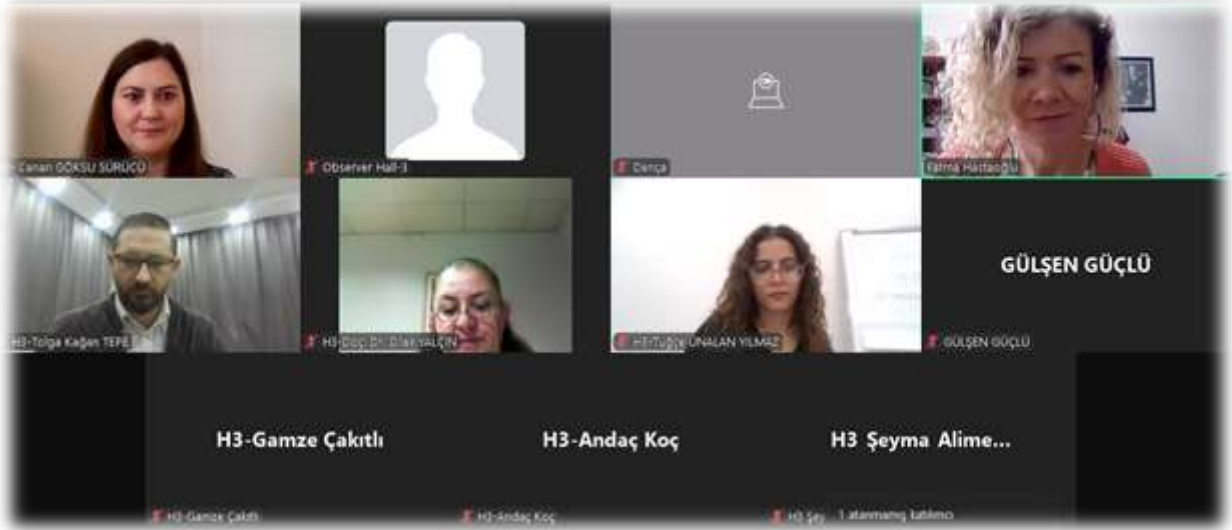


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UZAY BESLENMESİNİN GELİŞİMİ THE EVOLUTION OF SPACE NUTRITION

- 20. yüzyılın ortalarında başlayan uzay keşiflerinden bu yana, astronotların beslenmesi zorlu koşullarda gerekli besinleri sağlamak için yenilikçi yaklaşımlar gerektiren önemli bir sorun olmuştur.
- İlk uzay yiyecekleri basit, kolayca saklanabilen, tüpler içinde püre haline getirilmiş yiyecekler ve küçük küplerdi.
- Bu erken dönemdeki öğünler, temel beslenmeye ve atık miktarının en aza indirilmesine odaklanıyordu.

- Since the dawn of space exploration in the mid-20th century, feeding astronauts has been a critical challenge.
- Space missions required innovative approaches to ensure that astronauts could receive the necessary nutrients in harsh conditions.
- The first space foods were simple, easy-to-store items like tubes of pureed food and small cubes.
- These early meals focused on basic nutrition and minimal waste.



PHOTO GALLERY



Gestasyonel Diabetes Mellitus (GDM)

- Gebeliğin ikinci yarısında ortaya çıkan ve hiperglisemi ile birlikte seyreden bir hastalıktır.
- Dünya çapında, GDM'nin bildirilen yaygınlığı <%1 ile %28 arasında değişmektedir.
- GDM, insülin direnci ve bozulmuş pankreas β -hücre fonksiyonu ile karakterizedir ve gelecekteki diyabetin (tip2 diyabet) iyi bilinen bir ön habercisidir.
- *It is a disease that occurs in the second half of pregnancy and is accompanied by hyperglycemia.*
- *Worldwide, the reported prevalence of GDM varies between <1% and 28%.*
- *GDM is characterized by insulin resistance and impaired pancreatic β -cell function and is a well-known precursor to future diabetes (type 2 diabetes).*





3rd INTERNATIONAL CONGRESS ON FOOD RESEARCHES

16-17-18 OCTOBER 2024 / SIVAS, TÜRKİYE

CONGRESS PROGRAM

Participant Countries (24): Türkiye, India, Egypt, Bangladesh, Ethiopia, Morocco, Romania, Pakistan, Nigeria, South Africa, Algeria, Macedonia, Malaysia, Iran, Georgia, Indonesia, Poland, Iraq, Portugal, Ukraine, Serbia, Spain, Hungary, Greece

IMPORTANT, PLEASE READ CAREFULLY

- ✓ To be able to attend a meeting online, login via <https://zoom.us/join> site, enter ID "Meeting ID or Personal Link Name" and solidify the session.
- ✓ The Zoom application is free and no need to create an account.
- ✓ The Zoom application can be used without registration.
- ✓ The application works on tablets, phones and PCs.
- ✓ The participant must be connected to the session 15 minutes before the presentation time.
- ✓ All congress participants can connect live and listen to all sessions.
- ✓ Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

Points to Take into Consideration - TECHNICAL INFORMATION

- ✓ Make sure your computer has a microphone and is working.
- ✓ You should be able to use screen sharing feature in Zoom.
- ✓ **Attendance certificates will be sent to you as pdf at the end of the congress.**
- ✓ Requests such as change of place and time will not be taken into consideration in the congress program.

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exp. Hall-1, Merve KIDIRYUZ

-Opening Ceremony-

Date: 16.10.2024

Time (Ankara): 10:00-10:30

In-person Venue: Sivas Cumhuriyet Üniversitesi 4 Eylül Kültür Merkezi

Online: <http://youtube.com/onlineseminer>

Assoc. Prof. Dr. Meryem GÖKSEL SARAÇ
Sivas Cumhuriyet University
CHAIR OF CONGRESS

Prof. Dr. Özlem Pelin CAN
Sivas Cumhuriyet University
Director of Food Studies on Application and Research Center
CO-CHAIR OF THE CONGRESS

Prof. Dr. Ahmet ŞENGÖNÜL
Rector of Sivas Cumhuriyet University
HONORARY PRESIDENT OF THE CONGRESS



The poster for the 3rd International Congress on Food Researches (ICONFOOD'24) features the title in large blue letters and the subtitle "Future of Food" in a cursive font. It lists three panelists: Prof. Dr. Ayla SOYER (Future Food Production: New Foods and Innovative Technologies), Prof. Dr. Mustafa TAYAR (Food from Past to Future), and Prof. Dr. Haçim KELEBEK (Black Garlic: Production, Bioactivity, Functional Properties and Applications). The moderator is Prof. Dr. Özlem Pelin CAN. The event is scheduled for October 16, 2024, from 10:30 to 12:00. The poster includes logos of the organizing institutions and a QR code for more information.

ICONFOOD'24
3RD INTERNATIONAL CONGRESS ON FOOD RESEARCHES
Future of Food
CONGRESS PANEL SESSION

Prof. Dr. Ayla SOYER
"Future Food Production: New Foods and Innovative Technologies"

Prof. Dr. Mustafa TAYAR
"Food from Past to Future"

Prof. Dr. Haçim KELEBEK
"Black Garlic: Production, Bioactivity, Functional Properties and Applications"

MODERATOR
Prof. Dr. Özlem Pelin CAN

DATE: OCTOBER 16, 2024 | TIME: 10.30-12.00

#WorldFoodDay
For More Information:
iconfood.cumhuriyet.edu.tr

-Closing Ceremony-

Time (Ankara): 16:30-17:00

16.10.2024 | SESSION-1



Ankara Local Time: 13.30-14.20



Sivas Cumhuriyet Üniversitesi 4 Eylül Kültür Merkezi

Moderator: Assoc. Prof. Dr. Emre HASTAOĞLU

Title	Author(s)	Affiliation
THE EFFECT OF WHITE CHERRY STEM ON PHYSICOCHEMICAL AND SENSORY PROPERTIES OF MUFFIN CAKES	Assist. Prof. Dr. Tuğba DEDEBAŞ Emine TECEM	Afyon Kocatepe University TÜRKİYE
GELATINE/CMC/CHITOSAN FILM ACTIVATED BY ROSEMARY ESSENTIAL OIL AND ZNO NANOPARTICLE AS A PACKAGING MATERIAL IN CHICKEN MEAT	MSc. Ezgi ERYİĞİT ARSLAN Assoc. Prof. Dr. Eda DEMİROK SONCU	Ankara University TÜRKİYE
THE POTENTIAL OF BIOACTIVE COMPONENTS AND THEIR APPLICATION IN THE ENHANCEMENT OF VARIOUS FOODS	Murat İŞÇİ Assist. Prof. Dr. Hatice Aybüke KARAOĞLAN	Sivas Cumhuriyet University TÜRKİYE
FERMENTATIVE LACTIC ACID PRODUCTION FROM PISTACHIO SHELL BY PROTIC IONIC LIQUID PRETREATMENT	Assist. Prof. Dr. Simel BAĞDER ELMACI Ekin Selin ŞAHİN Zeynep Sude ERDOĞAN Dilan GENÇ Helin Eysan ATAY Res. Assist. Zeynep Yaren PEHLİVAN	Ankara University TÜRKİYE Çukurova University TÜRKİYE

16.10.2024 | SESSION-2



Ankara Local Time: 14.30-15.20



Sivas Cumhuriyet Üniversitesi 4 Eylül Kültür Merkezi

Moderator: Assoc. Prof. Dr. Ayşe Burcu Aktaş

Title	Author(s)	Affiliation
PLANT BASED PROTEINS	Şeyma Alime BAKIRCI Lect. Dr. Ertürk BEKAR Assoc. Prof. Dr. Perihan YOLCI ÖMEROĞLU Prof. Dr. Ömer Utku ÇOPUR	Bursa Uludağ University TÜRKİYE
EVALUATION OF THE TOTAL PHENOLIC CONTENT, ANTIOXIDANT ACTIVITY, AND MINERAL CONTENT OF LONICERA CAUCASICA	Assist. Prof. Dr. Kübra CİNAR TOPCU Dr. Pınar ANLAR Assoc. Prof. Dr. Özlem ÇAKIR Assoc. Prof. Dr. Abdurrahman SEFALI	Bayburt University TÜRKİYE Atatürk University TÜRKİYE Bayburt University TÜRKİYE Bayburt University TÜRKİYE
EFFECT OF VARIOUS PLANT POWDERS ON THE TECHNOLOGICAL PROPERTIES OF GLUTEN-FREE BREADS PRODUCED USING BLACK CHICKPEA FLOUR	Tuğba ARSLANHAN Assist. Prof. Dr. Hatice Aybüke KARAOĞLAN	Sivas Cumhuriyet University TÜRKİYE
PROTECTION OF GASTRONOMY AND CULTURAL HERITAGE DIGITAL ARCHIVING OF TRADITIONAL FLAVOURS	Res. Assist. Şefahat EYCE	Sivas Cumhuriyet University TÜRKİYE

16.10.2024 | SESSION-3



Ankara Local Time: 15.30-16.20



Sivas Cumhuriyet Üniversitesi 4 Eylül Kültür Merkezi

Moderator: Assist. Prof. Dr. Hatice Aybüke KARAOĞLAN

Title	Author(s)	Affiliation
BLUE-GREEN SUPERFOOD: BIOCHEMICAL COMPOSITION AND BIOACTIVE PROPERTIES OF LABORATORY-GROWN AND COMMERCIAL SPIRULINA PLATENSIS	Dr. Türkan UZLAŞIR Prof. Dr. Haşim KELEBEK Hatice Kübra ŞAŞMAZ	Adana Alparslan Türkeş Science and Technology University TÜRKİYE
INVESTIGATION ON SOME CHEMICAL CHARACTERISTICS OF SUNFLOWER OIL DURING DEEP-FAT FRYING	Merve Yavuz Taştepe Assoc. Prof. Dr. Ayşe Burcu Aktaş	Sivas Provincial Directorate of Agriculture and Forestry TÜRKİYE Sivas Cumhuriyet University TÜRKİYE
INVESTIGATION OF THE EFFECT OF COMBINED TREATMENT OF MENTHA LONGIFOLIA L. ON CELL CYCLE IN COLON CANCER	Gonca KABAK Lect. Zuhâl TUNÇBİLEK Assoc. Prof. Dr. Ayça TAŞ Prof. Dr. Yavuz SİLİĞ	Sivas Cumhuriyet University TÜRKİYE Yıldızeli Vocational School TÜRKİYE Sivas Cumhuriyet University TÜRKİYE Sivas Cumhuriyet University TÜRKİYE
BIBLIOMETRIC ANALYSIS OF POSTGRADUATE THESES IN THE FIELD OF MOLECULAR GASTRONOMY	Res. Assist. Şefahat EYCE	Sivas Cumhuriyet University TÜRKİYE
EVALUATION OF ANTI-CANCER ACTIVITY OF POSTBIOTICS OBTAINED FROM KEFİR ON STOMACH CANCER CELLS	Fidan KILIÇ Assoc. Prof. Dr. Ayça TAŞ	Sivas Cumhuriyet University TÜRKİYE

17.10.2024 | HALL-1 | SESSION-1



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assoc. Prof. Dr. Müge HENDEK ERTOP

Title	Author(s)	Affiliation
THE EFFECT OF FLOUR ON THE NOODLE PROPERTIES: A COMPARATIVE STUDY OF PURPLE FLOUR AND PURPLE WHEAT FLOUR	Assist. Prof. Dr. Fundagül EREM	Zonguldak Bülent Ecevit University TÜRKİYE
EVALUATION OF THE PHYSICOCHEMICAL PROPERTIES AND ANTIOXIDANT ACTIVITY OF ASCORBIC ACID MICROCAPSULES	Assoc. Prof. Dr. Tuğça BİLENLER KOÇ Lect. Ülkühan BAĞIŞ Prof. Dr. İhsan KARABULUT	İnönü University TÜRKİYE Sivas Cumhuriyet University TÜRKİYE İnönü University TÜRKİYE
EFFECT OF NITROGEN DOSAGES INTERACTION IN DIFFERENT IRRIGATION SYSTEMS ON PROTEIN CONTENT IN SUGAR BEET LEAVES	Ş. Rüveyda KARKI Oğuzhan ULU Ayşe ATILGAN	Kayseri Şeker A.Ş., TÜRKİYE
PARAMETERS AFFECTING THE PERFORMANCE OF VITAMIN B12 ANALYSIS BY HPLC	Lect. Dr. Hayriye Göknur AĞCA-KÜÇÜKAYDIN Lect. Dr. Göksel TIRPANCI SIVRI Prof. Dr. Cemile ÖZCAN Prof. Dr. Ömer ÖKSÜZ	Kırklareli University TÜRKİYE Tekirdağ Namık Kemal University TÜRKİYE Kırklareli University TÜRKİYE Tekirdağ Namık Kemal University TÜRKİYE
OBTAINING DEIONIZED SUGAR AS AN ALTERNATIVE GLUCOSE SYRUP FROM LIQUID WASTES OF NATURAL COLORING PROCESS AND DETERMINING THE POSSIBILITIES OF THE USAGE IN MODEL FOODS	Burcu TÜZÜN Assoc. Prof. Dr. İlyas ATALAR Ayşe APAYDIN Assoc. Prof. Dr. Ömer Said TOKER Prof. Dr. İbrahim PALABIYIK Prof. Dr. Nevzat KONAR	Eskişehir Osmangazi University TÜRKİYE Yıldız Technical University TÜRKİYE Tekirdağ Namık Kemal University TÜRKİYE Ankara University TÜRKİYE
THE EFFECT OF DIFFERENT COCOA ALKALIZATION CONDITIONS ON THE QUALITY PARAMETERS OF COCOA MILK DRINKS	Ayşe APAYDIN Assoc. Prof. Dr. İlyas ATALAR Burcu TÜZÜN Prof. Dr. Nevzat KONAR	Eskişehir Osmangazi University TÜRKİYE Ankara University TÜRKİYE
EFFECTS OF CONJUGATION APPLICATIONS ON TECHNO-FUNCTIONAL PROPERTIES OF PLANT PROTEINS	Tuba SARI Assoc. Prof. Dr. İlyas ATALAR	Eskişehir Osmangazi University TÜRKİYE
SOME PHYSICOCHEMICAL AND SENSORY PROPERTIES OF CUP CAKES INCORPORATED IN DRIED ELDERBERRY POMACE AND ELDERFLOWER	Assoc. Prof. Dr. Müge HENDEK ERTOP Ashhan ÖZASLAN	Kastamonu University TÜRKİYE

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17.10.2024 | HALL-2 | SESSION-1



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assoc. Prof. Dr. Didem BERBER

Title	Author(s)	Affiliation
A GENERAL EVALUATION OF YOZGAT PROVINCE GEOGRAPHICALLY INDICATION PRODUCTS IN ONLINE PRINTING PRESS	Res. Assist. Dr. Handan AYTEKİN	Yozgat Bozok University TÜRKİYE
STUDIES ON GASTRONOMY CITIES IN THE UNESCO CREATIVE CITIES NETWORK: DOCUMENT ANALYSIS	Res. Assist. Dr. Handan AYTEKİN	Yozgat Bozok University TÜRKİYE
FUNCTIONAL GRANOLA BAR PRODUCTION	Assoc. Prof. Dr. Didem BERBER Lect. Kübra TOPALOĞLU GÜNAN Hüseyin YALLAGÖZ	Maltepe University TÜRKİYE
BISCUIT PRODUCTION FOR DISASTERS AND EMERGENCIES	Lect. Kübra TOPALOĞLU GÜNAN Lect. Seda ÇAKMAK KAVSARA Lect. Tuğçe BOĞA Assist. Prof. Dr. Özlem AKTÜRK GÜMÜŞAY Assoc. Prof. Dr. Didem BERBER	Maltepe University TÜRKİYE
PROBLEMS ENCOUNTERED IN THE CATERING SECTOR	Assist. Prof. Dr. Gülden KILIÇ Rümeysa KÜYÜK Büşra ARSLAN Prof. Dr. İlkin YÜCEL ŞENGÜN	Alanya University TÜRKİYE Ege University TÜRKİYE
EVALUATION OF FATTY ACIDS and FAT QUALITY INDEXES IN FISH	Assist. Prof. Dr. Esra BALIKÇI	Yozgat Bozok University TÜRKİYE
INCORPORATION OF BLACK CHOKEBERRY (ARONIA MELANOCARPA L.) EXTRACTS INTO BREAD FORMULATIONS: EFFECTS ON GLYCEMIC INDEX, ANTIOXIDANT PROPERTIES, AND IN VITRO BIOACCESSIBILITY OF BIOACTIVE COMPOUNDS	Assist. Prof. Dr. Gözde KUTLU	Ankara Medipol University TÜRKİYE
PHENOLIC ACID PROFILE ALTERATIONS IN AQUEOUS AND ETHANOLIC STEVIA EXTRACTS ACROSS SEQUENTIAL PURIFICATION STAGES	Yeşim KAPİ Assist. Prof. Dr. Hatice Reyhan ÖZİYCİ Prof. Dr. Mustafa KARHAN	Akdeniz University TÜRKİYE Antalya Bilim University TÜRKİYE Akdeniz University TÜRKİYE

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17.10.2024 | HALL-3 | SESSION-1



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assoc. Prof. Dr. Fatma HASTAOĞLU

Title	Author(s)	Affiliation
A USEFUL OPTION FOR INCLUDING CEREAL IN A GLUTEN-FREE DIET: SORGHUM	Dr. Canan GÖKSU SÜRÜCÜ	Ministry of Agriculture and Forestry Ankara TÜRKİYE
STEAM ASSISTED COOKING IN THE OVEN AND EFFECTS OF STEAM ON FOOD QUALITY	Tuğçe ÜNALAN YILMAZ	Haier Europe Eskisehir, TÜRKİYE
HARNESSING MICROALGAE IN SPACE MISSIONS: AN ESSENTIAL NUTRITIONAL RESOURCE WITH INNOVATIVE PRODUCTION TECHNIQUES	Assoc. Prof. Dr. Dilek YALÇIN Prof. Dr. İlkay AÇIKGÖZ ERKAYA Assist. Prof. Dr. İsmail Hakkı TEKİNER	Başkent University TÜRKİYE Kırşehir Ahi Evran University TÜRKİYE Haliç University TÜRKİYE
DETERMINATION OF ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF WATER EXTRACTS OF TEUCRIUM POLIUM L. ON FOODBORNE PATHOGENS BACILLUS CEREUS AND ESCHERICHIA COLI O157:H7	MSc. Denca TOKER Dr. Orcun TOKSOZ Assoc. Prof. Dr. Didem BERBER Prof. Dr. N. Cenk SESAL	Marmara University TÜRKİYE
THE MORE INFORMATION AGENT: THE INTELLIGENT FOOD PACKAGING	Lect. Dr. Tolga Kağan TEPE Assist. Prof. Dr. Fadime Begüm TEPE	Giresun University TÜRKİYE
KETOGENIC DIET AND ALZHEIMER'S	Assoc. Prof. Dr. Fatma HASTAOĞLU	Sivas Cumhuriyet University TÜRKİYE
HYPOGEUSIA IN CHEMOTHERAPY PATIENTS	Assoc. Prof. Dr. Fatma HASTAOĞLU	Sivas Cumhuriyet University TÜRKİYE
INVESTIGATION OF THE STABILITY OF PHENOLIC COMPOUNDS DURING THE STORAGE PERIOD OF FUNCTIONAL DRIED FRUIT PRODUCTS ENRICHED WITH BIOACTIVE COMPOUNDS FROM GREEN TEA AND PRESERVED BY HEAT TREATMENT	Gamze ÇAKITLI	Food Textile Industry Import Export Investment A.Ş. İzmir TÜRKİYE

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17.10.2024 | HALL-4 | SESSION-1



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assist. Prof. Dr. Tuğba DEDEBAŞ

Title	Author(s)	Affiliation
CONTENT ANALYSIS OF UNDERGRADUATE THESIS STUDIES ON ICE CREAM AND VEGETABLE FAT MILK ICE SAMPLES; 2004-2024	Hasibe EKİCİ Assoc. Prof. Dr. Meryem GÖKSEL SARAÇ	Sivas Cumhuriyet University TÜRKİYE
DEEP LEARNING IN FOOD	Prof. Dr. Özlem Pelin CAN	Sivas Cumhuriyet University TÜRKİYE
USES OF POSTBIOTICS	Prof. Dr. Özlem Pelin CAN	Sivas Cumhuriyet University TÜRKİYE
ALTERNATIVE MEAT TYPE: RABBIT MEAT	Assoc. Prof. Dr. Emre HASTAOĞLU	Sivas Cumhuriyet University TÜRKİYE
FOOD FRIENDLY HOTEL CONCEPT	Assoc. Prof. Dr. Emre HASTAOĞLU	Sivas Cumhuriyet University TÜRKİYE
MICRO PLASTICS IN DRINKING WATER AND THEIR EFFECTS ON HUMAN HEALTH	Serap EMEK Prof. Dr. Ülker Ash GÜLER	Sivas Cumhuriyet University TÜRKİYE
BIOGENEIC TASTE AND ODOUR MANAGEMENT FROM WATER SOURCE TO TREATMENT PLANT, THROUGH DISTRIBUTION SYSTEMS TO CONSUMERS	Prof. Dr. Ülker Ash GÜLER	Sivas Cumhuriyet University TÜRKİYE

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17.10.2024 | HALL-5 | SESSION-1



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Tamás Misik

Title	Author(s)	Affiliation
INFLUENCE OF EXTENSION AND FORMAL EDUCATION ON INCOME OF RICE PROCESSORS IN BOSSO AND CHANCHAGA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA	Jibrin, S Ahmed, I. I Umaru, A Shehu, M. Egamana, M. N. EZE, C. P	Federal University NIGERIA
EFFECT OF INPUT SUBSIDIES ON OUTPUT OF RICE FARMERS UNDER VALUE CHAIN DEVELOPMENT PROGRAMME IN NIGER STATE, NIGERIA	YISA, E.N. Muhammad, H.U. Tsado, J.H. Ajayi, O.J.	Federal University of Technology NIGERIA
PRODUCTION OF BIODIESEL FROM SOYABEANS AS AN ALTERNATIVE TO FOSSIL FUELS	Anas Muazu Abdullahi Haruna Abubakar Danyaya	Federal Polytechnic Daura NIGERIA
THE ROLE OF ANIMICROBIAL RESIDUES IN FOODBORNE PATHOGENS AND THE DEVELOPMENT OF AMR (ANTIMICROBIAL RESISTANCE)	Ujalla Tanveer Kulsoom Ghaffar	University of Agriculture Faisalabad PAKISTAN MNS University of Agriculture Multan PAKISTAN
INSECTICIDAL ACTIVITY OF ESSENTIAL OILS FROM SALVIA OFFICINALIS AGAINST ECTOMYELOIS CERATONIAE ZELLER (LEPIDOPTERA: PYRALIDAE) MAIN PEST OF DATES	SelmaAdouane Mohamed Seghir Mehaoua JoseTudela	Mohamed Khider University ALGERIA Mohamed Khider University ALGERIA University of Murcia SPAIN
SUSTAINABILITY RESTAURANTS AND GOOD PRACTICES IN NORTHEASTERN HUNGARY	Tamás Misik Zoltán Nagy Rita Domjänné Nyizsalovszki	Eszterházy Károly Catholic University HUNGARY
INNOVATION OF OREGANO LEAVES (PLECTRANTHUS AMBOINICUS SPRENG) AND GINGER (ZINGIBER OFFICINALE) ENHANCEMENT TO AGRIBUSINESS VARIANT OF ODORLESS SALTED DUCK EGGS	Ristina Siti Sundari Budhi Wahyu Fitriadi Reny Hidayati	University of Perjuangan Tasikmalaya INDONESIA
AI-POWERED SMART AGRICULTURE FOR FOOD SAFETY AND SUPPLY CHAIN SECURITY	AYODELE Oluwakemi Sade SEYI-AYODELE Ayomide Lewis BAMIDELE Gbekele Iyanu	Kogi State College of Education Technical NIGERIA
MICROBIOLOGICAL ASSESSMENT OF COMMERCIALY PREPARED TIGER NUT DRINK SOLD IN ILORIN SOUTH LOCAL GOVERNMENT AREA OF KWARA STATE, NIGERIA	SUNDAY AWE ELIZABETH OLUBUNMI ADEROJU	Kwara State University NIGERIA

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17.10.2024 | HALL-6 | SESSION-1



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Subhashish Dey

Title	Author(s)	Affiliation
APPLICATIONS OF FOOD COLOR AND BIO-PRESERVATIVES IN THE FOOD AND ITS EFFECT ON THE HUMAN HEALTH	Subhashish Dey	Seshadri Rao Gudlavalleru Engineering College INDIA
EFFICACY OF THE TRADITIONAL USE OF OLIVE LEAVES DECOCTION AS ANTI-DIABETIC AGENT IN GERIATRICS	Amany Mohamed Basuny Lamiaa N Abdelaaty Catherine K.B. Zakhari Raghda Roshdy Sayed Hussein Mohamed Ragab Ahmed Mohamed Sayed Ali Galal Ali	October 6 University EGPYT Beni-Suef University EGPYT
UNLOCKING WHEAT RESILIENCE: GENOMIC AND GENOME EDITING ADVANCES AGAINST MAGNAPORTHE ORYZAE PATHOTYPE TRITICUM	Tofazzal Islam	Rahman Agricultural University BANGLADESH
THE EFFECT OF TOTAL QUALITY MANAGEMENT PRACTICES ON INNOVATION: EVIDENCE FROM SELECTED AGRICULTURAL TECHNICAL AND VOCATIONAL EDUCATION TRAINING COLLEGES IN ETHIOPIA	Sintayehu Assefa Yirga (Ph.D.) Misrak Ayalew Beshir	Hawassa University ETHIOPIA
LEVERAGING ETHNOBOTANY AND THE PHARMACOLOGICAL PROPERTIES OF MEDICINAL PLANTS FOR INNOVATIVE FOOD ADDITIVES" ; CASE OF CHAMAEROPS HUMILIS	Khadija BENAMAR Saad Ibsnouda Koraichi Kawtar Fikri-Benbrahim	Ben Abdellah University MOROCCO
EXPLORNG THE IMPORTANCE OF DIETARY CONSIDERATIONS FOR CANINE HEALTH	Ştefania Elena Degeratu	University of Bucharest ROMANIA
SUPPLEMENTATION OF DIFFERENT TYPES OF BIOCHAR IN DIETS OF CATLA CATLA: EFFECTS ON CARCASS COMPOSITION, HEMATOLOGY, AND MINERAL STATUS	Muhammad Amjad Syed Makhdoom Hussain Adnan Khalid Esha Razzaq Muhammad Mahmood Ulfat batool Ajwa Nazar	Government College University PAKISTAN
ANTAGONISTIC EFFECTS OF ORANGE PEEL METHANOLIC EXTRACT ON SELECTED BACTERIA AND FUNGI ISOLATES FROM CORN GRAINS	Shitu, S. Ishaya, J. Philip, J. I.	School of Applied Sciences NIGERIA
ISOLATION AND PREVALENCE OF VIBRIO PARAHAEMOLYTICUS FROM READY-TO-EAT FRUIT COCKTAILS SOLD IN PUBLIC MARKETS WITHIN OGHARA NEXUS	Bright E. Igere Uchechukwu U. Nwodo	Delta State University NIGERIA University of Fort Hare SOUTH AFRICA

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17.10.2024 | HALL-1 | SESSION-2



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assist. Prof. Dr. Zeynep AKŞİT

Title	Author(s)	Affiliation
THE USE OF AROMATIC PLANTS IN FOOD SAFETY AND AS NATURAL PRESERVATIVES	Serap TOPRAK DÖŞLÜ Lect. Dr. Nurten CENGİZ	Mardin Artuklu University TÜRKİYE Adana Alparslan Türkeş Science and Technology University TÜRKİYE
MOLECULARLY IMPRINTED POLYMERS (MIPS) IN FOOD ANALYSIS	Lect. Dr. Nurten CENGİZ	Adana Alparslan Türkeş Science and Technology University TÜRKİYE
INVESTIGATION OF pH AND PRESSURE EFFECTS ON HAZELNUT PROTEIN MODIFICATION	Hatice ELEN Assoc. Prof. Dr. İlyas ATALAR Assoc. Prof. Dr. Furkan Türker SARICAOĞLU Prof. Dr. Osman GÜL Prof. Dr. M. İrfan AKSU Prof. Dr. Nevzat KONAR	Eskişehir Osmangazi University TÜRKİYE Eskişehir Osmangazi University TÜRKİYE Bursa Teknik University TÜRKİYE Kastamonu University TÜRKİYE Ataturk University TÜRKİYE Ataturk University TÜRKİYE
THE EFFECTS OF INFRARED DRYING ON THE PHYSICOCHEMICAL PROPERTIES OF COCONUT (COCOS NUCIFERAL.) AND PROCESS OPTIMIZATION	Ceren BEKTAŞ Assoc. Prof. Dr. Onur KETENOĞLU	Eskişehir Osmangazi University TÜRKİYE
REAL-TIME DETECTION OF GLUTEN CONTAMINATION IN FOOD POWDERS USING NEAR-INFRARED SPECTROSCOPY AND MACHINE LEARNING	Assist. Prof. Dr. Samet ÖZTÜRK	Gümüşhane University TÜRKİYE
ERZINCAN TULUM AND CHEESE AND SHELF LIFE STUDIES	Fatma YENİCE Assist. Prof. Dr. Zeynep AKŞİT	Erzincan Binali Yıldırım University TÜRKİYE
PHENOLIC COMPOUNDS IN FOOD WASTE	Sena AKBAŞ Assist. Prof. Dr. Zeynep AKŞİT	Erzincan Binali Yıldırım University TÜRKİYE

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17.10.2024 | HALL-2 | SESSION-2



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Prof. Dr. Sibel SİLİCİ

Title	Author(s)	Affiliation
THE ROLE OF PROBIOTICS ON HEALTH	Assist. Prof. Dr. Çağlar AKÇALI	Mardin Artuklu University TÜRKİYE
THE ROLE OF ESSENTIAL OILS IN FOOD PRESERVATION AND HEALTH	Assist. Prof. Dr. Çağlar AKÇALI Assist. Prof. Dr. Serap TOPRAK DÖŞLÜ	Mardin Artuklu University TÜRKİYE
ALTERNATIVE PROTEIN SOURCE: EDIBLE INSECTS	Assist. Prof. Dr. Tuba Eda ARPA ZEMZEMOĞLU Prof. Dr. Huri İLYASOĞLU	Gümüşhane University TÜRKİYE
ADAPTOGENIC PLANTS: AS AN ALTERNATIVE TO COPING WITH STRESS	Assist. Prof. Dr. Tuba Eda ARPA ZEMZEMOĞLU	Gümüşhane University TÜRKİYE
QUINOA, A FUNCTIONAL FOOD AND ITS EFFECTS ON HEALTH	Assist. Prof. Dr. Duygu MATARACI DEĞİRMENCİ	Ordu University TÜRKİYE
EFFECTS OF POMEGRANATE, A FUNCTIONAL FOOD, ON HEALTH	Assist. Prof. Dr. Duygu MATARACI DEĞİRMENCİ	Ordu University TÜRKİYE
CHANGES IN BIOACTIVITY AND EXIN LAYER OF POLEN FERMENTED WITH KOMBUCHA AND GREEN TEA	Prof. Dr. Sibel SİLİCİ	Erciyes University TÜRKİYE
ENDOCRINE DISRUPTING EFFECT OF HONEY BEE PRODUCTS (ROYAL JELLY AND APILARNİL)	Prof. Dr. Sibel SİLİCİ	Erciyes University TÜRKİYE

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17.10.2024 | HALL-3 | SESSION-2



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assoc. Prof. Dr. Handan GÜLER

Title	Author(s)	Affiliation
EXTRACTION METHODS, ANALYSES AND BIOLOGICAL ACTIVITIES OF ROSEMARY (<i>Rosmarinus officinalis</i> L.)	Dr. Seçil KARAHÜSEYİN Assist. Prof. Dr. Merve NENNİ	Çukurova University TÜRKİYE
UTILIZATION AND ANALYSIS OF MODERN EXTRACTION TECHNIQUES IN MEDICINAL PLANTS	Assist. Prof. Dr. Merve NENNİ Dr. Seçil KARAHÜSEYİN	Çukurova University TÜRKİYE
FUNCTION AND STRUCTURE OF OSTEOPONTIN, A BIOACTIVE PROTEIN IN HUMAN MILK	Büşra SEVİM Assoc. Prof. Dr. Evrim GÜNEŞ ALTUNTAŞ	Ankara University TÜRKİYE
COMPARISON OF THE EFFECTIVENESS OF DIFFERENT METHODS IN OBTAINING POSTBIOTIC FROM LACTIC ACID BACTERIA	Amtalsaboor ALMAHBASHI Assoc. Prof. Dr. Evrim GÜNEŞ ALTUNTAŞ	Ankara University TÜRKİYE
ESTROGEN, PROGESTERONE IN PREGNANT COW'S MILK AND WOMEN'S HEALTH	Assoc. Prof. Dr. Hale UYAR HAZAR Seçkin KAYA	Bitlis Eren University TÜRKİYE
THE INVESTIGATION OF MIGRATION RISKS IN BAMBOO-MELAMINE MATERIALS AND ARTICLES	Assoc. Prof. Dr. İsra TOPTANCI Fatma TÜRKMEN Mehmet KILINÇER Alev POLAT YAZICI Kübra KELEŞ	Istanbul Food Control Laboratory Directorate İstanbul TÜRKİYE
FOODS THAT IMPROVE BREAST MILK QUALITY	Assoc. Prof. Dr. Handan GÜLER Assoc. Prof. Dr. Ferdağ YILDIRIM	Sivas Cumhuriyet University TÜRKİYE
CAN GESTATIONAL DIABETES BE PREVENTED WITH A GLUTEN-FREE DIET?	Assoc. Prof. Dr. Handan GÜLER Assoc. Prof. Dr. Mine BEKAR	Sivas Cumhuriyet University TÜRKİYE

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17.10.2024 | HALL-4 | SESSION-2



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Dr.Faiz Muhammad Shaikh

Title	Author(s)	Affiliation
IMPACT OF FOOT PRINTS ON FOOD SECURITY ENVIRONMENT SUSTAINABILITY ON CHICK PEA CROP: A CASE STUDY SUKKUR SINDH-PAKISTAN	Dr. Faiz Muhammad Shaikh Rasool Bux Junejo Syed Mehtab Ali Shah Muhammad Zafar Wassan Tanweer channa	Professor-University of LarkanoPAKISTAN
FOOD SECURITY IN PAKISTAN : PERFORMANCE AND CHALLENGES: A CASE STUDY OF SINDH PAKISTAN	Dr.Faiz Muhammad Shaikh Rasool Bux Junejo Syed Mehtab Ali Shah Muhammad Zafar Wassan Tanweer channa	Professor-University of LarkanoPAKISTAN
EVALUATION OF THE ACTIVITY OF ARGAN PLANT EXTRACTS (ANTICHOLINESTERASE)	Imane HAOUAME Hamdi BENDIF Nadjim SEMCHEDDINE Amina hamadi	Université Mohamed Boudiaf ALGERIA Laboratoire d'Ethnobotanique et Substances Naturelles ALGERIA
RED WEAVER ANTS: A SUSTAINABLE AND NUTRITIOUS FOOD SOLUTION FOR THE FUTURE	V.H. Badiye N.S. Sharma D.R. Sharma	Shri Mathuradas Mohota College of Science INDIA
DEVELOPMENT OF FORMULATION CONTAINING HERBAL EXTRACT OF RANDIA DUMETORUM LAMK AND ITS EVALUATION FOR ANTI-FUNGAL ACTIVITY	Shubham Sharma Prof. Sunil Gupta	Mangalayatan University INDIA
ISOLATION AND IDENTIFICATION OF MICROORGANISMS FROM HERBAL MIXTURE SOLD IN MALETE METROPOLIS	Ajiboye, A. E. Olakunle, O. J.	Kwara State University NIGERIA Federal Polytechnic Offa NIGERIA
ZINC OXIDE NANOPARTICLES IMPACT ON GERMINATION PARAMETERS, NUTRITIONAL QUALITY, YIELD AND ANTIOXIDANT ACTIVITY OF TRITICUM AESTIVUM	Nayyab Mansoor Ayesha Younus	Government college women university PAKISTAN
SOWING QUALITIES OF RADISH SEEDS WHEN USING GROWTH REGULATORS	Shchetyna Serhii Kichigina Olga	Uman National University of Horticulture UKRAINE Institute of Agroecology and Environmental Management of the National Academy of Agrarian Sciences of UKRAINE
INHIBITION OF RHIZOCTONIA SOLANI, THE CAUSATIVE AGENT OF BROWN RHIZOCTON DISEASE, BY AN ACTINOBACTERIA STRAIN ISOLATED FROM ALGERIAN SAHARAN SOIL	Fedwa BEGHADADI El-Hadj DRICHE	Hassiba Benbouali University of Chlef ALGERIA
THE EFFECT OF BANANA PEEL MEAL ON THE GROWTH PERFORMANCE, CARCASS CHARACTERISTICS, AND DIGESTIBILITY IN BROILERS	Shahid Ali Rajput	Muhammad Nawaz Shareef University of Agriculture PAKISTAN

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17.10.2024 | HALL-5 | SESSION-2



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Prof. Dr. Olena A. Lykholat

Title	Author(s)	Affiliation
ROLE OF GAUB (DIOSPYROS PEREGRINA) FRUIT PREPARATION IN THE IMMUNE CELL ACTIVATION DURING ACUTE LYMPHOBLASTIC LEUKEMIA	Soham Bindu Pradeep R Oishi Mukherjee Roshni Bibi Koustav Sarkar	SRM Institute of Science and Technology INDIA
DUAL ROLE OF LACTIC ACID BACTERIA CULTURES FOR FERMENTATION AND CONTROL OF PATHOGENIC BACTERIA IN FRUIT ENRICHED FERMENTED MILK	M.R. Adedayo Kate Rachael Imeje	Kwara State University NIGERIA
NANOCELLULOSE DERIVED FROM AGRICULTURAL BIOWASTE BY-PRODUCTS—SUSTAINABLE SYNTHESIS, BIOCOMPATIBILITY, BIOMEDICAL APPLICATIONS, AND FUTURE PERSPECTIVES: A REVIEW	R. Thiruchelvi Dr. P. Saravanan Dr. M. Chamundeeswari	St. Joseph's College of Engineering INDIA
ANTIBIOTIC RESISTANCE OF BACTERIA ISOLATED FROM POULTRY DUNGS	Emmanuel Tomisin Bello Olatunji Matthew Kolawole Faith Feranmi Folahan Oluwaseun Grace Famoroti Shalom Olaoluwa Olawepo	Ilorin University NIGERIA IHE Delft Institute for Water Education NETHERLANDS Newland Polytechnic and College of Health Technology NIGERIA Kwara State University NIGERIA
PROTECTIVE EFFECT OF GSPE ON AFB1-INDUCED OXIDATIVE STRESS, AND APOPTOSIS THROUGH MITOCHONDRIAL PATHWAY IN THE IMMUNE ORGAN OF BROILERS	Shahid Ali Rajput	Muhammad Nawaz Shareef University of Agriculture PAKISTAN
LOCAVORE AS AN ELEMENT OF HEALTH PSYCHOLOGY	Prof. Dr. Olena A. Lykholat PhD, Tetyana Y. Lykholat Lecturer, Maksim O. Kvitko Prof. Dr. Yuriy V. Lykholat	University of Customs and Finance UKRAINE Oles Honchar Dnipro National University UKRAINE Kryvyi Rih State Pedagogical University UKRAINE
TOBACCO GROWTH ENABLEMENT BY INDOLE ACETIC ACID (IAA) FOR THE CONTROL OF SOIL ORGANIC POLLUTION	Anyasi, R.O.	Department of Environmental Science University of SOUTH AFRICA
TOURISM AS A CATALYST FOR ORGANIC FARMING AND AGRO-ENTREPRENEURSHIP IN NIGERIA	Sadiq, M.S Singh, I.P Ahmad, M.M Sani, B.S Yusuf, K.B	Federal University NIGERIA
THE IMPORTANCE OF FOOD SECURITY THROUGH AGRO-TECHNOLOGICAL INNOVATION: A CASE STUDY ON THE DEVELOPMENT OF RICE IN MOROCCO	Elwahab Fathalah Ziri Rabea Brhadda Najiba Sedki Mohamed	University Ibn Toufail MOROCCO Regional Center of Agricultural Research of Kenitra MOROCCO

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17.10.2024 | HALL-6 | SESSION-2



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Kristina Tomska

Title	Author(s)	Affiliation
ORGANIC FOOD CONSUMPTION AND ATTENTION PERFORMANCE IN 10-13 MOROCCAN PRIMARY STUDENTS FROM KHEMISSSET	Mohcin Elkhafir Miloud Chakit Abdechahid Loukili Youssef Aboussaleh	Ibn Tofail University MOROCCO
MICROBIOLOGICAL QUALITY ASSESSMENT OF DRIED BEEF STORED IN DIFFERENT PACKAGING MATERIALS	Adamu Ahmad Abubakar Olaleye Oladimeji Olanipekun Saka Habeeb Kayode Abdullahi Tafida Ibrahim Ahmed Kyari Yerima Bala Ibrahim Farida Umar Ahmad	Nigerian Stored Products Research Institute NIGERIA
SOY PRODUCTS PROCESSING AND FOOD ALLERGIES	Sabina Khanam	Kanpur University INDIA
ISOLATION AND IDENTIFICATION OF PSEUDOMONAS SYRINGE PV SYRINGE CAUSAL AGENT OF BACTERIAL SPECK OF TOMATO CROP	Fedwa BEGHADADI El-Hadj DRICHE1	Hassiba Benbouali University ALGERIA
WHEY PROTEIN: A FUNCTIONAL INGREDIENT FOR LIVER HEALTH AND ENZYME MODULATION	Kristina Tomska	University St. Kliment Ohridski MACEDONIA
EFFECT OF SOME PLANT EXTRACTS, PLANT OILS AND TRICHODERMA SPP. ON TOMATO FUSARIUM WILT DISEASE	Ajiwe, S. T.	Ajayi Crowther University NIGERIA
EVALUATION OF COMBINED APPLICATION OF IODINE, IRON AND ZINC IN THE MANAGEMENT OF FUSARIUM WILT (<i>Fusarium oxysporum</i> f. sp. <i>lycopersici</i>)	Babatunde, A. J. Ajiwe, S. T. Adelaja, T. P	Federal University of Agriculture NIGERIA
RECENT SUCCESSES IN THE CONTROL OF FUSARIUM WILT OF TOMATO USING NANOPARTICLES: A REVIEW	Ajiwe, S. T. Oyelakin, F. O.	Ajayi Crowther University NIGERIA
EFFECT OF FUNGAL FERMENTATION ON IMPROVING THE NUTRIENT COMPONENTS OF ALBIZIA LEBBECK PODS	Majekodunmi Racheal Adedayo Awoyiola Zipporah Boluwatife	Kwara State University NIGERIA

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18.10.2024 | HALL-1 | SESSION-3



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assist. Prof. Dr. Hatice Ayb ke KARAOĐLAN

Title	Author(s)	Affiliation
EXAMINATION OF KYRGYZ CUISINE WITHIN THE FRAMEWORK OF GASTRONOMY INTERACTION: YOZGAT PROVINCE EXAMPLE	Assist. Prof. Dr. Muhabbet ELİK	Yozgat Bozok University T�RKİYE
FOOD LEGISLATION AND EVALUATION OF THE CURRENT SITUATION	Assist. Prof. Dr. Mehmet aĐlar FIRAT	Erzincan Binali Yıldırım University T�RKİYE
IMPORTANCE, DETERMINATION, AND ALTERNATIVE APPLICATIONS OF EMAMEKTIN BENZOATE RESIDUE IN FISH	Lect. Dr. Utku DURAN Assist. Prof. Dr. Sinem OLAK	Zonguldak B�lent Ecevit University T�RKİYE
THE IMPORTANCE OF GROWTH FACTORS IN BUFFALO MILK	B�şra Şahin Lect. Dr. Utku DURAN Assist. Prof. Dr. Sinem OLAK	Ondokuz Mayıs University T�RKİYE Zonguldak B�lent Ecevit University T�RKİYE
INVESTIGATION OF ANTIOXIDANT AND TOTAL PHENOLIC CONTENTS OF TAPIOCA STARCH-BASED FILMS	Lect. Dr. Nilay KAHYA Akile İrem KARAPINAR Assoc. Prof. Dr. Nevin �ZTEKİN	İstanbul Technical University T�RKİYE
TRADITIONAL FRUIT SNACKS OF ERZINCAN: "SEFTALI (PEACH) SARUCU" AND "UZUM (GRAPE) SARUCU"	Lect. Dr. Mehmet Ali SALIK	Bing�l University T�RKİYE
COLLAGEN: HEALTH EFFECTS, TECHNOLOGICAL PROPERTIES, AND USAGE POTENTIAL IN THE FORTIFICATION OF DAIRY PRODUCTS	Lect. Dr. Mehmet Ali SALIK	Bing�l University T�RKİYE
THE EFFECT OF ETHYLENE VINYL ALCOHOL BARRIER ON MODIFIED ATMOSPHERE PACKAGED CHICKEN MEAT PRODUCTS	Buse RENKLİ Rabia EZEN Bet�l Durak ER	KeskinoĐlu Poultry and Breeding Enterprises San. Tic. A.Ş Mnaisa T�RKİYE
THE EFFECTS OF MILKING HYGIENE ON RESIDUE ISSUES IN DAIRY CATTLE ENTERPRISES	Dr. G�l Banu İEK BİDECİ	Ministry of Agriculture and Livestock Kastamonu T�RKİYE

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18.10.2024 | HALL-2 | SESSION-3



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assoc. Prof. Dr. Nesrin İÇLİ

Title	Author(s)	Affiliation
DETERMINATION OF THE CAPSAICIN AMOUNT OF THREE RED PEPPER SPICES PRODUCED BY DIFFERENT MANUFACTURING METHODS IN TÜRKİYE	Lect. Elif TUNÇİL	Hacettepe University TÜRKİYE
NUTRITIONAL ASSESSMENT, BIOACCESSIBILITY OF ANTIOXIDANTS, AND ANTIDIABETIC POTENTIAL OF THE TRADITIONALLY USED WILD PLANT BERBERIS CRATAEGINA DC.	Assist. Prof. Dr. Kübra Feyza EROL	University of Health Sciences İstanbul TÜRKİYE
POISONOUS MUSHROOMS AND POISONING SYMPTOMS	Assoc. Prof. Dr. Nesrin İÇLİ	Kastamonu University TÜRKİYE
ROYAL JELLY AND IMMUNITY REGULATORY EFFECTS	Assoc. Prof. Dr. Nesrin İÇLİ	Kastamonu University TÜRKİYE
A FUNCTIONAL FOOD: ENRICHED BREAD	Elif AL Assoc. Prof. Dr. Burak DEMİRHAN	Gazi University TÜRKİYE
ARTIFICIAL MEAT	Elif AL Assoc. Prof. Dr. Burak DEMİRHAN	Gazi University TÜRKİYE
NUTRITIONAL APPROACHES IN CANDIDA INFECTIONS	Elif POLAT Assist. Prof. Dr. Nazife YILMAZ	Erzincan Binali Yıldırım University TÜRKİYE
THE ROLE OF AKKERMANSIA MUCINIPHILA IN NUTRITION	Edanaz ADAŞIROĞLU Assist. Prof. Dr. Nazife YILMAZ	Erzincan Binali Yıldırım University TÜRKİYE
INVESTIGATION OF EMULSION PROPERTIES DEPENDING ON STORAGE TIME OF MAYONNAISE PREPARED AT DIFFERENT TEMPERATURES USING THERMOMIX	Duygu Başkaya SEZER	Amasya University TÜRKİYE
FTIR CHARACTERIZATION OF SUPERCRITICAL CO ₂ EXTRACT FROM PEANUT SKIN	Tülin EKER Pınar KADİROĞLU	Adana Alparslan Türkeş Science and Technology University TÜRKİYE Osmaniye Korkut Ata University TÜRKİYE

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18.10.2024 | HALL-3 | SESSION-3



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assist. Prof. Dr. Fadime SEYREKOĞLU

Title	Author(s)	Affiliation
NOVEL COOKIE FORMULATIONS DEVELOPED WITH FLAXSEED MEAL AND WILD FRUITS	Doç. Dr. Elif YAVER Prof. Dr. Asuman KAN	Konya Technical University TÜRKİYE
THE INHIBITION POTENTIAL OF PROBIOTIC LACTOBACILLUS REUTERI CULTURE AND EDIBLE FILM SOLUTION AGAINST DIFFERENT PATHOGENS	Lect. Dr. Pelin ERTÜRKMEN Asst. Prof. Dr. Damla Bilecen ŞEN	Burdur Mehmet Akif Ersoy University TÜRKİYE
EVALUATION AND SOME PARAMETERS IN EGGS COATED WITH MATERIALS PREPARED FROM COTTONSEED OIL AND CARNAUBA WAX	Assist. Prof. Dr. Fadime SEYREKOĞLU Assoc. Prof. Dr. Gözde KILINÇ	Amasya University TÜRKİYE
APPLICATION OF METALIC NANOPARTICLES IN FOOD INDUSTRY	Assist. Prof. Dr. Tolunay YÜCEL Assist. Prof. Dr. Fadime SEYREKOĞLU	Amasya University TÜRKİYE
THE IMPACT OF PROXIMATE COMPOSITION OF FOOD ON THE MICROPLASTIC BIOACCUMULATION	Assoc. Prof. Dr. Elif Tuğçe AKSUN TÜMERKAN	Ankara Yıldırım Beyazıt University TÜRKİYE
THE INTERACTIONS BETWEEN CLIMATE CHANGE AND MICROPLASTIC IN FOOD CHAIN	Assoc. Prof. Dr. Elif Tuğçe AKSUN TÜMERKAN	Ankara Yıldırım Beyazıt University TÜRKİYE
METHODS TO REDUCE THE PRESENCE OF BIOGENIC AMINES IN FOODS	Lect. Özge KILIÇ TOSUN Prof. Dr. Ahmet Hilmi ÇON	Ondokuz Mayıs University TÜRKİYE

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18.10.2024 | HALL-4 | SESSION-3



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Labiba ZERARI

Title	Author(s)	Affiliation
FOOD SECURITY IN GREECE . THE EXISTING SITUATION AND PROSPECTS	PaschalidisCh.,D PetropoulosD.,P. PaschalidisD.,Ch SotiropoulosS.,S Giannatou M. L.,D., Papakonstantinou	University of the Peloponnes GREECE CGK Consulting Ltd GREECE University of the Peloponnes GREECE Customer Service Officer of Piraeus Bank GREECE Engineering Agronomist Freelancer GREECE
FOOD SITUATION ANALYSIS IN THE MODERN WORLD	PaschalidisCh.,D PetropoulosD.,P. PaschalidisD.,Ch SotiropoulosS.,S Giannatou M. L.,D., Papakonstantinou	University of the Peloponnes GREECE CGK Consulting Ltd GREECE University of the Peloponnes GREECE Engineering Agronomist Freelancer GREECE
"COMPARATIVE STUDY OF THE BEHAVIOR OF THREE VARIETIES OF 'PHASEOLUS VULGARIS L.' BEAN SOWN IN POLLUTED SOIL FROM AN UNCONTROLLED LANDFILL SITE"	Labiba ZERARI Saoussene CHERNINE Chahira RETEM Leila HAMDI Amir BRINIS	Badji Mokhtar University ALGERIA Badji Mokhtar-Annaba University ALGERIA
VERTICAL FARMING IN URBAN LANDSCAPES: ARCHITECTURAL APPROACHES TO SUSTAINABLE FOOD SYSTEMS.	Melik Sami Khelil Sara Tallal Abdel Karim Bouzir	Mohamed Khider Biskra University ALGERIA
EDIBLE CITIES: ARCHITECTURAL APPROACHES TO INTEGRATING FOOD PRODUCTION INTO THE URBAN FABRIC	Melik Sami Khelil Sara Tallal Abdel Karim Bouzir	Mohamed Khider Biskra University ALGERIA
FROM FARM TO TABLE: ARCHITECTURAL APPROACHES TO STREAMLINING SUSTAINABLE FOOD DISTRIBUTION	Melik Sami Khelil Sara Tallal Abdel Karim Bouzir	Mohamed Khider Biskra University ALGERIA
FROM WASTE TO RESOURCE: ARCHITECTURAL INNOVATIONS FOR SUSTAINABLE FOOD WASTE MANAGEMENT IN URBAN AREAS	Melik Sami Khelil Sara Tallal Abdel Karim Bouzir	Mohamed Khider Biskra University ALGERIA
WAYS TO REDUCE PATULIN TOXIN IN APPLE JUICE	Zahra Rezapour Narges Fathabadibozcheloei	Islamic Azad University IRAN
BIOACTIVE MOLECULES, ANTIOXIDANT EGCG POLYPHENOLS EXTRACT OF GREEN TEA CAMELLIA SINENSIS L.	AMROUCHE Zoheir Marie laure Fauconnier Laribi Habchi Hassiba	University of Khemis Miliiana ALGERIA University of Liege- BELGIUM University of Blida ALGERIA
INFLUENCES OF THE ENVIRONMENT ON THE PHYSIOLOGICAL CHARACTERISTICS OF DIFFERENT APPLE VARIETIES	Hassane Boudad Abdelmajid Haddioui Mentag Rachid El Fazazi Kaoutar Mohamed Elkadi Jamal Charafi	National Institute of Agricultural Research MOROCCO

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18.10.2024 | HALL-5 | SESSION-3



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Irina-Ana DROBOT

Title	Author(s)	Affiliation
THE ROLE OF THE MIND DIET IN NEURODEGENERATIVE DISEASE PREVENTION AND CARDIOVASCULAR HEALTH	Mónika Fekete Noémi Mózes Andrea Lehoczki János T Varga	Semmelweis University BUDAPEST Semmelweis University BUDAPEST National Institute for Haematology and Infectious Diseases HUNGARY Semmelweis University BUDAPEST
THE INFLUENCE OF SPRING BARLEY AND OATS ON THE AGGRESSIVENESS OF A PHYTOPATHOGENIC ISOLATE	Liliia Havryliuk Dmytro Gentosh Olena Bashta	National University of Life and Environmental Sciences UKRAINE
MICROBIOME-TARGETED VETERINARY DIET: ENHANCING PET HEALTH THROUGH NUTRITION	Areej Tanveer Muhammad Hamza Muneer Kashif Hussain Maryam Bashir	MNS University PAKISTAN
DESIGN AND CONSTRUCTION OF AN ATMOSPHERIC WATER HARVESTING SYSTEM RUNNING TITLE: INNOVATIVE AWH SYSTEM DESIGN	Sadaf Rashidi Jafar Massah Akbar Arab Hoseini	Tehran University IRAN
EFFECTS OF ORAL ADMINISTRATION OF SCENT LEAF ON THE LIVER HISTOLOGY OF BROILER CHICKENS	Akinlade, O. O Irivboje, O.A Okusanya, P.O	Federal Polytechnic Ilaro NIGERIA
JAPANESE CULTURE FEATURES IN WAGASHI, OR TRADITIONAL SWEETS	Irina-Ana DROBOT	Technical University of Civil Engineering Bucharest ROMANIA
"EFFECTS OF WASTE MUSHROOM BIOMASS ON MACROMOLECULAR COMPOSITION OF MARIGOLD"	Piotr SALACHNA Łukasz ŁOPUSIEWICZ Agnieszka ZAWADZIŃSKA Ireneusz OCHMIAN Marcelina KRUPA-MAŁKIEWICZ	West Pomeranian University of Technology Szczecin POLAND University of Economics and Human Sciences in Warsaw POLAND West Pomeranian University of Technology Szczecin POLAND
SUSTAINABLE MANAGEMENT OF GASTRONOMIC EVENTS: SCOPING REVIEW	Marianys FERNÁNDEZ, PhD. Candidate Prof. Nuno BAPTISTA, Phd. Prof. Mário ANTÃO, PhD.	Universidad de Sevilla PORTUGAL Polytechnic University PORTUGAL Universidade Lusíada de Lisboa PORTUGAL
GROWTH PERFORMANCE OF CHILI PEPPER UNDER RAIN SHELTER MICROCLIMATE CONDITION	Meivie Tivalli Kusumiyati Kusumiyati Shazma Anwar	Universitas Padjadjaran INDONESIA The University of Agriculture Peshawar PAKISTAN
THE YIELD RESPONSE OF PISTACHIO TREES TO FOLIAR SPRAY OF SOME MICRO-NURRIENTS AT TIME OF POST-BLOOM	Akbar Soliemanzadeh Vahid Mozafari	Hormozgan Agricultural and Natural Resources Research and Education Center IRAN Vali-e-Asr University of Rafsanjan IRAN

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18.10.2024 | HALL-6 | SESSION-3



Ankara Local Time: 09⁰⁰-11⁰⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Teodora Kukrić

Title	Author(s)	Affiliation
THE APPLICATION OF BIOSENSOR IN DETECTION OF FOOD CONTAMINANTS	Shaapera, Aondoakura	Federal University Wukari NIGERIA
ASSESSING MICROBIAL CONTAMINATION ON SURFACES IN A YOGHURT FACTORY: IMPACT ON PRODUCT SAFETY	Belaidi Chanez Bouayad Leila Boudjit Rosa Lakhdara Nedjoua	Constantine 1 University ALGERIA "Laboratory of Food Hygiene and Quality Insurance System (HASAQ), Higher National Veterinary School ALGERIA" Constantine 1 University ALGERIA
ANTIFUNGAL STUDY OF SELECTED HYDROPHOBIC DEEP EUTECTIC SOLVENTS	Teodora Kukrić Prof. Dr. Boris Popović	Novi Sad University SERBIA
ASSESSMENT OF MOROCCAN CONSUMERS' PREFERENCES AND INFLUENCING FACTORS FOR FISH PROCESSED PRODUCTS CONSUMPTION	Chaymae GHAFLOULI Khaoula FAIZ Adil ROUKBANI Prof. Dr. Bouchra	Sidi Mohammed Ben Abdellah University MOROCCO
CHEMOPROFILING AND ANTIOXIDANT POTENTIAL OF OLIVE POMACE EXTRACT	Khaoula FAIZ Chaymae GHAFLOULI Adil ROUKBANI Abdelhadi MAZRHA Mohammed MERZOUKI Mohammed BENLMLIH Bouchra LOUASTÉ	Sidi Mohammed Ben Abdellah University MOROCCO
ANTIOXYDANT ACTIVITY OF GRAPE POMACE	Abdelhadi MAZRHA Malika AMMARI Khaoula FAIZ Fatimaezzahrae Mrizak Chaymae GHAFLOULI Adil ROUKBANI Bouchra LOUASTÉ Mohammed MERZOUKI	Sidi Mohammed Ben Abdellah University MOROCCO
ASSESSMENT AND MAPPING SOIL ORGANIC MATTER USING THE EM38 AND MSP3 SENSORS: A FOCUS ON THE MODELLING APPROACHES	Hajjaj Hasna Ibno Namr Khalid El Aissaoui Abdellah Bel-lahbib Sanae	Chouaib Doukkali University MOROCCO Chouaib Doukkali University MOROCCO National Institute of agronomic Research MOROCCO
FOOD SELF-SUFFICIENCY IN THE FACE OF CLIMATE CHANGE: EMPIRICAL EVIDENCE FROM NIGERIA	Abdulsalam, R.Y. Egwuma, H. Mukhtar, U. H. Abdulazeez	Dutse Federal University NIGERIA Ahmadu Bello University NIGERIA
SUNFLOWER SEED'S ROLE IN CARDIOVASCULAR HEALTH	Mr Fareed Afzal Mr Asjid Hanan Malik Sumaiya Haroon	Gulab Devi Educational Complex PAKISTAN

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18.10.2024 | HALL-1 | SESSION-4



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Assoc. Prof. Dr. Aysun YÜCETEPE

Title	Author(s)	Affiliation
INTERFACIAL ADSORPTION AND STABILIZATION OF PICKERING EMULSIONS BY PLANT GUMS	Res. Assist. Dr. Duygu ASLAN TÜRKER	Erciyes University TÜRKİYE
EFFECTS OF DRYING METHODS ON THE POWDER PROPERTIES OF CAMELINA (CAMELINA SATIVA (L.) CRANTZ.) SEED PROTEIN CONCENTRATES	Assist. Prof. Dr. Fatma KORKMAZ	Balıkesir University TÜRKİYE
PLANT PROTEIN-BASED EDIBLE FILMS LOADED WITH BIOACTIVE COMPOUNDS FOR FOOD PACKAGING	Lect. Dr. Elif Meltem İŞÇİMEN	Erciyes University TÜRKİYE
PHYTOCHEMICAL COMPOSITION AND THERAPEUTIC PROPERTIES OF ARTEMISIA L.	Beyza KABA Prof. Dr. İlkey KOCA	Ondokuz Mayıs University TÜRKİYE
USE OF VIRTUAL REALITY TECHNOLOGY IN SENSORY ANALYSE OF FOODS	Res. Assist. Andaç KOÇ Prof. Dr. Ali Coşkun DALGIÇ	Gaziantep University TÜRKİYE
SOME CHEMICAL, PHYSICAL AND SENSORY PROPERTIES OF GLUTEN-FREE BREADS SUPPLEMENTED WITH CHICKPEA AND DRY BEAN FLOURS	Gözde KARABULUT Ece PEKER Yasemin FELEKOĞLU ÖRCÜN Assist. Prof. Dr. Ezgi ÖZGÖREN ÇAPRAZ Assoc. Prof. Dr. Fatma IŞIK	Uyar Holding Yozgat TÜRKİYE Uyar Holding Yozgat TÜRKİYE Uyar Holding Yozgat TÜRKİYE Pamukkale University TÜRKİYE Pamukkale University TÜRKİYE
OPTIMIZATION OF EXTRACTION CONDITIONS OF SARGASSUM ACICULARIS PROTEINS: INVESTIGATION OF ANTIOXIDANT ACTIVITY OF PROTEIN EXTRACTS	Assoc. Prof. Dr. Aysun YÜCETEPE Assist. Prof. Dr. Emine Şükran OKUDAN Prof. Dr. Beraat ÖZÇELİK	Aksaray University TÜRKİYE Akdeniz University TÜRKİYE Istanbul Technical University TÜRKİYE
DEVELOPMENT OF EDIBLE FILMS BASED ON PEA PROTEIN ISOLATE ENRICHED WITH ESSENTIAL OIL OF PINUS PINASTER RESIN	Res. Assist. Dr. Huriye Gözde CEYLAN	Adıyaman University TÜRKİYE

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18.10.2024 | HALL-2 | SESSION-4



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Prof. Dr. Meltem SARIOĞLU CEBECİ

Title	Author(s)	Affiliation
AN OVERVIEW OF PLANT-BASED BEVERAGES	Senanur SOYÜNEN AYDOĞAN Prof. Dr. Buket ER DEMİRHAN	Gazi University TÜRKİYE
NUTRITIONAL QUALITY, HEALTH EFFECTS AND SAFETY OF MICROGREENS	Senanur SOYÜNEN AYDOĞAN Prof. Dr. Buket ER DEMİRHAN	Gazi University TÜRKİYE
IMPROVING FOAM PROPERTIES OF SOY PROTEIN ISOLATE: TAGUCHI-DEAR HYBRID OPTIMIZATION	Assist. Prof. Dr. Mehmet GÜLDANE	Sakarya University TÜRKİYE
PRODUCTION OF MULBERRY POWDER USING MICROWAVE-ASSISTED FOAM MAT DRYING	Assist. Prof. Dr. Mehmet GÜLDANE	Sakarya University TÜRKİYE
FERMENTED PURSLANE (PORTULACA OLERACEA L.) JUICE AS A NOVEL FUNCTIONAL BEVERAGE: A REVIEW	Lect. Dr. Tuba Gül DİKME Assist. Prof. Dr. Hakiye ASLAN	Harran University TÜRKİYE Bingöl University TÜRKİYE
FOOD INSECURITY AND HEALTH OUTCOMES IN VULNERABLE GROUPS: A LITERATURE REVIEW	Lect. Mehmet ÖZYURT	Mardin Artuklu University TÜRKİYE
EVALUATION OF SUGAR INDUSTRY WASTES FOR WASTEWATER TREATMENT	Prof. Dr. Meltem SARIOĞLU CEBECİ	Sivas Cumhuriyet University TÜRKİYE
AGRICULTURE: THE PERENNIAL PRIORITY OF THE EUROPEAN UNION	Prof. Dr. Süreyya Yiğit	New Vision University GEORGIA
HARNESSING CARBON DOTS FOR SMART AND SUSTAINABLE FOOD PACKAGING	Assoc. Prof. Dr. Saliha DİNÇ	Selçuk University TÜRKİYE

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18.10.2024 | HALL-3 | SESSION-4



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Prof. (Assoc.) PhD. Anna KOPICZKO

Title	Author(s)	Affiliation
RELATIONSHIP OF CONSUMPTION DAIRY PRODUCTS AND NUTRITIONAL STATUS WITH FOREARM BONE MINERAL DENSITY IN ADOLESCENT CAUCASIAN BOYS: CROSS-SECTIONAL STUDY	Prof. (Assoc.) PhD. Anna KOPICZKO PhD Student Jakub BAŁDYKA PhD Student Wiktoria PIETRZAK	Józef Piłsudski University POLAND
DETERMINATION OF CHEMICAL COMPOSITION AND ANTIMICROBIAL POTENTIAL OF Lentinula edodes MUSHROOM	Dr. Monika Stojanova Acad. Prof. Dr. Dragutin A. Djukic Prof. Dr. Marina T. Stojanova	Association for Scientific-research, Educational and Cultural Activities NORT MACEDONIA University of Kragujevac SERBIA University of Ss. Cyril and Methodius NORT MACEDONIA
THE INFLUENCE OF GROWING MEDIA COMBINATION ON MORPHOLOGY, PHYSIOLOGY AND GROWTH PERFORMANCE OF STEVIA REBAUDIANA	Mohammad Moneruzzaman Khandaker Nur Aqilah Binti Abdullah	Universiti Sultan Zainal Abidin MALAYSIA
NEONICOTINOIDS AND BRAIN HEALTH: DISRUPTIONS IN LEARNING, MEMORY, AND BEHAVIOR FROM CHRONIC EXPOSURE	Sarra Zouaoui Rachid Rouabhi	Echahid Larbi tebessi University ALGERIA
PROXIMATE COMPOSITION AND SENSORY PROPERTIES OF FERMENTED CONDIMENT (DAWADAWA) FROM BLENDS OF SOYBEAN AND MORINGA SEED	Onyekwelu, Chinyere Nkemakonam Izuchukwu, Chinyere Grace	Department of Food Technology NIGERIA
CHANGES IN ANTIOXIDANT COMPOUNDS OF FRESH JUJUBE (ZIZIPHUS JUJUBA) FRUIT AFTER COLD STORAGE	Farid MORADINEZHAD Maryam DOROSTKAR	Birjand University IRAN Ferdowsi University IRAN
COMPARISON OF 1-MCP AND HIGH CO ₂ POSTHARVEST APPLICATION IN EXTENDING THE SHELF-LIFE OF FRESH APRICOT FRUIT	Maryam Dorostkar Yahya Selahvarzi Ali Tehranifar Farid Moradinezhad	Ferdowsi University IRAN Birjand University IRAN
PHYSICO-CHEMICAL PROPERTIES AND QUALITY OF STORED SEEDLESS BARBERRY FRUIT FROM THE MAIN PRODUCTION AREAS OF IRAN	Farid MORADINEZHAD Maryam DOROSTKAR Razieh NIAZMAND	Birjand University IRAN Ferdowsi University IRAN
DOES THE GENDER HAVE AN IMPACT ON THE CONSUMPTION OF ORGANIC FOODS?	Dr. Chems Eddine BOUKHEDIMI	University of Tizi Ouzou ALGERIA

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18.10.2024 | HALL-4 | SESSION-4



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Major Gheorghe GIURGIU

Title	Author(s)	Affiliation
EFFECTS OF SUPERVISION AND TRAINING ON ENTREPRENEURSHIP DEVELOPMENT IN SOKOTO STATE - NIGERIA	Ph.D. Mulikat FolashadeUsman	Usmanu Danfodiyo University NIGERIA
EFFECT OF THE DIFFERENT LEVELS OF THE CRUDE PROTEIN ON BODY GROWTH, BLOOD PARAMETERS AND MEAT QUALITY IN PEKIN DUCK	Aftab Hussain Dr. Asia Iqbal Dr. Arshad Jvaid Dr. Sehrish Sadia	University of Veterinary and Animal Sciences INDIA
EXTRACTION AND TECHNOLOGICAL APPLICATIONS OF ROSEMARY ESSENTIAL OIL	Dr. Muhammad Imran	Government College University PAKISTAN
HARVESTING ANTIOXIDANTS: TECHNIQUES AND EFFICACY IN FRUITS AND VEGETABLES	Muhammad Tayyab Arshad Ali Ikram Muhammad Ahmad	Lahore University PAKISTAN
AGRI-FOOD TOURISM AND LOCAL CUISINE IN NIGERIA	Sadiq, M.S Singh, I.P Ahmad, M.M Sani, B.S Yusuf, K.B	Federal University NIGERIA
GUT MICROBIOTA MEDIATES THE IMMUNOMODULATOR EFFECT OF DIETARY COCOA: IMPACT OF POLENODERM	Major Gheorghe GIURGIU Prof. Dr. Med. Manole COJOCARU	Deniplant-Aide Sante Medical Center ROMANIA Titu Maiorescu University ROMANIA
ENHANCING CASHEW APPLE UTILIZATION: A STUDY ON EXTRACTION METHODS AND TANNIN REDUCTION	Vinh PHAN THI KHANH Anh TRAN THI PHUONG Bao NGUYEN	Nha Trang University VIETNAM
STUDIES ON THE PRODUCTION, PROXIMATE COMPOSITION AND CHEMICAL PRESERVATION OF TIGER NUT MILK, USING SODIUM AZIDE AS AN ADDITIVES	Halimatu Ibrahim Dr. Ahmed Lawal Mashi, PhD Dr. Abubakar sani PhD Mal. Magaji Ilu barde	Umaru Musa Yar'adua University NIGERIA
GROWTH, PRODUCTION, AND FRUIT QUALITY OF TOMATO PLANTS GROWN IN AN INTERCROPPING SYSTEM UNDER DROUGHT STRESS	Rana CHOUKRI Mohamed FAIZE Ali SKALLI Mourad BAGHOUR	University Mohammed I MOROCCO University Chouaïb Doukkali MOROCCO
EVALUATION OF NUTRITIONAL PROPERTIES OF COMPLEMENTARY FOOD PRODUCED FROM SELECTED SPICES, BAMBARA NUT AND MAIZE BLENDS	Nwakalor Chizoba Nkiru	Federal Polytechnic NIGERIA

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18.10.2024 | HALL-5 | SESSION-4



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Adeyinka Elizabeth Ajiboye

Title	Author(s)	Affiliation
BIOPRESERVATIVE ACTIVITY OF CRUDE BACTERIOCIN PRODUCED BY LACTIC ACID BACTERIA FROM SELECTED FERMENTED FOOD SAMPLES AGAINST SOME FOODBORNE PATHOGENIC BACTERIA	Adeyinka Elizabeth Ajiboye Majekodunmi Racheal Adedayo Fatima Mojisola Akanbi	Kwara State University NIGERIA Government College University PAKISTAN
ADULTERATION OF MEAT: A CRITICAL ISSUE FOR PUBLIC HEALTH	Muhammad Bilal Hussain Marwa Waheed Farhan Saeed Muhammad Afzaal Bushra Niaz	Government College University PAKISTAN Riphah International University PAKISTAN
THE VALORIZATION OF OLIVE OIL WASTE BY THE USE OF NEW BIOCHEMICAL STRATEGIES	Adil ROUKBANI Khaoula FAIZ Chaymae GHAFFOULI Prof. Dr. Bouchra LOUASTÉ	Sidi Mohammed Ben Abdellah University MOROCCO
BIOTECHNOLOGICAL INNOVATIONS IN CULTURED MEAT PRODUCTION: TECHNIQUES AND APPLICATIONS	Madalina Alexandra DAVIDESCU Alexandru USTUROI	"Ion Ionescu de la Brad" University of ROMANIA
SUSTAINABLE TEA INNOVATION: HARNESSING ORANGE RIND AND PINEAPPLE CORE FOR FUNCTIONAL BEVERAGE DEVELOPMENT	Kukwa, R.E. Ngunjoh, C.E. Leke, L	Benue State University NIGERIA
FOOD PRESERVATION AND SAFETY: THE ROLE OF ESSENTIAL OILS	Chaymae GHAFFOULI Khaoula FAIZ Adil ROUKBANI Bouchra LOUASTE	Sidi Mohammed Ben Abdellah University MOROCCO
PREPARATION OF HYDROGEL BEADS CONTAINING PLANT EXTRACT	Imdadul Hossain Molla	I. K. Gujral Punjab Technical University INDIA
EFFECT OF FORTIFICATION OF LETTUCE AND GERMINATED CHICKPEA FLOUR ON COOKING, FUNCTIONAL AND TEXTURAL PROPERTIES OF PASTA	NEHA	I. K. Gujral Punjab Technical University INDIA
EVALUATION OF THE ANTIOXIDANT AND ANTIDIABETIC ACTIVITY (IN VITRO) OF POLYPHENOLIC EXTRACTS OF ILLICIUM VERUM	Hamza BELKHODJA Abderrahmane REMIL Fatima Zohra LABBACI Khaoula SACI Nawel CHERGUI	University of Mustapha Stambouli ALGERIA
DISPLACEMENT DUE TO ARMED BANDITRY AND ITS EFFECTS ON FOOD SECURITY: A COMPREHENSIVE REVIEW	Sadiq, M.S Singh, I.P Ahmad, M.M Sani, B.S Yusuf, K.B	Federal University NIGERIA

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18.10.2024 | HALL-6 | SESSION-4



Ankara Local Time: 11³⁰-13³⁰



ZOOM ID: 829 5595 6031 / PASSCODE: 161616

Moderator: Dr. K.R.Padma

Title	Author(s)	Affiliation
SINCE THE BEGINNING OF HUMAN HISTORY, FOOD, NUTRITION, AND BEVERAGES ARE VITAL PARTNERS: FACTS AND INTERPRETATIONS	K.R.Padma K.R.Don	
THE MICROCLIMATE OF SCREEN HOUSE: AN OPTIMAL ENVIRONMENT FOR GROWTH, DISEASE RESISTANCE, AND QUALITY FRUIT DEVELOPMENT IN SOLANACEOUS CROPS (CHERRY TOMATO AND CHILI)	Farhan Ahmad Kusumiyati Kusumiyati Mochamad Arief Soleh Muhammad Rabnawaz Khan Ristina Siti Sundari	Universitas Padjadjaran INDONESIA Faculty of Crop Production Sciences PAKISTAN Faculty of Crop Production Science PAKISTAN Universitas Perjuangan INDONESIA
EFFECT OF DEFENSE ENZYMES ON THE GROWTH OF <i>Bipolaris maydis</i> ON MAIZE (<i>Zea mays</i> L.)	Vignesh K Sathiya Aravindan V Sunil Suriya M	Palar Agricultural College INDIA Annamalai University INDIA
ABOUT AGRI-FOOD GOVERNANCE AND QUALITY – INSIGHTS FROM BULGARIA 1	Hrabrin Bachev Bozhidar Ivanov	Institute of Agricultural Economics BULGARIA
SUSTAINABLE STRATEGIES FOR BOOSTING TOMATO FOOD VALUE: MITIGATING COPPER TOXICITY WITH CHITOSAN AND NANOSILVER	Marcelina KRUPA-MALKIEWICZ Ireneusz OCHMIAN Sylwia CZARNECKA	West Pomeranian University POLAND
PREVALENCE OF INTERNAL PARASITES IN LOCAL CHICKEN IN KARBALA PROVINCE/IRAQ	Firas Alali Marwa Jawad Asaad Sh. M. Alhesnawi Ali alshimry	College of Veterinary Medicine IRAQ University of Kerbala IRAQ
INVESTIGATING THE EFFECTS OF HOT WATER SOAKING ON THE PROXIMATE AND ANTI-NUTRITIONAL COMPOSITION OF MORINGA (<i>Moringa oleifera</i>) LEAVE	Abdulrauf Rukayat Titilayo	Federal University of Technology Minna NIGERIA
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EFFECT OF DEFENSE ENZYMES ON THE GROWTH OF <i>Bipolaris oryzae</i> ON RICE (<i>Oryza sativa</i> L.)	Vignesh K Sathiya Aravindan V Sunil Suriya M	Palar Agricultural College INDIA Annamalai University INDIA
THE YIELD RESPONSE OF PISTACHIO TREES TO FOLIAR SPRAY OF SOME MICRO-NUTRIENTS AT TIME OF POST-BLOOM	Akbar Soliemanzadeh Vahid Mozafari	Soil and Water Research Department, Hormozgan Agricultural and Natural Resources Research and Education Center, AREEO, Bandar-e-Abbas IRAN Vali-e-Asr University of Rafsanjan IRAN

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BIOTECHNOLOGICAL INNOVATIONS IN CULTURED MEAT PRODUCTION: TECHNIQUES AND APPLICATIONS

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ABSTRACT

Cultured meat, also known as lab-grown or cell-based meat, represents a revolutionary advancement in the field of food production, offering a sustainable alternative to traditional livestock farming. This paper explores the biotechnological innovations driving the development of cultured meat, focusing on the various techniques and their applications. The production of cultured meat involves the proliferation of animal cells in a controlled environment, bypassing the need for animal slaughter and addressing concerns related to animal welfare, environmental sustainability, and food security (Stephens et al., 2018).

Key biotechnological techniques employed in cultured meat production include cell sourcing, scaffold fabrication, and bioreactor design. The selection of appropriate cell types, such as myoblasts, adipocytes, and fibroblasts, is critical for developing meat products that mimic the texture and nutritional profile of conventional meat. Recent advancements in genetic engineering and CRISPR technology have enhanced the efficiency of cell proliferation and differentiation, paving the way for more consistent and scalable production processes (Post, 2012).

Scaffold fabrication, which provides structural support for cell growth, is another crucial aspect of cultured meat production. Innovations in biomaterials, such as edible polymers and hydrogels, have enabled the creation of scaffolds that not only support cell attachment and growth but also degrade safely upon consumption. Additionally, the use of 3D bioprinting technology has allowed for the precise layering of cells and biomaterials, resulting in meat products with complex structures and textures similar to those of traditional cuts of meat (Kadim et al., 2015).

Bioreactor design and optimization play a vital role in scaling up cultured meat production. Advanced bioreactors are being developed to create the ideal conditions for cell culture, including optimal temperature, pH, and nutrient supply. These bioreactors must be capable of supporting large-scale cell cultures while maintaining high product quality and safety. Innovations in bioprocessing, such as perfusion systems and microcarrier-based cultures, have shown promise in enhancing cell density and viability, thereby increasing production efficiency (Specht et al., 2018). The applications of cultured meat extend beyond food production. This technology holds potential for biomedical research, offering models for studying muscle and tissue development, disease progression, and drug testing. Moreover, cultured meat can contribute to reducing the environmental impact of meat production, as it requires significantly less land, water, and energy compared to conventional livestock farming (Zhang et al., 2017).

Despite the significant progress made in biotechnological innovations for cultured meat production, several challenges remain. These include optimizing cost-effectiveness, ensuring regulatory approval, and achieving consumer acceptance. Continued interdisciplinary research and collaboration between scientists, engineers, policymakers, and industry stakeholders are essential to address these challenges and realize the full potential of cultured meat (Gholobova et al., 2018).

Table 1. Techniques Used in the Production of Cultured Meat

Technique	Description
1. Cell sourcing	Selection of suitable cell types such as myoblasts, adipocytes, and fibroblasts for culturing.
2. Cell proliferation	Expansion of selected cells in culture media to achieve a high cell density.
3. Genetic engineering	Use of CRISPR and other genetic tools to enhance cell growth and differentiation.
4. Scaffold fabrication	Creation of structural supports for cell attachment and growth using biomaterials like edible polymers and hydrogels.
5. 3d bioprinting	Layer-by-layer printing of cells and scaffolds to create complex tissue structures.
6. Bioreactor design	Development of controlled environments for large-scale cell culture, including temperature, pH, and nutrient management.
7. Perfusion systems	Techniques to continuously supply nutrients and oxygen to growing cell cultures in bioreactors.
8. Microcarrier-based Cultures	Use of microcarriers to increase surface area for cell growth in suspension cultures.
9. Cell differentiation	Induction of specific cell types to form muscle, fat, and other tissues found in meat.
10. Nutrient media optimization	Formulation of culture media to support optimal cell growth and differentiation.

In conclusion, biotechnological innovations are at the forefront of transforming cultured meat from a novel concept to a viable and sustainable food source. By advancing techniques in cell culture, scaffold fabrication, and bioreactor design, researchers are paving the way for the future of meat production, with broad implications for health, sustainability, and the global food supply.

Key words: alternative proteins, biotechnology, cultured meat, synthetic lab meat

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THE VALORIZATION OF OLIVE OIL WASTE BY THE USE OF NEW BIOCHEMICAL STRATEGIES

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ABSTRACT

In terms of the global production of olive oil by-products, the amount of olive mill wastewater and pomace produced every year achieve several millions of tons. Disposal of these waste products could create a serious environmental problem due to the phytotoxic nature of and low biodegradation of the lignocellulosic biomass.

Our studies highlight on the treatment approaches and valorization options for dealing with olive pomace residues, predominantly those allowing for the recovery of valuable natural components such as: biofuel, biogaz, enzymes, and other compounds.

The use of anaerobic digestion for production of new compounds based on physicochemical and biochemical properties of olive oil waste.

The results showed that anaerobic digestion is performance method for olive waste valorization and energy production.

Keywords: valorization, olive oil waste, olive mill wastewater, olive pomace, biochemical strategies.

FOOD SECURITY IN PAKISTAN: PERFORMANCE AND CHALLENGES: A CASE STUDY OF SINDH PAKISTAN

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This research investigates the food security challenges: A case Study of Sindh Pakistan. Ensuring food security is an issue of great concern for a country like Pakistan where more than one-third of the population is estimated to be absolutely poor and one-half of all children malnourished in one way or another. Pakistan has progressed positively on several health outcomes, but the state of food and nutrition security in the country still requires more focus. The 2016 Millennium Development Goals (MDGs) report noted that, despite Pakistan's significant progress during MDG era, more sustained efforts are required to accelerate achievement, particularly related to food and nutrition security (Food and Nutrition security analysis, 2019). In the present paper an attempt has also been made to understand the performance of food security in terms of availability, accessibility and absorption which is the main dimensions of food security and challenges in ensuring food security in Pakistan. The findings show that the food grains production has declined since Pakistan entered in the era of globalization. The analysis of per capita net availability of foodgrains showed that there is marginal increment in food grains availability but the per capita availability of rice and wheat has declined despite in record production in both the crops. The dietary intake of fat, protein and energy shows that among the three nutrients, only per capita per day consumption of fat has shown an increasing trend since 1983. Despite its self-sufficiency in food availability, and being one of the world's largest grain producer, about 25% of Pakistanis go to bed without food. Large scale food wastage.

**IMPACT OF FOOT PRINTS ON FOOD SECURITY ENVIRONMENT
SUSTAINABILITY ON CHICK PEA CROP: A CASE STUDY SUKKUR SINDH-
PAKISTAN**

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Abstract:

This research investigates the Impact of foot prints on Food security environment sustainability on Chick pea crop: A Case Study Sukkur Sindh-Pakistan; Data were collected from Sukkur Abad Kacha from 45 farmers of chickpea. An interconnection exists between environmental sustainability and food security, which guarantees equal chances for the current as well as future generations. This article examines the complicated dynamics between environmental components and food production and production systems in terms of the crucial demand of reconciling productive agriculture with ecological healthiness. Such challenges as climate change, water shortages, land degradation, and biodiversity losses still are the most important factors that undermine agriculture and increasing inequalities at the international level. While the future of food systems might be uncertain, various approaches such as sustainable farming methods, technology advancement and the implementation of policies could be highly effective in curbing these challenges as well as building food systems resilience. Acknowledging sustainable agricultural practices, biodiversity conservation, empowering marginalized communities, and involving consumers in this process is one of the most integral steps that should be taken in order to achieving both the environment sustainability and food security as goals. On the other hand the frameworks and international agreements like the Paris Agreement and the Sustainable Development Goals supply the environmental sustainability and food security in policy agendas investment approaches.

EFFECTS OF WASTE MUSHROOM BIOMASS ON MACROMOLECULAR COMPOSITION OF MARIGOLD

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ABSTRACT

Fourier-Transform Infrared Spectroscopy (FT-IR) can provide comprehensive data on macromolecule composition in plants and plant raw materials. This method allows for identification of individual functional groups of macromolecules in the tested material and for tracking the changes occurring in various chemical bonds. Waste mushroom biomass can be used as substrate components for peat. Marigold is an aromatic herb cultivated worldwide for culinary, medical, essential oil, and ornamental purposes. The objective of this study was to test whether using waste mushroom biomass can alter the macromolecular composition of two cultivars 'Mikrus' and 'Petite Yellow' marigold (*Tagetes patula*). The analysis of leaf and petal spectra for both cultivars revealed that enriching the peat with waste mushroom biomass increased the intensity of bands centered around 3270 cm^{-1} , 2917 cm^{-1} , 2849 cm^{-1} , 1600 cm^{-1} , 1022 cm^{-1} typical of proteins, lipids, carbohydrates and polyphenolics ($-\text{OH}$, $-\text{NH}_2$, $-\text{CH}$, $-\text{CH}_3$, $-\text{CH}_2$, $\text{O}=\text{C}$ and $\text{C}=\text{C}$ groups). These quantitative changes were more intense in 'Petite Yellow' marigold, where we also observed a qualitative change in the samples of leaves and petals within bands characteristic for carbohydrates ($1500\text{--}1200\text{ cm}^{-1}$) and cell wall components ($1000\text{--}650\text{ cm}^{-1}$). The results of macromolecules FT-IR analyses obtained by the spectroscopic method should be reinforced by further biochemical and molecular studies in order to better understand the effects of waste mushroom biomass on plant composition and structure.

Keywords: Agro residue, FT-IR Spectroscopy, Organic components, Potting media

SUSTAINABLE STRATEGIES FOR BOOSTING TOMATO FOOD VALUE: MITIGATING COPPER TOXICITY WITH CHITOSAN AND NANOSILVER

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ABSTRACT

This study explored the impact of copper (Cu) stress on tomato plants (*Solanum pimpinellifolium*) and evaluated the role of chitosan and nanosilver (nAg) in mitigating this stress while enhancing the food value of tomatoes. While copper is essential for plant growth, excess levels induce oxidative stress, reducing plant productivity and fruit quality. The greenhouse experiment showed that chitosan improved root growth by 48-53%, delayed fruit ripening, and significantly increased antioxidant content, including a 178 mg/kg rise in ascorbic acid and 31.4 mg/kg in lycopene, both important for human health. Nanosilver increased fruit yield by 151.5% and enhanced potassium uptake to 4.11 g/100g, improving fruit nutritional value. Despite reducing shoot growth by 30%, the combination of Cu with chitosan increased dry matter content to 9.4%, improving fruit texture and shelf life. Cu+nAg treatments enhanced overall yield by 145.5% and delayed ripening, ensuring better storage and extended freshness. These treatments also modulated essential nutrient uptake, with Cu+nAg increasing potassium and copper levels in the fruit, making them more nutritionally dense. The findings suggest that chitosan and nanosilver not only mitigate copper toxicity but also enhance the nutritional quality, marketability, and storage potential of tomatoes, offering a sustainable solution for improving food value under heavy metal stress.

Keywords: Copper stress, Tomato, Chitosan, Nanosilver, Antioxidant properties, Food quality, Crop yield.

ALLELOCHEMICAL EFFECT ON *AVERRHOA CARAMBOLA L.* IN ANATOMICAL ARCHITECTURE ON WHEAT GROWTH

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Abstract

Allelopathy is recognised as a potential technology to control weeds, and could also be a suitable approach for enhancement of crop yield. The study was conducted to investigate the allelopathic role of *Averrhoa carambola* leaf extract on growth, anatomical and physiological features of three wheat lines, namely 3094, 7076 and A2011. Three dilutions i.e. 0% (control), 15% and 30% of the leaf aqueous extract were applied at 15 day intervals (total five applications) on wheat lines until maturity. All wheat lines showed differential behaviour to allelochemicals of *A. carambola* leaf extract. Increased root area was accompanied by a high Handling Editor: proportion of storage parenchyma tissues and enlarged vascular bundles in line. Disintegration Enrico Francia of root cortical parenchyma and complete transformation of chlorenchyma into sclerenchyma in stem was recorded in all wheat lines, particularly at the highest concentration of leaf extract. Line 7076 showed very different behaviour, as it possessed a proportionally enlarged root cortex, enlarged stem vascular bundles and increased leaf thickness, primarily at the highest concentration of leaf extract. Line A2011 was relatively more sensitive, indicating a significant reduction ($P < 0.05$) in root and stem area and deformed leaves. A low concentration (15%) of leaf extract promoted growth and development, whereas a higher concentration caused significant reduction in growth and anatomical attributes. A lower dose of *Averrhoa* leaf extract promoted growth and development in all wheat lines, and hence can be used as a growth promoter. A higher concentration is important for eradicating unwanted plants.

Keywords: allelochemicals, anatomical architecture, chlorenchyma, growth promotion, leaf thickness, parenchyma, sclerenchyma.

AYVA ÇEKİRDEĞİ MÜSİLAJINDAN YENİLEBİLİR FİLM ÜRETİMİ

PRODUCTION OF EDIBLE FILM FROM QUINCE SEED MUCILAGE

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ÖZET

Ayva (*Cydonia oblonga* Miller) Rosaceae ailesinden olup; sert, asidik ve boğucu özelliklere sahip meyvedir. Ayva çekirdeği fenolik bileşenler için ekonomik ve doğal bir kaynaktır. Polisakkarit yapıdaki bitki biyopolimeri olan ayva çekirdeği müsilajı, flavonoidler, steroller, alkaloidler, tanenler, saponinler, reçine, fenol ve terpenoidler içermektedir. Minimum üretim maliyeti ve kolay ekstrakte edildiğinden iyi bir film veya kaplama bileşeni olduğu görülmektedir.

Bu çalışmada ayva çekirdeğinden elde edilen müsilajdan yenilebilir film oluşturularak, bu filmin antioksidan etkileri araştırıldı. Elde edilen film dilimlenmiş elma örneklerinde kullanılarak elmanın +4 C' de muhafazası sırasında meydana gelen renk değişimleri incelendi.

Bitkisel müsilaj için 5 g ayva çekirdeği hassas terazi de tartılıp bir behere alınmıştır. Tartılan ayva çekirdeğinin üzerine 250 ml distile su eklenmiştir. Hazırlanan karışımın jel kıvamına gelmesi için 1 gece oda sıcaklığında bekletilmiştir. Yenilebilir film oluşturmak içinse 40 ml ayva jeli ve 8 damla gliserol behere alınarak manyetik karıştırıcı da karıştırılıp petri kabına döküldü. Film oluşumu 4 gün boyunca gözlemlendi. 4. gün sonunda filmler petri kaplarından çıkartıldı ve analizler için hazır hale getirildi.

Yenilebilir filmin antioksidan aktivitesinin belirlenmesi; film küçük parçalar halinde kesildi ve 10 mg olarak tartıldı. Daha sonra 6×10^{-5} M konsantrasyonda DPPH çözeltisi hazırlandı ve bu reaktif çözeltisinden 1.0 mL numune tüplerine ilave edildi. Oda sıcaklığında karanlık ortamlarda 30 dakika bekletildi. Daha sonra, tüm çözeltiler bir UV-Vis spektrofotometresi ile 517 nm dalga boyunda ölçüldü.

Elma dilimlerinin film ile kaplanması; aynı kalınlıkta ve ağırlıkta hazırlanan elma dilimleri, ayva çekirdeği müsilajından elde edilen film materyali ile (daldırma yöntemi) kaplandı. Deneysel örnekler +4 C' de 1., 3., 5. ve 7. günlerde renk analizleri (L^* , a^* ve b^* değeri) yapılmak üzere depolandı.

Kontrol grubu örneklerde 1. günde L^* , a^* ve b^* değerleri sırasıyla; 35.42, 26.64 ve 10.10 olarak tespit edildi. Kontrol grubu örneklerde 3. Günde L ve a değerinde artış, b değerinde düşüş görüldü. Ayrıca elma dilimlerinde ağırlık kaybı ve duyusal olarak büzülme meydana geldiği gözlemlenirken, deneysel örneklerde 7. Gün ile 1. Gün arasındaki istatistiksel fark önemsiz olduğu tespit edildi ($p > 0.05$).

Sonuç olarak; ayva çekirdeği müsilajından elde edilen yenilebilir film kaplamanın antioksidan aktivitesinin yüksek olduğu ve kolay okside olabilen gıdaların depolanması sırasında oksidasyonu önleyerek raf ömrünün uzatılabileceği düşünülmektedir.

Anahtar Kelimeler: antioksidan aktivite, ayva çekirdeği, müsilaj, yenilebilir film

ABSTRACT

Quince (*Cydonia oblonga* Miller) belongs to the Rosaceae family and is known for its hard, acidic, and astringent characteristics. Quince seeds are an economical and natural source of phenolic compounds. The mucilage derived from quince seeds, a plant biopolymer with a polysaccharide structure, contains flavonoids, sterols, alkaloids, tannins, saponins, resins, phenols, and terpenoids. Due to its low production cost and ease of extraction, it is considered a good film or coating material.

This study aimed to produce an edible film from quince seed mucilage and investigate its antioxidant effects. The resulting film was applied to sliced apples, and color changes during storage at +4°C were examined.

For the plant mucilage, 5 g of quince seeds were weighed using a precision scale and placed in a beaker. To the seeds, 250 ml of distilled water was added. The mixture was allowed to gel at room temperature for one night. To create the edible film, 40 ml of quince gel and 8 drops of glycerol were mixed in a beaker using a magnetic stirrer and poured into a petri dish. Film formation was observed over four days. At the end of the fourth day, the films were removed from the petri dishes and prepared for analysis.

To determine the antioxidant activity of the edible film, it was cut into small pieces and weighed at 10 mg. A 6×10^{-5} M DPPH solution was prepared, and 1.0 mL of this reagent was added to sample tubes. The samples were incubated in the dark at room temperature for 30 minutes. After incubation, all solutions were measured using a UV-Vis spectrophotometer at a wavelength of 517 nm.

For the apple slices, samples of the same thickness and weight were coated with the film material derived from quince seed mucilage using the immersion method. The experimental samples were stored at +4°C, and color analyses (L^* , a^* , and b^* values) were conducted on days 1, 3, 5, and 7.

In the control group samples, the L^* , a^* , and b^* values on the first day were determined to be 35.42, 26.64, and 10.10, respectively. On the third day, an increase in L and a values and a decrease in b value were observed in the control group. Additionally, weight loss and sensory shrinkage were noted in apple slices, while the statistical difference between the experimental samples on the 1st and 7th days was found to be insignificant ($p > 0.05$).

In conclusion, the edible film obtained from quince seed mucilage exhibited high antioxidant activity, suggesting that it may prevent oxidation during the storage of easily oxidizable foods, thus extending shelf life.

Keywords: antioxidant activity, quince seed, mucilage, edible film.

INFLUENCES OF THE ENVIRONMENT ON THE PHYSIOLOGICAL CHARACTERISTICS OF DIFFERENT APPLE VARIETIES

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Abstract

Research has shown that a variety of environmental factors and characteristics associated to genotype affect apple adaptability. This study set out to assess how two different climates affected the physiological characteristics and vegetative growth of ten different apple varieties. The bulk of the assessed response variables showed significant varietal variations in the results. For most cultivars evaluated in high temperatures, there was a noticeable reduction in shoot length, leaf area, and leaf density. Along with a decrease in stomatal density and dimensions, this reduction was linked to a decrease in stomatal conductance. On the other hand, compared to base altitude regions, apple leaf physiological characteristics showed the highest proline and cuticular wax levels.

The findings show that the levels of heat resistance among the apple cultivars under investigation varies significantly. The aforementioned heterogeneity presents auspicious prospects for the amalgamation of cross-breeding tactics, hence facilitating the genesis of apple varieties that are more suited to the milder climate prevalent in neighboring Moroccan regions.

**THE EFFECT OF TOTAL QUALITY MANAGEMENT PRACTICES ON INNOVATION:
EVIDENCE FROM SELECTED AGRICULTURAL TECHNICAL AND VOCATIONAL
EDUCATION TRAINING COLLEGES IN ETHIOPIA**

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ABSTRACT

Considerable effort has been devoted over the years by many organizations to adopt total quality management practices, but few studies have assessed the relationship between TQM practices and innovation in service industry. So, the main aim of this study was to investigate the assessment of the relationship between TQM practices and innovation in a three selected MoA ATVET Colleges (i.e., Ardaita, Agarfa and Alage). The researcher employed a cross-sectional descripto-explanatory research design and also a quantitative research approach was used to collect and analyze primary data. In order to collect primary data a survey instrument was adapted from business quality management practices literatures and by using stratified sampling techniques 150 questionnaires were distributed to employees, senior and functional managers of MoA ATVET Colleges and only 140 questionnaires were fully filled and returned with a 93% response rate. The survey data were analyzed through descriptive statistics, correlation and multiple regression analysis to investigate the relationship between TQM practices dimensions (independent variables) and innovation (dependent variables). The findings of multiple regression analysis insured that in the MoA ATVET Colleges all of the seven TQM practices dimensions (management leadership, employee involvement, training and education, employee empowerment, customer focus, information and analysis and continuous improvement) have positive and significant relationship with innovation at 95% confidence level. From the seven TQM practice dimensions, management leadership dimension with beta value of 0.174 was the most influential TQM practice dimension to have positive and significant effect on innovation followed by customer focus with beta value of 0.131. Information and analysis dimension was the third influential TQM practice dimension with beta value of 0.115, followed by continuous improvement dimension with beta value of 0.113. Employee involvement dimension was the fifth influential TQM practice dimension with beta value of 0.111, followed by training and education with beta value of 0.092. Finally employee empowerment dimension was the least influential TQM practice dimension to have positive and significant effect on innovation with beta value of 0.080. Also, regression result also shows that in MoA ATVET Colleges, the fore mentioned seven dimensions of TQM practices explained 88.3% of the variations in innovation. Therefore the researcher recommended that the management bodies of the colleges should give their employees a high degree of autonomy in order to do their job and participate in the implementation of TQM practices so as to increase their innovativeness. Additionally, the management bodies of the MoA ATVET Colleges should establish their quality management systems according to the requirement of ISO 9001:2008 standards to increase innovation in the colleges.

Key Words: TQM Practices Dimensions, Innovation, MoA ATVET Colleges

THE EFFECT OF BANANA PEEL MEAL ON THE GROWTH PERFORMANCE, CARCASS CHARACTERISTICS, AND DIGESTIBILITY IN BROILERS

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Abstract

Poultry meat is one of the most important sources of animal protein in the world. Feeding is the most expensive single input in the poultry production industry, making up 65–70% of the overall cost of production. Banana peel is utilized as an alternative feed source in broilers' diets because it is cost-effective. It has excessive protein, high fiber, and high power. The purpose of the current research was to investigate the effect of banana peel meal on growth performance, carcass characteristics, and digestibility in broilers. A total of 120 broilers were randomly assigned into 4 treatment groups. Group 1, Basel diet with no Banana Peel Meal (no BPM), Group 2, 10% BPM, Group 3, 20% BPM, and Group 4 with 30% BPM. Each treatment group had 30 broiler birds with 10 birds per replicate and the trial lasted for 8 weeks. Our findings revealed that the supplementation of banana peel in the diet significantly increased the growth performance of broilers. Moreover, banana peel was markedly effective in improving the carcass characteristics in broiler chickens. Additionally, banana peel considerably enhanced nutrient digestibility in broilers. Conclusively, the present study might provide a way for future research, probably offering good awareness of the impacts of Banana Peel on broilers' health and productivity.

Keywords: Banana Peel, Growth, Digestibility, Broilers

**NANOCELLULOSE DERIVED FROM AGRICULTURAL BIOWASTE BY-PRODUCTS—
SUSTAINABLE SYNTHESIS, BIOCOMPATIBILITY, BIOMEDICAL APPLICATIONS,
AND FUTURE PERSPECTIVES: A REVIEW**

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ABSTRACT

Cellulose, a natural linear biopolymer composed of hierarchically arranged cellulose nanofibrils, presents a compelling avenue for sustainable nanocellulose synthesis from agricultural by-products. This innovative approach both mitigates organic waste and landfill disposal and unlocks the latent potential of nanocellulose, transforming agricultural residue into valuable resources. This paradigm shift towards sustainability resonates across diverse industrial sectors, particularly in biomedical research and development. In recent years, the remarkable attributes of nanocellulose, including its biocompatibility, low cytotoxicity, and exceptional water holding capacity for cell immobilization, have propelled its adoption in various medical applications. From drug delivery systems to wound healing, tissue engineering, and antimicrobial treatments, nanocellulose has emerged as a versatile biomaterial. Moreover, the strategic integration of nanocellulose into composites and its structural functionalization enable customizing its properties for specific functions, further expanding its utility. This comprehensive review explores prominent types of nanocellulose—including cellulose nanocrystals, cellulose nanofibrils, and microbial or bacterial cellulose—elucidating their biomedical applications. This review underscores the sustainability principles underpinning its utilization by exploring the cellulose sources derived from biowaste and industrial processes for nanocellulose production. As a crucial component in a wide array of biomedical materials, nanocellulose both drives innovation and propels the advancement of biomedicine toward sustainability.

Keywords: Hierarchically arranged cellulose nanofibrils Nanocellulose biocompatibility Cellulose nanocrystals Bacterial cellulose, Microbial cellulose Biowaste

EFFECT OF SOME PLANT EXTRACTS, PLANT OILS AND TRICHODERMA SPP. ON TOMATO FUSARIUM WILT DISEASE

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ABSTRACT

Plant extracts of Aloe vera and Syzygium aromaticum (clove) inhibited the growth and sporulation of *Fusarium oxysporum* f.sp. *lycopersici* (FOL) both under laboratory and green-house conditions. However, essential oils also reduced the growth and spore population of FOL significantly. The best results were obtained when clove oil was applied; followed by *Mentha arvensis* (mint) oil. *Trichoderma harzianum* and *T. asperellum* were the best tested *Trichoderma* spp. isolates in reducing the growth of FOL. Under green house and artificial soil infestation conditions, All the above mentioned treatments reduced the wilt disease incidence and improved the growth of tomato plants; significantly.

PREPARATION OF HYDROGEL BEADS CONTAINING PLANT EXTRACT

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Abstract

Hydrogels are a group of hydrophilic polymeric network having a three dimensional porous structure by having the proper arrangement small or macromolecular polymers in it. Their hydrophilic structure allows them to store water in their three-dimensional (3-D) networks but not dissolved in water. The hydrogel products have different important functions like in drug delivery systems, food additives, separation of biomolecules or cells, pharmaceuticals, biomedical applications, tissue engineering and regenerative medicines. The most common polysaccharides used to formulate hydrogels Chitosan, Alginate, Cellulose, Starches, Locust Bean Gums, Xanthan gum, Guar Gum etc. Hydrogel formulations made it possible for the bioactive components of plant extracts to be encapsulated. Plant extracts significantly impact human nutrition and can treat several ailments. The plant extracts possess various herbal properties including antiparasitic, antibiotic, antioxidant, antihypertensive, antiviral, insecticide, anticancer, antifungal, and hypoglycemic activities. The hydrogel beads are prepared by Ionotropic Gelation method which based on the reaction between a polymeric solution & a gelling agent. Drug delivery always face different challenges like low solubility of the drug in a carrier and its low bioavailability. These factors have prompted scientists to look into novel medicine delivery strategies. Different studies showed that the polymers used to make the Hydrogel Beads reduces the pores which in turn reduces the drug release rate over a period of time.

Keywords: Hydrogel beads, Ionotropic Gelation, Polymeric solution, Drug (plant extract) Release

STUDIES ON THE PRODUCTION, PROXIMATE COMPOSITION AND CHEMICAL PRESERVATION OF TIGER NUT MILK, USING SODIUM AZIDE AS AN ADDITIVES

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ABSTRACT

Fresh Tigernut (*Cyperus esculentus*) was investigated for its proximate composition using the various methods described by the Association of official Analytical Chemist (AOAC), 2010. The proximate analysis of 100g of fresh tiger nut revealed that the carbohydrate content has highest value followed by crude fat, moisture, crude protein, ash content and lowest crude fibre. Tigernut milk (*Cyperus esculentus*) was pasteurized and treated with the addition of sodium azide of chemical preservatives (singly-0.2% sodium azide, 0.12% sodium azide and 0.04% sodium azide). These were evaluated for its sensory quality characteristics during 14 days storage period ($28\pm 2^{\circ}\text{C}$). The results of this study have shown that tigernut milk pasteurized and treated with 0.2% sodium azide was generally preferred in all the sensory quality attributes (colour, aroma, taste, and overall quality).

Keywords; Fresh tigernut, sodium azide, chemical preservative, sensory evaluation

MICROBIOLOGICAL ASSESSMENT OF COMMERCIALY PREPARED TIGER NUT DRINK SOLD IN ILORIN SOUTH LOCAL GOVERNMENT AREA OF KWARA STATE, NIGERIA

SUNDAY AWE

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ABSTRACT

This study aimed to assess the microbiological quality of commercially prepared tiger nut drinks sold in the Ilorin metropolis. A total of three (3) samples were purchased from various vendors in three locations of Ilorin (Basin, Pipeline, and Fate areas) and analyzed for microbial load, including total viable count (TVC), coliform count, yeast, and mold count. Standard microbiological methods were employed for the isolation and enumeration of microorganisms. Results revealed pH values of the samples ranged from 3.8 to 5.2 while the total heterotrophic bacterial count ranged from 1.94 to 3.90 log₁₀ CFU/mL. The total fungal count of tiger nut drinks ranged from 1.07 to 9.10 log₁₀ CFU/mL. A total of five (5) bacterial genera namely Staphylococcus sp. (32.5%), Escherichia sp. (12.5%), Pseudomonas sp. (12.5%), Bacillus sp. (25%) and Enterobacter sp. (12.5%) were isolated from the samples. Three (3) fungal genera were also discovered in the drink samples which include, Aspergillus fumigatus (22%), Aspergillus flavus (22%), Aspergillus niger (34.5%), Fusarium sp. (12%) and Penicillium sp. (12%). The result revealed that Staphylococcus sp. had the highest percentage of occurrence (32.5%) followed by Bacillus sp (25%), while Enterobacter sp. (12.5%), Pseudomonas sp (12.5%) and Escherichia coli (12.5) had the least percentage of occurrence. The results of this study revealed that all the samples from the three (3) locations were heavily contaminated with pathogenic microorganisms and found unsuitable for human consumption based on the standard recommended by the National Agency for Food and Drug Administration and Control (NAFDAC). NAFDAC stipulated that the mesophilic aerobic count of locally prepared beverages should be < 5.0 log₁₀ CFU/mL. Conclusively, the huge contamination recorded in all the samples irrespective of the location could be linked to poor hygienic levels during processing. Therefore, good manufacturing practices, public health enlightenment campaigns and strict regulations from relevant agencies are recommended to avoid foodborne infections, diseases and possible deaths that could result from consumption of such contaminated tiger nut drinks.

Key words : Tiger nut, pathogenic microorganisms

ADULTERATION OF MEAT: A CRITICAL ISSUE FOR PUBLIC HEALTH

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Abstract

In the food sector, adulteration of meat poses a substantial threat to customer trust, economic investment, and public health. Adding less expensive meat species, using non-meat components, or mislabeling are examples of fraudulent techniques. Adding water or ice to enhance weight, combining beef with offal from cows, or combining pork with poultry are common examples of adulteration. The reasons behind meat adulteration include low cost, increased demand, and antiquated methods. It infringes on consumer rights for religious and cultural preferences and presents health hazards, such as allergies. Analysis of proteins and DNA is frequently used in analytical techniques to find adulteration. Spectroscopy-based sensors are promising; multispectral imaging achieves 87–100% higher accuracy than visible and fluorescent spectra. Pork, beef, sheep, and duck may all be detected simultaneously in commercial products using a real-time fluorescence loop-mediated isothermal amplification (LAMP) microfluidic assay with a 0.1% detection limit and high specificity and sensitivity. Although there are laws prohibiting adulteration, they are nonetheless difficult to implement. To protect the welfare of the public, meat adulteration is a complicated, multifaceted problem that calls for sophisticated detection techniques and strong regulatory frameworks. Sustained investigation of sensitive, quick methods is essential to stopping this scam.

Keywords: Meat, Adulteration, Food fraud, Detection Techniques

BIOACTIVE MOLECULES, ANTIOXIDANT EGCG POLYPHENOLS EXTRACT OF GREEN TEA CAMELLIA SINENSIS L.

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Abstract

Polyphenols are bioactive molecules exhibiting a lot of scientific attention due to their multiple biological activities. They are antioxidants and are the active principals of many medicinal plants. We find them, in general, in all vascular plants, where they can be located in various organs: roots, stems, wood, leaves, flowers. Reason of this, our study consists on extracting polyphenols from green tea *Camellia sinensis* leaves, measuring their toxicity (LD₅₀) and their antioxidant effects and some therapeutic activities: action against stress, slimming activity and antibacterial activity. Polyphenols ultrasonic extract, identification of bioactive molecules with LC-MS, mesure toxicité LD₅₀ and the model of depression SICD induced in mice, slimming activity used rabbit, antibacterial activity, *Pseudomonas aeruginosa* & *Escherichia coli*.

Analytical results of this extract allows us to identify the presence of therapeutic molecule so-called Epigallocatechine gallate (EGCG) revealed by LC-MS (Up to 60,1 %); The analysis by LC-MS identified 4 polyphenolic components included in the obtained lyophilisate which EGCG is the most abundant. For therapeutic settings, the results obtained show that the polyphenols of green tea have protective effects on the model of depression SICD induced in mice, a strong slimming activity and a very effective antibacterial activity against *Pseudomonas aeruginosa* and screw-negative against *Escherichia coli*.

The application of green tea polyphenols as a natural remedy is very efficient so it is a return to the traditional pharmacy, and used this antioxidant bioactive molecule in the pharmaceutical industry.

Keywords: *Camellia sinensis*, Antioxidant, Bioactive molecule, Polyphenols (EGCG).

**EVALUATION OF THE ANTIOXIDANT AND ANTIDIABETIC ACTIVITY (IN VITRO)
OF POLYPHENOLIC EXTRACTS OF ILLICIUM VERU**

**MILLICIUM VERUM'UN POLİFENOLİK EKSTRAKTLARININ ANTİOKSİDAN VE
ANTİDİABETİK AKTİVİTESİNİN (İN VİTRO) DEĞERLENDİRİLMESİ**

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Abstract:

Natural extracts from plants contain a variety of biologically active molecules. *Illicium verum* is a plant used in traditional and culinary medicine in Algeria. It belongs to the Schisandraceae family. The objective of this work is the phytochemical study, the evaluation of the antioxidant and anti-diabetic activity of polyphenolic extracts of *Illicium verum*. The quantitative analysis is based on the dosage of phenolic compounds, tannins, and flavonoids. The evaluation of the antioxidant activity was carried out by the DPPH and Total Antioxidant Capacity tests. While the evaluation of the anti-diabetic activity is according to the method of inhibition of the enzyme α -Amylase and α -Glucosidase. The qualitative analysis of these extracts by phytochemical screening revealed the presence of phenolic compounds: flavonoids, total tannins, leucoanthocyanins, terpenoids, saponosides and cardenolides in the extracts. This is confirmed by a quantitative analysis based on the dosage of phenolic compounds, tannins, and flavonoids knowing that the methanolic decoction extract shows higher values than the other extracts by average values equal to 308.85 ± 0.53 mg EAG/g, 85.80 ± 0.28 mg EQ/g and 36.09 mg EC/g for total polyphenols, flavonoids and condensed tannins respectively. The evaluation of the antioxidant activity using the DPPH and Total Antioxidant Capacity tests shows that the methanolic decoction extract of *I. verum* reveals interesting antiradical properties in both methods ($IC_{50} = 0.03$ mg/ml, $CAT = 116.36 \pm 0.09$ mg EAA/g). Moreover, the evaluation of anti-diabetic activity according to the α -Amylase and α -Glucosidase enzyme inhibition method shows that the methanolic decoction extract of *I. verum* exhibits anti-diabetic activities against α -Amylase enzyme ($IC_{50} = 0.025$ mg/ml) and α -Glucosidase enzyme ($IC_{50} = 0.02$ mg/ml).

Keywords: *Illicium verum*, Polyphenols, Oxidative stress, Diabetes.

Özet:

Bitkilerden elde edilen doğal özütler çeşitli biyolojik olarak aktif moleküller içerir. *Illicium verum*, Cezayir'de geleneksel ve mutfak tıbbında kullanılan bir bitkidir. Schisandraceae familyasına aittir. Bu çalışmanın amacı, fitokimyasal çalışma, *Illicium verum*'un polifenolik özütlerinin antioksidan ve anti-diyabetik aktivitesinin değerlendirilmesidir. Kantitatif analiz, fenolik bileşiklerin, tanenlerin ve flavonoidlerin dozajına dayanmaktadır. Antioksidan aktivitenin değerlendirilmesi DPPH ve Toplam Antioksidan Kapasite testleri ile gerçekleştirilmiştir. Anti-diyabetik aktivitenin değerlendirilmesi ise α -Amilaz ve α -Glukozidaz enziminin inhibisyon yöntemine göre yapılmıştır. Bu ekstraktların fitokimyasal tarama ile nitel analizi, ekstraktlarda fenolik bileşiklerin: flavonoidler, toplam tanenler, lökoantosiyeninler, terpenoidler, saponozitler ve kardenolidlerin varlığını ortaya koydu. Bu, fenolik bileşiklerin, tanenlerin ve flavonoidlerin dozajına dayalı nicel bir analizle doğrulandı; metanol kaynatma ekstraktının, toplam polifenoller, flavonoidler ve yoğunlaştırılmış tanenler için sırasıyla $308,85 \pm 0,53$ mg EAG/g, $85,80 \pm 0,28$ mg EQ/g ve $36,09$ mg EC/g'a eşit ortalama değerlerle diğer ekstraktlardan daha yüksek değerler gösterdiği biliniyordu. DPPH ve Toplam Antioksidan Kapasitesi testleri kullanılarak antioksidan aktivitenin değerlendirilmesi, *I. verum*'un metanol kaynatma özütünün her iki yöntemde de ilginç antiradikal özellikler gösterdiğini göstermektedir ($IC_{50} = 0,03$ mg/ml, $CAT = 116,36 \pm 0,09$ mg EAA/g). Ayrıca, α -Amilaz ve α -Glukosidaz enzim inhibisyon yöntemine göre anti-diyabetik aktivitenin değerlendirilmesi, *I. verum*'un metanol kaynatma özütünün α -Amilaz enzimine ($IC_{50} = 0,025$ mg/ml) ve α -Glukosidaz enzimine ($IC_{50} = 0,02$ mg/ml) karşı anti-diyabetik aktivite gösterdiğini göstermektedir.

Anahtar kelimeler: *Illicium verum*, Polifenoller, Oksidatif stres, Diyabet.

ISOLATION AND IDENTIFICATION OF MICROORGANISMS FROM HERBAL MIXTURE SOLD IN MALETE METROPOLIS

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ABSTRACT

Herbal mixtures, popular for their natural medicinal properties, can carry harmful microorganisms. By analyzing these products, the research aims to assess their microbiological quality and enhance public health safety in the region. This study investigates the isolation and identification of microorganisms in herbal mixtures sold in Malete Metropolis, Kwara State, Nigeria. A total of (4) samples including two(2) finished herbal preparations and two local herbal preparations were purchased from pharmaceutical shops and local hawkers respectively. All samples were evaluated for bacterial load using aerobic plate count method and bacterial isolates were presumptively identified using standard microbiological methods. pH and bacterial load of samples ranged from 2.51 to 5.11 and 1.76×10^6 to 2.02×10^8 cfu/ml respectively. Bacterial and fungal contaminants isolated and their frequency of occurrence in the herbal preparations included, *Salmonella* sp. (7.12%), *Klebsiella* sp. (7.12%), *Bifidobacterium longum* (7.12%), *Anthrobacterium oxydans* (7.12%), *Actinomyces* spp. (7.12%), *Proteus vulgaris* (7.12%), *Cladosporium herbarum* (7.12%), *Aspergillus flavus* (7.12%) and *Bacillus* sp. (7.12%), which were isolated at the same frequencies while *Fusarium* sp. (14.28%) and *Staphylococcus aureus* (14.28%) being the highest occurrence in frequency. The antimicrobial sensitivity testing organisms isolated from different herbal mixtures was carried out against some selected antibiotics using disc diffusion method on Muller Hinton agar. *Staphylococcus aureus* and *Bacillus* sp are the most sensitive organism while *Klesiella* sp and *Salmonella* sp. were the only organism less sensitive to all the antibiotics. The observed high bacterial load and the presence of *S. aureus* as well as enteric bacteria of public health importance in these herbal mixtures underscore the potential risk inherent in the consumption of these preparations. Therefore, public health awareness campaign on the dangers of unapproved liquid herbal preparations consumption should be instituted.

Keywords: Contamination, pathogenic bacteria, herbal, Nigeria

**YENİLİKÇİ GIDA KATKI MADDELERİ İÇİN ETNOBOTANİK VE TIBBİ
BITKİLERİN FARMAKOLOJİK ÖZELLİKLERİNDEN YARARLANMA";
CHAMAEROPS HUMILIS ÖRNEĞİ**

**LEVERAGING ETHNOBOTANY AND THE PHARMACOLOGICAL PROPERTIES OF
MEDICINAL PLANTS FOR INNOVATIVE FOOD ADDITIVES" ; CASE OF
CHAMAEROPS HUMILIS**

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ÖZET

Etnomedikal verilerin farmakolojik araştırmalarla entegrasyonu, tıbbi ve aromatik bitkilerden elde edilen doğal gıda katkı maddelerinin geliştirilmesinde çok önemlidir. Geleneksel bilgi, bu bitkilerin sağlığa faydaları ve güvenli uygulamaları hakkında değerli bilgiler sağlayarak fonksiyonel bileşenler olarak potansiyelleri hakkında bilgi verir. Bunun en iyi örneği, çeşitli tıbbi özellikleriyle bilinen bir Akdeniz palmyesi olan Chamaerops humilis'tir. Son çalışmalar antioksidan, anti-enflamatuar ve antimikrobiyal aktivitelerini vurgulamakta ve doğal bir gıda koruyucusu olarak etkinliğini ortaya koymaktadır. Chamaerops humilis'ten yararlanarak gıda güvenliğini artırabilir, raf ömrünü uzatabilir ve besin profillerini iyileştirerek tüketicilerin doğal içeriklere yönelik artan talebine uyum sağlayabiliriz. Bu yaklaşım sadece gıda endüstrisinde yenilikçi çözümleri teşvik etmekle kalmıyor, aynı zamanda yerel kaynakları kullanarak sürdürülebilir uygulamaları da destekliyor. Etnomedikal bilgi ve farmakolojik doğrulamanın sinerjik bir şekilde uygulanması, halk sağlığına ve çevresel sürdürülebilirliğe katkıda bulunan yeni gıda katkı maddelerinin geliştirilmesine yol açabilir. Bu sunum, Chamaerops humilis ve benzeri bitkilerin doğal gıda katkı maddelerinin geleceğinde hayati bileşenler olma potansiyelini araştıracaktır.

Anahtar kelimeler: Etnomedikal, Farmakoloji, Doğal katkı maddeleri, Chamaerops humilis, Tıbbi bitkiler, Gıda koruma, Antioksidanlar

ABSTRACT

The integration of ethnomedicinal data with pharmacological research is pivotal in developing natural food additives derived from medicinal and aromatic plants. Traditional knowledge provides valuable insights into the health benefits and safe applications of these plants, informing their potential as functional ingredients. A prime example is Chamaerops humilis, a Mediterranean palm known for its diverse medicinal properties. Recent studies highlight its antioxidant, anti-inflammatory, and antimicrobial activities, suggesting its efficacy as a natural food preservative.

By leveraging *Chamaerops humilis*, we can enhance food safety, prolong shelf life, and improve nutritional profiles, aligning with the growing consumer demand for natural ingredients. This approach not only fosters innovative solutions within the food industry but also promotes sustainable practices by utilizing local resources. The synergistic application of ethnomedicinal knowledge and pharmacological validation can lead to the development of novel food additives that contribute to public health and environmental sustainability. This presentation will explore the potential of *Chamaerops humilis* and similar plants as vital components in the future of natural food additives.

Key words: Ethnomedicine, Pharmacology, Natural additives, *Chamaerops humilis*, Medicinal plants, Food preservation, Antioxidants

ZINC OXIDE NANOPARTICLES IMPACT ON GERMINATION PARAMETERS, NUTRITIONAL QUALITY, YIELD AND ANTIOXIDANT ACTIVITY OF TRITICUM AESTIVUM

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ABSTRACT

The vast production and use of engineered nanoparticles in various fields increased incredibly during recent years, which has motivated researchers to evaluate their potential applications in agriculture field along with serious concern about their toxicity on various species in ecosystem. Metallic nanoparticles along with their oxides have wide range of applications, among which silver, gold, zinc, iron are most common. In this research work we have selected Zinc Oxide nanoparticles, due to their enormous applications and great physical, chemical and antimicrobial/antibacterial activities. ZnO NPs impact on wheat plant (*Triticum Aestivum*) germination, growth and yield was investigated as it is one of the most used staple food crop worldwide. For this purpose, ZnO NPs were synthesized by simple precipitation technique by optimizing various synthesis parameters (Precursors concentration, pH, post-synthesis NPs drying and calcination temperature). The obtained nanoparticles were characterized by X-ray diffraction (XRD), Scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR) technique. The average crystalline size of the synthesized NPs was 35.56 nm as determined from XRD data. The obtained NPs were pure having crystalline wurtzite hexagonal structure. The SEM results showed spherical morphology of NPs with average 40 nm size along with aggregated and larger particles. The FTIR spectra showed a peak at 576.12 cm^{-1} which represents Zn-O bond and confirmed ZnO NPs formation. Comparison of NPs with bulk counterpart should also be made in agriculture applications to study their toxicity or positive impact on plants. To study the interaction of ZnO NPs with wheat plant, firstly the effect of ZnO NPs and ZnO Bulk powder on germination and early growth parameters of wheat plant was investigated. Two different concentrations (300 ppm and 600 ppm) of each group were utilized by seed priming method and comparison was made with control group. Obtained results were analyzed statistically using one way Anova to measure significant difference levels and the means comparison was made by Tukey HSD (Honest significant difference) test at 5% significance level. Among wheat germination parameters germination percentage remained unaffected for each group but coefficient of velocity of germination enhanced for ZnO NPs treated seeds. Also the shoot length and shoot weight enhanced significantly by ZnO NPs treatment compared to bulk and control. As ZnO NPs did not show any toxic effect on wheat seed germination and promoted early growth so they were further used at optimized concentration (10 ppm, 20 ppm) in field like conditions (soil experiment). For this Wheat plants were grown in soil medium (in pots) upto maturity with three replicates of each group. Seed priming of wheat seeds was performed in corresponding treatment solution and later this solution was added to the pot soil. Control group without any zinc treatment was used for comparison. The wheat was grown until full maturity and its morphological, biochemical and yield parameters were investigated. The plant height and biomass increased in ZnO NPs 10 ppm treated group by 11.24% and 12.85% respectively compared to control. Among yield parameters ZnO NPs 10 ppm treatment enhanced spike length, number of spikelets per spiker, number of grains per spike, number of grains per pot and 1000 grain weight by 9.26%, 11.59%, 21.65%, 17.38% and 10.39% respectively compared to control group. The biochemical analysis of control and treated wheat groups showed increase in Catalase and Peroxidase activity

in ZnO NPs treated group and also total phenolic content increased compared to control group. These results showed enhanced antioxidant activity and activated defense system of wheat plant to protect from reactive oxygen species damage. Concentration of some major macronutrients and micronutrients such as Ca, Fe, Zn and Cu in roots, shoots and seeds was determined through atomic absorption spectroscopy (AAS). Zinc concentration increased in ZnO NPs 20 ppm treated plant roots by 112.59% compared to control and bulk ZnO 20 ppm treatments which shows higher uptake of nanoparticles by plant root due to their small size. No significant change in Zinc was observed in seeds by any treatment which shows that Zn translocation from roots to shoots and seeds was not prominent as compared to control which shows the safety of yield crop. But treatment with ZnO NPs promoted nutritional content in seeds as ZnO NPs 10 ppm treatments increased Fe content by 113% showing positive effect of ZnO NPs on seeds nutritional parameters. Calcium content varied in all treatments while Copper content was not affected by ZnO NPs treatment. ZnO NPs treatment in such a minor quantity (10 ppm and 20 ppm) did not show any toxic effect and promoted growth and yield of wheat and enhanced its nutritional value so in future such ZnO NPs can be used as plant growth promoter.

THE IMPORTANCE OF FOOD SECURITY THROUGH AGRO-TECHNOLOGICAL INNOVATION: A CASE STUDY ON THE DEVELOPMENT OF RICE IN MOROCCO

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Abstract

Food security is a major global challenge, particularly in developing countries like Morocco, where agriculture represents a significant part of the economy and the livelihood of the population. Agro-technological innovation emerges as a key solution to addressing the growing challenges related to sustainable food production. In this context, the development of rice, a strategic crop for food security, has garnered special attention. This literature review examines various technological innovations applied to agriculture, particularly in the rice sector in Morocco, focusing on agro-physiological and molecular approaches. Genetic improvement, the selection of disease-resistant varieties such as Magnaporthe oryzae, and the adaptation of cultivation techniques are crucial elements in increasing yields and seed quality. This review also highlights local initiatives, such as the introduction of new rice varieties, aimed at strengthening the country's food self-sufficiency while addressing climatic and socio-economic challenges.

Keywords: Food security, Agro-technological innovation, Rice cultivation, Morocco.

LOCAVORE AS AN ELEMENT OF HEALTH PSYCHOLOGY

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ABSTRACT

Up-day many consumers are scrutinizing product information and willing to pay more for nutritious and natural products, and healthy eating is a priority, even if financial resources are limited. Restaurants supporting local food and organic products have a positive effect on customers, who choose such establishments more often. One of the most important attributes in making a restaurant decision is food made with fresh ingredients (not frozen). Customers are increasingly interested in knowing where the food on their plates comes from. They are also interested in the taste, consistency, freshness, safety of food products, traditional production methods. Therefore, the wider implementation of locavore and the production of craft products in public catering contributes to the competitiveness of restaurants with the ability to guarantee the sustainability of the local area and promote local culture based on the identity of unique food products. The key factors are the proximity of production, the quality of products ecologically produced and certified. Thus, the introduction of locavore in the regional economy has several promising aspects, such as, economic, ecological, hygienic, gastrocultural. In our opinion, in modern conditions, the psychophysiological importance of local products is of particular importance, connected with the expansion of the range of products with high biological and physiological value to meet the needs of consumers who choose balanced, healthy, ecologically clean and safe food, ensuring the availability of wider strata population to superfoods thanks to the offer of affordable products, the possibility for the consumer to monitor the entire food chain due to its locality in order to obtain information about the product, evaluate its quality.

Keywords: food, biological and physiological value, traditional production methods.

SUPPLEMENTATION OF DIFFERENT TYPES OF BIOCHAR IN DIETS OF CATLA CATLA: EFFECTS ON CARCASS COMPOSITION, HEMATOLOGY, AND MINERAL STATUS

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Abstract

This study investigates the impact of different biochar based diets on the carcass composition, hematological indices, and mineral status of *Catla catla*, a significant species in aquaculture. Biochar, a carbon-rich product derived from pyrolysis of organic matter. Recently, its use in aquaculture has gained interest due to its ability to improve water quality, function as a feed additive, and manage fish waste. In this study, *C. catla* (average weight; 6.29 ± 0.04 g) were fed with six different diets, including a control diet without biochar and five experimental diets each containing 2 g/kg of different types of biochar such as farmyard manure biochar (FMB), parthenium biochar (PB), vegetable waste biochar (VWB), poultry waste biochar (PWB) and corncob waste biochar (CWB). *Moringa oleifera* seed meal was used a basal diet. The results revealed significant variations ($p < 0.05$) in carcass composition, hematological parameters, and mineral content based on the type of biochar used in the diets. Notably, the diet containing PWB led to the highest protein content and most beneficial hematological impacts, suggesting its potential utility in enhancing the nutritional profile and health status of *C. catla* fingerlings whereas PB negatively impacted all parameters. These findings highlight the potential of using biochar, particularly PWB, as a dietary supplement in sustainable aquaculture management. However, further research is needed to understand the long-term implications of these dietary changes on fish health and productivity.

Keywords: *Catla catla*, Biochar, poultry waste biochar , parthenium biochar

ANTAGONISTIC EFFECTS OF ORANGE PEEL METHANOLIC EXTRACT ON SELECTED BACTERIA AND FUNGI ISOLATES FROM CORN GRAINS

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ABSTRACT

Bacterial or fungal infection have been the problem of humankind for ages which affect both man and plant, which lead to food shortages and shortage of man power in agricultural sectors. *Citrus cinensis* is a rich source of secondary metabolites which contribute to the antimicrobial activities attributed to this plant. The antimicrobial potency of orange peel extract is believed to be due to tannins, saponins, phenolic compounds, essential oils and flavonoids. The present investigation evaluated the antagonistic effects of methanolic extract of *Citrus sinensis* Linn. (Rutaceae) fruit peel extracts on selected pathogenic bacterial and fungal isolates from corn grain. The bacterial and fungal used in this investigation were isolated from corn grains using standard microbiological procedure. The fungal and bacterial isolated were identified on the basis of their colonial and morphological feature and basic biochemical tests were employed for the confirmation of the isolates. These bacteria and fungi were identified as *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Aspergillus niger* and *Rhizopus* species respectively. The antimicrobial activity of methanolic extract of *C. sinensis* fruit peel was tested against two bacterial and two fungal strains isolated from corn grains. Turbidimetric or tube dilution method and paper disc diffusion method were followed. The extracts were also subjected for phytochemical screening of the bioactive compounds. Results were expressed as mean \pm standard deviation. The *C. sinensis* fruit peel methanolic extracts exhibited antibacterial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The phytochemistry of *C. sinensis* fruit peel methanolic extract revealed the presence of tannins, flavonoid saponnin, alkaloids and steroid. Most of the organic chemical constituents reported are aromatic phenolic compounds, which are known for their wide spectra of antimicrobial activity. Therefore, *C. sinensis* fruit peel methanolic extract is a potential source of natural antimicrobials.

Keywords: Corn Grains, Antagonistic Effects, Bacteria and Fungi, Orange Peel, Methanolic Extract,

**EFFECTS OF SUPERVISION AND TRAINING ON ENTREPRENEURSHIP
DEVELOPMENT IN SOKOTO STATE – NIGERIA**

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ABSTRACT

This study examined the effects of training and supervision on entrepreneurship development in Sokoto metropolis, Sokoto State. There are identifiable key research gaps on entrepreneurship in Sokoto State, Nigeria as well as limited number of research analysing the effects of training and supervision on entrepreneurship development in Sokoto State. A sample size of fifty entrepreneurs were selected using Krejcie and Morgan (1970) sampling approach techniques. The study also used Multiple Regression Analysis and Anova to test the study hypotheses. The instrument used was structured questionnaire using 5-point likerts scale. The study found that training has a positive significant influences on entrepreneurship development. The study also found a positive but moderate correlation between training and supervision. The study recommends among others that Government should organize training program tailored towards entrepreneurial success.

Keywords: Entrepreneurship, Development, Supervision, Training, Sokoto State.

EFFECT OF FUNGAL FERMENTATION ON IMPROVING THE NUTRIENT COMPONENTS OF ALBIZIA LEBBECK PODS

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ABSTRACT

Fermentation is one of the oldest food preservation techniques, and it is widely used across cultures for various food products. This study aimed to investigate the effect of fungal fermentation on improving the nutrient components of Albizia lebeck pods using *Penicillium* sp. Albizia lebeck pods were collected, cleaned, and fermented using *Penicillium* sp. isolated from naturally fermented Albizia lebeck pods. Proximate composition, phytochemical content, mineral profile, antioxidant activity and amino acid content were analyzed in both fermented and non-fermented pods. The proximate content of fermented pods ranged from 1.04 ± 0.02 % (ash) to 39.17 ± 0.05 % (carbohydrate), with increases in moisture and protein, and decreases in ash, lipid, crude fiber, and carbohydrate. Phytochemical content in fermented pod revealed disappearance of saponins, flavonoids, and alkaloids, and appearance of terpenoids, steroids triterpenes, and coumarin, with levels ranging from 0.14 ± 0.05 mg/100g (coumarin) to 18.15 ± 0.02 mg/100g (triterpenes). The mineral content of fermented pods decreased across all minerals, ranging from 19.31 ± 0.67 ppm (manganese) to 170.71 ± 0.28 ppm (magnesium). The antioxidant activity of fermented pods increased across all the concentrations, with inhibition rates ranging from 64.32 ± 0.32 % to 64.84 ± 0.21 %. The level of all the amino acids were significantly increased in fermented pods, ranging from 0.57 ± 0.01 % (cystine) to 7.73 ± 0.15 % (glutamic acid). These findings suggest that fungal fermentation can enhance the nutritional value of Albizia lebeck pods, making them a more viable option for both food and feed applications.

GIDALARIN DUYUSAL ANALİZİNDE SANAL GERÇEKLIK TEKNOLOJİSİ KULLANIMI

USE OF VIRTUAL REALITY TECHNOLOGY IN SENSORY ANALYSE OF FOODS

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ÖZET

Gıdalarda duyu analizi, panelistin tercihini olumlu ve ya olumsuz etkileyecek tüm etkenlerden mümkün oldukça uzaklaştırılmış bir ortamda gerçekleştirilmektedir. Gıdalarda duyu analizi gerçekleştirmek için eğitilmiş/egitimsiz panelist, standart duyu analiz odası/laboratuvarı ve duyu analiz sırasında örneklerin standart sunumu gerekmektedir. Tüm bu şartlar sağlandıktan sonra panelistlerden gelen yanıtlara göre ürün üzerinde geliştirmeler devam etmekte ve ürün nihai formuna ulaşmaktadır. Tüm bu gerekliliklerin sağlanması uzun bir süreç gerektirmektedir. Ancak bu duyu analiz gereksinimlerinin panelistlere sanal gerçeklik teknolojisi kullanılarak, sanal gerçeklik ortamında sağlanması durumunda, panelistlerin laboratuvar ortamında bulunma gereksinimi ortadan kalkmakta, analiz ortamının hazırlanması ve standart halde tutulması kolaylaşmakta ve duyu analiz ortamında değişiklik yapmak mümkün hale gelmektedir. Sanal gerçeklik ortamında duyu analizi gerçekleştirmek için panelistler yalnızca sanal gerçeklik gözlüğüne ihtiyaç duymakta ve duyu analizi düzenleyen yönetici yardımı ile sanal gerçeklik gözlüğünü kullanarak, örneklerin tat, koku ve tekstürel özelliklerini farklı sanal gerçeklik ortamlarında değerlendirebilmektedir. Yapılan çalışmalarda, ürünlere hedeflenen tüketim alanlarında duyu analizi yapılmış ve ürünlerin laboratuvar ortamına kıyasla hedeflenen tüketim alanlarında daha yüksek puan aldığı bildirilmiştir. Ancak her bir ürün için hedeflenen alanda duyu analizi gerçekleştirmek hem lojistik bakımdan zorluklar hem de yüksek maliyet getirmekte olup sanal gerçeklik ortamının kullanılması ile bu lojistik ve maliyet bakımından kolaylık sağlamaktadır. Gıdaların duyu analizinde sanal gerçeklik ortamı kullanımı farklı tüketim alanları üzerine çalışma yapmayı da kolaylaştırmakta ve ürünün pazarlama aşamasında daha iyi bir strateji yürütülmesine olanak sağlamaktadır. Geleneksel duyu analize göre sanal gerçeklik ortamı kullanımının en büyük dezavantajı olarak ürünün görsel özelliklerinin tam olarak algılanamaması ve sanal gerçeklik gözlüğü kullanımının zorlukları öne çıkmaktadır. Gıdaların duyu analizinde sanal gerçeklik teknolojisi kullanımının gelecek yıllarda hızla artacağı ön görülmekte ve bu konuda yapılacak çalışmalar ile gerekli olan bilgi eksikliğinin giderilmesi gerekmektedir. Bu çalışmada, gıdalarda gerçekleştirilen duyu analize yeni bir bakış açısı kazandıran sanal gerçeklik ortamında duyu analiz yönteminin, geleneksel duyu analize kıyasla avantajları, dezavantajları ve gıdalarda sanal gerçeklik ortamında duyu analizinin gelecekteki yeri derlenmiştir.

Anahtar Kelimeler: Gıdalarda Duyu Analiz, Sanal Gerçeklik, Ürün Geliştirme

ABSTRACT

Sensory analysis of foods is carried out in an environment that is removed as far as possible from all factors that will positively or negatively influence the panelists' preferences. Sensory analysis

of foods requires trained/untrained panelists, a standard sensory analysis room/laboratory, and a standard presentation of samples during sensory analysis. After all these conditions are met, sensory analysis of the samples is carried out and the product improvement process continues on the product according to the responses from the panelists. Meeting all of these requirements is a process that takes time to complete. However, if these sensory analysis requirements are provided to the panelists in a virtual reality environment using virtual reality technology, the need for the panelists to be in the laboratory environment is eliminated, the preparation and standardization of the analysis environment becomes easier and it becomes possible to make changes to in the sensory analysis environment. To perform sensory analysis in a virtual reality environment, panelists only need a virtual reality headset. They can evaluate the taste, smell and textural properties of the samples in different virtual reality environments with the help of the manager who organizes the sensory analysis. Some studies reported that when sensory analysis was performed at the target consumption areas, products scored higher in the target consumption areas compared to the laboratory environment. However, performing sensory analysis in the target consumption areas for each product is both logistically difficult and costly, and the use of a virtual reality environment provides convenience in terms of logistics and cost. The use of a virtual reality environment also facilitates the perform sensory analyse The use of a virtual reality environment also makes it easier to carry out sensory analysis in different target consumption areas and enables a better strategy for the marketing of the product. The biggest disadvantages of using a virtual reality environment compared to traditional sensory analysis are the inability to fully perceive the visual features of the product and the difficulty of using virtual reality equipments. It is expected that the use of virtual reality technology in the sensory analysis of foods will increase rapidly in the coming years. Lack of information on this subject should be eliminated with the studies to be carried out on this topic. In this study, the advantages and disadvantages of sensory analysis in a virtual reality environment, which brings a new perspective to sensory analysis in foods, compared to traditional sensory analysis and the future place of sensory analysis in a virtual reality environment in foods are reviewed.

Keywords: Food Sensory Analyse, Virtual Reality, Product Development

THE INFLUENCE OF SPRING BARLEY AND OATS ON THE AGGRESSIVENESS OF A PHYTOPATHOGENIC ISOLATE

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ABSTRACT

In the modern world, the interaction between plant pathogens and the plant microbiome, which can affect the number and growth rate of pathogen populations, is increasingly being studied. Therefore, it is important to study varieties not only by the degree of immunity, but also by their influence on the aggressiveness of phytopathogenic fungi. The aim of the study was to determine the effect of spring barley and oats treated with Trichodermin on the aggressiveness of the *F. oxysporum* strain.

According to the results of the research, it was established that the highest aggressiveness of the strain was observed under the influence of Sebestyan spring barley plants without treatment with the drug, where the intensity of sporulation of the strain reached 3.82 million pcs./ml, 80% of viable spores were found, the development of the disease was 62%, and the lesion score of seedlings was 1. At the same time, high immune properties of plants and their ability to suppress the development of the micromycete *F. oxysporum* were observed during treatment of this variety with the drug Trichodermin (intensity of sporulation – 1.06 million pcs./ml, viable spores – 15%, development of plant disease – 21%, damage score of seedlings – 7). Micromycete *F. oxysporum* was moderately aggressive towards spring barley plants treated with Trichodermin. At the same time, according to the results of the study, it was established that the least aggressiveness of the *F. oxysporum* strain was found towards oat plants both after treatment with the drug and without treatment. Oat seedlings without treatment with Trichodermin had an effect on the intensity of micromycete sporulation (1.05 million pcs./ml), viable spores – 38%, development of plant disease – 28%, seedling damage score – 5. At the same time, spring barley seedlings treated with Trichodermin are able to significantly to suppress indicators of aggressiveness of the micromycete *F. oxysporum* (intensity of sporulation – 0.67 million pcs./ml, viable spores - 5%, development of plant disease – 7% and damage score of seedlings – 7). The micromycete was weakly aggressive towards oat plants treated with Trichodermin.

Therefore, spring barley and oat plants treated with the drug Trichodermin are able to significantly affect the aggressiveness of the *F. oxysporum* strain, suppressing its intensity of sporulation and the formation of spore viability and the ability to spread in plant tissues.

**INNOVATION OF OREGANO LEAVES (PLECTRANTHUS AMBOINICUS SPRENG)
AND GINGER (ZINGIBER OFFICINALE) ENHANCEMENT TO AGRIBUSINESS
VARIANT OF ODORLESS SALTED DUCK EGGS**

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ABSTRACT

The scarcity or excess supply chain of food products forces us to continue diversifying to maintain food security and resilience. Eggs are one of the commodities that support this goal because of their high nutritional content and practicality for consumption. However, the odor smell of duck eggs is often the cause of the lack of public interest in consuming duck eggs. Its nutritional content is higher than chicken eggs. One alternative is to use Oregano leaves (*Plectranthus amboinicus* SPRENG). Oregano leaves can eliminate the odor smell of duck eggs because they have a distinctive bioflavonoid, phenol, and essential oil content. Ginger (*Zingiber officinale*) used as spice and medicine. These substances are thought to be able to reduce the level of fishiness and eliminate pathogens in duck eggs. The study was conducted to create an innovation in making odorless salted duck eggs enriched with Oregano leaves and ginger. The study used a descriptive and exploratory method of a Randomized Block Design experiment repeated three times. The odor smell of salted duck eggs was significantly reduced and preferred at 1 g/1 egg. Consumer taste also increased rapidly when salted duck eggs were enriched with ginger. Salted eggs enriched with Oregano leaves and ginger are of higher quality and preferred than conventional salted eggs. There are other advantages, such as duck eggs being more durable and of better quality. This finding provides new business opportunities and appetizing product variants.

Keywords: Salted egg, odorless, Variant of taste

INTERFACIAL ADSORPTION AND STABILIZATION OF PICKERING EMULSIONS BY PLANT GUMS

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ABSTRACT

Pickering emulsions stabilized by naturally generated biopolymeric particles have been the subject of extensive investigation over the last decade. Plant gum characteristics at the oil-water interface play an essential role in stabilizing Pickering emulsions. Plant gums' adsorption behaviors allow the O/W interface to exhibit controlled regulating mechanisms. However, from an interface standpoint, research on the modulation of Pickering emulsions by plant gum adsorption behaviors at the O/W interface is restricted. As a result, this study focuses on the O/W interfacial adsorption of protein particles and their control in Pickering emulsions. The implications of the establishment of the interfacial layer and the interfacial properties on Pickering emulsions stabilized by plant gum particles are discussed in details. Interfacial adsorption behavior of plant gum is significantly influenced by the size, wettability, shape, and surface charge of the particles. Significantly, the thickness and rheology of the interfacial layers, as well as other interfacial layer characteristics, determine the stability of plant gum-based Pickering emulsions. Thus, based on interface design, this study offers gives valuable insights for the production of Pickering emulsions stabilized by plant gum particles.

Keywords: Pickering emulsions, plant gum, interfacial adsorption, emulsion stability

ANTIFUNGAL STUDY OF SELECTED HYDROPHOBIC DEEP EUTECTIC SOLVENTS**Teodora KUKRIĆ**

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Antifungal agents are utilized in agro-food industries against fungal pathogens - a diverse group of eukaryotic organisms with complex cellular structures. Antifungal agents must disrupt components of fungal cells, such as the cell wall, without harming the host organism. Synthetic fungicides have been widely used, but concerns over their negative environmental impact have prompted researchers to explore more sustainable methods.

Botrytis cinerea is among the most harmful phytopathogens. This phytopathogen can cause severe crop losses, particularly during storage and transportation. Its ability to infect a wide range of hosts and its capacity to develop resistance to commonly used fungicides make it a critical target for ongoing research into more sustainable and effective antifungal strategies.

Hydrophobic deep eutectic solvents (HDES) represent a novel class of liquid mixtures. Our research tested the potential of ten HDES as an alternative antifungal agent to synthetic fungicides against *B. cinerea*. Each HDES contained menthol as one of the two components. Menthol, a naturally occurring compound with known antifungal properties, was suitable for HDES formulations.

The *in vitro* study included determination of the efficacy of HDES. The experiment was conducted on potato dextrose agar (PDA) medium in Petri plates. Eight two-fold dilutions of each HDES were directly applied to the PDA surface. A plug of *B. cinerea* mycelium was placed at the centre of each plate. Incubation lasted seven days.

According to results, all ten menthol-based HDES (Men:ForA, Men:AcetA, Men:CapA, Men:LaurA, Men:OleA, Men:Lim, Men:Euc, Men:Pin, Men:Cam, Men:Thy) provided efficacy 22 – 100%. Men:Pin reached the highest efficacy of 93 – 100%, and Men:ForA the lowest efficacy of 22 – 100%.

Testing menthol-based HDES, we explored a more environmentally friendly approach to managing fungal diseases. The results of these tests could be the basis for new strategies in fungal pathogen management.

Keywords: HDES, menthol, *Botrytis cinerea*, decay

UNLOCKING WHEAT RESILIENCE: GENOMIC AND GENOME EDITING ADVANCES AGAINST MAGNAPORTHE ORYZAE PATHOTYPE TRITICUM

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Abstract

Wheat is a major food crop that provides 20% of the calories and 25% of the protein consumed by people worldwide. Blast, a devastating disease of wheat caused by the filamentous fungus *Magnaporthe oryzae* pathotype *Triticum* (MoT), poses a significant threat to global food security. First identified in Brazil in 1985, this seed- and air-borne disease rapidly spread to Argentina, Bolivia, and Paraguay. The urgency to address this threat escalated following outbreaks in Bangladesh (Asia) in 2016 and Zambia (Africa) in 2018, raising concerns about its potential for a worldwide pandemic. Utilizing advanced omics technologies, along with open data sharing and collaborative scientific practices, our research identified a clonal lineage of MoT in both Bangladesh and Zambia, traced back to independent introductions from South America. To detect asymptomatic MoT in seeds and plants, we developed a rapid detection method employing genome-specific markers and CRISPR-Cas12a technology. Recent advancements led to the discovery of the major blast resistance gene *Rmg8*, which allows us to control the longstanding pandemic lineage by integrating *Rmg8* into wheat varieties that already possess a blast-resistant chromosomal segment (2NS). Our transcriptomic analysis revealed key associations between certain susceptibility genes (*S*-genes) and the damage observed in wheat leaves infected by MoT. This opens new avenues for utilizing CRISPR-Cas technology to edit these genes, potentially leading to the development of durable blast-resistant wheat varieties. As efforts to contain the wheat blast fungus progress, fostering global collaboration remains essential for accurately tracing and managing this imminent agricultural crisis.

Professor Tofazzal Islam, born on December 20, 1966, is the Founding Director of the Institute of Biotechnology and Genetic Engineering (IBGE) at Bangabandhu Sheikh Mujibur Rahman Agricultural University in Bangladesh. Internationally recognized for molecular plant-microbe interactions and agrobiotechnology, he holds a Ph.D. in Applied Biosciences from Hokkaido University.

With postdoctoral experience at prestigious institutions supported by JSPS, Alexander von Humboldt, Commonwealth, and Fulbright fellowships, Dr. Islam led an international team that rapidly identified the origin of the 2016 wheat blast epidemic in Bangladesh. Currently, he heads a large international team addressing wheat blast disease, utilizing genomics, genome editing, nanobiotechnology, biocontrol, and advanced molecular approaches. Their collaboration resulted in a rapid point-of-care diagnostic method.

As Editor-in-Chief of two book series for Springer Nature and serving on editorial boards of *Physiologia Plantarum*, *Scientific Reports* and *Frontiers in Microbiology*, Prof. Islam is recognized as a Fellow of American Phytopathological Society, Bangladesh Academy of Sciences and The World Academy of Sciences, earning awards such as the Gold Medal of Bangladesh Academy of Sciences and the Commonwealth Innovation Award. With over 350 articles published with more than 10,800 total citations, his research has secured over \$10 million in global funding, reflecting his commitment to advancing agricultural research on a global scale.

HARVESTING ANTIOXIDANTS: TECHNIQUES AND EFFICACY IN FRUITS AND VEGETABLES

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Abstract

The extraction of antioxidants from vegetable and fruit waste presents a sustainable approach with the potential to repurpose waste materials into valuable bioactive compounds. However, several challenges and gaps in understanding need to be addressed to enhance the potential of this approach. Key areas for further research include standardization and quality control of extraction methods, valorization of underutilized plant parts, development of functional foods fortified with antioxidants, assessment of environmental impact, evaluation of nutritional and health benefits, waste valorization strategies, and optimization of industrial-scale extraction processes. Addressing these gaps through further research can contribute to advancing the field of antioxidant extraction from vegetable and fruit waste, promoting sustainability and waste reduction.

Keywords: Antioxidants, Waste valorization, Sustainable extraction

EFFECT OF THE DIFFERENT LEVELS OF THE CRUDE PROTEIN ON BODY GROWTH, BLOOD PARAMETERS AND MEAT QUALITY IN PEKIN DUCK.

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ABSTRACT:

The present study is designed to determine the blood parameters, body growth and meat quality in Pekin duck. A total of 54 birds, 7-day old chicks was selected. These birds were kept at University of Veterinary and Animal Sciences, Ravi campus, C-block, Pattoki. The experimental period was five months. All these birds were divided into three different treatment groups with three replicates and examined on weekly basis. The groups were named as (treatment T¹ group), (treatment T² group), and (treatment T³ group). The T¹ was designated as a control group. While T² and T³ were selected as experimental group treatment T² and treatment T³ with 18 birds in each. The feed ratio was divided on the basis of crude protein composition. 14 % crude protein was given to the control group. 16% crude protein was given to the experimental group T² and 18% crude protein was given to the experimental group T³. The experimental diets were created in accordance with the National Research Council's recommendations (NRC, 1994). Body weight was measured on weekly basis except of the last week. The Body Weight Gain (BWG) and Feed Intake (FI) of duck were measured on weekly basis except of last week of the period for growth performances. It was determined the Average Daily Gain (ADG) and Feed Intake (FI). Blood collection from the birds was done in a secure and timely manner. After handling, they were easily stressed. Blood sample was accumulated in Wing vein that was chosen randomly from every group. The needle was kept steady. 1.5 ml blood was collected at the end of the trail for blood parameters, through disposable syringes. After blood collection, the blood was transfer into clean, ethylene di-amine tetra acetic acid (EDTA) tube to prevent coagulation of blood (McInroy, 1953). The hematology of blood was performed in hematology analyzer. Some instruments like coagulation Analyzer, Analyzer and slides strainers were used in laboratory for hematology (MEK-6550). Blood hematology was performed at the department of fisheries and aquaculture laboratory, University of Veterinary and Animal Sciences, Ravi campus, C-block, Pattoki. The blood count consists of various parameters such as Red Blood Cells (RBCs), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Hematocrit (HCT), White Blood Cells (WBCs) and Hemoglobin (Hb). The blood count of both categories was compared with each other (Moizisova et al. 2012). Serum was stored in Eppendorf test tube at -10⁰C. Serum was preserved until used for serum biochemical parameters analysis. The content of serum glucose, Total Protein (TP) and Total Cholesterol (TC) were determined (Trinder, 1969). For meat quality parameters, duck of normal length from each

replica was chosen randomly. These ducks were slaughtered at the completion of trail. When verifying meat, cut the proportion of different portions namely breast, wings, back and legs were measured with the help of dividing the live weight for the meat cut ratio with each part and then the proportion within each part was computed. Chemical analysis of meat was performed on the breast section. The breast was chilled after being packed in plastic bags (4°C to 6°C). The sample was frozen at -18°C in the laboratory until it had been tested. The pH of the breast muscle was taken 15 minutes after slaughtered (pH-3110). Carcass was cooled at 20°C for 24 hours before being tested for pH (Zhang et al. 2015). For water holding capacity used weighted balance and then use Whatman filter paper for Water Holding Capacity (WHC). The color of meat was checked with the help of Chroma meter (CR-410). Both pH and Chroma meter were graded in Central Complex Laboratory (CLC), University of Veterinary and Animal Sciences, A-block, Ravi Campus, Pattoki.

Key words: Body growth, blood parameters, meat quality, Pekin duck.

MICROBIOME-TARGETED VETERINARY DIET: ENHANCING PET HEALTH THROUGH NUTRITION

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Abstract

The interest in animal microbiome usage as therapeutic targets is increasing as the cost and accessibility of equipment to study the microbial world decreases. The food fed to animals has a direct impact on enhancing animal health and gut microbiota. These meals, designed for sick animals, are enhanced with vital nutrients, probiotics, and prebiotics that can improve the composition and function of the gut microbiota. This approach aims to hold up a broad and well-balanced microbial community in pets to enhance their digestive system, neural, and endocrine pathways, and nutrient absorption to overtake multiple health conditions. Microbiome features and metabolites are extensively connected with the organism's well-being and contagion of the disease by briefing about the nature of the host and facilitating personalized medical treatment. Dysbiosis, or an imbalance in the gut microbiota, is a biomarker for specific diseases and health problems like gastrointestinal disorders, obesity, and even behavioral changes. Authentic modulation and monitoring along with personalized nutrition practice, could be done by operating the gut microbiome as a diagnostic tool for proper and precise treatment consequently promoting the health and longevity of pets. Microbiomics is being transformed by the latest developments in DNA sequencing and computational biology specifically phage therapy and CRISPR-Cas, accordingly permitting the systemic analysis of an animal and its microbial symbionts. Community-wide changes such as fecal microbiota transplants, use of antibiotics, and incorporation of functional nutrients like omega-3 fatty acids, antioxidants, and dietary fiber regulate healthy microbiota. The ecology of the microbial community overall impacts the host phenotypes by targeting particular pathways to affect social health and behavioral changes, paving the path for an innovative perspective to pet health management.

Keywords Animal microbiome, Gut microbiota modulation, Probiotics, Personalized nutrition, Phage therapy and CRISPR-Cas

MICROBIOLOGICAL QUALITY ASSESSMENT OF DRIED BEEF STORED IN DIFFERENT PACKAGING MATERIALS

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ABSTRACT

Dried meats are a popular food throughout the world due to shelf stability and nutrient content of the food product. The drying of meats allows for reduction of moisture, creating a product with a low water activity (A_w) and therefore a microbially safe and shelf-stable product. The primary purpose of meat packaging is to provide a physical barrier that will protect the meat product from its surrounding environment, while also limiting microbial growth and oxidation. This study aims to assess the safety and quality of dried beef stored in different packaging materials. Samples were analyzed over a period of six months at one-month interval for microbial analysis. Microbial counts (bacteria and fungi) were determined using procedure described by American Public Health Association (APHA, 2001). An **analysis of variance (ANOVA) and Tukey's test at 95% confidence level ($p < 0.05$) was used**. The result showed that a total of seven bacterial species as well as seven fungal strains were identified from the dried beef sample during the storage period. The highest in the frequency of occurrence among all the samples was *E. coli* (16 of 53; 30.1%) with high total bacterial recoveries from samples stored in glass jars (21 of 53; 39.62%). This study also revealed that high density polyethylene (HDPE) had the least bacterial and fungal species isolated and thus was better than paper envelope and glass jars. It is therefore, recommended that dried beef should be better packaged in HDPE for reliable nutritional quality retention and longer storage time.

**INSECTICIDAL ACTIVITY OF ESSENTIAL OILS FROM SALVIA OFFICINALIS
AGAINST ECTOMYELOIS CERATONIAE ZELLER (LEPIDOPTERA: PYRALIDAE)
MAIN PEST OF DATES**

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Abstract

The present research aims to explore the chemical composition and evaluate the insecticidal activity of two *Salvia officinalis* L. (Lamiaceae) essential oils chemotypes from the Mediterranean region against different life stages of *Eceratoniae ceratoniae* Zeller (Lepidoptera: Pyralidae) main pest of dates. Essential oils were extracted by hydrodistillation and analysed by gas chromatography– mass spectrometry technique (GC–MS). The ovicidal activity of oils was assessed by topical application, while the adulticidal and larvicidal activities were studied by fumigation and ingestion. Camphor (16.15%), α -thujone (15.70%), manool (10.00%), and α -humulene (9.90%) were obtained as major compounds in the essential oil of *S. officinalis* from Algeria, while the main essential oil compounds of *S. officinalis* from Spain were camphor (30.90%), 1,8-cineole (21.07%) and α -pinene (4.90%), and camphene (4.70%). Results demonstrated that insecticidal toxicity varied with plant species, essential oil concentration, and exposure time. The Spanish *S. officinalis* essential oil presented the highest toxic activities. The exposure to this oil caused 78.33% of inhibition of the hatching rate at the concentration of 2.5 mg/mL, while at the same concentration, the inhibition of the hatching rate was 76.67% when eggs were exposed to Algerian *S. officinalis* oil. The adulticidal activity of both oils decreased with the increase in concentration or exposure time. The corresponding LC₅₀ values were found to be 0.20 and 0.30 mg/mL respectively for *S. officinalis* oils from Spain and Algeria. Young larvae L1 seemed to be more resistant to both essential oils in the antifeedant bioassay (LC₅₀= 4.85 mg/mL for Spanish *S. officinalis* and 9.68 mg/mL for Algerian *S. officinalis*). Overall, this work indicated the efficacy of essential oils from plants of Mediterranean origin that could be used as an alternative to chemical insecticides for the management of *E. ceratoniae*.

Keywords:

Ectomyelois ceratoniae, Essential oils, Insecticidal activity, Lethal concentration, *Salvia officinalis*.

BIOPRESERVATIVE ACTIVITY OF CRUDE BACTERIOCIN PRODUCED BY LACTIC ACID BACTERIA FROM SELECTED FERMENTED FOOD SAMPLES AGAINST SOME FOODBORNE PATHOGENIC BACTERIA

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ABSTRACT

The roles of lactic acid bacteria (LAB) in inhibition of pathogenic organisms have opened new horizons in the fields of medical science and food biotechnology. Members of lactic acid bacteria are known to have antimicrobial properties due to their ability to produce bacteriocins and organic acids. This study was designed to assess some locally fermented beverages as potential sources of LABs and investigate the biopreservative action of their crude bacteriocin on some Foodborne pathogenic bacteria. LABs were isolated from fermented pineapple juice, “nunu”, “ogi”, cheese and yogurt using pour plate method on de Man Rogosa Sharpe (MRS) agar, characterization and identification of isolates were done through standard microbiological methods. Cell free supernatants (CFS) from de Man Rogosa Sharpe (MRS) broth cultures of the LAB strains were used as crude bacteriocin and screened for biopreservative action on *Pseudomonas aeruginosa*, *Escherichia coli* and *Staphylococcus aureus* by agar well diffusion method. Total bacterial count ranged between 1.15 ± 0.12 in yoghurt to 3.87 ± 0.05 CFU/ml in “nunu”. Isolated LABs were identified as *Lactococcus* sp., *Lactobacillus plantarum*, *Lactobacillus* sp., *Streptococcus* sp., *Lactobacillus fermentum* and *Leuconostoc* sp. The crude bacteriocin had inhibitory effect as depicted by clear zone of no growth on *Escherichia coli* and *Pseudomonas aeruginosa* but not against *Staphylococcus aureus*. This study revealed the biopreservative potential of crude bacteriocin from isolated LABs on Foodborne pathogens tested.

Key words: Bacteriocin, Biopreservative, Lactic acid bacteria, Foodborne pathogens, pathogenic bacteria

EFFECTS OF ORAL ADMINISTRATION OF SCENT LEAF ON THE LIVER HISTOLOGY OF BROILER CHICKENS

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Abstract

The resistance to antibiotics and different artificial pills by means of pathogens in livestock because of drug residues and application above permissible limits has necessitated using spices and herbs that are residue-free. This observe evaluated the results of oral administration of ethanolic extracts of heady scent leaf (*Ocimumgratissimum*) at the liver of broiler chickens. Five hundred grammes (500 g) of Scent leaf powder become soaked in one thousand ml of ethanol (99.Nine% purity) for 24 hours and filtered, and then 20% of the filtrate become organized (by way of adding 80 ml of distilled water to 20 ml of the filtrate) and used for the test. There were Four (4) treatment levels (T1: zero ml extract of scent leaf (ESL) in step with litre of water (0ml/L), T2: ESL 10 ml/L, T3: ESL 15 ml/L, T4: ESL 20 ml/L).One hundred and twenty day-old broiler chicks had been randomly allocated to the four treatments, each treatment was replicated thrice with ten birds consistent with replicate. The experiment lasted for six weeks. On 42nd day of the experiment, three birds from every remedy had been randomly decided on, weighed and sacrificed through jugular vein puncture. The sacrificed birds were dressed and eviscerated following the standard approaches. The weight of the liver changed into degree and expressed as a percentage of the live weight. Five centimeter (5 cm) fragment of the liver sample was reduce and glued in 10 % formaldehyde. It turned into processed the usage of the Paraffin embedding technique and stained with hematoxylin and eosin (H&E) staining technique to assess the liver histology. The histology of the liver showed slight atrophy and multifocal hepatocellular necrosis and inflammation in birds on ESL 20 ml/L inclusion degree. The experiment concluded that oral management of ESL at 20 ml/L of water causes damage to the cells of the liver consequently it should be use.

Keyword: Damage, Ethanol, Liver, Scent Leaf, Water

ANTIBIOTIC RESISTANCE OF BACTERIA ISOLATED FROM POULTRY DUNGS

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The use and overuse of antibiotics in poultry farming significantly contribute to the development and dissemination of antibiotic resistomes among poultry populations. These resistant genes pose a potential risk to human health through the consumption of contaminated poultry products or direct contact with the birds. In this study, samples were collected from various poultry farms, ensuring aseptic techniques were employed throughout the process. A mass of 1 gram from each sample was measured and subjected to a serial dilution process. The diluted samples were then cultured on selective media, resulting in approximately 25 isolates. From these, ten isolates were chosen for further characterization and identification using the Microbact system. The identified enteric bacteria included *Enterobacter agglomerans* complex, *Enterobacter asburiae*, *Pseudomonas fluorescens*, *Pasteurella multocida*, *Aeromonas hydrophila*, *Bacillus pseudomallei*, *Brevundimonas diminuta*, *Vibrio parahaemolyticus*, *Burkholderia cepacia*, and *Klebsiella pneumoniae*. The antibiotics tested included ceftazidime, cefuroxime, gentamicin, cefixime, ofloxacin, augmentin, nitrofurantoin, and ciprofloxacin. Notably, sensitivity to ofloxacin, nitrofurantoin, and ciprofloxacin was observed in 90% of the isolates, while 80% showed sensitivity to gentamicin. However, all isolates were resistant to ceftazidime, cefuroxime, and augmentin; 90% were resistant to cefixime; 30% to gentamicin; and 10% to both ofloxacin and nitrofurantoin. This research underscores that the indiscriminate use of antibiotics in poultry feeds is a critical factor in the emergence of resistant bacterial strains, highlighting the urgent need for implementing stringent antibiotic stewardship practices in poultry farming to mitigate the risks associated with antibiotic resistance.

GASTRONOMİ VE KÜLTÜREL MİRASIN KORUNMASI: GELENEKSEL TATLARIN DİJİTAL ARŞİVLENMESİ

PROTECTION OF GASTRONOMY AND CULTURAL HERITAGE DIGITAL ARCHIVING OF TRADITIONAL FLAVOURS

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ÖZET

Gastronomi, bir toplumun kültürel mirasının önemli bir parçasıdır ve geleneksel tatlar, bu mirasın korunmasında kritik rol oynar. Dijitalleşme çağında, geleneksel yemek tarifleri ve pişirme teknikleri hızla unutulmakta, bu da kültürel mirasın kaybolma riskini artırmaktadır. Bu bağlamda, gastronomi ve kültürel mirasın korunması için dijital arşivleme yöntemleri önemli bir çözüm sunmaktadır. Geleneksel tatların dijital ortamda saklanması, hem kültürel mirasın korunmasına hem de bu mirasın gelecek nesillere aktarılmasına katkı sağlayacağı düşünülmektedir. Bu doğrultuda çalışmanın amacı, geleneksel gastronomik tatların dijital arşivlenmesi yoluyla kültürel mirasın korunmasını ve sürdürülebilirliğini sağlamaktır. Dijital arşivleme yöntemlerinin gastronomi mirasının korunmasındaki rolünü incelemek, bu sürecin kültürel sürekliliğe katkı sağladığı alanları belirlemek ve uygulamada karşılaşılan zorlukları incelemektir. Ayrıca, dijital arşivlerin gastronomi kültürünün gelecek nesillere aktarımındaki etkinliğini değerlendirmek ve bu süreçte önerilen stratejileri sunmaktır. Gastronomi mirasının korunması üzerine yapılan araştırmalar, dijital arşivlemenin bu mirası korumada önemli bir araç olduğunu ortaya koymaktadır. UNESCO'nun kültürel miras listesinde yer alan gastronomik unsurlar, global kültürel çeşitliliğin bir parçası olarak değerlendirilmektedir. Dijital arşivleme, geleneksel yemek tariflerinin, pişirme tekniklerinin ve yerel malzemelerin dijital platformlarda saklanmasını sağlar. Bu süreç, genç nesillerin kültürel mirasa erişimini kolaylaştırırken, geleneksel tatların küresel ölçekte tanıtımını da destekler. Ayrıca, dijital arşivleme, kültürel mirasın korunması ve sürekliliği açısından önemli bir belgeleme aracı olarak kabul edilmektedir. Geleneksel tatların dijital arşivlenmesi, gastronomik mirasın korunmasına önemli katkılar sağlamaktadır. Dijital platformlar, hem mevcut gastronomik bilgi ve geleneksel tariflerin korunmasını hem de bu bilgilere geniş bir erişim imkanı sunmaktadır. Bu yaklaşım, kültürel mirasın kaybolmasının önüne geçilmesine ve gastronomik kültürün sürdürülebilir bir şekilde gelecek nesillere aktarılmasına olanak tanımaktadır. Geleneksel gastronomi mirasının dijital arşivlerle korunması sürecinde devletlerin, yerel yönetimlerin ve akademik kurumların işbirliği yapması gerekmektedir. Ayrıca, halkın katılımını teşvik eden interaktif dijital platformlar oluşturulmalı ve kültürel mirasın dijital ortamda etkileşimli bir şekilde sunulması sağlanmalıdır. Eğitim ve bilinçlendirme çalışmaları, dijital arşivlerin etkin kullanımını destekleyecek ve gastronomik mirasın korunmasına katkıda bulunacaktır.

Anahtar Kelimeler: Gastronomi, kültürel miras, geleneksel tatlar

ABSTRACT

Gastronomy is an important part of a society's cultural heritage and traditional flavours play a critical role in preserving this heritage. In the age of digitalisation, traditional recipes and cooking techniques are rapidly being forgotten, which increases the risk of loss of cultural heritage. In this context, digital archiving methods offer an important solution for the preservation of gastronomy and cultural heritage. It is thought that storing traditional flavours in digital environment will contribute to both the protection of cultural heritage and the transfer of this heritage to future generations. In this direction, the aim of the study is to ensure the protection and sustainability of cultural heritage through digital archiving of traditional gastronomic flavours. To examine the role of digital archiving methods in the protection of gastronomic heritage, to determine the areas where this process contributes to cultural continuity and to examine the difficulties encountered in practice. In addition, to evaluate the effectiveness of digital archives in the transfer of gastronomy culture to future generations and to present the strategies recommended in this process. Research on the protection of gastronomic heritage reveals that digital archiving is an important tool in protecting this heritage. Gastronomic elements included in UNESCO's cultural heritage list are considered as a part of global cultural diversity. Digital archiving enables traditional recipes, cooking techniques and local ingredients to be stored on digital platforms. This process facilitates access to cultural heritage for younger generations and supports the promotion of traditional flavours on a global scale. Furthermore, digital archiving is recognised as an important documentation tool for the preservation and continuity of cultural heritage. Digital archiving of traditional flavours makes significant contributions to the preservation of gastronomic heritage. Digital platforms offer both the preservation of existing gastronomic knowledge and traditional recipes and a wide access to this information. This approach enables the prevention of the loss of cultural heritage and the sustainable transfer of gastronomic culture to future generations. In the process of preserving traditional gastronomy heritage with digital archives, states, local governments and academic institutions should cooperate. In addition, interactive digital platforms that encourage public participation should be created and cultural heritage should be presented interactively in the digital environment. Education and awareness-raising activities will support the effective use of digital archives and contribute to the protection of gastronomic heritage.

Keywords: Gastronomy, cultural heritage, traditional flavours

MOLEKÜLER GASTRONOMİ ALANINDA YAPILAN LİSANSÜSTÜ TEZLERİN BİBLİYOMETRİK ANALİZİ

BIBLIOMETRIC ANALYSIS OF POSTGRADUATE THESES IN THE FIELD OF MOLECULAR GASTRONOMY

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ÖZET

Gastronomi alanında teknoloji, yaşanan teknolojik, endüstriyel, ekonomik ve kültürel gelişmeler, toplumun günlük yaşamını da etkileyerek yeni gastronomi akımlarının doğmasına yol açmıştır. Bu akımlar arasında slow food, raw food, yenilebilir böcekler, nörogastronomi ve moleküler gastronomi gibi trendler dikkat çekmektedir. Özellikle moleküler gastronomi, yeme-içme deneyimlerine bilimsel bir boyut kazandırarak, gıdaların fiziksel ve kimyasal yapılarını dönüştüren yenilikçi tekniklerle öne çıkmaktadır. Bu bağlamda, moleküler gastronomi, gastronominin sınırlarını genişleterek, hem görsel hem de duyuşsal anlamda geleneksel yemek alışkanlıklarını yeniden tanımlamıştır. Moleküler gastronomi, nispeten yeni bir çalışma alanı olmasına rağmen, bu alandaki bilimsel araştırmaların literatüre katkı potansiyeli oldukça yüksektir. Bu nedenle, bu çalışma, 2011-2024 yılları arasında Türkiye'deki Ulusal Tez Merkezi'nde yayımlanan moleküler gastronomi konulu lisansüstü tezleri incelemeyi amaçlamaktadır. Araştırma sürecinde, tezler yıl, üniversite, anabilim dalı, tez türü, anahtar kelimeler, çalışma konusu ve araştırma yöntemi gibi değişkenler açısından bibliyografik olarak analiz edilmiştir. Çalışmanın bulguları, moleküler gastronomi konusundaki tez çalışmalarının özellikle 2019 yılında yoğunlaştığını göstermektedir. Bunun yanı sıra, yapılan tezlerin büyük bir kısmının yüksek lisans düzeyinde olduğu ve "moleküler gastronomi" anahtar kelimesiyle üretilen çalışmaların ağırlıklı olarak Gastronomi ve Mutfak Sanatları Anabilim Dalı bünyesinde gerçekleştirildiği tespit edilmiştir. Bu durum, gastronomi alanında moleküler gastronominin giderek artan bir ilgiyle ele alındığını ve akademik düzeyde önemli bir çalışma konusu haline geldiğini göstermektedir.

Anahtar Kelimeler: Gastronomi, moleküler gastronomi, lisansüstü tezler, bibliyometri.

ABSTRACT

Technological, industrial, economic and cultural developments in the field of gastronomy have led to the emergence of new gastronomy trends by affecting the daily life of the society. Among these trends, slow food, raw food, edible insects, neurogastronomy and molecular gastronomy stand out. Especially molecular gastronomy stands out with innovative techniques that transform the physical and chemical structures of foods by adding a scientific dimension to eating and drinking experiences. In this context, molecular gastronomy has redefined traditional food habits both visually and sensually by expanding the boundaries of gastronomy. Although molecular gastronomy is a relatively new field of study, the potential of scientific research in this field to contribute to the literature is quite high. Therefore, this study aims to examine the postgraduate theses on molecular gastronomy published in the National Thesis Centre in Turkey between 2011 and 2024. During the research process, the theses were analysed bibliographically in terms of

variables such as year, university, department, thesis type, keywords, study topic and research method. The findings of the study show that thesis studies on molecular gastronomy intensified especially in 2019. In addition, it was determined that most of the theses were at the master's level and the studies produced with the keyword 'molecular gastronomy' were mainly carried out within the Department of Gastronomy and Culinary Arts. This situation shows that molecular gastronomy is handled with increasing interest in the field of gastronomy and has become an important subject of study at the academic level.

Keywords: Gastronomy, molecular gastronomy, postgraduate theses, bibliometrics.

PREVALENCE OF INTERNAL PARASITES IN LOCAL CHICKEN IN KARBALA PROVINCE/IRAQ

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Abstract:

Gastrointestinal (GI) parasites are the most common and detrimental parasites impacting poultry productivity. Globally, *Eimeria* spp., *Ascaridia galli*, and *Heterakis gallinarum* are infect most variety of domestic and wild birds. The prevalence of endoparasite infection in the research area is presently mild and mostly influenced by farming practices; our findings can establish a baseline for managing infections in domestic hens. The research was carried out from October 2023 to September 2024 to ascertain the prevalence and diagnostic characteristics of parasite gastrointestinal illnesses. A total of 100 fresh fecal samples of backyard chickens were collected from different poultry markets. Fecal examination carried out by using the native method, and floating method to determine the presence of worm eggs. Identified among the nematodes were the following parasites: *Eimeria* spp., *Ascaridia galli*, and *Heterakis gallinarum*. The total prevalence was (22%). The infection according to sex in *Eimeria* spp. was (63.6%), (60.0%), (66.7%) in male and female, respectively. *Ascaridia galli* infection was (27.3%), (30.0%), (25.0%) in male and female, respectively, and *Heterakis gallinarum* infection was (9.1%), (10.0%), (8.3%) in male and female, respectively. The infection according to sex were. The infection according to age in *Eimeria* spp. was (63.6%). *Ascaridia galli* infection was (27.3%), and *Heterakis gallinarum* infection was (9.1%). The prevalence of chickens in ages (one week to two years) were ranged between (0-100%). Age, sex, and avian species were a significantly ($p \geq 0.05$) associated with the prevalence of gastrointestinal parasite infections. The study found that *Eimeria* spp., *Ascaridia galli*, and *Heterakis gallinarum* were the most common gastrointestinal parasite infestations. In conclusion, to fully understand how gastrointestinal parasites affect the well-being and output of village hens, as well as to develop workable intervention and control strategies that small-holder farmers may use, more research is needed.

Keywords: Ascariidiosis, Chicken, Coccidiosis, Heterakiasis, Iraq.

ARTIFICIAL MEAT

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ABSTRACT

According to reports by the United Nations and the Food and Agriculture Organization, the increase in the world population and food demand is expected to result in a rapid rise in total meat consumption and a significant supply deficit in global livestock production. With the increasing population, the necessity for humanity to focus on more sustainable and secure food production methods is becoming evident. Environmental factors, including the intensification of agricultural land use and elevated greenhouse gas emissions, further highlight the necessity for alternative, resource-efficient protein sources to meet the growing demand. In this regard, cultured meat has emerged as a viable solution. Research suggests that cultured meat offers substantial environmental benefits, such as reducing water and carbon footprints, while providing nutritional advantages through controlled lipid content, which may contribute to the prevention of diet-related non-communicable diseases, such as obesity and cardiovascular conditions. Additionally, it is anticipated that with adjustments to the fatty acid composition, it will be possible to produce meat products that are healthier or suitable for special diets. The production of cultured meat is believed to significantly reduce water and carbon footprints, yet debates continue regarding ethical concerns, food safety, cost analysis, and its potential as a true solution to environmental issues. Compiling current information on cultured meat production and safety and providing guidance for future academic research in this area is aimed in this study.

Keywords: Artificial meat, cultured meat, meat alternative

A FUNCTIONAL FOOD: ENRICHED BREAD

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ABSTRACT

In many societies, a significant portion of daily energy intake comes from cereal-based products. As a staple food that is widely consumed and easily accessible, bread is an ideal candidate for enrichment with functional components. The process of food fortification involves adding natural active ingredients to enhance nutritional value, extend shelf life, promote food sustainability, and boost antioxidant capacity. It is stated that fortifying bread can positively impact various attributes such as fermentation volume, bread density, pH, dry matter content, water content, water activity, and shelf life, while also reducing mold growth. Beyond its role as a source of basic nutrition, food that provides health benefits or reduces the risk of disease is classified as functional food. There has been increasing interest in utilizing agricultural by-products and food waste as functional ingredients in baked goods. Enriching bread - a key dietary staple - with food waste is considered a potential strategy to improve public health outcomes. This approach not only promotes healthier diets, particularly for lower-income populations, but also supports preventive healthcare initiatives and helps reduce the strain on healthcare systems. This study aims to explore the enrichment of bread, which holds a vital place in community nutrition, with food waste, and to provide insights into the health benefits associated with this functional food.

Keywords: enriched bread, food waste, food quality, functional food

A COMPREHENSIVE REVIEW OF MOLECULAR SIEVE ADSORBENTS AND THEIR ROLE IN ENHANCING ATMOSPHERIC WATER HARVESTING SYSTEMS

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Abstract

Molecular sieve adsorbents are essential materials characterized by their unique porous structures, allowing for selective adsorption of small molecules, including water vapor. This review provides a comprehensive examination of various types of molecular sieve adsorbents, including zeolites, metal-organic frameworks (MOFs), and carbon molecular sieves, focusing on their specific properties and mechanisms of action. The critical role these materials play in enhancing atmospheric water harvesting systems is highlighted, emphasizing their ability to optimize moisture absorption and improve water yield from humid air. By comparing the adsorption capacities, thermal stability, and regeneration processes of different molecular sieves, this study aims to guide the selection of appropriate materials for efficient water collection. Furthermore, advances in molecular sieve technology are discussed, showcasing their potential in addressing water scarcity issues in arid and semi-arid regions. This review underscores the importance of molecular sieve adsorbents in developing sustainable atmospheric water harvesting solutions.

Keywords

Molecular sieves, Adsorbents, Atmospheric water harvesting, Moisture absorption, Zeolites, Metal-organic frameworks (MOFs), Carbon molecular sieves, Adsorption efficiency, Environmental applications.

ASSESSING MICROBIAL CONTAMINATION ON SURFACES IN A YOGHURT FACTORY: IMPACT ON PRODUCT SAFETY

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ABSTRACT

This study investigated the effectiveness of cleaning and disinfection procedures in a yoghurt production facility located in Bejaia, Algeria. We evaluated the levels of microbial contamination on various surfaces that come into direct contact with the yoghurt throughout the production process.

Analysis of samples taken from different surfaces before and after cleaning/disinfection operations showed that:

Cleaning-disinfection operations are effective at all sampling points except at TLC and TLF where they have been found to be insufficient where bacterial loads (FAMT) have been reduced to only 3×10^9 UFC/sw and 1.4×10^{10} UFC/sw respectively.

The fungal flora also recorded very high values in the TMB where the yoghurt matured (10^7 /sw yeasts and 8×10^5 /sw molds) before cleaning-disinfection. No fungi were detected after these operations.

While cleaning and disinfection procedures appear to be generally effective, our findings suggest the need for further evaluation, particularly at TLC and TLF, to ensure consistent and optimal hygiene throughout yoghurt production. Maintaining effective sanitation protocols is crucial for mitigating microbial contamination risks and safeguarding consumer health.

Key words: Microbial contamination, surfaces, yoghurt, cleaning / disinfection.

**BİBERİYE UÇUCU YAĞI VE ZNO NANOPARTİKÜLÜ İLE AKTİFLEŞTİRİLMİŞ
JELATİN/CMC/KITOSAN FILMİNİN PİLİÇ ETİNDE AMBALAJ MATERYALI
OLARAK KULLANIMI**

**GELATINE/CMC/CHITOSAN FILM ACTIVATED BY ROSEMARY ESSENTIAL OIL
AND ZNO NANOPARTICLE AS A PACKAGING MATERIAL IN CHICKEN MEAT**

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ÖZET

Petrol bazlı plastik ambalaj materyalleri hafiflik, ucuzluk, sağlamlık gibi avantajları nedeniyle gıda endüstrisinde yaygın bir kullanım alanı bulmuş olsada, sürdürülebilirlik temasının yoğun yaşandığı günümüzde çalışmalar sentetik plastiklerin yerini alabilecek biyobozunur ambalaj materyallerinin keşfi üzerinde yoğunlaşmıştır. Benzer yaklaşımla, bu çalışma kapsamında jelatin/CMC/kitosan bazlı çok katmanlı biyobozunur özellikli bir filmin tasarlanması amaçlanmıştır. Ayrıca bu filmin farklı katmanlarına biberiye uçucu yağı (BUY), çinko oksit nanopartikülü (ZnO-NP) ya da BUY+ZnO-NP ilave edilerek filme biyoaktif özellik kazandırılmış ve 4 farklı bileşimde hazırlanan filmlerin karakteristik özellikleri ile piliç göğüs etinin raf ömrü üzerine etkisi incelenmiştir. BUY+ZnO-NP kullanılan filmde en yüksek $-a^*$ ve b^* değerleri ölçülmüştür ($p<0.05$). Biyofilme ZnO-NP ilavesi ışık geçirgenliğini artırırken, BUY ilavesi daha opak bir film eldesi ile sonuçlanmıştır ($p<0.05$). Filmlerin su buharı geçirgenlik düzeyi 0.37-0.44 g.mm/m².h.kPa olarak belirlenmiştir. Depolama sürecinde biyoaktif film kullanılmayan kontrol grubunda pH değerinde mikrobiyel üremeye bağlı 0.5 birimlik artış gözlenirken, BUY ve ZnO-NP kullanımı pH değerindeki değişimleri minimize etmiştir. Film bileşimine BUY ilavesinin bir sonucu olarak piliç etlerinde 13.günde en düşük TBARS değeri ölçülmüştür. Toplam mezofilik aerobik bakteri sayıları incelendiğinde ise kontrol grubunda 5.günde kritik limite (6 log KOB/g) ulaşılırken, ZnO-NP, BUY, BUY+ ZnO-NP içeren filmler ile sarılmış piliç etlerinde bu limite sırasıyla 9., 10. ve 12.günlerde ulaşılmıştır ($p<0.05$).

Anahtar Kelimeler: Biyoaktif film, biyobozunur, uçucu yağ, çinko oksit, oksidasyon, depolama

ABSTRACT

Although petroleum-based plastic packaging materials have found widespread application in the food industry due to their advantages of lightweight, low cost, and durability, contemporary discussions surrounding sustainability have shifted research focus towards the discovery of biodegradable packaging materials that can replace synthetic plastics. In line with this approach, the present study aims to design a multilayer biodegradable film based on gelatin, carboxymethyl cellulose (CMC), and chitosan. Furthermore, bioactive films were prepared with four different compositions by incorporating rosemary essential oil (REO), zinc oxide nanoparticles (ZnO-NP), or a combination of REO and ZnO-NP into different layers of the film. Analyses to determine the

characteristic properties of the films and their effects on the shelf life of chicken breast meat were performed. The film containing REO and ZnO-NP exhibited the highest values of $-a^*$ and b^* ($p < 0.05$). The addition of ZnO-NP to the biofilm increased light transmittance, while the inclusion of REO resulted in a more opaque film ($p < 0.05$). The water vapor permeability level of the films was determined to be between 0.37 and 0.44 g.mm/m².h.kPa. During the storage process, the control group without bioactive film showed a 0.5 unit increase in pH value due to microbial growth, whereas the use of REO and ZnO-NP minimized changes in pH. As a result of the addition of REO to the film composition, the lowest TBARS value in chicken meat was measured on the 13th day. When examining total mesophilic aerobic bacterial counts, the control group reached the critical limit (6 log CFU/g) by the 5th day, while chicken meat wrapped in films containing ZnO-NP, REO, and REO+ZnO-NP reached this limit on the 9th, 10th, and 12th days, respectively ($p < 0.05$).

Key words: Bioactive film, biodegradable, essential oil, zinc oxide, oxidation, storage

BİTKİSEL BAZLI PROTEİNLER

PLANT-BASED PROTEINS

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ÖZET

Proteinler, yüksek moleküler ağırlığa sahip organik moleküller olan aminoasitlerden oluşmaktadır. Proteinin besin değeri üzerinde, amino asit profili, biyoyararlanım, sindirilebilirlik, anti-besinsel faktörler ve protein işleme yöntemleri, önemli bir etkiye sahiptir. Her amino asit, vücudun nasıl çalıştığı konusunda benzersiz ve önemli bir rol oynamaktadır. Esansiyel amino asitler insan vücudu tarafından üretilmeyen ve gıdalardan alınması gereken organik bileşiklerdir. Yüksek kaliteli bir protein, dokuz esansiyel amino asidin her birinden yeterli miktarda içermelidir. Tüketiciler, protein ihtiyaçlarını iki ana kaynaktan (hayvansal ve bitkisel kaynaklar) alabilmektedir. Son yıllara kadar protein kaynağı olarak hayvansal kaynaklı proteinler kullanılırken, dünya nüfusunun artmasıyla kaynakların azalması, artan maliyetlerle tedarik zincirinde sorunlar yaşanması ve artan sera gazı emisyonunda hayvansal üretimin payının çok olması alternatif protein kaynaklarına yönelimi artırmıştır. Vegan ve vejetaryen gibi tüketici gruplarının sayılarının artması bu yönelimi desteklemiştir. Hayvansal proteinlere kıyasla bitkisel proteinler, daha kolay sindirilebilir, yüksek biyolojik değere sahip net protein kullanımı sağlamaktadır. Çok çeşitli bitkisel protein kaynakları bulunmaktadır. Baklagiller (soya fasulyesi, bezelye, nohut, barbunya, maş fasulyesi), tahıl proteinleri (yulaf, pirinç, buğday ve mısır), yağlı tohumlar (yerfıstığı proteini, keten tohumu, susam, ay çekirdeği, arpa vb.) kapsamlı olarak araştırılmış ve protein takviyeleri olarak literatürde bildirilmiştir. Bu bildiride, bitkisel bazlı protein kaynaklarının önemi, eldesi, işlenme yöntemleri ve tüketimde kullanım alanlarının ele alınması amaçlanmıştır.

Anahtar Kelimeler: bitkisel proteinler, protein eldesi, tüketici yönelimi

ABSTRACT

Proteins consist of amino acids, which are organic molecules with high molecular weight. Amino acid profile, bioavailability, digestibility, anti-nutritional factors and protein processing methods have a significant impact on the nutritional value of protein. Each amino acid plays a unique and important role on the body functions. Essential amino acids are organic compounds that cannot be produced by the human body and must be obtained from food. A high-quality protein should contain adequate amounts of each of the nine essential amino acids. Consumers supply their protein needs from two main sources, namely animal and plant sources. While animal-based proteins were used as a protein source until recent years, the decrease in resources due to the increase in the world population, problems in the supply chain due to increasing costs and the large share of animal production in increasing greenhouse gas emissions have increased the tendency towards alternative protein sources. The increase in the number of consumer groups such as vegan and vegetarian has supported this trend. Compared to animal proteins, plant proteins provide easily digestion, high biological value net protein usage. There are a wide variety of plant protein sources. Legumes (soybean, pea, chickpea, kidney bean, mung bean), cereal proteins (oat, rice, wheat and corn), oilseeds (peanut protein, flaxseed, sesame, sunflower seed, barley etc.) have been extensively researched and reported in the literature as protein supplements. This study aims to address the importance of plant-based protein sources, their extraction, processing methods and areas of use in consumption.

Key Words: plant-based protein, protein extraction, consumer tendency

**DOĞAL RENKLENDİRİCİ PROSES SIVI ATIKLARINDAN GLUKOZ ŞURUBU
ALTERNATİFİ DEİYONİZE ŞEKER ELDE EDİLMESİ VE MODEL GIDALARDA
KULLANIM OLANAKLARININ BELİRLENMESİ**

**OBTAINING DEIONIZED SUGAR AS AN ALTERNATIVE GLUCOSE SYRUP FROM
LIQUID WASTES OF NATURAL COLORING PROCESS AND DETERMINING THE
POSSIBILITIES OF THE USAGE IN MODEL FOODS**

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ÖZET

Bu çalışmada, endüstriyel kırmızı pancar (KP) (*Beta vulgaris* L.) ekstrakt tozu üretiminde KP sebze suyu konsantresinden pigment ekstraksiyonu sonrasında açığa çıkan (~12.0°Bx) kırmızı pancar akışkan atığı (KPAA) olarak mısır şurubu (glikoz şurubu) alternatif deiyonize şeker şurubu elde edilmesi ve model gıda olarak dondurma formülasyonunda kullanım potansiyelinin belirlenmesi amaçlanmıştır. Bu amaçla hazırlanan KPAA, glikoz şurubu ve salepin bağımsız değişkenler olduğu bir dondurma deneme planı hazırlanmıştır (n=14). Hazırlanan dondurma örneklerinin miksleri üzerinde fizikokimyasal özellikler (pH, kurumadde, kül), reolojik özellikler (akış davranış özellikleri ve moduluslerin belirlenmesi), renk (L*, a*, b*, chroma ve hue açısı) özellikleri analiz edilmiş olup son ürün dondurmada ise biyoaktif (TPC, %inhibisyon), renk (L*,

a*, b*, chroma ve hue açısı), tekstür (sertlik), erime özellikleri (ilk damlama süresi, son damlama süresi, erime hızı) ve duyu analizleri yapılmıştır. Yapılan erime analizleri sonucunda deiyonize şeker ve salep oranları artması, glikoz şurubu oranının az olması ilk damlama ve son damlama süreleri üzerinde artışa neden olmuştur. En düşük sertlik değeri 799 g olarak 3.03 g/100g deiyonize şeker, 2.52 g/100g glikoz şurubu, 0.95 g/100g salep kullanımı sonucu tespit edilmiştir. En yüksek sertlik değeri ise 2111 g olarak 0.30 g/100g deiyonize şeker, 5.00 g/100g glikoz şurubu, 1.20 g/100g salep kullanımı sonucu tespit edilmiştir. Çalışma sonucunda kırmızı pancar sıvı atığının klarifikasyon ve dekolorizasyon sonrası dondurma glikoz şurubu ikamesi olarak kullanılabilir bir materyal olduğu belirlenmiştir. Ayrıca sürdürülebilirlik ve döngüsel ekonomi yaklaşımı ile kırmızı pancar renklendirici endüstriyel atıklarının geri kullanımı ile yenilikçi ve potansiyel bir gıda bileşeni elde edilmiştir. Doğal renklendirici prosesi atık yönetimine fayda sağlaması ve çevre güvenliğine katkı sağlaması amaçlanılmış olup buna uygun materyal elde edilmiş ve kullanım potansiyeli dondurma ürününde katkı sağlamıştır.

Anahtar Kelimeler: Deiyonizasyon, Jelly, Dondurma, Tekstür, Reoloji.

ABSTRACT

In this study, it was aimed to obtain deionized sugar syrup as an alternative to corn syrup (glucose syrup) as red beet liquid waste (RBLW) from the liquid waste (~12.0°Bx) released after pigment extraction from RB vegetable juice concentrate in industrial red beet (RB) (*Beta vulgaris* L.) extract powder production and to determine its potential for use in ice cream formulation as a model food. For this purpose, an ice cream experiment plan was prepared in which RBLW, glucose syrup and salep were independent variables (n=14). Physicochemical properties (pH, activity of water, ash), rheological properties (G'G", consistency, flow index R²), color (L*, a*, b*, chroma and hue angle) were analyzed on the mixtures of the prepared ice cream samples and bioactive (TPC, %inhibition), color (L*, a*, b*, chroma and hue angle), texture (hardness), melting properties (first dropping time, last dropping time, melting rate) and sensory analysis were performed. As a result of the melting analysis, the increase in deionized sugar and salep ratios and the decrease in glucose syrup ratio caused an increase in the first and last drip times. The lowest hardness value of 799 g was determined using 3.03 g/100g deionized sugar, 2.52 g/100g glucose syrup, and 0.95 g/100g salep. The highest hardness value of 2111 g was determined using 0.30 g/100g deionized sugar, 5.00 g/100g glucose syrup, and 1.20 g/100g salep. As a result of the study, it was determined that red beet liquid waste is a material that can be used as an ice cream glucose syrup substitute after clarification and decolorization. In addition, an innovative and potential food ingredient was obtained by reusing red beet colorant industrial waste with a sustainability and circular economy approach. The natural colorant process benefits waste management and contributes to environmental safety. The appropriate material has been obtained, and its potential for use has contributed to the ice cream product.

Keywords: Deionization, Jelly, Ice cream, Texture, Rheology.

GROWTH, PRODUCTION, AND FRUIT QUALITY OF TOMATO PLANTS GROWN IN AN INTERCROPPING SYSTEM UNDER DROUGHT STRESS.

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ABSTRACT

Tomatoes is an economically important crop for many Mediterranean countries. This crop, which is destined for local consumption and export, is usually cultivated in greenhouses located in arid or semi-arid lands. However, tomato yields are threatened in many areas because of climate change, salinization, temperature extremes, drought and changing rainfall patterns. Thus, the adoption of novel agricultural technologies and diversifying farming systems is necessary to overcome these abiotic stresses and to increase yield productivity. Among these strategies, planting density and intercropping systems are the most important techniques used to overcome these limitations. Intercropping is a farming practice involving two or more crop species, or genotypes, growing together and coexisting for a time. In this study, it has been shown that intercropping tomato with maize was very effective in overcoming drought stress under semi-arid conditions. Our results suggest that intercropping may alleviate drought-induced stress and enhances crop performance of shade tolerant tomato by improving morphological, physiological, and biochemical parameters and improved fruit quality of different varieties of tomato plants studied here.

Keywords: Intercropping, tomato, drought, shade tolerance, fruit quality, yield

**COMPARATIVE STUDY OF THE BEHAVIOR OF THREE VARIETIES OF
'PHASEOLUS VULGARIS L.' BEAN SOWN IN POLLUTED SOIL FROM AN
UNCONTROLLED LANDFILL SITE**

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The uncontrolled dumping of waste on the edge of farmland is an imminent danger to environmental health. On the one hand, it alters the soil, threatens the water table and consequently affects crops; on the other, plants are the first link in the food chain, so soil-plant transfer is a potential danger to human health. Three varieties of the common bean 'Phaseolus vulgaris L.', were tested in this trial: (V1 : COCO ROSE, V2 : HARICOT MGT INNOVIAL et V3 : HARICOT MICHELET) they are grown locally in the Annaba region. The study compares the behaviour of these three varieties sown in polluted soil, from an unauthorized landfill site in the Sidi-Salem region on the outskirts of agricultural land, via an assay of total proteins, an assay of CAT and APx enzymatic activity, as well as respiration with a statistical study, and a histological study of the roots.

The results obtained confirm the toxicity of the soil studied through the disturbances observed in the parameters studied in this experiment: an increase in total protein levels, a disruption of CAT activity and a decrease in APx activity. At the same time, respiration was inhibited in all treated batches. Histological examination of the roots confirmed these data, with various disturbances and anatomical changes observed.

Key words: Soil, Wild landfill, Phaseolus vulgaris L., Variety, Root, Toxicity.

EVALUATION OF COMBINED APPLICATION OF IODINE, IRON AND ZINC IN THE MANAGEMENT OF FUSARIUM WILT (*Fusarium oxysporum* f. sp. *lycopersici*) OF TOMATO

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Abstract

Fusarium oxysporum frequently causes wilt on tomatoes (*Solanum lycopersicum* L.). It has been proven that iodine, iron, and zinc have fungicidal properties that help control diseases of plants. So, in 2023, a field experiment was conducted at the Teaching and Research Farm, Federal University of Agriculture, Abeokuta, Nigeria, to determine the effect of combined Iron, Iodine, and Zinc application on *Fusarium* wilt and fruit yield of two tomato varieties (Roma and UC-82). A 2 x 2 x 3 factorial experiment with three replicates was set up in a Randomized Complete Block Design. The treatment (combined iodine, iron, and zinc) was applied using two distinct techniques (foliar spraying and drenching) at concentrations of 10 and 20 mg/L. Plots that were left untreated served as the control. The means were separated using Duncan's Multiple Range Test ($p < 0.05$) and the data were subjected to Analysis of Variance. The results indicated that the Roma treated with combined I-Fe-Zn at 10 mg/L by foliar application method had the lowest disease incidence and severity (13.33 % and 0.33, respectively), whereas the control plots showed the highest disease incidence and severity (100.00 % and 5.33, respectively). Also, Roma treated with combined I-Fe-Zn at a concentration of 10 mg/L produced significantly higher yield (420.61 g/plant), while the control plots produced the least yield (98.80 g/plant). Based on the results of the study, applying 10 mg/L of combined I-Fe-Zn reduced *Fusarium* wilt and boosted tomato fruit output. As a result, the foliar treatment of combined I-Fe-Zn is recommended for controlling *Fusarium* wilt.

Keywords: Tomato, *Fusarium* wilt, Iron, zinc, Iodine.

FOOD PRESERVATION AND SAFETY: THE ROLE OF ESSENTIAL OILS

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Abstract

Essential oils (EOs) are widely recognized for their aromatic and therapeutic properties, but their application in the food industry provides significant advantages for the prevention and preservation of food products. This research will focus on the study of specific essential oils and their effectiveness in preventing food spoilage due to their antioxidant and antibacterial properties. The study delves into the essential oils derived from plants such as thyme, rosemary, and cinnamon. These plants have been selected for their proven efficacy in protecting against oxidation and bacterial growth. Thyme, rich in thymol, is known for its potent antibacterial and antifungal properties. Rosemary, containing carnosol and rosmarinic acid, offers significant antioxidant capacities, delaying the rancidity of oils and fats in food products. Cinnamon, valued for its cinnamaldehyde content, exhibits strong antimicrobial activity. The study will also discuss the mechanisms through which these essential oils inhibit the growth of pathogenic microorganisms and delay oxidation processes, thereby extending the shelf life of meat and fish products. We will present experimental data illustrating the effectiveness of essential oils in various meat and fish matrices, as well as optimal dosages and application methods to ensure food safety and quality.

Keywords: Food safety, meat and fish products, Food preservation, Essential oils.

ANTIOXYDANT ACTIVITY OF GRAPE POMACE

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ABSTRACT

The production of natural extracts from agro-industrial byproducts, enriched in compounds with recognized health benefits is gaining importance. The wine-making industries produce millions of tons of residues (grape pomace) after fermentation, which represents a waste management issue both ecologically and economically. The productive use of such by-products could offer substantial economic benefits. With this in mind, our work focuses on the valorization of grape pomace from red wine as a source of high value-added active biomolecules such as phenolic compounds. In this order we opted for an eco-extraction of phenolic compounds using three solvents (Ethanol 80 %, Water and Ethyl acetate) at different ratio of sample mass to solvent volume (1/5, 1/10 and 1/20). The extracted molecules were then identified by High Performance Liquid Chromatography (HPLC), and their antioxidant activity was in terms of 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) radical scavenging activity and ABTS diammonium salt radical scavenging activity. The results showed a significant antioxidant activity of grape pomace extracts with better activity for the aqueous extract reflected by an IC_{50} varied from 5,44 to 6,73 mg/ml and from 2.19 to 4.22 mg/ml of DPPH and ABTS, respectively. This activity is due to the presence of different phenolic compounds which were identified by HPLC.

Keywords Valorization, Grape pomace, Phenolic compounds, Antioxidant activity, HPLC

HEMOPROFILING AND ANTIOXIDANT POTENTIAL OF OLIVE POMACE EXTRACT

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ABSTRACT

The olive oil industry produces substantial quantities of byproducts. Pomace are ranked in second place after olive mill wastewater. Olive pomace, the solid residue left after the extraction of olive oil, comprises skins, pulp, seeds, and stems. Traditionally considered waste, this byproduct poses significant disposal challenges and environmental concerns. However, recent research has unveiled its potential as a rich source of bioactive compounds with numerous health benefits. This study aims to explore the chemoprofiling and antioxidant potential of olive pomace extract. By utilizing advanced chromatographic technique such as High-Performance Liquid Chromatography (HPLC), a comprehensive analysis of the phytochemicals present in the extract was conducted. The chemoprofiling revealed a diverse array of bioactive compounds, including phenolic acid, flavonoids, and other phenolic substances known for their health-promoting properties. To evaluate the antioxidant potential, several in vitro assay were performed, including the DPPH (2,2-diphenyl-1-picrylhydrazyl) assay. The results demonstrated that the olive pomace extract exhibits a high antioxidant capacity IC_{50} 650 μ g/mL, significantly scavenging free radicals and reducing oxidative stress. These findings suggest that olive pomace, often discarded as waste, can be repurposed as a valuable source of natural antioxidants. The study underscores the potential

applications of olive pomace extract in the food and pharmaceutical industries. By harnessing its antioxidant properties, olive pomace extract could contribute to the development of functional foods and nutraceuticals aimed at promoting health and preventing diseases associated with oxidative stress.

This research underscores the importance of sustainable practices in the olive oil industry, turning a byproduct into a beneficial component for the food and pharmaceutical sectors.

Keywords: Olive pomace extract, chemoprofiling, antioxidant potential, DPPH, HPLC.

PROXIMATE COMPOSITION AND SENSORY PROPERTIES OF FERMENTED CONDIMENT (DAWADAWA) FROM BLENDS OF SOYBEAN AND MORINGA SEED

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ABSTRACT

The proximate composition and sensory properties of fermented condiment (dawadawa) from blends of soybean and moringa seeds were evaluated. The moringa and soybean seed were blended in ratio of 100:0, 95:5, 90:10 and 0:100 which were coded as CS1, CS2, CS3 and CS4 respectively. The proximate composition was determined using standard methods and sensory evaluation was evaluated using 9-point Hedonic scale. The result proximate composition showed that moisture content ranged from 9.01 to 10.29%, protein from 40.38 to 44.74%, fat content 7.35 to 12.42%, fibre from 4.73 to 5.38%, Ash content from 3.79 to 8.83% and carbohydrates from increase in inclusion of moringa dawadawa. Increase the protein and fat content of fermented condiment (dawadawa). Moringa “dawadawa” had the highest mean score and was most preferred by panelists in all the sensory attribute. Therefore, acceptable and nutritional fermented condiment (dawadawa) can be produced from blends of soybean and moringa seeds.

Keywords : Fermented condiment ,soyabeen , mooring seed, proximate

DEVELOPMENT OF FORMULATION CONTAINING HERBAL EXTRACT OF RANDIA DUMETORUM LAMK AND ITS EVALUATION FOR ANTI-FUNGAL ACTIVITY

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Abstract-

The development of alternative treatments derived from natural sources is gaining attention due to the increasing resistance of pathogens to conventional antifungal agents. *Randia dumetorum* Lamk, commonly known as “Mainphal,” is a medicinal plant traditionally used in various herbal remedies. The present study focuses on the development of a formulation containing the herbal extract(s) of *Randia dumetorum* Lamk and its evaluation for antifungal activity. The fruits of *Randia dumetorum* Lamk were collected, authenticated, and processed to obtain the active herbal extract(s). Various extraction techniques, including maceration and Soxhlet extraction, were employed to isolate the bioactive constituents responsible for the antifungal properties. Phytochemical screening of the extract revealed the presence of important secondary metabolites such as alkaloids, flavonoids, glycosides, tannins, and saponins, which are known for their antimicrobial potential. To develop a stable formulation, different excipients were chosen to ensure the optimal delivery of the active compounds. A cream-based topical formulation was prepared using the herbal extract(s) of *Randia dumetorum* Lamk. The formulation was optimized for consistency, spreadability, pH, and stability. The evaluation of the formulation involved both in-vitro and in-vivo testing to assess its antifungal efficacy. In-vitro antifungal activity was evaluated using the agar diffusion method against common fungal strains such as *Candida albicans*, *Aspergillus niger*, and *Trichophyton rubrum*. The zones of inhibition produced by the herbal formulation were compared with those of standard antifungal drugs like fluconazole. The results demonstrated significant antifungal activity of the formulation, with the extract(s) inhibiting the growth of tested fungal strains effectively. Further, in-vivo studies were conducted using an animal model with induced fungal infections. The topical application of the formulation showed remarkable improvement in the infection site, reducing the fungal burden and promoting faster healing compared to the untreated control group. Histopathological examination of the skin tissues confirmed the antifungal efficacy, showing reduced fungal colonization and inflammation in the treated group. The stability of the formulation was assessed over a period of three months, during which it retained its physical and chemical properties without any signs of degradation. The study also included a toxicity evaluation, confirming that the formulation was safe for topical application without causing any skin irritation or adverse reactions.

In conclusion, the herbal extract(s) of *Randia dumetorum* Lamk exhibit promising antifungal properties, making it a potential alternative to conventional antifungal agents. The developed topical formulation proved to be effective, stable, and safe for use against fungal infections. Further clinical studies are warranted to establish its efficacy in human subjects and explore its full therapeutic potential.

Keywords: *Randia dumetorum* Lamk, herbal extract, antifungal activity, topical formulation, *Candida albicans*, *Aspergillus niger*, *Trichophyton rubrum*, phytochemicals, stability testing, toxicity evaluation.

GLÜTENSİZ BESLENMEYE TAHILI DAHİL ETMEK İÇİN FAYDALI BİR SEÇENEK: SORGUM

A USEFUL OPTION FOR INCLUDING CEREAL IN A GLUTEN-FREE DIET: SORGHUM

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ÖZET

Çölyak, irritable bağırsak sendromu gibi hastalıklar nedeniyle glütensiz beslenme zorunluluğu veya sadece glütensiz beslenmenin daha sağlıklı olduğuna yönelik artan toplumsal inanç, glütensiz ürün pazarını gün geçtikte büyütülmektedir. Glütensiz ürünlerdeki besinsel ve reolojik özelliklerin iyileştirilerek tüketici beğenisini kazanan sağlıklı, besleyici ve yüksek lif içeren ürün üretilerek piyasaya sunulması glütensiz beslenen insanlar için önemli unsurlardır.

Diğer yandan sorgum (*Sorghum bicolor* L.), dünyada en çok yetiştirilen beşinci tahıl ürünü olarak bilinir. Sorgum dünyada gelişmekte olan ülkelerde insanların günlük besinleri için nişasta, protein, bazı vitaminler ve mineralleri sağlamaktadır. Batıda ise ağırlıklı olarak hayvan beslemede, etanol ve biyobenzin ile kağıt ve ahşap malzemelerin üretiminde kullanılmaktadır. Tarımsal faaliyetin ve diğer ürünlerin ekimi için çevrenin uygun olmadığı bazı Afrika ülkelerinde insanlar için başlıca gıda kaynağıdır. Sorgumun besinsel bileşimi çeşitler arasında farklılık gösterir. Genel olarak karbonhidratlar (nişasta ve nişasta olmayan polisakkaritler), proteinler ve lipitler tahılın ana bileşenleridir. Ortalama olarak 100 g tahılda yaklaşık 72,1 g karbonhidrat, 12,4 g su, 10,6 g protein, 6,7 g lif ve 3,5 g lipit içerir ve yaklaşık 1,377 kJ enerji sağlar. Sorgumun insan gıdası olarak kullanımı, yüksek besin potansiyeline sahip olması ve çölyak hastalığı olan kişiler tarafından güvenle tüketilebilmesi nedeniyle ilgi görmektedir. Sorgum ayrıca diyabet ve obezite hastalıkları olan kişiler için mükemmel bir besindir. Düşük protein sindirilebilirliği ve düşük nişasta içeriğine sahip olmasıyla karakterize edilir. Bunun dışında, antioksidan aktivite bakımından önemli bir tahıldır.

Türkiyede ise sorgum daha çok hayvan yemi olarak kullanılmaktadır. Bu nedenle sorgum gibi besinsel açıdan zengin bir tahılı glütensiz beslenmeye dahil etmek hedef gruplar açısından önemli görülmektedir.

Anahtar Kelimeler: Sorgum, *Sorghum bicolor* L., tahıl, glütensiz, beslenme.

ABSTRACT

The necessity of a gluten-free diet due to diseases such as celiac disease, irritable bowel syndrome, or the increasing social belief that a gluten-free diet is healthier is increasing the gluten-free product market day by day. Improving gluten-free products' nutritional and rheological properties producing a healthy, nutritious, and high-fiber product that gains consumer appreciation, and presenting it to the market are important elements for people who eat gluten-free.

Sorghum (*Sorghum bicolor* L.), on the other hand, is known as the fifth most cultivated cereal crop in the world. Sorghum provides starch, protein, some vitamins, and minerals for the daily nutrition of people in developing countries worldwide. In the West, it is mainly used in animal feeding, in the production of ethanol and biobenzine, as well as in the production of paper and wood materials. It is the main food source for people in some African countries where the environment is not suitable for agricultural activity and the cultivation of other products. The nutritional composition of sorghum differs between varieties. In general, carbohydrates (starch and

non-starch polysaccharides), proteins, and lipids are the main components of the grain. On average, 100 g of cereal contains approximately 72.1 g of carbohydrates, 12.4 g of water, 10.6 g of protein, 6.7 g of fiber, and 3.5 g of lipids and provides approximately 1,377 kJ of energy. The use of sorghum as a human food is gaining interest due to its high nutritional potential and the fact that it can be safely consumed by people with celiac disease. Sorghum is also an excellent food for people with diabetes and obesity diseases. It is characterized by having low protein digestibility and low starch content.

Moreover, sorghum is an important cereal in terms of antioxidant activity. In Türkiye, sorghum is mostly used as animal feed. For this reason, target groups need to include a nutritionally rich cereal like sorghum in a gluten-free diet.

Keywords: Sorghum, Sorghum bicolor L., cereal, gluten-free, diet.

ANNE SÜTÜ BİYOAKTİF PROTEİNLERİNDEN OSTEOPONTİNİN İŞLEVİ VE YAPISI

FUNCTION AND STRUCTURE OF OSTEOPONTIN, A BIOACTIVE PROTEIN IN HUMAN MILK

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ÖZET

Osteopontin (OPN), düzensiz yapı (intrinsically disordered) bir protein olup, anne sütünde laktoferrin gibi biyoaktif proteinlerle yüksek afinite etkileşim sergiler. Bu etkileşimler, sindirim sürecinde ve immünolojik gelişimde önemli rol oynar. Ancak, OPN'nin yapısal özellikleri ve biyolojik fonksiyonları üzerine yapılan çalışmalar sınırlıdır. Osteopontin'in, laktoferrin ile oluşturduğu komplekslerin antimikrobiyal ve immünomodülatör etkileri artırdığı çeşitli araştırmalarla gösterilmiştir. Bu durum, OPN'nin bebek beslenmesindeki önemini bir kez daha ortaya koymaktadır. Çalışmada, Homo sapiens, Bos taurus ve Capra hircus türlerine ait OPN protein dizileri UniProt veri tabanından alınarak hizalanmıştır. Bu dizilere dayalı olarak AlphaFold yardımıyla üç boyutlu yapılar tahmin edilmiştir. Osteopontin üzerindeki potansiyel yapısal motifler ve fonksiyonel bölgelerin tespiti için PROTEUS2 ve SCRATCH gibi çeşitli in silico araçlar kullanılmıştır. Ayrıca, osteopontinin antimikrobiyal aktivite gösterme potansiyeline sahip bölgeler CAMPR3 ve AntiBP web sunucuları yardımıyla belirlenmiş ve MEME Suite aracılığıyla motif analizleri gerçekleştirilmiştir. İn silico analiz sonuçlarına göre, OPN'nin intrinsically disordered bir yapıya sahip olmasına rağmen, belirli bölgelerinde sekonder yapı oluşturmaya uygun amino asit kompozisyonları tespit edilmiştir. Ayrıca, OPN üzerinde olası antimikrobiyal aktiviteler sergileyen bölgeler de belirlenmiştir. Bu bulgular, osteopontin ve laktoferrin arasındaki sinerjik etkileşimlerin, bebek beslenmesi ve immünolojik gelişim açısından ne kadar önemli olduğunu göstermektedir. Osteopontin'in yapısal özelliklerinin daha iyi anlaşılması, anne sütü proteinlerinin endüstriyel olarak işlenmesi ve termal dayanıklılığının artırılmasına yönelik yeni tekniklerin geliştirilmesine katkı sağlayabilecektir.

Anahtar Kelimeler: osteopontin, anne sütü, süt biyoaktif proteinleri, antimikrobiyal peptidler.

ABSTRACT

Osteopontin (OPN) is an intrinsically disordered protein that interacts with bioactive proteins such as lactoferrin in human milk with high affinity. These interactions play a significant role in the digestive process and immunological development. However, studies on OPN's structural characteristics and biological functions are limited. Research has shown that the complexes formed between osteopontin and lactoferrin enhance their antimicrobial and immunomodulatory effects, highlighting the importance of OPN in infant nutrition. In this study, OPN protein sequences from Homo sapiens, Bos taurus, and Capra hircus species were retrieved from the UniProt database and aligned. Based on these sequences, three-dimensional structures were predicted using AlphaFold. To identify potential structural motifs and functional regions of osteopontin, in silico tools such as PROTEUS2 and SCRATCH were used. Additionally, regions with potential antimicrobial activity were determined through the CAMPR3 and AntiBP web servers, and motif analysis was conducted using MEME Suite. According to the in silico analysis

results, despite OPN's intrinsically disordered structure, certain regions were found to have amino acid compositions suitable for forming secondary structures. Furthermore, regions of OPN exhibiting possible antimicrobial activities were identified. These findings underscore the importance of the synergistic interactions between osteopontin and lactoferrin in terms of infant nutrition and immunological development. A better understanding of OPN's structural features could contribute to the development of new techniques to enhance the industrial processing and thermal stability of human milk proteins.

Keywords: osteopontin, breastmilk, milk bioactive proteins, antimicrobial peptides.

LAKTİK ASİT BAKTERİLERİNDEN POSTBİYOTİK ELDESİNDE FARKLI YÖNTEMLERİN ETKİNLİĞİNİN KARŞILAŞTIRILMASI

COMPARISON OF THE EFFECTIVENESS OF DIFFERENT METHODS IN OBTAINING POSTBIOTIC FROM LACTIC ACID BACTERIA

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ÖZET

Postbiyotikler, genellikle probiyotik bakteriler tarafından üretilen ve sağlık açısından önemli faydalar sağlayan biyoaktif bileşikler olarak son yıllarda büyük ilgi görmektedir. Canlı probiyotiklerin aksine, postbiyotiklerin daha stabil ve dayanıklı olması, bu bileşenlerin uygulamada kullanımını daha cazip kılmaktadır. Bu çalışmanın amacı, laktik asit bakterilerinden postbiyotik elde etmek için kullanılan farklı yöntemlerin etkinliğini incelemektir. Çalışmada, hücreden arındırılmış süpernatant eldesi (CFS), ısıtma işlemi uygulaması ve enzimatik işlem ile kombine edilmiş sonikasyon yöntemlerinin karşılaştırılması yapılmıştır. Yöntemlerin birbirleri ile karşılaştırılmasında, işlem sonrası hücre canlılığının kontrolü ve elde edilen postbiyotiklerin antimikrobiyal etkinliği incelenmiştir.

Denemede yer alan örneklerden, CFS örneği ve ısıtma işlemi uygulaması sonrası elde edilen postbiyotiklerde canlı hücre tespit edilmezken, enzimatik işlem ile kombine edilmiş sonikasyon uygulaması ile elde edilen postbiyotiklerde canlı hücrelerin bulunduğu gözlemlenmiştir. Ayrıca, aralarında *Listeria monocytogenes*, *Escherichia coli*, *Salmonella enterica* ve *Staphylococcus aureus* bulunan patojen mikroorganizmalar üzerindeki antimikrobiyal aktivite incelendiğinde, CFS postbiyotik örneklerin ısıtma işlemi ile elde edilen örneklerle kıyasla nispeten daha yüksek antimikrobiyal etki gösterdiği belirlenmiştir. *L. monocytogenes* için, CFS ile elde edilen postbiyotikler 14.00 mm'ye ulaşan seviyelerde inhibisyon zonları oluştururken, ısıtma işlemi ile elde edilen örneklerde en yüksek antimikrobiyal zon çapı 13.75 mm seviyesinde ölçülmüştür. *E. coli* için, CFS postbiyotikler 10.25-13.75 mm arasında; ısıtma işlemi ile elde edilenler ise 9.50-13.50 mm arasında antimikrobiyal zon çapı oluşturmuştur. *S. enterica* üzerinde CFS postbiyotiklerin antimikrobiyal etkinliğini gösteren zon çapları 10.50-14.00 mm arasında, ısıtma işlemi ile elde edilen örnekler ise 10.75-13.50 mm arasında ölçülmüştür. *S. aureus* için her iki yöntemde de 9.75-14.00 mm arasında antimikrobiyal zonlar gözlemlenmiştir.

Çalışmada elde edilen sonuçlar dikkate alındığında, CFS yöntemi, gıda, beslenme ve tedavi uygulamaları için biyoaktif postbiyotik üretmek adına diğer yöntemlere kıyasla daha uygun bir yöntem olarak belirlenmiştir. Bu sonuçlar, postbiyotik üretim süreçlerinin optimize edilmesi ve endüstriyel kullanımın kolaylaştırılmasına katkıda bulunmaktadır.

Anahtar Kelimeler: Postbiyotik, Laktik Asit Bakterileri, Ekstraksiyon Yöntemleri

ABSTRACT

Postbiotics, which are bioactive compounds generally produced by probiotic bacteria and provide significant health benefits, have garnered considerable interest in recent years. Unlike live probiotics, the greater stability and resilience of postbiotics make them more appealing for practical applications. The aim of this study is to investigate the effectiveness of various methods used to obtain postbiotics from lactic acid bacteria. In this study, a comparison of methods such as obtaining cell-free supernatant (CFS), heat treatment, and sonication combined with enzymatic treatment was conducted. In the comparison of methods, the viability of cells after treatment and the antimicrobial efficacy of the obtained postbiotics were examined.

In the postbiotics obtained from CFS and heat-treated samples, no viable cells were detected, while viable cells were observed in postbiotics obtained through sonication combined with enzymatic treatment. Moreover, when the antimicrobial activity against pathogenic microorganisms such as *Listeria monocytogenes*, *Escherichia coli*, *Salmonella enterica*, and *Staphylococcus aureus* was examined, it was found that CFS postbiotic samples exhibited relatively higher antimicrobial effects compared to those obtained through heat treatment. For *L. monocytogenes*, postbiotics obtained via CFS formed inhibition zones with diameters reaching 14.00 mm, while the maximum antimicrobial zone diameter measured in heat-treated samples was 13.75 mm. For *E. coli*, CFS postbiotics formed antimicrobial zones with diameters ranging from 10.25 to 13.75 mm, while those obtained through heat treatment ranged from 9.50 to 13.50 mm. The antimicrobial zone diameters of CFS postbiotics against *S. enterica* ranged from 10.50 to 14.00 mm, whereas those from heat-treated samples ranged from 10.75 to 13.50 mm. For *S. aureus*, antimicrobial zones between 9.75 and 14.00 mm were observed for both methods.

Considering the results obtained in this study, the CFS method was identified as a more suitable approach for producing bioactive postbiotics for use in food, nutrition, and therapeutic applications compared to other methods. These findings contribute to the optimization of postbiotic production processes and the facilitation of their industrial use.

Keywords: Postbiotics, Lactic Acid Bacteria, Extraction Methods.

EDIBLE CITIES: ARCHITECTURAL APPROACHES TO INTEGRATING FOOD PRODUCTION INTO THE URBAN FABRIC

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Abstract:

Edible Cities is a vision where food production and self-sustainability are not at odds with the built environment. In this article, we examine the kind of architectural strategies that will make it easier to integrate urban agriculture within cities themselves in order to ensure food security, sustainability and a sense of community. This research draws on case studies like The Pasona Urban Farm in Tokyo, The Agropolis Building in Paris, and De Ceuvel and Amsterdam to illustrate how practices such as vertical farming, rooftop gardens and permaculture systems are producing rich ecosystems within empty city tons. The effectiveness of key design principles and technologies including hydroponics to create multifunctional spaces able to support both ecological resilience and social cohesion are assessed. The post also discusses some of the regulatory and economic constraints to edible cities, and highlights the importance of adaptable policies and communal designs. At the end of the day, incorporating food production into urban design is a necessary step to futureproof cities for both larger populations and climate change.

Keywords: Edible Cities; Urban Agriculture; Sustainable Architecture; Hydroponics; Green Infrastructure.

EFFECT OF FORTIFICATION OF LETTUCE AND GERMINATED CHICKPEA FLOUR ON COOKING, FUNCTIONAL AND TEXTURAL PROPERTIES OF PASTA

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Abstract

This study examined the impact of fortifying pasta with lettuce and germinated chickpea flour (GCF) on its cooking, functional, and textural properties.. Semolina flour(100%) served as the control, replaced by GCF (7%, 15%, 23%) and lettuce (3%, 5%, 7). Fortification increased ash, fiber, and protein content while reducing fat.. Moisture content ranged from 9.98% to 11.37%, ash from 1.59% to 3.28%, fat from 1.52% to 1.1%, and fiber from 0.03% to 1.1% in fortified pasta samples (Control, Sample A, Sample B, Sample C). Cooking losses were higher in Sample C, with longer cooking times observed in the control sample. Swelling index ranged from 2.02% to 2.8%, with Sample C showing more volume expansion. The addition of GCP and lettuce boosted the total phenolic content and antioxidant activity of pasta. These fortified pastas had lower lightness due to presence of color components. Texture profile analysis showed varying hardness and stickiness among raw and cooked samples, with raw Sample Control having more hardness and cooked Sample B exhibiting higher stickiness and the cooked Control pasta being harder. Sensory evaluation favored Sample A (GCP 7%, Lettuce 3% , 1% xanthan gum) for overall acceptance.

Keywords: Lettuce powder, fortified semoolina pasta, cooking quality, antioxidant activity, texture, sensory evaluation.

EFFICACY OF THE TRADITIONAL USE OF OLIVE LEAVES DECOCTION AS ANTI-DIABETIC AGENT IN GERIATRICS

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Abstract

Background: Several studies focused the light on the antidiabetic effect of Olive Leaves extract especially on the geriatrics. **Aim:** The current study was conducted to evaluate the anti-diabetic effect of olive leaves decoction on elder patients. **Methods:** The elderly subjects were randomized into 4 groups: Group I: Normal control group, Group II (gp2): hypertensive group, Group III: diabetic group & Group IV : diabetic hypertensive group. Each group included 20 subjects who was taken a specific dose of Olive leaves tea for 8 weeks treatment twice daily with a meal. Blood glucose level was measured at baseline screening and after each week until the end of the study. **Results:** During the study period, blood sugar and glycosylated hemoglobin changed significantly. The mean fasting blood glucose (F. BL. G.) difference reached up to 11.35 mg/dL for group I ,up to 10.55 mg/dL for Gp. II, up to 96.70 mg/dL for the Gp. III and up to 78.50 mg/dL for Gp.IV . After 8 weeks of treatment, the mean blood sugar had significantly decreased in group II and group IV ($p < 0.001$; $n = 20$). **Conclusion:** the results of this study suggest that olive leaves extract is beneficial to the diabetic patients to control plasma glucose level.

Keywords: Olive leaves, geriatrics, diabetic patients, glycemic control

**EVALUATION OF THE ACTIVITY OF ARGAN PLANT EXTRACTS
(ANTICHOLINESTERASE)**

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Abstract – The argan tree is an endemic species with several by-products such as seeds, leaves, and oils, which hold a very important place in the therapeutic field. The primary objective of this study is to evaluate the anti-cholinesterase potential of organic extracts of the argan tree using two different methods: acetylcholinesterase (AChE) and butyrylcholinesterase (BChE), by measuring IC50 values. The obtained IC50 results reveal a non-significant anti-cholinesterase activity for both methods, with IC50 values greater than 200: AChE > 200 and BChE > 200. In this case, the results suggest that our organic extract does not exhibit any anti-cholinesterase activity..

Keywords – Argana, anti-cholinestérase activity, ACHE,BCHE, enzyme

EXPLORING THE IMPORTANCE OF DIETARY CONSIDERATIONS FOR CANINE HEALTH

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Abstract:

Both human and animal bodies require essential nutrients obtained from food to maintain optimal health. Meeting these nutritional needs involves consuming a diverse range of foods on a daily basis. A healthy and balanced diet should include proteins, carbohydrates, fats, minerals, vitamins, and water. Canine nutritional requirements differ from those of humans. Unlike humans, who are encouraged to incorporate fresh fruits and vegetables into their diets for vitamin C, dogs do not need additional vitamin C as the bacteria in their gastrointestinal tracts synthesize sufficient amounts. While dogs can survive without carbohydrates, they are not strict carnivores and require a well-rounded diet of meat, grains, and vegetables to thrive. Premium dog food varieties are meticulously formulated to deliver the ideal combination of nutrients and delectable dog flavors. While it may be tempting to supplement their diet with human food and scraps, it can compromise their nutritional equilibrium and overall well-being. Consequently, the primary objective of this paper is to clarify the misconception that the dietary needs of pets are less critical than those of humans. Energy is not the only important factor in dog nutrition. Optimal nutrition supports cell development and preservation, prevents digestive, joint, and age-related issues, and protects against disease.

Keywords: nutrition, allergies, behavior, proteins, minerals.

THE MICROCLIMATE OF SCREEN HOUSE: AN OPTIMAL ENVIRONMENT FOR GROWTH, DISEASE RESISTANCE, AND QUALITY FRUIT DEVELOPMENT IN SOLANACEOUS CROPS (CHERRY TOMATO AND CHILI)

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Abstract

For solanaceous crops like cherry tomatoes and chili, screen houses offer a regulated microclimate that protects plants from harmful environmental stresses and infections, improving development, production, and fruit quality. Since these crops are susceptible to light, humidity, and temperature changes, screen buildings provide a better-growing environment than open fields. This systematic review investigates the effects of screen house microclimate on solanaceous crop growth, fruit quality, and disease resistance. Data comparing fruit quality, production, and the occurrence of pests and diseases between screen houses and other farming systems—like open fields and greenhouses—were gathered from multiple peer-reviewed research. The crops produced in screen houses were regularly found to have higher levels of disease resistance, enhanced fruit firmness, and greater marketability. The incidence of diseases, especially fungal infections, was considerably lower in screen house circumstances because of the controlled environment, which makes it less favorable for the growth of pathogens. Additionally, cherry tomatoes and chili cultivated in screen houses produced superior commercial yields due to increased fruit quality metrics like size, color, and antioxidant levels. A meta-analysis of disease incidence and yield from multiple studies is also included in the paper, offering statistical support for the advantages of screen house cultivation. The economic ramifications for farmers are covered in the conclusion, focusing on the enhanced profitability even with the early setup expenditures.

Keywords; Screen house microclimate, disease resistance, fruit quality, marketable fruits, protected cultivation

KURUTMA YÖNTEMLERİNİN KETENCİK (CAMELINA SATIVA (L.) CRANTZ.) TOHUM PROTEİN KONSANTRATLARININ TOZ ÖZELLİKLERİ ÜZERİNE ETKİLERİ

EFFECTS OF DRYING METHODS ON THE POWDER PROPERTIES OF CAMELINA (CAMELINA SATIVA (L.) CRANTZ.) SEED PROTEIN CONCENTRATES

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ÖZET

Sürdürülebilir bir yağlı tohum olan ketencik (*Camelina sativa* (L.) Crantz.), yeni bir bitkisel protein kaynağıdır. Bu çalışmada, farklı kurutma yöntemlerinin ketencik tohumu protein konsantratının toz özelliklerine etkisinin belirlenmesi amaçlanmıştır. Ketencik tohumu protein konsantratları, alkali ekstraksiyon ve izoelektrik noktada çöktürme yoluyla müsilağı ve yağı uzaklaştırılmış tohum unundan proteinlerin ekstrakte edilmesi ve ardından protein ekstraktlarının dondurularak kurutma, püskürtülerek kurutma ve vakum kurutma yöntemleri kullanılarak kurutulması yoluyla üretilmiştir. Ketencik tohumu protein konsantratları arasında, püskürtülerek kurutulmuş protein konsantratı en düşük partikül yoğunluğunu (1.03 g/cm^3) sergilemiştir. Ayrıca en yüksek ıslanabilirlik süresi (44.33 sn) de püskürtülerek kurutulmuş protein konsantratında bulunmuştur. Diğer yandan, dondurularak kurutulmuş ve vakumla kurutulmuş protein konsantratlarının benzer parçacık yoğunluğu ve ıslanabilirlik değerlerine sahip olduğu gözlenmiştir. Vakumla kurutulmuş protein konsantratının nem çekme değeri (%17.46) diğerlerinden (%12.97 - %13.12) daha yüksek bulunmuştur. Püskürtülerek kurutulmuş protein konsantratı en yüksek su çözünürlük değerini (%26.33) göstermiş olup, bunu sırasıyla vakumla kurutulmuş (%18.98) ve dondurularak kurutulmuş (%16.12) protein konsantratları takip etmiştir. Genel olarak, farklı yöntemlerle kurutulmuş ketencik tohumu protein konsantratları farklı toz özellikleri göstermiştir. Sonuç olarak, ketencik tohumu protein konsantratı üretiminde kurutma yönteminin seçimi, farklı gıda uygulamalarının gerektirdiği toz özelliklerinin sağlanması açısından gerekli olduğu değerlendirilmiştir.

Anahtar Kelimeler: *Camelina sativa*, partikül yoğunluğu, ıslanabilirlik, nem çekme, çözünürlük

ABSTRACT

Camelina (*Camelina sativa* (L.) Crantz.), a sustainable oilseed crop, is a new source of plant-based protein. In this study, it was aimed to determine the effects of different drying methods on the powder properties of camelina seed protein concentrate. Camelina seed protein concentrates were prepared by extracting proteins from mucilage and oil removed seed flour through alkaline extraction and isoelectric precipitation, followed by drying the protein extracts using freeze, spray, and vacuum drying methods. Spray-dried protein concentrate exhibited the lowest particle density (1.03 g/cm^3) among all camelina seed protein concentrates. Moreover, the highest wettability time (44.33 s) was found in spray-dried protein concentrate. On the other hand, it was observed that

freeze-dried and vacuum-dried protein concentrates had similar particle density and wettability values. The hygroscopicity of vacuum-dried protein concentrate (17.46%) was higher than others (12.97% - 13.12%). Spray-dried protein concentrate showed the highest solubility (26.33%), followed by vacuum-dried (18.98%) and freeze-dried (16.12%) protein concentrates, respectively. Overall, camelina seed protein concentrates dried by different methods demonstrated different powder properties. As a result, it was evaluated that the selection of a drying method in the production of camelina seed protein concentrate was necessary to provide the powder properties required by different food applications.

Keywords: Camelina sativa, particle density, wettability, hygroscopicity, solubility

KEFİRDEN ELDE EDİLEN POSTBİYOTİKLERİN MİDE KANSERİ HÜCRELERİNDE ANTİKANSER AKTİVİTESİNİN DEĞERLENDİRİLMESİ

EVALUATION OF ANTI-CANCER ACTIVITY OF POSTBIOTICS OBTAINED FROM KEFIR ON STOMACH CANCER CELLS

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ÖZET

Kefir, Lactobacillus, Streptococcus ve Saccharomyces gibi probiyotikler açısından zengin fermente bir süt ürünüdür. Kefirin probiyotik ve postbiyotik nitelikleri, bağırsak florasını düzenleyerek iltihabı azaltabilir ve sindirim sistemini koruyabilir. Postbiyotikler; canlı probiyotik mikroorganizmalar tarafından üretilen veya hücrel lizizden sonra açığa çıkan ve konağa olumlu etki sağlayabilen biyoaktif çözümler metabolik yan ürünlerdir. Son zamanlarda, postbiyotiklerin antikanser etkisi üzerine birçok in vitro ve in vivo araştırma yapılmış ve postbiyotiklerin çeşitli vücut organlarının kanserlerinin önlenmesinde ve tedavisinde önemli bir role sahip olduğunu gösterilmiştir. Bu çalışmada; kefir tanelerinden elde edilen postbiyotiklerin mide kanser hücre hattı üzerine olan etkisinin araştırılması amaçlanmıştır. Hazırlanan nutrient broth besiyeri içerisinde kefir taneleri 37°C de 48 saat süre ile inkübasyona bırakıldı. Filtre kağıdından geçirilerek elde edilen postbiyotik içeren süpernatant distile su ile seyreltilerek yedi farklı konsantrasyonu hazırlandı. Mide kanser hücre hattı (SNU-1) RPMI-1640 besiyeri ortamında 37°C de %5 CO₂ içeren inkübatörde büyütüldü. Daha sonra bu hücre hattına postbiyotiğin 7 farklı konsantrasyonu 24h, 48h ve 72h süre ile uygulandı ve postbiyotiğin antikanser aktivitesi 3-(4,5-dimethyl-2-thiazolyl)-2,5-diphenyl-tetrazolium bromide (MTT) metodu ile belirlendi. SNU-1 hücrelerine uygulanan postbiyotik içeriğinin IC₅₀ dozları 24, 48 ve 72 saatleri için 91.03, 21.69 ve 11.685 µg/ml olarak bulundu. En yüksek aktivitenin 72 saatte olduğu gözlemlendi. Sonuç olarak; Postbiyotiklerin mide kanserinde etkili olabileceği öngörülmektedir. Buna göre mide kanserinin ilerlemesini engelleyebilecek yeni bir strateji olarak postbiyotiklerin araştırılmasına ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Postbiyotik, kefir, kanser, mide kanseri, hücre canlılığı, antikanser aktivite

ABSTRACT

Kefir is a fermented dairy product rich in probiotics such as Lactobacillus, Streptococcus and Saccharomyces. The probiotic and postbiotic properties of kefir can reduce inflammation and protect the digestive system by regulating the intestinal flora. Postbiotics are bioactive soluble metabolic by-products produced by live probiotic microorganisms or released after cellular lysis and can have a positive effect on the host. Recently, many in vitro and in vivo studies have been conducted on the anticancer effects of postbiotics and it has been shown that postbiotics have an important role in the prevention and treatment of cancers of various body organs. In this study; it

was aimed to investigate the effect of postbiotics obtained from kefir grains on gastric cancer cell line (SNU-1). Kefir grains were incubated in the prepared nutrient broth medium at 37°C for 48 hours. The postbiotic containing supernatant obtained by passing through filter paper was diluted with distilled water and seven different concentrations were prepared. Gastric cancer cell line was grown in RPMI-1640 medium at 37°C in an incubator containing 5% CO₂. Then, 7 different concentrations of postbiotic were applied to this cell line for 24h, 48h and 72h and the anticancer activity of the postbiotic was determined by 3-(4,5-dimethyl-2-thiazolyl)-2,5-diphenyl-tetrazolium bromide (MTT) method. IC₅₀ doses of postbiotic content applied to SNU-1 cells were found to be 91.03, 21.69 and 11.685 µg/ml for 24h, 48h and 72h respectively. The highest activity was observed at 72 hours. In conclusion; it is predicted that postbiotics may be effective in gastric cancer. Accordingly, there is a need to investigate postbiotics as a new strategy that may prevent the progression of gastric cancer.

Keywords: Postbiotic, kefir, cancer, stomach cancer, cell viability, anticancer activity

SINCE THE BEGINNING OF HUMAN HISTORY, FOOD, NUTRITION, AND BEVERAGES ARE VITAL PARTNERS: FACTS AND INTERPRETATIONS

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Abstract

There is a clear correlation between the food, drinks, and nutrients we take in and the customs, culture, and views that we have acquired over the ages. People's eating and drinking habits differ depending on where they live, and the environment and biological wealth of the surrounding area have a big impact. Moreover, eating and drinking patterns are impacted by climate and weather patterns. The large nation of India has a wide range of climatic, cultural, racial, and religious conditions. Diversities provide discriminating foodies with pleasant gastronomic variants. The ethnic foods and drinks of India's many regions have been created over generations with consideration for the dietary requirements of the average person from birth to death. The nutritional needs of people in various age groups, including growing children, youth, the working class, expectant and nursing mothers, sick people, and the elderly, were taken into consideration by our forefathers when they devised various food and beverage varieties. Recent developments in genetics are helping to validate the Ayurvedic notion of Rasayana therapy. The comprehensive approach used by Ayurvedic acharyas in managing human health and nutrition has been supported by the fields of nutrigenomics, nutrigenetics, proteomics, metabolomics, and transcriptomics. An attempt has been made to assess our diverse and rich cuisine and drinks in this article.

Keywords: Rasayana therapy, Food, Ayurvedic acharyas, nutrigenomic metabolomics.

FOOD SECURITY IN GREECE . THE EXISTING SITUATION AND PROSPECTS

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Abstract

The issue of food security particularly relevant today in Greece . In 2020 the agro-food sector of Greece it contributed 4.7% of the total Gross Value Added of our country. It is a factor of social cohesion, as it employs over 400,000 people and represents approximately 10% of total employment in Greece. The food, beverage and tobacco industry is the largest employer in domestic manufacturing, employing 39% of the workforce. The Agri-Food sector also contributes significantly to Greek exports. After many years in which the trade balance of its products remained in deficit. In 2020 it showed a positive trade balance of €207 million, due to improved export performance, combined with a slight decrease in imports. In our country, the Agri-Food sector is called upon to strengthen its traditionally low productivity by increasing the size of agricultural holdings, supporting partnerships, investing in the adoption of technological innovations.

Key words: food security, food quality, imports,

**FOOD SELF-SUFFICIENCY IN THE FACE OF CLIMATE CHANGE:
EMPIRICAL EVIDENCE FROM NIGERIA**

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In an effort to reduce dependence on imports, the Nigerian government in the past two decades has intensified efforts to pursue self-sufficiency in staple food crops, thereby ensure their availability for its growing population. However, this presents a dilemma between climate change mitigation and increasing food production. This study aimed to highlight the need to mainstream climate change policies in food self-sufficiency policies in the country by examining the relationship between self-sufficiency levels of three staple crops and climate change variables in Nigeria. Using time series data spanning 32 years, three models representing corn, rice and wheat were estimated using Autoregressive Distributive Lag (ARDL) technique. The long run results showed positive relationships between the self-sufficiency levels of the staples and all three greenhouse gases included in the models. Moreover, these relationships were statistically significant. The results send an important message that mainstreaming climate change adaptation/mitigation strategies in food self-sufficiency policies is essential for ensuring long-term food production. This will require a multifaceted approach that balances the need for increased food production with the imperative to protect natural resources, and build resilience to climate change impacts. Collaborations among the various stakeholders in the country's agri-food system is essential to find sustainable solutions that ensure food availability for future generations.

Key words: Nigeria, self-sufficiency, climate change, greenhouse gases, Autoregressive Distributive Lag

FOOD SITUATION ANALYSIS IN THE MODERN WORLD

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The article examines the features of the food situation in the world. An attempt is made to analyze multidimensional nature of the problem, the solution of which goes beyond the scope of the rural area itself economy, since in most cases the problem is associated with natural disasters and catastrophes. Particular attention is paid to the formation of food security. The world population suffering from hunger and malnutrition continues to increase. The problem of providing the world's population with food is becoming global. It is concluded that that food security is not simply providing the country's population with food nutrition in the required quantity, and achieving this through our own production

FROM FARM TO TABLE: ARCHITECTURAL APPROACHES TO STREAMLINING SUSTAINABLE FOOD DISTRIBUTION

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Abstract

Within the construct of the "farm to table" movement, this article investigates the impact and design responsibility that architects have in enabling sustainable food distribution. With more people living in urban environments, and with environmental pressures building to induce a change in diet patterns along with an increased demand for locally grown food, embedding local food systems into the urban fabric seems inevitable as a way of reducing the distance our food has to travel from farm paddock to city streets while at the same time reducing emissions through transportation and enhancing security of supply. We review case studies of creative initiatives including rooftop farms, vertical farming and the adaptation of urban sites to limit food miles by harnessing the power design in linking production to consumption as well as feeding social spaces. The results indicate that architectural solutions can not only provide habitats for insects and pollinators but also be a platform to grow fruits, vegetables, herbs and grains next to living buildings in urban environments as part of the solution and adaptation of cities during climate changes. By illustrating the benefits, lessons and questions regarding food production in contemporary inner urban areas, this research strengthens not only sustainable urban development strategies but can also provide practical ideas for how future cities can integrate food production into structural systems that policymakers may utilize to establish resilient and adaptable local food networks.

Keywords: Sustainable food distribution; Farm to table; Urban agriculture; Architectural design; Rooftop farming.

FROM WASTE TO RESOURCE: ARCHITECTURAL INNOVATIONS FOR SUSTAINABLE FOOD WASTE MANAGEMENT IN URBAN AREAS

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Abstract:

The rise of urban populations, and the subsequent management of food waste induced such a large carbon footprint creation between both environmental and sociological fields that we require some unorthodox perspectives. In the challenge of designing for food waste, architecture can play a transformative role by incorporating long-term sustainable design and practice in order to maintain the needs of this ever-changing society. Using case studies R-Urban (Paris), CopenHill (Copenhagen) and the Biocycler Initiative (Los Angeles), this research demonstrates architectural projects that have incorporated food waste management into urban infrastructure. Two East Coast projects focusing on the repurposing of organic waste as compost for urban farming, renewable energy and sustainable biobased construction materials. The research highlights the ability of architectural and design strategies to enable community participation, reduce landfill reliance and initiate a move towards a circular economy. It identifies major scale, policy and community readiness challenges as well as the need for interdisciplinary efforts to advance sustainable urban food waste systems. The value of this research adds to the discussion surrounding urban sustainability and how architecture can be a critical part of flipping food waste from a problem into potential.

Keywords: Sustainable architecture; Food waste management; Urban sustainability; Circular economy; Composting systems.

ASSESSMENT OF MOROCCAN CONSUMERS' PREFERENCES AND INFLUENCING FACTORS FOR FISH PROCESSED PRODUCTS CONSUMPTION

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ABSTRACT

The consumption of fish and processed fish products has gained considerable attention worldwide due to its nutritional benefits and economic importance. This study focuses on understanding the preferences of Moroccan consumers and the various factors that influence their consumption of processed fish products. Using a comprehensive mixed-methods approach, we collected data through surveys and focus group discussions across different sociodemographic groups in Morocco.

Our research reveals a multifaceted landscape of consumer preferences, shaped by factors such as age, gender, educational background, and current professional occupation. Younger age groups exhibit a higher preference for tuna as the most commonly processed fish product.

This presentation will provide an in-depth analysis of Moroccan consumers' behavior towards fish processed products, offering valuable insights for policymakers, health professionals, and the seafood industry. By understanding these preferences and influencing factors, stakeholders can develop strategies to promote the consumption of fish processed products in a way that aligns with consumer needs and cultural practices.

Keywords: fish products, consumers, preferences, Morocco, survey.

GUT MICROBIOTA MEDIATES THE IMMUNOMODULATOR EFFECT OF DIETARY COCOA: IMPACT OF POLENODERM

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ABSTRACT

Background Cocoa and its products are rich sources of polyphenols such as flavanols. However, cocoa polyphenols are poorly absorbed in the intestine, and most of them cannot reach the systemic circulation in their natural forms. In fact, once reaching the intestine, cocoa polyphenols interact bidirectionally with the gut microbiota.

Objective Acne also has close connections with the gastrointestinal tract, and many argue that the gut microbiota could be involved in the pathogenic process of acne. The purpose of this study was to compare the diversity of the skin microbiota in acne patients before and after taking Polenoderm which contents cocoa. Based on this observation, the effect of cocoa on the gut microbiota will be discussed in acne.

Materials and methods However, current knowledge of the cacao root-associated microbiome is limited. This review aims to summarize the available knowledge of the bidirectional interaction between cocoa polyphenols and gut microbiota in acne. This study concentrates on the skin and gut microbes in acne, the role that the gut-brain-skin axis plays in the immunobiology of acne, and newly emerging microbiome-based therapies that can be applied to treat acne.

Results Cocoa can modulate the composition of the gut microbiota exerting prebiotic mechanisms. Bioactive cocoa metabolites can enhance gut health, displaying anti-inflammatory activities, positively affecting immunity. Our study provides insight into the skin microbiota in acne and how it is modulated by Polenoderm and diet.

Conclusion Acne also has close connections with the gastrointestinal tract, and many argue that the gut microbiota could be involved in the pathogenic process of acne.

Keywords acne, gut-brain-skin axis microbiota, cocoa, Polenoderm, diet

FINDIK PROTEİNLERİNİN MODİFİKASYONUNDA pH ve BASINÇ ETKİLERİNİN İNCELENMESİ

INVESTIGATION OF pH AND PRESSURE EFFECTS ON HAZELNUT PROTEIN MODIFICATION

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ÖZET

Gün geçtikçe artan dünya nüfusu, vegan ürün talepleri, sağlıklı beslenmeye eğilim, düşük maliyet gibi nedenler bitkisel protein kaynaklarının değerlendirilmesine yönelik çalışmaların son zamanlarda önem kazanmasına neden olmuştur. Bitkisel protein kaynakları emülsiyon ve köpük oluşturma, jelleşme gibi özelliklerinden dolayı gıda ingrediyesi olarak çeşitli gıdaların formülasyonlarında kullanılmaktadır. Ancak bitkisel proteinlerin sahip oldukları düşük çözünürlük, kıvam, tekstür ve aroma kusurları gıdalarda kullanımlarını sınırlandırmaktadır. Bu sorunların ortadan kalkması için fermantasyon, enzimatik ve fiziksel modifikasyon yöntemlerine ihtiyaç duyulmaktadır. Bu çalışmada soğuk pres ekstraksiyon (SPE) atığı küspeden proteinler çözündürme, çöktürme tekniği esas alınarak izolat haline getirilmiştir. Fındık izolatatının yüksek basınç işlemi ile modifikasyonunda proses parametrelerinden pH (6-12) ve basınç değeri (350-1400 bar) bağımsız seçilerek oluşturulan yanıt yüzey deneme deseni ile bu parametrelerin fonksiyonel özellik üzerine etkileri araştırılmıştır. Modifikasyon tekniğine ait işlem parametrelerinin proteinlerin fonksiyonel özellikleri üzerine etkileri ortaya konularak aynı zamanda optimum protein özellikleri (yüksek çözünürlük, emülsiyon aktivite ve stabilitesi, köpük oluşturma kapasitesi özellikleri) için işlem koşulları da tespit edilmiştir. Yapılan çalışma

sonucunda çözünürlüğün, kontrol fındık proteini izolatında %5,3 iken artan pH 9 ve 1405 bar basınç etkisiyle 65 seviyelerine çıktığı, emülsiyon oluşturma özelliklerinden emülsiyon aktivite indeksi, kontrol fındık proteini izolatında 7.88 m²/g iken yüksek pH (11,8) koşullarında 33.12 m²/g'a yükseldiği, köpük oluşturma kapasitesi, kontrol fındık proteini izolatında %1.49 iken pH 9 500 bar basınç koşullarında % 33 seviyesine çıktığı tespit edilmiştir. Fındık protein izolatlarının teknofonksiyonel özelliklerinin geliştirilmesinde basınç işleminin yanı sıra pH değerinin de etkili olduğu modifikasyon işleminde bu iki parametrenin birlikte dikkate alınması gerektiği tespit edilmiştir.

Anahtar Kelimeler: Fındık proteini, modifikasyon, teknofonksiyonel özellikler

ABSTRACT

The increasing world population, demand for vegan products, tendency towards healthy nutrition, and low cost have led to the recent importance of studies on using plant protein sources. Plant protein sources are used as food ingredients in the formulations of various foods due to their properties, such as emulsion and foam formation and gelation. However, plant proteins' low solubility, consistency, texture and flavor defects limit their use in foods. Fermentation, enzymatic and physical modification methods are needed to eliminate these problems. In this study, proteins from cold press extraction (CPE) waste meal were isolated by solubilization and precipitation techniques. In the modification of hazelnut isolate by high-pressure process, pH (6-12) and pressure value (350-1400 bar) were selected independently from the process parameters and the effects of these parameters on functional properties were investigated with the response surface experimental design. The effects of the process parameters of the modification technique on the functional properties of proteins were revealed and the process conditions for optimum protein properties (high solubility, emulsion activity and stability, foam forming capacity properties) were also determined. As a result of the study, it was determined that the solubility increased from 5.3% in the control hazelnut protein isolate to 65 levels with the effect of increasing pH 9 and 1405 bar pressure, emulsion activity index, one of the emulsion forming properties, increased from 7.88 m²/g in the control hazelnut protein isolate to 33.12 m²/g under high pH (11.8) conditions, foam forming capacity increased from 1.49% in the control hazelnut protein isolate to 33% under pH 9 and 500 bar pressure conditions. It was determined that the pH value and the pressure level are effective in improving the techno-functional properties of hazelnut protein isolates. These two parameters should be considered together in the modification process.

Keywords: Hazelnut protein, modification, technofunctional properties

ASSESSMENT AND MAPPING SOIL ORGANIC MATTER USING THE EM38 AND MSP3 SENSORS: A FOCUS ON THE MODELLING APPROACHES

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Abstract

Agriculture is crucial in ensuring global food security, especially in no-till systems. The pressure on agricultural lands due to a growing population and climate change necessitates innovative solutions.

Proximal soil sensing using electromagnetic induction (EMI) and electrical conductivity (ECa) sensors has gained prominence. These technologies provide rapid, non-destructive measurements of soil properties, offering advantages over remote sensing and laboratory analyses. In Morocco's arid and semi-arid conditions, the use of proximal soil sensing can be particularly beneficial.

Despite extensive research on the impact of no-tillage on soil organic matter (SOM), there's a notable gap in studies employing proximal soil sensing and pedotransfer models to predict SOM through EMI and EC data. This research addresses this gap by conducting a comprehensive study in Morocco, utilizing two proximal soil sensors, MSP3 and EM83, to assess soil organic matter in no-till systems.

The proposed research aims to develop context-specific pedotransfer functions and conduct large-scale mapping, contributing valuable insights to sustainable agricultural practices. Proximal soil sensing measurements, such as EC, can identify management zones for precise applications, informing seeding rates, nutrient applications, yield mapping, and soil greenhouse gas measurements. The outcomes hold promise for scientific advancements in SOM dynamics and the development of region-specific guidelines for sustainable agriculture, catering to Morocco's distinct climate conditions. Ultimately, this research contributes to the global effort to ensure food security and sustainable agricultural practices.

Keywords: Soil mapping, Arid land, No-till system, Soil Compaction, SOM, Digital Mapping, EMI, EC, MSP3, EM38, pedotransfer functions.

DOES THE GENDER HAVE AN IMPACT ON THE CONSUMPTION OF ORGANIC FOODS?

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Abstract

In this study, the main aim is to assess the effect of respondent gender on their health care awareness, by consuming organic foods. In this way, 333 participants were involved, most of them were Indians (n = 100), Albanians (n = 85), Algerians (n = 53), Georgians (n = 50), and Turkish (n = 45).

The data were collected through an online survey in two stages, during 2022, and between December 29 and August 22, 2024. The findings revealed that both men and women are aware regarding the consumption of organic foods. (Sig of Chi square test: $0.809 > 0.05$).

Keywords: Organic foods, Consumer behavior, Green marketing.

SİYAH NOHUT UNU İLE ÜRETİLEN GLUTENSİZ EKMEKLERİN TEKNOLOJİK ÖZELLİKLERİ ÜZERİNE FARKLI BİTKİ TOZLARI İLAVESİNİN ETKİSİ

EFFECT OF VARIOUS PLANT POWDERS ON THE TECHNOLOGICAL PROPERTIES OF GLUTEN-FREE BREADS PRODUCED USING BLACK CHICKPEA FLOUR

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ÖZET

Günümüzde gluten intoleransı problemi yaşayan insan sayısındaki artış, glutensiz ürünlere olan talebin artmasına neden olmuştur. Glutensiz ekmek üretiminde ekmeğin yeterince kabarmaması gibi teknolojik özelliklerinde istenmeyen durumlar ortaya çıkmaktadır. Bu problemin ortadan kalkması için glutensiz ekmek üretiminde glutenin yerini alabilecek özellikle doğal kaynakların araştırılması önemlidir.

Bu çalışmada farklı formülasyonlarda bitki tozu (çemen otu, bamya, ayva çekirdeği) ve siyah nohut unu kullanılarak glutensiz ekmekler üretilmiştir. Ekmek örneklerinin teknolojik özellikleri; yükseklik, spesifik hacim, nem (iç, kabuk, toplam) ve renk (L, a, b değerleri) değerleri ile belirlenmiştir. Bu analizler içerisinde yükseklik, spesifik hacim, nem (kabuk) ve b değerleri açısından glutensiz ekmek örnekleri arasında önemli farklılıklar tespit edilmiştir ($P < 0,05$). Örneklerin yükseklik değerleri; bitki tozu ilaveli glutensiz ekmek örneklerinde $2,87 \pm 0,13$ cm ile $3,11 \pm 0,21$ cm arasında olup, kontrol örneklerinde $2,34 \pm 0,14$ cm olarak tespit edilmiştir. Glutensiz ekmek örneklerinin spesifik hacim değerleri; bitki tozu ilaveli örneklerde $2,17 \pm 0,02$ cm³/g ile $4,23 \pm 0,18$ cm³/g arasında değişmekte iken kontrol örneklerinde $2,17 \pm 0,02$ cm³/g olarak belirlenmiştir. Kontrol örneklerinin kabuk nem değeri % $20,20 \pm 1,80$ iken, bitki tozu ilave edilen örneklerin kabuk nem değerleri % $17,11 \pm 0,41$ ile % $25,11 \pm 0,27$ aralığındadır. Örneklere ait kabuk b renk değerleri bitki tozu ilave edilen örneklerde $19,38 \pm 0,36$ ile $23,15 \pm 0,69$ aralığında değişmekte iken, kontrol örneğinin $22,97 \pm 0,58$ 'dir. Elde edilen sonuçlar, glutensiz ekmek üretiminde, ilave edilen bitki tozunun oranı ve çeşidine bağlı olarak ekmeklerin teknolojik özellikleri üzerine olumlu etkilere neden oldukları belirlenmiştir.

Anahtar Kelimeler: Gluten intoleransı, bamya, ayva çekirdeği, çemen otu

ABSTRACT

Currently, due to the rise in individuals afflicted with gluten intolerance, the demand for gluten-free products has increased. In the manufacture of gluten-free bread, an undesirable outcome is insufficient rise due to its technological qualities. To prevent this problem, research should be conducted on natural alternatives to gluten.

This study involved the production of gluten-free bread with various formulations of plant powders (fenugreek, okra, quince seed) and black chickpea, which were compared to breads

produced without plant powders. The technological qualities assessed included height, specific volume, moisture content (internal, crust, total), and color (L, a, b values). In this analysis of height, specific volume, moisture (crust), and color (b values), significant variations have been identified ($P < 0.05$). The height measurements of the gluten-free bread samples with plant powder addition ranged from 2.87 ± 0.13 cm to 3.11 ± 0.21 cm, while the control samples measured 2.34 ± 0.14 cm. The specific volume of the gluten-free bread samples with added plant powder ranged from 2.17 ± 0.02 cm³/g to 4.23 ± 0.18 cm³/g, whereas the control samples exhibited a specific volume of 2.17 ± 0.02 cm³/g. The crust moisture value of control samples was $20.20 \pm 1.80\%$, whereas the crust moisture values of samples with added plant powder ranged from $17.11 \pm 0.41\%$ to $25.11 \pm 0.27\%$. The crust b color values of the samples ranged from 19.38 ± 0.36 to 23.15 ± 0.69 in those with additional plant powder, whereas the control sample exhibited a value of 22.97 ± 0.58 . The results indicated that the rate and kind of plant powder incorporated in gluten-free bread production positively influenced the technological features of the bread.

Keywords: Gluten intolerance, okra, quince seeds, fenugreek

FTIR CHARACTERIZATION OF SUPERCRITICAL CO₂ EXTRACT FROM PEANUT SKIN

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ABSTRACT

Peanut pods contain kernels, typically two per pod. Each kernel is wrapped in a thin, papery, pink-red layer known as peanut skin (PS). The PSs are usually removed during the processing of peanuts into various products such as snacks, peanut butter, and confectioneries. On average, around 30 grams of PS is discarded for every kilogram of peanuts processed. With global peanut production surpassing one million tons annually, peanut skins are generated in large quantities. This abundant by-product holds potential for value-added utilization due to its rich content of bioactive compounds. Recently, researchers demonstrated that PS is a rich source of phenolic compounds, especially flavonoids (proanthocyanidins), stilbene derivatives (trans-resveratrol), and isoflavones (daidzein and genistein). Although many studies have focused on the conventional extraction of PS phenolics, there is limited research on utilizing eco-friendly methods, such as supercritical carbon dioxide (SC-CO₂) extraction. In this study, the SC-CO₂ extraction method was applied using Static method parameters and single-factor experiments (extraction time, sample amount and ethanol concentration). Subsequently, the best SC-CO₂ extraction parameters were chosen for their superior bioactive potential, and the resulting extracts were freeze-dried to obtain SC-CO₂ powder. This study also examined the influence of two solvents, water and ethanol (50%, v/v), on the total phenolic content (TPC), total flavonoid content (TFC), antioxidant activity and FTIR properties of the freeze-dried SC-CO₂ powder to provide a comprehensive characterization. Powders solved in water and 50% ethanol presented similar levels of TPC. However, the TFC was found to be higher in the ethanolic extract compared to the aqueous extract. FTIR spectroscopy was performed to investigate the functional group profile of lyophilized (LE), aqueous (AE) and ethanolic extracts (EE) and the results showed that a total of 10 wave range peaks were observed. The FTIR analysis of lyophilized extract (LE), aqueous extract (AE), and 50% ethanolic extract (EE) revealed significant functional groups and distinct peak patterns. Notable peaks were observed at 3288.05 cm⁻¹, 2127.71 cm⁻¹, and 1636.20 cm⁻¹ in the aqueous extract, indicating the presence of hydroxyl groups (-OH) and water molecules. The wide band centered around 3200 cm⁻¹ was attributed to hydroxyl groups, while peaks at 2979.01 cm⁻¹ and 2925.00 cm⁻¹ in LE and EE were linked to polysaccharides, lipids, and carbohydrates (C-H stretching). A common peak at 1606.75 cm⁻¹ in all extracts was associated with N-H and C=O bending vibrations, characteristic of flavonoid compounds. The presence of aromatic rings (700–1640 cm⁻¹), methoxy groups (950–1470 cm⁻¹), and carboxylic acids (1630–1755 cm⁻¹) confirmed the abundance of phenolic acids. The similarity between LE and EE spectra suggested that 50%

ethanol effectively dissolves both polar and non-polar compounds, while water primarily dissolves polar constituents, leading to spectral differences.

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Keywords: Peanut skin, Supercritical carbon dioxide extraction, total phenolic, total flavonoid, antioxidant activity, FTIR

DETERMINATION OF ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF WATER EXTRACTS OF TEUCRIUM POLIUM L. ON FOODBORNE PATHOGENS *BACILLUS CEREUS* AND *ESCHERICHIA COLI* O157:H7

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ABSTRACT

As stated by the World Health Organization (WHO), approximately 600 million cases of illness and 420,000 associated deaths worldwide are caused by contaminated food annually. The bacteria *Bacillus cereus* and *Escherichia coli* O157:H7 are frequently identified as the causative agents in foodborne outbreaks. Gram-positive *B. cereus* and Gram-negative *E. coli* may contaminate a wide variety of food products, including meat, dairy, fruits, vegetables, seafood, grains, and water. The transmission of antibacterial resistance can occur via the food chain, through both direct and indirect exposure. Recently, there has been a shift in focus towards the discovery of natural compounds as a means of addressing the problem of antibiotic resistance, which also spreads through the food chain. There is a growing interest in natural materials, particularly in the efficacy of plants that have been utilized in traditional medicine since antiquity and are still included in various herbal preparations. The objective of this study was to ascertain to determine the antibacterial, and antioxidant effects of water extracts derived from *Teucrium polium* L. against *B. cereus* and *E. coli* O157:H7, which were isolated from food samples. The antibacterial, and antioxidant (DPPH, total phenolic and flavonoid content) activities were measured spectrophotometrically using the serial dilution method in a 96-well microplate. The suppressive effect of *T. polium* L. decoction extract on the bacterial growth of *B. cereus* at the concentration of 12.5 mg/mL was found to be $32.77\% \pm 1.42$. In the same tested concentration, the antibacterial effect was recorded to be as $14.31\% \pm 0.38$ and $14.51\% \pm 0.44$ against *B. cereus* for the infusion and room temperature extracts, respectively. The antibacterial activity of tested extracts on *E. coli* O157:H7 was found to be similar to each other. The antibacterial activities of the decoction, infusion, and room temperature extracts were observed to be 47.81 ± 2.83 , 32.81 ± 4.31 , and $36.31 \pm 2.75\%$, respectively, at the 12.5 mg/ml concentration. The DPPH activities obtained were not significantly different between the tested extracts (~95%). However, total phenolic and flavonoid content was observed to be higher in decoction extracts than in the other extracts. It can be

concluded that the *T. polium* L. decoction extract demonstrated superior antibacterial activity against both bacteria compared to the infusion and room temperature extracts. Therefore, it is suggested that *T. polium* L. water extracts may be a natural source for the control of *B. cereus* and *E. coli* O157:H7 food pathogens in public health.

Keywords: Food pathogens, *B. cereus*, *E. coli* O157:H7, *Teucrium polium* L., antibacterial, antioxidant.

AFET VE ACİL DURUMLAR İÇİN BİSKÜVİ ÜRETİMİ

BISCUIT PRODUCTION FOR DISASTERS AND EMERGENCIES

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ÖZET

Acil durumlar ve afetler sonrasında bireyler, dış gıda yardımlarına bağımlı hale gelmektedirler. Bu tür durumlar nedeniyle etkilenen bireylerin beslenme ihtiyaçlarının değerlendirilmesi, güvenilir kaynaklardan enerji almalarının sağlanması ve beslenme ihtiyaçlarının karşılanma durumlarının izlenmesi, toparlanma süreçlerinin başarılı bir şekilde yürütülmesi açısından büyük önem arz etmektedir. Afet ve acil durum gerçekleşikten sonraki ilk 72 saat içerisinde sunulan beslenme hizmeti kısa dönem beslenme hizmeti olarak adlandırılmaktadır. Sıcak yemek hizmeti başlayana kadar beslenme ihtiyacını karşılamak amacıyla hazırlanmış içerisinde en az 1 adet tatlı ve tuzlu bisküvi, 1 adet meyve suyu (200 ml) ve 1 adet su (250 ml) bulunan paketlere acil beslenme kiti adı verilmektedir. Ancak bu paketlerle temel enerji ihtiyacını karşılasa da hassas gruplar veya özel beslenme ihtiyacı olan bireyler için yeterli olmamaktadır.

Afet ve acil durumlar için kolay üretilebilir, hızlı tüketime uygun, hassas grupların ihtiyaçlarına yönelik makro ve mikro besin öğeleri açısından zenginleştirilmiş bisküvi geliştirilmesinin, afet riski yüksek olan toplumlarda önemli olduğu düşünülmektedir. Bu bisküvinin herkes tarafından tüketilebilir özellikte olması, afetin yaşandığı kritik saatlerde beslenme ihtiyacını karşılamaya yardımcı olması büyük avantaj sağlayacaktır.

Bu çalışmada genel popülasyonun ve hassas gruplardan olan çocuk, yaşlı ve gluten intoleransı olan bireylerin ihtiyacına yönelik besleyiciliği yüksek, raf ömrü uzun, tüketime hazır ve yüksek enerjili afet ve acil durum bisküvileri geliştirilmiştir. Üretilen tüm bisküvi örneklerinin pişme özellikleri (kalınlık, çap, yayılma oranı ve tekstürel sertlik) ve renk değerleri belirlenmiştir.

Sonuç olarak, daha sağlıklı ve fonksiyonel özelliklere sahip yüksek enerjili bir acil durum bisküvisinin geliştirilmesi, halk sağlığı açısından önemli bir katkı sağlayacağı düşünülmektedir.

Anahtar Kelimeler: Acil Durum, Afet, Bisküvi, Hassas Grup

ABSTRACT

After emergencies and disasters, individuals become dependent on external food aid. Assessing the nutritional needs of individuals affected by such situations, ensuring that they receive energy from reliable sources, and monitoring whether their nutritional needs are met are of great importance for the successful execution of recovery processes. The nutrition service provided within the first 72 hours after the occurrence of a disaster or emergency is called short-term nutrition service. Until hot meal service begins, packages prepared to meet nutritional needs, containing at least one sweet and one salty biscuit, one fruit juice (200 ml), and one water (250 ml), are called emergency nutrition kits. However, while these packages meet basic energy needs, they are not sufficient for vulnerable groups or individuals with special dietary requirements.

It is considered important to develop biscuits that are easy to produce, suitable for quick consumption, and enriched with macro and micronutrients to meet the needs of vulnerable groups for disasters and emergencies, especially in communities with high disaster risk. The fact that these biscuits can be consumed by everyone and help meet nutritional needs during the critical hours following a disaster would provide a significant advantage.

In this study, disaster and emergency biscuits with high nutrition, long shelf life, ready-to-eat and high energy were developed for the needs of the general population and vulnerable groups such as children, elderly and gluten intolerant individuals. Baking properties (thickness, diameter, spreading rate and textural hardness) and color values of all biscuit samples produced were determined.

As a result, the development of a high-energy emergency biscuit with healthier and functional properties is thought to make an important contribution to public health.

Keywords: Emergency, Disaster, Biscuit, Vulnerable Group

FONKSİYONEL GRANOLA BAR ÜRETİMİ

FUNCTIONAL GRANOLA BAR PRODUCTION

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ÖZET

Türkiye'de de yüzyıllardır halk arasında hastalıkların tedavisinde kullanılan bitkilerden biri olan ve özellikle Kayseri çevresinde yetiştirilen *Viburnum opulus* (gilaburu) nun meyvelerinin antidiyabetik ve antioksidan etki dahil olmak üzere pek çok biyolojik aktiviteye sahip olduğu literatürde belirtilmiştir. Diyabet hastalığı, Dünya nüfusu genelinde gittikçe artan görülme sıklığı ile küresel sağlık sorunlarından biri olup, bu hasta grubuna ilaç tedavisine başlanmadan önce egzersiz, kilo kontrolü ve kontrollü şeker tüketimi önerilmektedir.

Bu çalışmada, gilaburu meyvesi çeşitli işlemlerden geçirilerek gilaburu meyvesi tozu elde edilmiştir. Elde edilen gilaburu meyvesi tozu kullanılarak 5 farklı granola bar reçetesi oluşturulmuştur. Rafine şeker, granola barın ana bileşenlerinden biri olup, yapışkanlık ve tatlılık vermektedir. Ancak diyabet hastalarının şeker içeren ürünlerin tüketimini azaltması ya da tamamen kesmesi gerektiği için, rafine şeker yerine çeşitli doğal şeker alternatifleri tercih edilmiştir. Granola bar reçetesinde bulunan rafine şeker yerine değişen oranlarda stevia yaprağı tozu ve monk meyvesi tozu kullanılarak daha sağlıklı fonksiyonel bir granola bar üretimi gerçekleştirilmiştir. Stevia yapraklarının birçok ülkede gıda, içecek ve ilaçlarda şeker yerine kullanıldığı, sakarozdaki kan şekerini etkilemediği, 10-15 kat daha tatlı olduğu ve antioksidan özellik gösterdiği bilinmektedir. Son yıllarda gıda endüstrisinde kullanılan bir diğer şeker ikamesi ise monk meyvesi tozudur. Monk meyvesinin tatlılığı vücuttaki kan şekeri seviyelerini düşüren mogrositler adı verilen doğal bileşiklerden gelmektedir ve bu nedenle de diyabet hastaları için güvenli olduğu ifade edilmiştir.

Geliştirilen fonksiyonel granola bar örneklerinde 9'lu hedonik skala ile duyu analizi yapılmış ve tüm örneklerin genel kabul edilebilir düzeyi 6 puan ve üzerinde puan almıştır. Sonuç olarak, gilaburu meyvesi tozu ilaveli rafine şeker ikamesi (stevia yaprağı tozu ve monk meyvesi tozu) ile üretilen granola barların fonksiyonel gıda pazarına katkı sağlayacağı düşünülmektedir.

Anahtar Kelimeler: Diyabet, Granola Bar, Gilaburu, Stevia Yaprığı, Monk Meyvesi Tozu

Bu çalışma, TÜBİTAK 2209-A Üniversite Öğrencileri Araştırma Projeleri Destekleme Programından destek alınarak gerçekleştirilmiştir.

ABSTRACT

It has been documented in the literature that the fruits of the *Viburnum opulus* (gilaburu) plant, which has been utilized for centuries in traditional medicine practices among the people of Turkey and is particularly prevalent in the region around Kayseri, exhibit a multitude of biological

activities, including antidiabetic and antioxidant effects. Diabetes mellitus is one of the global health problems with an increasing incidence in the world population, and exercise, weight control and controlled sugar intake are recommended for this patient group before starting drug treatment. In this study, gilaburu fruit was subjected to a series of processes with the objective of obtaining a powdered form of the fruit. Five distinct granola bar formulations were developed utilizing the aforementioned gilaburu fruit powder.

Refined sugar is a main component of granola bars, imparting a viscoelastic texture and sweet flavor. However, given that individuals with diabetes are advised to limit or eliminate sugar-containing products from their diet, a range of natural sweeteners were selected in place of refined sugar. A healthier functional granola bar was produced by substituting stevia leaf powder and monk fruit powder in varying proportions for refined sugar in the granola bar recipe. It is known that stevia leaves are employed as a sugar substitute in food, beverages, and pharmaceuticals in numerous countries. They do not affect blood sugar in sucrose, are 10-15 times sweeter, and demonstrate antioxidant properties. Another sugar substitute utilized in the food industry in recent years is monk fruit powder. The sweetness of monk fruit is derived from natural compounds called mogrosides that reduce blood sugar levels in the body and are, therefore, suitable for diabetics.

The developed functional granola bar samples were subjected to sensory analysis using a 9-point hedonic scale, with the overall acceptable level of all samples scoring 6 points and above. Consequently, it is postulated that granola bars produced with refined sugar substitutes (stevia leaf powder and monk fruit powder) with the addition of gilaburu fruit powder will contribute to the functional food market.

Keywords: Diabetes, Granola Bar, Gilaburu, Stevia Leaf, Monk Fruit Powder

This study was carried out with the support of TUBITAK 2209-A Research Project Support Programme for Undergraduate Students.

MAVI-YEŞİL SÜPER GIDA: LABORATUVARDA YETİŞTİRİLEN VE TICARI SPIRULINA PLATENSIS 'IN BIYOKİMYASAL İÇERİKLERİ VE BİYOAKTİF ÖZELLİKLERİ

BLUE-GREEN SUPERFOOD: BIOCHEMICAL COMPOSITION AND BIOACTIVE PROPERTIES OF LABORATORY-GROWN AND COMMERCIAL SPIRULINA PLATENSIS

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ÖZET

Yetersiz beslenmeye bağlı ortaya çıkan hastalık riskleri ve nüfus artışı ile besin ihtiyacı gün geçtikçe artmaktadır. Bu olumsuz durumlar araştırmacıları mevcut kaynakları geliştirmeye ve yeni alternatif besin kaynaklarını araştırmaya yönlendirmiştir. Bu kapsamda, bitkiler, algler ya da mikroalgler gibi doğal kaynaklardan ekstrakte edilen doğal bileşenleri içeren fonksiyonel ve alternatif gıdalara yönelik ihtiyaçlar ve bu alanda yapılan bilimsel çalışmalar önem kazanmaktadır. Bu çalışma kapsamında, kontrollü laboratuvar koşullarında yetiştirilen (LAB-SP) ve ticari olarak satın alınan (T-SP) mavi-yeşil alg *Spirulina platensis*'in protein, klorofil-a, fikosiyanın, aminoasit, şeker profili ve antioksidan aktivitesi karşılaştırılmıştır. Toplam protein (%68.75), klorofil-a (143.15 µg/100g) ve fikosiyanın (495.35 mg/100g) miktarı LAB-SP kodlu örnekte daha yüksek düzeylerde belirlenmiştir. HPLC-PDA ile belirlenen esansiyel amino asitlerden histidin, izolösin, metiyonin, treonin, valin ve triptofan miktarı LAB-SP örneklerinde yüksek iken, fenilalanin ve lösin miktarı ise T-SP kodlu örnekte daha yüksek olarak belirlenmiştir. Toplam aminoasit miktarının ise LAB-SP kodlu örnekte T-SP kodlu örneğe göre daha yüksek olduğu ve miktarının ise 216.88 mg/kg olduğu saptanmıştır. HPLC-RID ile belirlenen şeker profilinde ise LAB-SP için baskın şekerin glikoz olduğu (211.55 mg/100 g KA), T-SP için ise sakkaroz olduğu (143.34) tespit edilmiştir. LAB-SP kodlu örneğin DPPH ve ABTS yöntemiyle saptanan antioksidan kapasitesiteleri sırasıyla 1800.47 ve 6796.43 µmol Trolox/100g, toplam fenolik madde miktarı ise 3345.90 mg GAE/100g olarak belirlenmiştir.

Anahtar Kelimeler: *Spirulina platensis*, biyoaktif bileşikler, şeker profili, pigment özellikleri

ABSTRACT

The risks of diseases due to malnutrition and the increase in the need for nutrients with population growth have led to the development of existing resources and the search for new alternative food sources. Therefore, the need for functional and alternative foods containing natural components extracted from natural sources such as plants, algae, or microalgae and scientific studies in this field are gaining importance daily. In this study, protein, chlorophyll-a, phycocyanin, amino acid,

sugar profile, and antioxidant activity of blue-green algae *Spirulina platensis* produced under controlled laboratory conditions (LAB-SP) and commercially purchased (T-SP) were compared. The highest amount of total protein (68.75%), chlorophyll-a (143.15 $\mu\text{g}/100\text{g}$), and phycocyanin (495.35 $\text{mg}/100\text{g}$) was determined in the LAB-SP coded sample. Among the essential amino acids specified by HPLC-PDA, histidine, isoleucine, methionine, threonine, valine, and tryptophan were higher in LAB-SP samples, while phenylalanine and leucine were highest in T-SP coded sample. The total amino acid content was higher in the LAB-SP sample than in the T-SP sample and was 216.88 mg/kg . In the sugar profile determined by HPLC-RID, glucose was the predominant sugar for LAB-SP (211.55 $\text{mg}/100\text{ g KA}$), while sucrose was the predominant sugar for T-SP (143.34). The antioxidant capacities of the LAB-SP sample determined by DPPH and ABTS methods were 1800.47 and 6796.43 $\mu\text{mol Trolox}/100\text{ g}$, respectively, and the total phenolic content was 3345.90 $\text{mg GAE}/100\text{ g}$.

Keywords: *Spirulina platensis*, bioactive compounds, sugar profile, pigment properties

REAL-TIME DETECTION OF GLUTEN CONTAMINATION IN FOOD POWDERS USING NEAR-INFRARED SPECTROSCOPY AND MACHINE LEARNING

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Abstract

There has been growing global concern about contamination in food powders, even in those marketed as allergen-free. This research focused on exploring the potential of Near-Infrared (NIR) spectroscopy paired with machine learning to detect allergen contamination in gluten-free flours under different motion conditions. Two NIR sensors with varying wavelength ranges were evaluated, and machine-learning models were used to distinguish between gluten-free and contaminated flours.

Eleven spectral pre-processing methods, three feature selection approaches, and five machine learning algorithms were tested to identify the most effective pipeline. It was determined that using autoencoders for spectral pre-processing, combined with Support Vector Machines (SVMs) and the full spectra from both sensors, provided the highest accuracy. Further enhancements were made using under-sampling and boosting techniques.

The method achieved classification accuracies of 99.22%, 97.06%, 94.01%, and 91.12% for static samples and samples moving at speeds of 0.017, 0.036, and 0.068 m/s, respectively. The models were also validated on an independent test set.

Keywords: Gluten-free flour: Allergen: Digital manufacturing: In-line sensors

HPLC'DE B12 VİTAMİN ANALİZİNDE PERFORMANS ETKİLEYEN PARAMETRELER
PARAMETERS AFFECTING THE PERFORMANCE OF VITAMIN B12 ANALYSIS BY HPLC

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ÖZET

B12 vitamini, vücutta protein, yağ ve karbonhidrat metabolizması, sinir sistemi, kırmızı kan hücrelerinin oluşumu gibi önemli olaylarda rol alan esansiyel bir bileşendir. İnsan vücudunda sentezlenemeyen B12 vitamininin dışarıdan alınması gerekmektedir.

B12 vitamini seviyelerinin doğru ve güvenilir şekilde ölçülmesi, özellikle klinik ve gıda alanlarındaki uygulamalar açısından büyük önem taşımaktadır. Yüksek performanslı sıvı kromatografisi (HPLC), B12 vitamini analizinde yaygın olarak kullanılan bir yöntemdir. Ancak, bu yöntemin performansı, çeşitli parametrelerin optimize edilmesine bağlıdır. HPLC analizinde kritik parametreler arasında mobil fazın bileşimi, kolon tipi, akış hızı ve dedektör tipi yer almaktadır. Mobil fazın pH'ı ve organik çözücü oranları, vitaminin retansiyon süresi ve pik kalitesi üzerinde doğrudan etkiye sahiptir. Genellikle asidik mobil fazlar, B12 vitamini için daha iyi çözünürlük ve pik simetrisi sağlar; ancak, aşırı düşük pH değerleri, kolon ömrünü kısaltarak analiz süresini uzatabilir. Ters faz kolonlar, B12 vitamini analizinde sıklıkla tercih edilirken, kolonun partikül boyutu ve uzunluğu, analiz süresi ve pik çözünürlüğü açısından kritik önem taşır. Daha küçük partikül boyutuna sahip kolonlar yüksek çözünürlük sağlarken, kısa kolonlar analiz süresini kısaltmaktadır. Akış hızı da HPLC analizinde verimlilik ve tekrarlanabilirlik açısından önemli bir parametredir. Düşük akış hızları pik genişlemesine ve analiz süresinin uzamasına neden olabilirken, yüksek akış hızları piklerin yeterince ayrışmamasına yol açabilir. Bu çalışmada, HPLC yöntemiyle B12 vitamini analizinde performansı etkileyen parametrelerin optimizasyonu hedeflenmiştir. Çalışmada mobil faz olarak farklı konsantrasyonlarda asetonitril-su ve metanol-su karışımları test edilmiş; en iyi sonuçlar, metanol-su mobil fazıyla elde edilmiştir. DAD dedektör

kullanılarak, C18 kolon (Phenomenex Luna C18 125 x 4,0 mm) ile yapılan çalışmada; kolon sıcaklığı 25°C, akış hızı 0,3 mL/dk ve analiz dalga boyu 361 nm olarak belirlenmiştir.

Anahtar Kelimeler: B12 vitamini, HPLC (Yüksek Performanslı Sıvı Kromatografisi), Analiz Parametreleri.

Teşekkür: Bu çalışma TÜBİTAK tarafından desteklenmiştir (TÜBİTAK 223O275).

ABSTRACT

Vitamin B12 is an essential component involved in important processes such as protein, fat, and carbohydrate metabolism, the nervous system, and the formation of red blood cells. Since vitamin B12 cannot be synthesized by the human body, it must be obtained externally.

Accurate and reliable measurement of vitamin B12 levels is of great importance, especially for clinical and food applications. High-performance liquid chromatography (HPLC) is a widely used method for vitamin B12 analysis. However, the performance of this method depends on the optimization of various parameters. Critical parameters in HPLC analysis include the composition of the mobile phase, column type, flow rate, and detector type. The pH of the mobile phase and the ratio of organic solvents directly affect the retention time and peak quality of the vitamin. Generally, acidic mobile phases provide better resolution and peak symmetry for vitamin B12; however, excessively low pH values can shorten column life and prolong analysis time. Reverse-phase columns are often preferred for vitamin B12 analysis, and the particle size and length of the column are critical in terms of analysis time and peak resolution. Columns with smaller particle sizes provide higher resolution, while shorter columns reduce analysis time. Flow rate is also an important parameter in HPLC analysis for efficiency and reproducibility. Low flow rates can lead to peak broadening and prolonged analysis time, while high flow rates may result in insufficient peak separation. In this study, the optimization of parameters affecting the performance of vitamin B12 analysis by the HPLC method was aimed. Different concentrations of acetonitrile-water and methanol-water mixtures were tested as the mobile phase, and the best results were obtained with a methanol-water mobile phase. Using a DAD detector and a C18 column (Phenomenex Luna C18 125 x 4.0 mm), the column temperature was set at 25°C, the flow rate at 0.3 mL/min, and the analysis wavelength at 361 nm.

Keywords: Vitamin B12, HPLC (High-Performance Liquid Chromatography), Analysis Parameters.

Acknowledgement: This study was supported by TUBITAK (TÜBİTAK 223O275).

EXTRACTION AND TECHNOLOGICAL APPLICATIONS OF ROSEMARY ESSENTIAL OIL

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ABSTRACT

Rosemary essential oil is extracted from various parts of plants. Rosemary essential oil is usually extracted by different processes which include water distillation, steam distillation and controlled instantaneous decompression. Rosemary essential oil is extracted by using volatile organic solvents such as hexane, ethanol and dichloromethane etc. Rosemary essential oil has multiple applications for different pharmaceutical industries. This essential oil has a high commercial value because of its therapeutic properties. Overall, it has wider technological applications in different processing industries and other allied commercial era.

Keywords

Rosemary Essential Oil, Supplementation, Extraction Procedures, Commercial Applications

INFLUENCE OF EXTENSION AND FORMAL EDUCATION ON INCOME OF RICE PROCESSORS IN BOSSO AND CHANCHAGA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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ABSTRACT

This study examined the influence of extension and formal education on income of rice processors in Bosso and Chanchaga Local Government Area of Niger State. The study covered eight (8) extension cells in the study area, Four (4) from each of them. Data were collected by means of a structured questionnaire from a total of one hundred and forty-four (144) processors. The data collected were analysed using descriptive analysis (frequencies and Percentages and mean) and inferential (ordinary least square (OLS)). Results revealed that half of (50.7%) rice processors had mean age of 42 years, mostly female (77.8%), married (81.3%) with secondary education (55%) and mean household size of 5persons. More so the result revealed that radio (50.7%), extension agent (34.0%) and mobile phone (20.1%) were the major sources of information on rice processing activities in the study area. Results of OLS revealed an R-squared of 81% and Prob > F was significant at 0.01 implying the entire model is fit the study. The coefficient of Age (1114.508), processing experience (1147.203) agrochemical usage (24907.68), access to credit and extension contacts (8801.962) were positive and statistically significant at 1% probability level indicating that increase in any of this variable by one unit will increase the income of the rice processors. Based on findings of this study, it was recommended that financial institutions and government agencies should provide credit facilities with favourable terms for small-scale processors as the study found the access to credit in the study area was very low.

Keywords: Influence, extension education, Formal education, Rice Processors and Income

ISOLATION AND PREVALENCE OF VIBRIO PARAHAEMOLYTICUS FROM READY-TO-EAT FRUIT COCKTAILS SOLD IN PUBLIC MARKETS WITHIN OGHARA NEXUS

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Abstract

The desire to improve livelihood and provide ready to eat food of various types including fruits has been a notable activity of various local populace, however such desire has been implicated with diverse infections distribution and emerging enteric diseases. One of such implicated food-borne infectious organism which is seldom reported in the tropics is *Vibrio parahaemolyticus*. This study determines the occurrence of *V. parahaemolyticus* in ready-to-eat fruit cocktail which are sold in local and public commercial places in Oghara nexus. Briefly, freshly prepared cocktails of farm products were sampled and collected from four local communities and sixteen public commercial shops in Oghara community Delta State for the isolation and molecular characterization of *V. parahaemolyticus* with fruit cocktails consisting; spinach, carrot, gabbage, watermelon, and cucumber. These vegetable mixes are commonly prepared, sold and used in Oghara community as well as its environs as small scale business enterprise/resource. Briefly, fruit cocktails and/or samples were collected, microbiologically analyzed using in vitro biochemical and virulent phenotypic determination while isolates were further characterized using molecular biology techniques. A total of Sixty-five presumptive isolates were obtained from samples, while thirteen (20%) isolates were confirmed using polymerase chain reaction. Other phenotypic virulent and antibiotic susceptibility testing revealed that isolates harbours diverse virulent phenotype and multiple antibiotic resistant determinants ranging from beta-lactam into cephalosporines with high resistance observed amongst ampicillin (69.2%). Observing such potential pathogens and their subsequent antibiotic resistance prevalence to various group of antibiotics amongst isolates from such ready-to-eat fruit cocktails pose health risk to consumers of such ready-to-eat food products. The need for prompt implementation of hygienic practices policy for preparation of such food products types and preparation remains a way forward for appropriate control.

Keywords: *Vibrio parahaemolyticus*; ready-to-eat fruits; fruit cocktails; vegetables mix; farm products

**EFFECT OF DEFENSE ENZYMES ON THE GROWTH OF *Bipolaris oryzae* ON RICE
(*Oryza sativa* L.)**

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Abstract

The impact of defense enzymes on the growth of *Bipolaris oryzae*, the causal agent of brown spot, was investigated in rice (*Oryza sativa*). Rice plants possess a variety of defense mechanisms, including the activation of key defense-related enzymes such as peroxidase (POD), polyphenol oxidase (PPO), and phenylalanine ammonia-lyase (PAL), which play pivotal roles in mitigating fungal invasion. In this study, the relationship between the activity of these enzymes and the suppression of *B. oryzae* was evaluated. Results showed that rice plants with higher activities of POD, PPO, and PAL exhibited a significant reduction in *B. oryzae* growth, suggesting that these enzymes contribute to a stronger defense response. The temporal expression of these enzymes was critical, as early induction following pathogen infection correlated with enhanced resistance. This study highlights the importance of defense enzymes in maize's innate immune response and suggests potential targets for breeding or biotechnological approaches aimed at improving resistance to *Bipolaris oryzae*.

Key Words: Rice, Brown spot, *Bipolaris oryzae*, POD, PPO, PAL.

**EFFECT OF DEFENSE ENZYMES ON THE GROWTH OF *Bipolaris maydis* ON MAIZE
(*Zea mays* L.)**

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Abstract

The impact of defense enzymes on the growth of *Bipolaris maydis*, the causal agent of southern corn leaf blight, was investigated in maize (*Zea mays*). Maize plants possess a variety of defense mechanisms, including the activation of key defense-related enzymes such as peroxidase (POD), polyphenol oxidase (PPO), and phenylalanine ammonia-lyase (PAL), which play pivotal roles in mitigating fungal invasion. In this study, the relationship between the activity of these enzymes and the suppression of *B. maydis* was evaluated. Results showed that maize plants with higher activities of POD, PPO, and PAL exhibited a significant reduction in *B. maydis* growth, suggesting that these enzymes contribute to a stronger defense response. The temporal expression of these enzymes was critical, as early induction following pathogen infection correlated with enhanced resistance. This study highlights the importance of defense enzymes in maize's innate immune response and suggests potential targets for breeding or biotechnological approaches aimed at improving resistance to *Bipolaris maydis*.

Key Words: Maize, Maydis Leaf Blight, *Bipolaris maydis*, POD, PPO, PAL.

DUAL ROLE OF LACTIC ACID BACTERIA CULTURES FOR FERMENTATION AND CONTROL OF PATHOGENIC BACTERIA IN FRUIT ENRICHED FERMENTED MILK

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Abstract

One of the concerns in the food industry is the contamination and spoilage of food by pathogens, which are a frequent cause of foodborne diseases. The use of antibiotics in the control of such infections is faced with the challenge of resistance of pathogens to antibiotics. The use of antimicrobial metabolites extracted from lactic acid bacteria to extend the shelf life of milk and milk products through antagonizing and killing food spoilage and pathogenic bacteria has given an interesting result worldwide. The aim of this research work is to investigate the dual role of lactic acid bacteria cultures for fermentation and control of pathogenic bacteria in fruit-enriched fermented milk. Cheese whey samples were collected from Ipata market, Ilorin, Kwara State and lactic acid bacteria were isolated from it using standard microbiological methods. Organisms isolated from Cheese whey sample were characterized and identified using biochemical tests. The lactic acid bacteria isolated were used to ferment powdered milk as single starter culture and combined starter culture and the products were subjected to physicochemical (moisture content, ash content, TTA) and organoleptic analysis. Crude bacteriocin was extracted from the isolates and was screened for antibacterial potency against *Escherichia coli*, *Staphylococcus aureus*, *Salmonella enterica*, *Bacillus subtilis* and *Pseudomonas aeruginosa* using agar well diffusion method. The isolates were identified as Isolate A (*Lactobacillus* sp. 1) and isolate B (*Lactobacillus* sp. 2). The physicochemical properties of the fermented milk shows moisture content values of 72.28 to 72.42%, Ash content of 0.99 to 1.99%, CHO of 22.26 to 22.56%, lipid content of 0.09 to 0.12%, Crude protein of 3.92 to 4.21%, Calorific value of 445.86 to 447.13kj/100g, while the Titratable acidity (TTA) of the fermented milk was 7214.40 to 7232.40mg/ml. The organoleptic score of the fermented milk products ranged from 66 to 85%. The highest score was in sample B while the least score was in sample A. The crude bacteriocin from isolate A produced inhibitory zone diameters of 15.33, 14.66, and 13.33mm against *Escherichia coli*, *Staphylococcus aureus* and *Bacillus subtilis* respectively with *Escherichia coli* having highest zone of inhibition while Bacteriocin from isolate B produced inhibitory zone diameters of 15.66 and 14.66mm against *Escherichia coli* and *Staphylococcus aureus* respectively. This research has demonstrated that bacteriocin-producing LAB with good primary fermentative, and bacteriocinogenic properties can be isolated from cheese whey samples.

STEAM ASSISTED COOKING IN THE OVEN AND EFFECTS OF STEAM ON FOOD QUALITY

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With the developing technology and the emergence of different types of nutrition, new techniques are being developed in food processing. Steam assisted cooking in the oven is one of these cooking techniques. This method is a cooking method in which steam is used in addition to heaters during cooking. The main purpose of steam cooking is to improve the color, texture and flavor of the cooked foods. It is used especially in bakery products to improve the surface shine, crust color, internal texture and volume of the product.

The aim of this project is to observe the effect of the amount of steam generated in the oven on food quality. The constant values used during the study are cooking temperature, cooking shelf level and the amount of water used. The variables of the study are the cooking algorithm and the water accessory used. In this regard, doughs prepared with the same recipe were fermented in the same way and baked at 200°C. In each test, 100 ml of water was used in a specific accessory. Changes in the amount of steam produced in the oven were examined and the most optimum parameters were determined by making changes in the operating algorithm of the oven and water accessories.

L*, a* and b* values of all baked bread colors were measured, and L (lightness) and browning data were examined. According to the data obtained, as the amount of steam increased, more obvious color changes, darker and brighter results were observed. At the same time, the rising rates were determined by measuring the height of the bread before and after baking, and it was stated that the breads cooked with more effective steam had higher volumes. With the increase in steam, a crispy and crunchy structure was formed on the outer surface of the bread and the bread texture that is more desired by consumers was achieved. These data were obtained as a result of sensory analysis evaluations using the 'single sample evaluation' technique with a selected group of people.

Keywords: oven, steam assisted cooking, bread, food quality, sensory analysis

**BAMBU-MELAMİN MADDE VE MALZEME DE MİGRASYON RİSKLERİNİN
ARAŞTIRILMASI****THE INVESTIGATION OF MIGRATION RISKS IN BAMBOO-MELAMINE
MATERIALS AND ARTICLES**

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ÖZET

Son yıllarda piyasaya sunulan "biyolojik" ve "bitki bazlı" gıda ile temas eden malzemeler, potansiyel güvenlik sorunlarını gündeme getirmiştir. Özellikle, bambu içeren bu malzemelerden kaynaklanabilecek kimyasal kirleticilere odaklanılmaktadır. Bu kirleticilerin büyük çoğunluğu, melamin-formaldehit reçinesi (MFR), boyalar, kaplamalar, koruyucular ve ağartma maddeleri gibi bileşenlerden kaynaklanmakta olup, melamin ve formaldehitin gıdaya geçişi gibi sağlık riskleri doğurabilmektedir. Bambu lifi içeren sofrta takımları bu bağlamda her zaman güvenli kabul edilmemektedir. Avrupa Birliği mevzuatları uyarınca, plastik-bambu kullanımına yetki verilmemiştir ve bazı AB ülkeleri bu ürünleri aktif olarak yasaklamıştır. Ayrıca, boyalar ve kaplamalardan kaynaklanan ağır metal geçişi ile gıda ile temasta kullanılması da önemli bir risk teşkil etmektedir. Bambu bazlı malzemelerde kasıtsız eklenen maddelerin (NIAS) tespitinin daha zorlu olduğu göz önünde bulundurulduğunda, bitki bazlı malzemelerde hedef dışı taramalar için veri tabanlarının geliştirilmesine ihtiyaç duyulmaktadır.

Bambu/melamin ürünlerinin gıda ile temasında meydana gelen migrasyon, insan sağlığı açısından ciddi riskler taşımaktadır. Özellikle bebekler ve küçük çocuklar, vücut ağırlıkları nedeniyle bu maddelere daha fazla maruz kalmakta ve mevcut spesifik migrasyon limitlerinin bu yaş grubu için yetersiz olduğu tespit edilmiştir. Bambu/melamin madde ve malzeme, çevre dostu bir imaj sunmaları dolayısıyla popülerlik kazanmış olsa da, bunlardan formaldehit ve melamin geçişi önemli sağlık riskleri taşımaktadır. Sonuç olarak, bu tür sofrta takımları "yeşil" bir imaj sunarken, kullanılan malzemelerin gıda güvenliği açısından risk taşıdığı vurgulanmaktadır.

Anahtar Kelimeler: Bamboo, melamine, migrasyon, formaldehit.

ABSTRACT

In recent years, the introduction of "bio-based" and "plant-based" food contact materials has raised potential safety concerns. Specifically, there is increasing focus on chemical contaminants that may arise from materials containing bamboo. The majority of these contaminants originate from components such as melamine-formaldehyde resin (MFR), paints, coatings, preservatives, and bleaching agents, which can pose health risks due to the migration of melamine and formaldehyde into food. Tableware made from bamboo fibers is not always considered safe in this context. According to European Union regulations, the use of bamboo in plastic materials has not been authorized, and several EU countries have actively banned these products. Additionally, the migration of heavy metals from paints and coatings used in contact with food poses significant risks. Given the challenges in detecting non-intentionally added substances (NIAS) in bamboo-

based materials, there is a need for improved databases for non-target screenings of plant-based materials.

The migration of bamboo-melamine products in food contact raises serious health risks for consumers, particularly for infants and young children, who are more susceptible to exposure due to their lower body weight. It has been found that the existing specific migration limits are insufficient for this age group. While bamboo/melamine materials have gained popularity due to their environmentally friendly image, the migration of formaldehyde and melamine from these products poses significant health risks. Therefore, it is emphasized that although such tableware presents a "green" image, the materials used can compromise food safety.

Keywords: Bamboo, melamine, migration, formaldehyde.

**PROTECTIVE EFFECT OF GSPE ON AFB1-INDUCED
OXIDATIVE STRESS, AND APOPTOSIS
THROUGH MITOCHONDRIAL PATHWAY IN THE IMMUNE ORGAN OF
BROILERS**

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ABSTRACT

The aim of this study was to investigate the ameliorative effects of GSPE against AFB1-induced histopathology, oxidative stress, and apoptosis via the mitochondrial pathway in the bursa of Fabricius (BF) of broilers. One hundred forty-four one-day-old Cobb chicks were randomly assigned into four treatment groups of six replicates (6 birds each replicate) for 28 days. Groups were fed on the following four diets: 1) basal diet without addition of GSPE or AFB1 (Control); 2) basal diet supplemented with 1 mg/kg AFB1 from contaminated corn (AFB1); 3) basal diet supplemented with 250 mg/kg GSPE (GSPE); 4) basal diet supplemented with 1 mg/kg AFB1 + 250 mg/kg GSPE (AFB1+GSPE). The present study showed that dietary GSPE treatment ameliorated AFB1-induced oxidative stress in the BF tissue by inhibiting the accumulation of LPO content and enhancing the antioxidant enzyme activities (T-SOD, CAT, GSH-Px, and GST). Similarly, GSPE markedly enhanced mRNA expression of antioxidant genes in comparison with the AFB1-fed group. In addition, histological results showed that GSPE alleviated AFB1-induced apoptotic cells in the BF of broilers. Additionally, the relative mRNA expression results manifested that mitochondrial-apoptosis-associated genes Bcl-2-associated X protein (Bax), caspase-3, caspase-9, and tumor protein p53 (p53) showed up-regulation, while B-cell lymphoma 2 (Bcl-2) showed down-regulation in AFB1 fed group. The supplementation of GSPE to the AFB1 diet significantly reversed the mRNA and protein expression of these apoptosis-associated genes, as compared to the AFB1 treated group. Conclusively, our results demonstrated that GSPE ameliorated AFB1-induced oxidative stress by reducing the LPO accumulation and enhancing the antioxidant defense system. Additionally, GSPE attenuates AFB1-induced excessive apoptosis in BF of broilers via the mitochondrial pathway.

Keywords: AFB1; GSPE, Oxidative stress, Apoptosis, Broilers

PROBIYOTİK LACTOBACILLUS REUTERI KÜLTÜRÜ VE YENİLEBİLİR FİLM ÇÖZELTİSİNİN FARKLI PATOJENLERE KARŞI İNHİBİSYON POTANSİYELİ

THE INHIBITION POTENTIAL OF PROBIOTIC LACTOBACILLUS REUTERI CULTURE AND EDIBLE FILM SOLUTION AGAINST DIFFERENT PATHOGENS

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ÖZET

Lactobacillus reuteri bağırsak floarasında bulunan probiyotik özellik gösteren bir bakteridir. L. reuteri tarafından üretilen antimikrobiyal bir bileşik olan reuterinin, Gram-pozitif ve Gram-negatif bakterilere karşı geniş spektrumlu etkiler gösterdiği kanıtlanmıştır. Benzer şekilde, çeşitli patojenik ve bozucu mikroorganizmalara karşı doğal bir antimikrobiyal polimer olan kitosanın, gıdaların raf ömrünü uzatmak amacıyla yenilebilir film ve kaplamalarda kullanıldığı bilinmektedir. Bu çalışmada L. reuteri kültürü ve kitosan bazlı yenilebilir film çözeltisinin farklı patojenlerin büyümesini in vitro olarak inhibe etme potansiyelleri araştırılmıştır. Çalışmada kullanılan L. reuteri kültürü Burdur Mehmet Akif Ersoy Üniversitesi Gıda Teknolojisi laboratuvarından temin edilmiş ve MALDI-TOF MS ile tanımlaması yapılmıştır. Bu çalışmada 10^7 log KOB/mL aktif L. reuteri kültürü, kitosan bazlı yenilebilir film çözeltisi ve bunların kombinasyonu kullanılarak agar kuyucuk difüzyon yöntemi ile Staphylococcus aureus ATCC 25923, Listeria monocytogenes ATCC 19115, Escherichia coli ATCC 25922 ve Salmonella Typhimurium ATCC 14028 patojenlerine karşı antimikrobiyal etki belirlenmiştir. 50 µL L. reuteri kültürü kullanılan grupta, Salmonella ve E. coli'ye karşı yüksek antimikrobiyal etki gözlenirken, L. monocytogenes ve S. aureus üzerinde daha düşük bir antimikrobiyal etki tespit edilmiştir. 25 µL L. reuteri ve 25 µL yenilebilir film çözeltisi içeren grupta Salmonella, E. coli ve L. monocytogenes'e karşı düşük düzeyde antimikrobiyal etki gözlenmiştir. Tek başına 50 µL yenilebilir film çözeltisinin kullanıldığı grupta ise patojenlere karşı herhangi bir antimikrobiyal etki bulunmamıştır. Sonuç olarak, bu çalışmada L. reuteri kültürünün farklı patojenlere karşı inhibisyon potansiyele sahip olduğu kanıtlanmıştır. Aktif kültürün gıda ürünlerinde potansiyel bir ajan olarak kullanımı için daha fazla araştırmaya ihtiyaç vardır.

Anahtar Kelimeler: Lactobacillus reuteri, kitosan, yenilebilir film, patojen.

ABSTRACT

Lactobacillus reuteri is a probiotic bacteria found in the intestinal flora. It has been proven that reuterin, an antimicrobial compound produced by L. reuteri, exhibits broad-spectrum effects against both Gram-positive and Gram-negative bacteria. Similarly, chitosan, a natural antimicrobial polymer, is known to be used in edible films and coatings to extend the shelf life of food products against various pathogenic and spoilage microorganisms. In this study, the potential of L. reuteri culture and chitosan-based edible film solution to inhibit the growth of different pathogens was investigated in vitro. The L. reuteri culture used in the study was obtained from the

Food Technology Laboratory of Burdur Mehmet Akif Ersoy University, and its identification was performed using MALDI-TOF MS. In this study, 10^7 log CFU/mL of active *L. reuteri* culture, chitosan-based edible film solution, and their combination were used to determine antimicrobial effects against *Staphylococcus aureus* ATCC 25923, *Listeria monocytogenes* ATCC 19115, *Escherichia coli* ATCC 25922, and *Salmonella Typhimurium* ATCC 14028 using the agar well diffusion method. In the group with 50 μ L of *L. reuteri* culture was used, a high antimicrobial effect was observed against *Salmonella* and *E. coli*, while a lower antimicrobial effect was detected against *L. monocytogenes* and *S. aureus*. In the group with 25 μ L of *L. reuteri* and 25 μ L of the edible film solution, a low level of antimicrobial effect was observed against *Salmonella*, *E. coli*, and *L. monocytogenes*. In the group with 50 μ L of the edible film solution was used alone, no antimicrobial effect against pathogens was found. As a result, this study demonstrated that *L. reuteri* culture has the potential to inhibit various pathogens. Further research is needed to explore the potential use of this active culture as an agent in food products.

Keywords: *Lactobacillus reuteri*, chitosan, edible film, pathogen.

PLANT PROTEIN-BASED EDIBLE FILMS LOADED WITH BIOACTIVE COMPOUNDS FOR FOOD PACKAGING

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ABSTRACT

As consumers turn to safe, non-toxic, and nutritious foods, edible and/or biodegradable materials have come to the fore in the coating of functional ingredients and packaging of foods. Food biopolymers like proteins, polysaccharides, and lipids are frequently used to generate edible coatings and films. Sometimes these polymers are combined to create composite films, which can be used to modify the functional and mechanical properties of the films or to construct films for particular applications. By-products formed in food production processes are important sources for obtaining protein. It is very advantageous to use these wastes with high protein content in coating and film production, especially for the recycling of food waste and by-products that occur after oil extraction from oilseeds. Edible films made of protein can be used for a variety of things, like delivering food in tiny, single-serving portions, coating food with antimicrobial and antioxidant compounds, and creating an interior layer that can be combined with non-edible films to create multilayer packaging. In addition, the use of plant materials such as essential oils and plant extracts in the production of functional and healthy edible protein-based films has attracted much attention recently. This is because these materials are rich sources of biologically active ingredients with a variety of qualities that improve human health. It is also noteworthy that they have high antimicrobial properties and have the potential to extend product shelf life. It's critical to emphasize how these cutting-edge films can protect food quality and lessen their negative effects on the environment by looking at their manufacturing processes, features, and structural characteristics. However, sustainability concerns, their use in the food industry, performance characteristics, and processing techniques are other issues that need to be taken into consideration.

Keywords: antioxidant; antimicrobial; by-products; edible film; plant protein

YEŞİL ÇAY BİYOAKTİF MADDELERCE ZENGİNLEŞTİRİLMİŞ VE ISIL İŞLEMLE MUHAFAZA EDİLMİŞ FONKSİYONEL KURU MEYVE ÜRÜNLERİNİN DEPOLANMA SÜRESİNCE FENOLİK MADDE STABİLİTELERİNİN İNCELENMESİ

INVESTIGATION OF THE STABILITY OF PHENOLIC COMPOUNDS DURING THE STORAGE PERIOD OF FUNCTIONAL DRIED FRUIT PRODUCTS ENRICHED WITH BIOACTIVE COMPOUNDS FROM GREEN TEA AND PRESERVED BY HEAT TREATMENT

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ÖZET

Çay, bileşiminde bulunan biyoaktif maddeler nedeniyle pek çok araştırmada kullanılan bir içecektir. Özellikle Yeşil çay kateşinler ve kateşin türevlerini kapsayan flavonoidlerce zengindir (kuru ağırlık üzerinden %30). Epigallokateşin gallat (EGCG), epigallokateşin (EGC), epikateşin (EC) ve epikateşin gallat (ECG) yeşil çayda bulunan başlıca kateşinlerdir. Bu bileşikler yeşil çayda miktarca EGCG (toplam kateşin miktarının %60'ı) > EGC > EC ≥ ECG şeklinde sıralanmaktadır.

Bu projede amaç, yeşil çayla zenginleştirilmiş kuru kayısı ve kuru incir ürünlerinin biyoaktif özelliklerinin incelenmesidir. Proje kapsamında, yeşil çay ile rehidre edilmiş kuru kayısı ve kuru incir ürünleri farklı pastörizasyon koşullarında proses edilmiş olup farklı pastörizasyon koşullarının ürün depolama süreci boyunca biyoaktif içerik miktarına etkisi incelenmiştir, ayrıca farklı yeşil çay markalarının fenolik içerikleri de proje kapsamında değerlendirilmiştir. Kuru kayısı ve kuru incir ürünleri yeşil çay ekstraktı ve demlenmiş yeşil çay solüsyonlarında rehidre edilerek farklı solüsyonların biyoaktif madde difüzyonuna etkisi de ayrıca incelenmiştir. Çalışmada EGC, C, EC, EGCG ve ECG içerikleri HPLC metodu ile tayin edilmiştir.

Su ile rehidre edilen kontrol kuru kayısı ve kuru incir ürünlerinde pastörizasyon reçetesi veya uygulanma koşulu (pastörizasyon öncesi veya pastörizasyon sonrası) fark etmeksizin fenolik madde başatlarını içermediği bulunmuştur. Hem kuru incir hem kuru kayısı ürünlerinde epigallokateşin ve kateşin başatlarının bulunduğu görülmüştür.

Anahtar Kelimeler: biyoaktif madde, yeşil çay ile rehidrasyon , kuru incir, kuru kayısı

ABSTRACT

Tea is a beverage widely used in numerous studies due to the bioactive compounds it contains. In particular, green tea is rich in flavonoids, including catechins and their derivatives, constituting approximately 30% of its dry weight. The primary catechins found in green tea are epigallocatechin gallate (EGCG), epigallocatechin (EGC), epicatechin (EC), and epicatechin gallate (ECG). Among these compounds, EGCG is the most abundant, followed by EGC, EC, and ECG, in the order of EGCG (60% of total catechins) > EGC > EC ≥ ECG. The objective of this project is to investigate the bioactive properties of dried apricot and dried fig products enriched with green tea.

In this study, dried apricot and fig products rehydrated with green tea were processed under different pasteurization conditions, and the effects of these conditions on the bioactive content throughout the storage period were examined. Additionally, the phenolic contents of various green tea brands were evaluated as part of the project. The dried apricot and fig products were

rehydrated using green tea extracts and brewed green tea solutions, and the impact of different solutions on the diffusion of bioactive substances was also investigated. The contents of EGC, C, EC, EGCG, and ECG were determined using HPLC methods.

In the control samples rehydrated with water, it was determined that there were no dominant phenolic compounds present, regardless of the pasteurization conditions and application. However, both dried fig and apricot products were found to contain significant levels of epigallocatechin and catechin compounds.

Key words: bioactive compounds, rehydration with green tea, dried fig, dried apricot

UZAY MİSYONLARINDA MİKROALGLERİN KULLANIMI: YENİLİKÇİ ÜRETİM TEKNİKLERİYLE TEMEL BİR BESİN KAYNAĞI

HARNESSING MICROALGAE IN SPACE MISSIONS: AN ESSENTIAL NUTRITIONAL RESOURCE WITH INNOVATIVE PRODUCTION TECHNIQUES

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ÖZET

Uzun süreli uzay misyonlarında sürdürülebilir beslenme, sınırlı alan ve kaynaklar nedeniyle büyük bir zorluk teşkil eder. Mikroalgler, hem yüksek besin içerikleri hem de esnek üretim yöntemleriyle bu soruna yenilikçi bir çözüm sunar. Mikroalgler, %60'a kadar ulaşabilen protein içeriği, omega-3 ve omega-6 yağ asitleri, B12 vitamini, C ve E vitaminleri gibi hayati öneme sahip mikro besinler açısından oldukça zengindir. Bu zengin içerik, astronotların kas ve kemik sağlığını desteklemenin yanı sıra bağışıklık sistemini güçlendirerek, genel sağlık ve dayanıklılığı artırır. Ayrıca, demir, magnezyum, potasyum ve çinko gibi mineraller, astronotların metabolik fonksiyonlarını düzenlemeye yardımcı olur. Mikroalglerin üretiminde kapalı biyoreaktör sistemleri kullanılır. Bu sistemler, uzayda sınırlı su ve enerji kaynaklarını en verimli şekilde kullanarak yüksek biyokütle üretimi sağlar. Mikroalglerin büyümesi için ışık, karbondioksit ve su gibi temel girdiler yeterlidir, bu da onları enerji açısından verimli ve sürdürülebilir bir besin kaynağı yapar. Fotobiyoreaktörler, mikroalglerin uzay ortamında yetiştirilmesini mümkün kılarak, düşük enerji tüketimi ve yer tasarrufu sağlar. Ayrıca, bu biyoreaktörler karbondioksiti oksijene dönüştürme yeteneği sayesinde uzay istasyonları için hem gıda hem de yaşam destek sistemlerine katkıda bulunur. Bu çalışmada, mikroalglerin besin değeri ve üretim teknikleri incelenerek, uzun süreli uzay misyonları için nasıl stratejik bir gıda kaynağı olarak değerlendirilebileceği ele alınmaktadır. Mikroalglerin hızlı büyüme hızı ve biyokütle üretimi hem gıda güvenliği hem de sürdürülebilirlik açısından kritik bir çözüm sunmaktadır. Bu bağlamda, mikroalglerin uzayda beslenme ve biyoteknoloji açısından potansiyeli büyük önem taşımaktadır.

Anahtar Kelimeler: Mikroalgler, Uzay misyonları, Sürdürülebilir beslenme, Biyoreaktör sistemleri, Besin güvenliği.

ABSTRACT

In long-term space missions, achieving sustainable nutrition poses a significant challenge due to limited space and resources. Microalgae offer an innovative solution to this problem, thanks to their high nutritional content and flexible production methods. Rich in essential micronutrients such as proteins (up to 60%), omega-3 and omega-6 fatty acids, as well as vitamins B12, C, and E,

microalgae provide crucial support for astronauts' muscle and bone health, while also strengthening the immune system and enhancing overall health and resilience. Additionally, essential minerals such as iron, magnesium, potassium, and zinc play a critical role in regulating astronauts' metabolic functions. Closed bioreactor systems are employed in the cultivation of microalgae, optimizing the use of limited water and energy resources in space to ensure high biomass production. Microalgae require only basic inputs—light, carbon dioxide, and water—making them an energy-efficient and sustainable food source. Photobioreactors enable microalgae cultivation in space environments, offering both low energy consumption and space-saving benefits. Furthermore, these bioreactors contribute to space station life support systems by converting carbon dioxide into oxygen, while simultaneously producing food. This study explores the nutritional value and production techniques of microalgae, examining how they can serve as a strategic food source for long-term space missions. The rapid growth rate and high biomass yield of microalgae make them a critical solution for both food security and sustainability. In this context, the potential of microalgae in space nutrition and biotechnology represents a significant advancement for the future of space exploration.

Keywords: Microalgae, Space missions, Sustainable nutrition, Bioreactor systems, Food security.

BALIKLARDA YAĞ ASİTLERİ ve YAĞ KALİTE İNDEKSLERİNİN DEĞERLENDİRİLMESİ

EVALUATION OF FATTY ACIDS AND FAT QUALITY INDEXES IN FISH

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ÖZET

Balıklar protein, yağ, karbonhidrat ve mineral maddeleri bakımından zengin olması ve kolay sindirilebilme özelliğinden dolayı insan beslenmesinde önemli ve değerli bir gıda maddesidir. Balıkları değerli kılan unsurlardan birisi de sahip oldukları yağ ve yağ asitleridir. Özellikle sağlık açısından büyük öneme sahip olan ve eikosapentaenoik asit (EPA) ve dokosaheksaenoik asit (DHA) ile karakterize edilen n-3 grubundaki çoklu doymamış yağ asitlerini (PUFA) içermesi en önemli besin kaynaklarından biri olmasında önemli rol oynamaktadır. Bu derlemede deniz ve tatlı su balıklarında bulunan yağ ve yağ asitleri içeriklerine örnekler verilmiş olup, bu içeriklere etki eden etmenler, balıkların PUFA/SFA, w6/w3 değerleri, yağ kalite indeksleri olarak adlandırılan Aterojenik indeks (AI), Trombojenik indeks (TI), Hipokolesterolemik/hiperkolesterolemik oranları (H/H) ve bu değerlerin sağlık açısından önemi hakkında bilgiler derlenmiştir.

Anahtar Kelimeler: balık, yağ asidi, kalite indeksleri, sağlık, beslenme.

ABSTRACT

Fish is an important and valuable foodstuff in human nutrition because it is rich in protein, fat, carbohydrate and mineral substances and is easily digestible. One of the factors that make fish valuable is their fat and fatty acids. The fact that it contains polyunsaturated fatty acids (PUFA) in the n-3 group, characterized by eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which are of great importance for health, plays an important role in being one of the most important food sources. In this review, examples of fat and fatty acid contents of marine and freshwater fish are given and information about the factors affecting these contents, PUFA/SFA, w6/w3 values of fish, Atherogenic index (AI), Thrombogenic index (TI), Hypocholesterolemic/hypercholesterolemic ratios (H/H), which are called fat quality indices, and the importance of these values for health are compiled.

Keywords: fish, fatty acids, quality indices, health, nutrition.

FARKLI KAKAO ALKALİZASYON KOŞULLARININ KAKAOLU SÜT İÇECEKLERİNİN KALİTE PARAMETRESİ ÜZERİNDEKİ ETKİSİ

THE EFFECT OF DIFFERENT COCOA ALKALIZATION CONDITIONS ON THE QUALITY PARAMETERS OF COCOA MILK DRINKS

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ÖZET

Sütün insan beslenmesinde önemli bir rolü bulunmaktadır. Süt tüketimini teşvik etmede kakao aromalı süt yaygın olarak kullanılmaktadır. Kakaolu sütlerde renk ve aroma gibi duyuşsal özellikler öne çıkmaktadır. Alkalizasyon işleminin naturel kakaonun buruk, acı tadını gidermek, fermantasyon sırasında meydana gelen asetik asidi kısmen de olsa ortadan kaldırmak, çözünürlüğü arttırmak ve renk özelliklerini geliştirmek için uygulanmaktadır. Alkalizasyon şiddetiyle beraber renk koyulaşırken pH değeri de artmaktadır. Bu değişimler üzerinde alkali konsantrasyonu ve kullanılan alkalizasyon solüsyonunun çeşidini kapsayan alkalizasyon proses koşulları da etkilidir. Çeşitli sütler kullanılarak aynı ürün için natürel ve alkalize kakao tozu kullanımının etkilerini inceleyen çalışmalar bulunmasına rağmen farklı alkali ajanlar kullanılarak alkalize olan kakaoların kakaolu süt üretiminde kullanımları ile ilişkili bir çalışma ile karşılaşılmamıştır. Bu çalışmada diğer proses koşulları sabit tutularak üç farklı alkali (NaOH, K₂CO₃ ve KOH) ile hazırlanan yağsız kakao tozlarının çikolatalı süt üretiminde farklı düzeylerde (0.500, 1.00 ve 1.50 g/100 mL) kullanımlarının, son ürün özellikleri üzerindeki etkileri incelenmiştir. Bu amaçla hazırlanan örneklerde (n= 9), fiziko-kimyasal (pH, renk, toplam çözünür katı madde), reolojik özellikler, toplam fenolik madde miktarı, antioksidan aktivite potansiyelleri ve duyuşsal özellikler belirlenmiştir. KOH ile üretilen çikolatalı sütler daha yüksek viskozite ve kıvama sahip bulunmuştur (p<0.05). NaOH kullanımı daha iyi renk stabilitesine ve çikolata ve kakao aromalarıyla ilişkili daha yüksek seviyelerde uçucu bileşiklere yol açmıştır. Bununla birlikte, alkalizasyon için K₂CO₃ kullanımı TPC, antioksidan kapasite ve depolama sırasında daha stabil pH değerleri açısından avantajlı olmuştur. Özellikle 1.00 ve 1.50 g/100 mL alkalize kakao tozu içeren çikolatalı sütlerde, çeşitli duyuşsal parametreler için tercih düzeyini arttırmak amacıyla farklı alkalik çözeltilerinin kullanılmasının gerekli olduğu belirlenmiştir. Bu çalışmada kakao tozunun

alkalileştirilmesi sürecinde alkali çözelti seçiminin çikolatalı süt için hedef tüketici gruplarına ve tüketim motivasyonlarına göre yapılması gerektiği sonucuna varılmıştır.

Anahtar Kelimeler: Alkalize Kakaolu Süt, Kakaolu Süt, Alkalizasyon

ABSTRACT

Milk plays an essential role in human nutrition. Cocoa-flavored milk is widely used to encourage milk consumption. Sensory characteristics such as color and aroma are prominent in cocoa-flavored milk. The alkalization process is applied to remove the astringent, bitter taste of natural cocoa, partially remove acetic acid that occurs during fermentation, increase solubility, and improve color properties. The pH value also increases while the color darkens with the alkalization intensity. The alkalization process conditions, including the alkali concentration and the type of alkalization solution used, are also effective in these changes. Although there have been studies investigating the effects of using natural and alkalized cocoa powder for the same product using various milks, there is no study on the use of cocoa alkalized using different alkalizing agents in the production of cocoa milk. In this study, the effects of the use of skimmed cocoa powders prepared with three different alkali agents (NaOH, K₂CO₃, and KOH) at different levels (0.500, 1.00, and 1.50 g/100 mL) in chocolate milk production on the final product properties were investigated, keeping other process conditions constant. Physico-chemical (pH, color, total soluble solids), rheological properties, total phenolic content, antioxidant activity potential and sensory properties were determined in the samples prepared for this purpose (n= 9). Chocolate milk produced with KOH was found to have higher viscosity and consistency (p<0.05). Using NaOH led to better color stability and higher levels of volatile compounds associated with chocolate and cocoa aromas. However, using K₂CO₃ for alkalization was advantageous regarding TPC, antioxidant capacity and more stable pH values during storage. It was determined that using different alkaline solutions is necessary to increase the preference level for various sensory parameters, especially in chocolate milk containing 1.00 and 1.50 g/100 mL alkalized cocoa powder. This study concluded that the choice of alkaline solution in the alkalization process of cocoa powder should be based on the target consumer groups and consumption motivations for chocolate milk.

Keywords: Alkalized Cocoa Milk, Cocoa Milk, Alkalization

INVESTIGATION OF ANTIOXIDANT AND TOTAL PHENOLIC CONTENTS OF TAPIOCA STARCH-BASED FILMS

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ABSTRACT

This project investigates the antioxidant and total phenolic content of tapioca starch-based films containing black carrot juice within the context of food coating. While there has been a recent increase in the production of tapioca starch-based films for food coating, research regarding their antioxidant capacity remains limited. There is no study in the literature in which black carrot extract was added to tapioca starch films. Within the scope of this research, tapioca starch material was investigated as a material that can preserve the shelf life of food. This project investigates the antioxidant and total phenolic content of tapioca starch-based films containing black carrot juice within the context of food coating. While there has been a recent increase in the production of tapioca starch-based films for food coating, research regarding their antioxidant capacity remains limited. There is no study in the literature in which black carrot extract was added to tapioca starch films. Within the scope of this research, tapioca starch material was investigated as a material that can preserve the shelf life of food. To extract black carrot juice, black carrots were kept in water for 48 h in a dark environment at refrigerator temperature. After this extraction process, the black carrot juice was obtained by filtering the water. The film solution, prepared with 20 mL of black carrot juice containing 3% tapioca starch, was poured into Petri dishes and dried in an oven at 40 °C. After drying, the films were analyzed for total phenolic content (TPC) and DPPH inhibition activity to evaluate their antioxidant properties. This study showed that the films enriched with black carrot juice demonstrated high performance in both antioxidant activity and phenolic content. As a food coating material, these films, with their natural antioxidant properties, could help extend the shelf life of food products.

Keywords: Black carrot, tapioca starch, film, food packaging, starch, extract.

RELATIONSHIP OF CONSUMPTION DAIRY PRODUCTS AND NUTRITIONAL STATUS WITH FOREARM BONE MINERAL DENSITY IN ADOLESCENT CAUCASIAN BOYS: CROSS-SECTIONAL STUDY

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Abstract

During childhood and adolescence, skeletal microarchitecture and bone mineral density (BMD) undergo significant changes. Peak bone mass is built and its level significantly affects the condition of bones in later years of life. The study aimed to relationship analysis of the consumption of dairy products and nutritional status with bone mineral density of 250 adolescent Caucasian boys aged 16.5. Forearm bone parameters were measured by densitometry. Dairy product consumption and eating habits were assessed using a dietary interview and developed in the computer program Diet 6.0. The strongest relationships between BMD in the distal part of the forearm were noted with BMI, number of dairy products per day, calcium intake (mg/day), protein intake (g/person/day), and also phosphorus intake (mg/day). The strongest relationships with BMD in the proximal part of the forearm were found with consumed dairy products per day, calcium, protein, and phosphorus intake. However, dairy product intake proved to be the most important predictor variable of BMD dis ($F=19.98$; $p=0.001$) and BMD prox ($F=13.96$; $p<0.001$). Eating habits proved to be an important determinant of forearm bone parameters in young Polish boys. Optimal eating habits especially adequate intake of important dietary components for bone health such as calcium, protein, and phosphorus affect the mineralization of forearm bones.

Keywords: bone mineral density; dairy product, nutritional status; adolescent boys, Caucasian

PRODUCTION OF MULBERRY POWDER USING MICROWAVE-ASSISTED FOAM MAT DRYING

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ABSTRACT

This study aims to investigate the drying properties of the mulberry foam and the color properties of the final powders. Firstly, the effects of independent variables such as egg white powder (2, 4, 6%), guar gum (0.5, 1, 1.5%), and whipping time (2, 4, 6 min) on the foam capacity response for the commercial beverage foam were researched by response surface method. With a desirability value of 0.993, optimal conditions were determined as 5.49% egg white powder, 0.82% guar gum, and 6 min whipping time. Secondly, the foam sample obtained under optimal process conditions was dried at different microwave power levels. For 300, 450, and 600 W microwave power levels, drying times were determined as 9, 14, and 21 minutes, respectively. In addition, D_{eff} values were calculated as 2.36×10^{-5} , 3.87×10^{-5} , and 58.6×10^{-4} , respectively. An increase in microwave power applied during drying had a significant impact on the color properties of the final powder product. The redness color value and brightness of the product decreased with increasing power applied. In addition, a decrease was observed in the chroma value of the powder product from 19.43 to 17.61. Considering both the drying characteristics and color changes in the product, 450 W microwave power could be selected to dry the commercial black mulberry beverage

Keywords: mulberry, foam mat drying, powder, microwave, optimization

COMPARISON OF 1-MCP AND HIGH CO₂ POSTHARVEST APPLICATION IN EXTENDING THE SHELF-LIFE OF FRESH APRICOT FRUIT

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ABSTRACT

Fresh apricot fruits have a soft texture, which reduces its shelf life. This research aimed to compare the post-harvest treatments of 1-MCP (1000 ppb) and high CO₂ (80% for 24 hours) on the ripening and shelf life of apricot fruit cultivar "Shahrudi" in June of 2024 in South Khorasan province, Iran. Apricot fruits were harvested based on commercial maturity (total soluble solids, 11°Brix). After being transported to the laboratory, they were sorted and the defective fruits were removed. Thereafter, treatments were applied and the fruits were transferred to packages and stored at 2°C with 85% relative humidity for 30 days. The results showed that both treatments significantly increased the firmness of the fruit tissue, so that the firmness in both treatments was 60% higher than the control. Since apricot is a climacteric fruit, these findings can be related to the anti ethylene effects of 1-MCP and CO₂ which reduced the effectiveness of ethylene hormone. Interestingly, high CO₂ (80%) treatment significantly reduced the microbial load compared to 1-MCP and the control. High CO₂ probably causes asphyxiate and destruction of pathogenic microorganisms. The obtained results indicated that the shelf-life of apricot fruit cultivar "Shahrudi" significantly extended by CO₂ treatment to 38 days, followed by 1-MCP treatment (27 days), compared with control fruits (10 days). In general, the results show that the use of high CO₂ (80% for 24 hours) compared to 1-MCP (1000 ppb), by reducing the microbial load and maintaining the firmness, causes a better extension of the apricot fruit shelf-life cultivar "Shahrudi". In addition, it does not have negative impact on fruit taste.

Keywords: 1-MCP, Apricot, Firmness, High CO₂, Shelf-Life

PHYSICO-CHEMICAL PROPERTIES AND QUALITY OF STORED SEEDLESS BARBERRY FRUIT FROM THE MAIN PRODUCTION AREAS OF IRAN

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ABSTRACT

The postharvest losses of fresh fruits and vegetables in developing nations is estimated to be around 30-50% owing to spoilage. There is a lack of information concerning the physico-chemical characteristics of dried barberry fruits originating from the main production areas of South Khorasan Province, Iran. Thus, we examined the nutritional quality and bioactive compounds of dried, seedless barberry fruits sourced from various locations within South Khorasan Province, Iran. The dried barberries were assessed after being acquired and gathered. The findings indicated that the barberries from the Birjand region exhibited the highest total soluble solids (TSS) and the most favorable taste index (TSS/TA), suggesting that the barberries from this area possess superior and sweeter flavors compared to those from other regions. Conversely, the barberry fruits from the Qaen region displayed the highest levels of titratable acidity (TA) and the lowest TSS, indicating that the fruits from this region are comparatively more sour than those from others. The analysis of color indices (L^* , a^* , b^* , Hue, and chroma) revealed that the lowest values of a^* (redness) and chroma were associated with the dried barberries from the Darmian region. Furthermore, the highest total phenol content and anthocyanin levels were identified in fruits from the Birjand region. However, barberry fruits from the Darmian region recorded the least phenol content along with the lowest amounts of anthocyanin and vitamin C. Strong positive correlations were observed between anthocyanin and TSS ($r = 0.82$), anthocyanin and phenol ($r = 0.95$), anthocyanin and vitamin C ($r = 0.77$), as well as anthocyanin and chroma ($r = 0.81$). Overall the dried, seedless barberry fruits from the Birjand region possess superior quality and nutritional value compared to those from other areas. Nonetheless, the barberries from the Zirkoh and Qaen regions also demonstrated acceptable quality and nutritional value.

Keywords: anthocyanin, *Berberis vulgaris*, postharvest, quality

CHANGES IN ANTIOXIDANT COMPOUNDS OF FRESH JUJUBE (ZIZIPHUS JUJUBA) FRUIT AFTER COLD STORAGE

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ABSTRACT

Today, people want to eat healthier foods to have a balanced diet, and this makes it necessary to monitor beneficial compounds such as antioxidants in food. Fresh jujube fruit is a rich source of antioxidants with many nutritional and medicinal effects on human health. However, it has a short shelf life at room temperature and it is necessary to keep at refrigerator storage to preserve its postharvest quality. Therefore, this research was conducted with the aim of investigating the changes in the antioxidant compounds of fresh jujube fruit after one month of cold storage and comparing it with freshly harvested jujube in South Khorasan province, Birjand, Iran in 2024. The design used in this research was completely randomized in four replications. Jujube fruits were harvested based on commercial maturity (two-thirds red skin color). Then the fruits were packed and stored at 4°C and 90% humidity for one month. In this experiment, antioxidant compounds such as total phenol content, amount of ascorbic acid (vitamin C) and total antioxidant activity were investigated. The results showed that after one month of cold storage, total phenol content, vitamin C content and total antioxidant activity of fresh jujube fruit decreased slightly compared to harvest time, however, there was no statistically significant difference. Therefore, it can be concluded that the nutritional value of fresh jujube fruit does not decrease during thirty days of storage at 4°C.

Keywords: Antioxidants, Fresh Jujube, Vitamin C, Phenol, Nutritional Value

WHEY PROTEIN: A FUNCTIONAL INGREDIENT FOR LIVER HEALTH AND ENZYME MODULATION

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Abstract

Milk-derived proteins are gaining attention for their health-promoting properties as bioactive agents. One of these protein sources, often overlooked, is whey—a byproduct of dairy processing. This study focuses on analyzing the bioactive composition of whey and its regulatory effects on liver enzymes. Specifically, the research investigates the concentrations of key proteins and minerals in whey, along with its potential inhibitory effects on enzymes such as alanine aminotransferase (ALT) and aspartate aminotransferase (AST) in both normal and pathological serum samples.

Whey samples, collected from a dairy factory in Bitola over a two-year period (2020–2022), were analyzed for total protein, albumin, and mineral content (Ca and P) using spectrophotometric techniques. Results showed that whey contained 18.00 g/L of total proteins and 2.00 g/L of albumin. Among the minerals, potassium had the highest concentration at 26.6 mmol/L, followed by calcium at 9.47 mmol/L and phosphorus at 9.40 mmol/L.

In terms of enzyme regulation, *in vitro* assays demonstrated whey's ability to significantly inhibit liver enzymes, with more pronounced effects in normal serum samples. In normal serum, the reductions in ALT and AST activities were 39% and 29%, respectively, compared to smaller reductions in pathological serum (ALT: 11%, AST: 9%).

These findings highlight whey as a rich source of bioactive compounds with promising therapeutic potential, particularly in the regulation of liver enzyme activity. Whey's bioactive properties make it a valuable addition to both food and pharmaceutical applications, reinforcing its role as a functional ingredient in promoting health. This study further supports the broader potential of dairy by-products in enhancing human health through dietary intervention.

Key words: whey proteins, liver enzymes, bioactive agents, therapeutic potential.

SUSTAINABLE TEA INNOVATION: HARNESSING ORANGE RIND AND PINEAPPLE CORE FOR FUNCTIONAL BEVERAGE DEVELOPMENT

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ABSTRACT

This study focuses on the physicochemical, phytochemical and sensory analysis of herbal tea produced from orange rind and pineapple core. Five variations of orange rind and pineapple core powder in 100:0, 75:25, 50:50, 25:75, 0:100 ratios were the experimental lots and labeled A to E respectively and a commercial green tea labelled sample F was used as a control. Various analytical techniques were employed to assess the physicochemical properties, anti-nutrient, phytochemical content and antioxidant capacity of the tea. Also, sensory evaluations were conducted to gauge consumer acceptance and preference. The physicochemical properties of the tea ranged; pH (4.7-5.6), TTA (0.62-1.00%), TSS (8.45-10.47 °Brix), Brix/acidity ratio (6.27-13.69). The anti-nutrient content ranged as follows; alkaloids (0.083-0.113%), oxalates (0.032-0.048%), phytates (0.001-0.003%), tannins (0.0005-0.0124%). The phytochemical content was as follows; total flavonoids (5.45-7.61 mgQE/g), total phenols (1.36-3.98 mgGAE/g). The samples also demonstrated significant antioxidant activity as follows; FRAP (2.23-8.79 mgAAE/g), H₂O₂ scavenging ability (4.23-10.11%). Sensory results showed that all the herbal tea samples were generally accepted by panelists. The tea samples produced demonstrated great potential for its use as a functional beverage and as substitute for other tea brands given its improved functional characteristics. This study explored the potential applications of orange and pineapple by-products in sustainable product development.

Keywords: functional beverage, orange rind, pineapple core, antioxidant, infusion

ORGANIC FOOD CONSUMPTION AND ATTENTION PERFORMANCE IN 10-13 MOROCCAN PRIMARY STUDENTS FROM KHEMISSSET

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Abstract

In last decades, as in other countries, Moroccan diet have known great changes involving foods artificial foods and fast food. This study aims to systematically assess associations between organic food consumption and cognition in sample of school children.

The study sample included data of 210 school students aging 10–13 years-old, from three elementary school cohorts. We measured all consumed foods including main meals, biscuits, , chemicals and life styles. The measured cognitive domains were attention memory (d2R test) and working (N-Back task). We used two statistical approaches to assess associations between organic foods and child cognition: the exposome-wide association study (ExWAS) considering each consumed food independently, and the deletion-substitution-addition algorithm (DSA) considering all exposures simultaneously to build a general model. The results show that child organic food intake was associated with higher fluid intelligence (attention) scores (beta = 1.18; 95% CI = 0.50, 1.87) and higher working memory (N-Back) scores (0.23; 0.05, 0.41), and child fast food intake (−1.25; −2.10, −0.40) was associated with lower attention and memory scores. However, the rural origin that reflect high physical activity.

This first comprehensive study of childhood nutrition risk factors suggests that unfavourable child diet, including low organic food consumption adversely and cross-sectionally associate with cognitive function. Unexpected associations were also observed and maybe due to confounding and reverse causality.

Key words : organic food, cognitive function, d2R test, adolescents, Morocco.

WAYS TO REDUCE PATULIN TOXIN IN APPLE JUICE

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Abstract

Patulin, a mycotoxin produced by *Penicillium expansum*, poses significant health risks when present in apple juice. This study explores various strategies to mitigate Patulin contamination in apple juice. Key methods include the application of good agricultural practices (GAPs) to prevent mold growth on apples, and the use of sanitizers to reduce spore populations during post-harvest handling. Additionally, processing techniques such as clarification, filtration, and the use of adsorbents have shown efficacy in reducing Patulin levels. Advanced methods like UV radiation, ultrasonic treatment, and high-pressure processing further enhance toxin reduction. Implementing these strategies collectively can significantly lower Patulin concentrations, ensuring safer apple juice products.

Keywords: Patulin, Mycotoxin, Apple juice, *Penicillium expansum*, Good agricultural practices (GAPs), Sanitizers, Post-harvest handling, Clarification, Filtration, Adsorbents, UV radiation, Ultrasonic treatment, High-pressure processing, Toxin reduction

PRODUCTION OF BIODIESEL FROM SOYABEANS AS AN ALTERNATIVE TO FOSSIL FUELS

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ABSTRACTS

Biodiesel is a renewable, biodegradable and environmentally friendly fuel for use in diesel engines. It can overcome the problems associated with fossil fuels such as its non-renewability, polluting nature and its global politics which is a matter of concern to many nations. In this research, biodiesel was produced from the soyabeans with methanol in the ratio of 5:3 (v/v) of the oil to alcohol. After the crude oil extract was trans-esterified, the viscosity of the biodiesel in ASTM D6751 is 1.9-6.0 mm²/sec at 40°C. was 0.859cm⁻², the cloud, the pour, and the flash points obtained were 10°C, 20°C and 17°C respectively. From the results it was clear that the produced biodiesel fuel was within the recommended standards of the biodiesel fuel and so can be used as fossil fuel substitute.

Keywords: Soya Beans, Biodiesel, Free Fatty Acid, Viscosity

RECENT SUCCESSES IN THE CONTROL OF FUSARIUM WILT OF TOMATO USING NANOPARTICLES: A REVIEW

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Abstract

Fusarium wilt is a serious disease that causes devastating losses in the tomato crop. Fusarium wilt can result in yield losses of up to 80% in tomato plants. The disease can infect tomatoes at any stage of growth and enter through the roots. Fungicides are mostly used in controlling this disease which poses high risk to human health and that of the environment. Increasing concern for public health and that of the environment motivates growers to seek other disease control strategies that could reduce the amount of synthetic fungicides usage. Nanoparticles are microscopic particles that range in size from 1 to 100 nanometers and have a variety of applications, including agriculture. Nanoparticles are recently being used to control this disease, with encouraging results. Nanoparticles can boost agricultural productivity and sustainability by improving agrochemical delivery, including insecticides, fertilizers, bio-pesticides, nucleic acid pesticides, plant growth regulators, and so on. Nanoparticles can operate as antifungal agents by killing or suppressing fungi growth. The current study discusses recent improvements in the use of nanoparticles to reduce Fusarium wilt in tomatoes. The effect of copper and silver nanoparticles on Fusarium growth was investigated using various sources accessible, and typical research was considered.

Keywords: Nanoparticles, fungicides, Fusarium, tomato.

OLE OF GAUB (DIOSPYROS PEREGRINA) FRUIT PREPARATION IN THE IMMUNE CELL ACTIVATION DURING ACUTE LYMPHOBLASTIC LEUKEMIA

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Abstract:

The immunomodulatory potential of *Diospyros peregrina* (Gaub) fruit preparation in the context of Acute Lymphoblastic Leukemia (ALL), a prevalent hematological malignancy characterized by the uncontrolled proliferation of immature lymphoid cells. *Diospyros peregrina*, a plant native to India, has been traditionally utilized in the treatment of various disorders, yet its antitumor properties, particularly in leukemia, remain inadequately explored. ALL results from genetic mutations that hinder the differentiation of B- and T-cell progenitors, leading to abnormal proliferation and survival. Despite advancements in chemotherapy and immunotherapy, current treatments exhibit significant side effects, underscoring the need for novel, non-toxic therapeutic agents. The study aims to investigate the immunomodulatory effects of *Diospyros peregrina*, a fruit known for its antioxidant, anti-inflammatory, and antitumor properties, as a potential natural, non-toxic therapy for ALL. Key findings from the preliminary research revealed that DFP enhances immune cell activity. Flow cytometry showed an increased expression of key immune markers, including CD4, CD8, CD19, CD14, and CD1d, while reducing the expression of CD5 and CD23 in treated cells. Moreover, DFP-treated cells exhibited significantly higher nitric oxide (NO) release, which is crucial for immune cell signaling and tumor destruction. A notable decrease in reduced glutathione (GSH) levels was also observed, indicating oxidative stress—a common response during immune activation. These findings suggest that DFP may activate cytotoxic T-lymphocytes (CTLs) and enhance immune cell-mediated tumor destruction in ALL. This research aligns with efforts to develop alternative treatments for ALL, offering a safer and more sustainable approach to cancer therapy.

Keywords: *Diospyros peregrina*, Immunomodulation, Acute Lymphoblastic Leukemia (ALL), Cytotoxic T-Lymphocytes (CTL), Cancer Immunotherapy

EFFECT OF NITROGEN DOSAGES INTERACTION IN DIFFERENT IRRIGATION SYSTEMS ON PROTEIN CONTENT IN SUGAR BEET LEAVES

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ABSTRACT

Sugar beet (*Beta vulgaris*) is an economically and strategically significant industrial crop for Türkiye. While sugar factories produce crystalline sugar from sugar beets, they also produce a range of by-products. Despite the common perception of sugar beet leaves as a mere by-product of sugar beet production, they represent a valuable source of essential nutrients and bioactive compounds. In the Kayseri Sugar interland, approximately 35,000 hectares of sugar beets are produced on an annual basis. A study conducted on 152 different locations during the harvest period revealed that the weight of the leaves was approximately 0.35 kg per kg of root weight. In light of the considerable volume of beets processed at Kayseri Sugar's three facilities, it is estimated that the quantity of beet leaves remaining in the fields during the harvesting season exceeds one million tons. It is therefore of significant importance to add value to this valuable resource.

The objective of this study is to assess the impact of irrigation and fertilisation rates on the protein content of sugar beet leaves. The study was conducted at the experimental/demonstration site of Kayseri Sugar. The research involved two distinct irrigation systems, namely drip irrigation and sprinkler irrigation, with four discrete nitrogen dosages, namely 5 kg N/da, 10 kg N/da, 15 kg N/da, and 25 kg N/da. The results demonstrated that the lowest protein content in sugar beet leaves was 1.91% with 15 kg N/da using drip irrigation, while the highest protein content was 7.15% with 15 kg N/da using sprinkler irrigation.

Increasing plant-based protein sources could be an effective solution to the food crisis and represents a crucial step in developing sustainable food systems. The integration of new plant sources is emerging as a significant solution to the food crisis. The adoption of these resources has the potential to enhance food security, promote sustainable agricultural practices, and improve nutritional quality. Scientific research and technological advancements can support the broader adoption and effective utilization of these plants.

Keywords: Sugar Beet Leaves, Irrigation, Fertilization, Protein Content

INHIBITION OF RHIZOCTONIA SOLANI, THE CAUSATIVE AGENT OF BROWN RHIZOCTON DISEASE, BY AN ACTINOBACTERIA STRAIN ISOLATED FROM ALGERIAN SAHARAN SOIL

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Abstract:

Brown Rhizokton disease is one of the most important fungal diseases that affects the potato crop every year and causes economic losses. Brown potato rhizoctonia is a disease that causes various types of damage to potatoes at different stages of the vegetation cycle and whose causative agent is a soil fungus, *Rhizoctonia solani*, pathogenic on potatoes but also on other crop species such as maize, beetroot, carrots, etc. crucifers and cereals, etc. Contaminated soil and plant are the main sources of inoculum for the disease.

The traditional chemical means used for the control of these plant phytopathogens are sometimes ineffective; costly and, above all, recognized for its side effects on the environment and the health of the consumer.

Faced with these problems, the search for new bioactive molecules is more than necessary to fight against these phythopatogens. Among the most promising sources of bioactive substances are microorganisms, especially actinobacteria, which are gram-positive bacteria with a high percentage of G+C.

Isolation of pathogenic fungi carried out on PDA medium and purification on the same medium, microscopic observation after staining with methylin blue made it possible to determine the genera of the Pathogenic fungi.

Isolation of actinobacteria carried out on chitin-vitamin B medium; after pretreatment with CaCO_3 , followed by incubation at 30°C for 21 days; enumeration is done using a colony counter; and purification on ISP2 medium by successive transplanting until pure colonies are obtained. The search for antimicrobial activity carried out by the cross-streak technique on ISP2 medium.

study of anti- Pathogenic fungi activity carried out on ISP2 medium using the cross-streak technique indicate a significant important inhibition of some phytopathogenic fungi.

Keywords: Actinobacteria, Brown Rhizokton disease, *Rhizoctonia solani*, pathogenic fungi, Bioactive molecules.

ISOLATION AND IDENTIFICATION OF PSEUDOMONAS SYRINGE PV SYRINGE CAUSAL AGENT OF BACTERIAL SPECK OF TOMATO CROP

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Abstract:

Crop yield losses due to disease must be reduced in order to meet the growing global food demand associated with the growth of the human population. It is well recognized that there is a need to develop new environmentally sound management strategies to control bacterial crop diseases. Current control measures involving the use of traditional chemicals or antibiotics are losing their effectiveness due to the natural development of bacterial resistance to these agents. In addition, there is a growing awareness that their use is not environmentally friendly.

Tomatoes come in first place among vegetable crops in terms of the area planted annually, production and consumption, either fresh or processed. Tomatoes are also characterized by being a high source of the antioxidant cyclopene and are used to prevent cancerous diseases. They are also considered a source of vitamin A, B, C and potassium, iron and calcium.

Like other agricultural crops, tomatoes are exposed to a large number of diseases, including bacterial diseases.

Plant diseases caused by the pathogen *Pseudomonas syringae* are serious problems for various plant species worldwide

Therefore, and from this study, our main objective, the isolation of *Pseudomonas syringae* the agent responsible for bacterial speck of tomato from a sample with the symptoms of the disease.

to isolate the bacteria, we used King culture medium, after preparing a series of decimal dilutions from 10^{-1} to 10^{-3} , a drop of each dilution spread on the medium and incubation at a temperature of 28C, purification on the same medium used for isolation (King culture medium), and concerning purification always by the use of the same medium.

Biochemical tests used for orientation to identification such as the KOH test, phytopathogenicity tests on tobacco leaves....and at the end an identification using the gallery apie 20 e.

Keywords: bacterial speck disease, *Pseudomonas syringae*, tomatoes crops, phytopatogenic bacteria.

AN OVERVIEW OF PLANT-BASED BEVERAGES

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ABSTRACT

Plant-based beverages, also known as non-dairy plant-based milks, are a product category that is gaining increasing popularity. These beverages, which share some sensory characteristics with cow's milk, are produced from water extracts of legumes, seeds, and cereals. The plant-based beverage market today includes soy milk, oat milk, coconut milk, almond milk, hazelnut milk and multigrain milk. One of the main factors determining the nutritional composition of these products is the ingredient used. Therefore, the nutritional properties of each beverage depend on the nature and amount of the main ingredient, as well as the addition of fortifying substances such as calcium and vitamin D or other possible components. Plant-based beverages contain several functional components (fiber, unsaturated fatty acids, phytosterols, isoflavones, and other phenolics) that support health, in addition to nutrients. Most of these beverages are in demand due to their functional bioactive compounds. Plant-based beverages are preferred by individuals with food restrictions due to allergies, lactose intolerance, or specific diets (vegetarian/vegan). In addition to their potential health benefits, these beverages also offer significant advantages in terms of environmental sustainability. The association of traditional animal-based milk production with high greenhouse gas emissions and water consumption highlights the ecological advantages of plant-based beverages. The production of plant-based beverages plays an important role in combating climate change, as it requires a lower carbon footprint and water consumption. The aim of this study is to provide general information on the nutritional values, sensory properties, potential health benefits, and environmental advantages of plant-based beverages derived from various seeds, grains, and legumes.

Keywords: Plant-based beverages, milk alternatives, lactose intolerance

NUTRITIONAL QUALITY, HEALTH EFFECTS AND SAFETY OF MICROGREENS

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ABSTRACT

In recent years, the increasing demand for healthy food products has driven the development of new approaches within the food industry. Microgreens, which are young plants typically harvested after the development of cotyledon leaves, are derived from plant, vegetable, and grain seeds. These microgreens are rich in antioxidants, vitamins, minerals, phenolic compounds, and numerous bioactive components that promote health. Additionally, they attract consumers' attention as a healthy food choice due to their vibrant colors, textures, and intense aromatic profiles. Microgreens, which have attracted significant attention in the fields of gastronomy and nutritional science, have been the subject of some studies, particularly regarding the prevention and management of metabolic diseases. The cultivation and consumption of microgreens have become increasingly widespread, both in professional kitchens and home environments. It is noted that these foods require special practices during post-harvest processing and storage to preserve their unique structural properties, quality, and safety throughout the production process. Additionally, it is thought that the raw consumption of microgreens may lead to health issues caused by foodborne pathogens. Therefore, despite the significant nutritional content of microgreens, the risks related to food safety should be taken into consideration. This study aims to provide information on the nutritional significance, potential health benefits, and food safety of microgreens.

Keywords: Microgreens, nutritional quality, food safety

SOWING QUALITIES OF RADISH SEEDS WHEN USING GROWTH REGULATORS

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Abstract

The aim of the work was to investigate the effect of Fitozide, FITOHELP, MycoHelp, Azotofit and Humisol on the quality of seeds of 8 radish hybrids. Laboratory methods according to DSTU 4138:2002. A positive effect of seed soaking in solutions of Fitozide, FITOHELP, MycoHelp, Azotofit preparations on laboratory seed germination was established by an average of 5.6–11.9%, germination energy – by 6.5–13.3%, depending on the hybrid. Azotofit and Fitozide preparations have the greatest stimulating effect on the sowing quality of radish seeds. With the use of Azotofit, the greatest positive effect on the stimulation of germination energy was found on hybrids Eliza, Stellar, Roxanne, Rolex, Donar – by 14–16%, laboratory germination of seeds on hybrids Stellar, Eliza, Rockstar, Rolex – by 13–14%. With the use of the drug Fitozide, the greatest positive effect on the stimulation of germination energy was found on hybrids Eliza, Adele, Stellar, Rockstar, Donar – by 11–13%, laboratory seed germination – on hybrids Eliza, Stellar, Rockstar, Rolex – by 11–13%. Soaking the seeds in a solution of Humisol did not have a positive effect on the sowing quality of radish seeds, and in some variants of the experiment, indicators lower than the control by 3–4% were noted. The positive effect of Fitozide, FITOHELP, MycoHelp and Azotofit preparations on the energy of seed germination and laboratory germination determines the feasibility of their use in order to improve the sowing qualities of seeds, stimulate growth processes at the first stages of organogenesis of the crop.

Keywords: *Raphanus sativus* (L.) convar. *radicula* (Pers) Sazon., hybrids, laboratory germination, energy of germination.

**ANTEP FISTIĞI KABUĞUNDAN PROTİK İYONİK SIVI ÖN İŞLEMİ İLE
FERMENTATİF LAKTİK ASİT ÜRETİMİ**

**FERMENTATIVE LACTIC ACID PRODUCTION FROM PISTACHIO SHELL BY
PROTIC IONIC LIQUID PRETREATMENT**

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ÖZET

Gıda ürünlerinin işlenmesi sonucunda ortaya çıkan tarımsal endüstri atıklarının büyük çoğunluğu ya yakılmakta ya da çevreye atılmaktadır. Alternatif olarak, tarımsal atıkların biyoteknolojik proseslerde hammadde olarak değerlendirilmesi, ticari değeri olmayan materyallerin katma değeri yüksek ürünlere dönüştürülmesiyle çevre sorunlarının azaltılmasına, hammadde rezervlerinin korunmasına ve ekonomik kayıpların önlenmesine olanak sağlayacaktır. Bu çalışmada, lignoselülozik atık türlerinden biri olan antep fıstığı kabukları, *Lactobacillus plantarum* MF4 ve MF33 ile fermantasyon yoluyla laktik asit üretiminde kullanılmıştır. Çalışmanın amacı, antep fıstığı kabuklarına protik iyonik sıvı ön işleme uygulayarak enzimatik hidrolize daha uygun hale getirmek ve hidroliz sonucunda elde edilen şekerin yüksek verimle laktik aside dönüştürülmesini sağlamaktır. Antep fıstığı kabuğu örnekleri, trietilamonyum hidrojen sülfat (TEAHSO_4) kullanılarak farklı sıcaklıklarda (130, 150 ve 170°C) ve çeşitli sürelerde (1, 1.5, 2 ve 3 saat), biyokütle konsantrasyonu %10 (g biyokütle/g protik iyonik sıvı) olacak şekilde ön işleme tabi tutulmuştur. Genel olarak, ön işlem sıcaklık ve süreleri arttıkça enzimatik hidrolizden elde edilen şeker verimleri artarken, katı geri kazanım oranları azalmıştır. Ön işlem görmüş antep fıstığı kabuklarının enzimatik hidroliz sonuçları, protik iyonik sıvı ön işleminin yüksek şeker konsantrasyonlarına ulaşmada etkili olduğunu göstermiştir; 130°C'de 3 saat süren işlemde 18.43 g/L şeker konsantrasyonuna ulaşılmış ve bu, optimal ön işlem koşulu olarak belirlenmiştir. Buna karşılık, ön işlem uygulanmamış antep fıstığı kabuklarının enzimatik hidrolizi sonucu elde edilen

indirgen şeker konsantrasyonu 1.48 g/L olarak tespit edilmiştir. Optimal koşullar altında ön işleme tabi tutulan biyokütle örnekleri, eşzamanlı sakkarifikasyon ve fermentasyona (SSF) tabi tutulmuş ve bu işlem sonucunda *Lactobacillus plantarum* MF4 ve MF33 tarafından 72. saatte toplam laktik asit (D-laktik asit + L-laktik asit) üretim verimi sırasıyla %36 ve %39 olarak elde edilmiştir. Genel olarak, protik iyonik sıvı ön işleme, şeker ekstraksiyonunu ve laktik asit üretimini etkili bir şekilde artırmış; bu durum, antep fıstığı kabuklarının laktik asit üretimi için potansiyel bir hammadde olarak değerlendirilebileceğini göstermektedir.

Anahtar Kelimeler: Laktik asit, antep fıstığı kabuğu, eşzamanlı sakkarifikasyon ve fermentasyon, laktik asit bakterileri, protik iyonik sıvı, ön işlem.

ABSTRACT

The processing of food products generates a significant amount of agricultural industrial waste, most of which is either incinerated or discarded into the environment. An alternative approach involves using agricultural waste as raw material in biotechnological processes, transforming these materials, which lack commercial value, into high value-added products. This strategy can help mitigate environmental problems, conserve raw material resources, and prevent economic losses. In this study, pistachio shells, a type of lignocellulosic waste, were utilized for lactic acid production via fermentation with *Lactobacillus plantarum* MF4 and MF33. The aim of this study was to enhance sugar yields from the enzymatic hydrolysis of pistachio shells and efficiently produce lactic acid by applying protic ionic liquid pretreatment. The pistachio shell samples were pretreated using triethylammonium hydrogen sulfate (TEAHSO_4) at various temperatures (130, 150, and 170°C) and for different durations (1, 1.5, 2, and 3 hours), with a biomass loading of 10% (g biomass/g protic ionic liquid). Overall, the sugar yields obtained from enzymatic hydrolysis increased, while solid recovery values decreased with higher pretreatment temperatures and longer durations. Enzymatic hydrolysis results of pretreated pistachio shells revealed that protic ionic liquid pretreatment was effective in achieving high sugar concentrations, reaching 18.43 g/L at 130°C for 3 hours, identified as the optimal pretreatment condition. In contrast, the reducing sugar concentration obtained from the enzymatic hydrolysis of untreated pistachio shells was determined to be 1.48 g/L. The biomass samples pretreated under optimal conditions were subjected to simultaneous saccharification and fermentation (SSF), which resulted in a total lactic acid (D-lactic acid+L-lactic acid) production yield of 36% and 39% by *Lactobacillus plantarum* MF4 and MF33 on the 72nd h of fermentation, respectively. Overall, protic ionic liquid pretreatment effectively enhanced sugar extraction and lactic acid production, suggesting that pistachio shells can be considered a potential feedstock for lactic acid production.

Keywords: Lactic acid, pistachio shell, simultaneous saccharification and fermentation, lactic acid bacteria, protic ionic liquid, pretreatment.

SOY PRODUCTS PROCESSING AND FOOD ALLERGIES**Sabina Khanam**Department of Zoology Maulana Abul Kalam Azad Faiz-e-Aam Mahavidyalaya,
Asalatganj, Kanpur (Kanpur University)**Abstract**

Soya also called soybean a legume which is low in saturated fat and rich in protein, vitamin C, calcium, potassium, iron, thiamin and healthful because it contains all the essential amino acids and isoflavones. Most of the places it is used as a food and as a protein supplements. Soy is also used to extract oil and this soy oil if used for various purposes such as engine lubricant, crayons, candles and ecologically friendly fuel. The nutritional value of soy and their products is based on how it is processed and what type of ingredients are added. There are so many benefits of taking soy in our diet such as it reduces the risk of breast cancer, Diarrhea, Kidney diseases, High blood pressure, manages obesity, lower the risk of heart diseases, osteoporosis, diabetes.

Soy can be processed into many products such as soy milk, soy fiber and soy protein. A compound called isoflavone is present in the soy which changed to phytoestrogens in the body which is similar in structure to estrogen hormone. Phytoestrogens affects the normal functioning of the estrogen by blocking its effects because in some cases phytoestrogens mimics the effects of estrogen.

Soy has so many benefits but in some cases it causes side effects such as mild constipation, nausea, bloating and some allergic reactions such as itching, tightness in throat, stomach cramps, vomiting, rashes, dizziness, swelling and breathing problems because soy allergens affects immune system to overreact to soy proteins. There are some allergenic proteins in soy which may cause allergy are: Gly m 1, Gly m 2, Gly m 3, Gly m 4, Gly m 5, Gly m 6, Gly m 7 and Gly m 8.

To attain the desirable properties soy ingredients are processed by various processes such as enzymatic hydrolysis and heat treatments which may leads to reduce the allergenicity in some cases but in most of the cases heat treatments increase the allergenicity.

Key words: Soy, allergy, effects, processing

APPLICATIONS OF FOOD COLOR AND BIO-PRESERVATIVES IN THE FOOD AND ITS EFFECT ON THE HUMAN HEALTH

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Abstract

Color is a key component to increase the ultimate appetizing value and consumer acceptance towards foods and beverages. Synthetic food colors have been increasingly used than natural food colors by food manufacturers to attain certain properties such as low cost, improved appearance, high color intensity, more color stability and uniformity. Varied foods and beverages available in the market may contain some non-permitted synthetic colors and over use of permitted synthetic colors. This may lead to severe health problems such as mutations, cancers, reduced hemoglobin concentrations and allergic reactions. Moreover, 60% of the beverages violated the label requirement without including proper color ingredients. The study concluded that there is a high tendency to use synthetic food colors in confectioneries and beverages and some confectioneries contain unidentified colors including a textile dye. Therefore, the implementation of regulations and awareness programs of food colors for consumers and food manufacturers are highly recommended.

Keywords: Food color Preservatives Storage and Antimicrobial and antioxidants

SUNFLOWER SEED'S ROLE IN CARDIOVASCULAR HEALTH

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Sunflower seeds (*Helianthus Annuus*) are increasingly recognized for their potential benefits to cardiovascular health due to their rich and varied nutrient profile. These seeds are high in polyunsaturated fats, including omega 6 fatty acids which aids in lowering elevated levels of low-density lipoproteins (LDL) often referred as bad cholesterol. Furthermore, it increases the level of high-density lipoproteins (HDL) known as good cholesterol. This change in lipid levels helps to reduce the risk of heart diseases. Additionally, sunflower seeds are rich source of vitamin E, a powerful antioxidant that helps comeback oxidative stress and inflammation, which are key factors in the development of cardiovascular diseases. Sunflower seeds also contain significant amount of magnesium, which pays a crucial role in regulating blood pressure and maintaining normal heart rhythms. This helps to prevent hypertension and reduce arrhythmias. There are several vitamins in sunflower seeds including B1, B5 and Folate. Moreover, sunflower seeds are an excellent source of plant-based proteins offering 6g per ounce, which covers 12 % of daily requirement. They are rich in essential amino acids like tryptophan, which are vital for building and repairing tissues. Additionally, 1 ounce of sunflower seeds provides 10% of daily iron requirement. Iron is crucial for transporting oxygen throughout the body including lungs, blood and cells. Consuming sunflower seeds regularly can improve heart health by lowering blood pressure and cholesterol level. Incorporating sunflower seeds in our diet can effectively boost cardiovascular health.

Key Words: Sunflower seeds; cardiovascular health and hypertension

SUSTAINABLE MANAGEMENT OF GASTRONOMIC EVENTS: SCOPING REVIEW

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ABSTRACT

The sustainable management of gastronomic events constitutes a novel topic of study due to the growing concern of academics, public-private agents involved in the organisation of events and the attendees themselves in the creation of sustainable strategies that respect the environment and contribute to turning human cities into more inclusive, safe, resilient and sustainable places. Despite the great interest of academia in the study of the subject, there needs to be more bibliographical sources and a lack of sustainable actions and policies that respond to the needs and expectations of the parties involved in the sustainable management of gastronomic events. In order to respond to the gaps above, the research aims to determine the factors associated with the sustainable management of gastronomic events using a scoping review, for which we aim to identify the theoretical bases associated with the research, detect possible gaps and propose future lines of study. It should be noted that to manage gastronomic events sustainably, it is necessary to implement policies that take into consideration the dimensions of sustainable development: economic, social and environmental and support practices that reduce environmental impact encourage environmental education of those attending the event, promote the authenticity of local products and the sustainable management of the gastronomic event to contribute to visitor satisfaction and the welfare of the local community .

Keywords: food events, food festivals, sustainable food events, sustainable local development, sustainable local management.

KONJUGASYON UYGULAMALARININ BİTKİSEL PROTEİNLERİN TEKNO-FONKSİYONEL ÖZELLİKLERİ ÜZERİNDEKİ ETKİLERİ**EFFECTS OF CONJUGATION APPLICATIONS ON THE TECHNO-FUNCTIONAL PROPERTIES OF VEGETABLE PROTEINS****Tuba SARI**

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ÖZET

Günümüzde sağlıklı beslenme ve yaşam tarzının benimsenmesi, tüketicilerin gıda içerikleri konusunda artan bilgi ve farkındalığı ile birleşerek bitkisel proteinlerin popülaritesinin artmasına yol açmaktadır. Doğal protein arayışı, çevre dostu ve sürdürülebilir gıda kaynaklarına olan ilginin artması da bu durumu desteklemektedir. Hem bitkisel hem de hayvansal proteinlerin kendine özgü avantajları bulunmaktadır. Artan vegan ürün talepleri, sağlıklı beslenmeye yönelim, inançlar, sosyo-ekonomik kaygılar, çevre güvenliği, maliyet ve sürdürülebilirlik gibi faktörler, gıda endüstrisinde bitkisel proteinlerin kullanımını artıran önemli etkenlerdir. Proteinler, çözünürlük, su tutma, yağ bağlama, köpürme, emülsiyon oluşturma ve jelleşme gibi çeşitli tekno-fonksiyonel özelliklerinden dolayı gıdaların görünüşlerine ve tekstürel özelliklerine katkıda bulunmaları sebebiyle gıda bileşeni olarak yaygın şekilde kullanılmaktadır. Proteinlerin fizikokimyasal, teknofonksiyonel ve besinsel özelliklerini değiştirmek amacıyla çeşitli fiziksel, kimyasal ve biyolojik yöntemler kullanılarak modifikasyon işlemi gerçekleştirilmektedir. Bu yöntemler içerisinde Maillard reaksiyonu kullanılarak proteinlerin polisakkaritler ile konjugasyonu, proteinlerin tekno-fonksiyonel özelliklerini geliştirmesi nedeniyle son yıllarda yaygın olarak kullanılmaktadır. Konjugasyonda amino asitlerin, peptitlerin veya proteinlerin ϵ -amino grupları ile polisakkaritlerin indirgeyici grupları arasında kovalent bağın oluşumu için Maillard reaksiyonu kullanılmakta olup, başlatılması veya sürdürülmesi için herhangi bir katkı maddesi gerekmediğinden bu reaksiyon “yeşil reaksiyon” olarak kabul edilmektedir. Proteinlerin polisakkaritlerle konjugasyonu iki farklı şekilde gerçekleşmektedir. Kuru ısıtma tekniğinde hazırlanan protein-polisakkarit karışımının belirli bir bağıl nem ve sıcaklık koşullarında birkaç gün veya hafta bekletilmektedir. Uzun reaksiyon süresine ve sarı-kahverengi renge sahip Maillard reaksiyon ürünlerinin oluşması, kuru ısıtma koşulunda gerçekleştirilen konjugasyon işleminin dezavantajları olarak görülmektedir. Yaş ısıtma tekniğinde ise hazırlanan protein-polisakkarit çözeltisinin birkaç dakika veya saat ısıtılması ile reaksiyon kısa sürede gerçekleşmekte ve Maillard reaksiyonunda Schiff bazı bileşikleri başlangıç düzeyinde oluşmaktadır. Bu nedenle endüstride konjugasyon uygulamasında yaş ısıtma tekniği daha çok tercih edilmektedir. Bununla birlikte konjugasyon işleminin etkinliği ve oluşacak ürünlerin özellikleri proteinin çeşidi, protein-polisakkarit oranı, reaksiyon sıcaklığı ve reaksiyon süresi gibi faktörlerden etkilenmektedir. Glikasyon reaksiyonlarıyla proteinlerin, peptitlerin ve aminoasitlerin fonksiyonel özellikleri ve antioksidan aktivitesi artırılabilir. Proteinler emülsiyon, köpük, film ve jel oluşturabilme özellikleri sayesinde ürün bileşiminde oldukça önemli yere sahip olup, gıdaların reolojik

davranışları, duyuşal özellikleri ve tekstürel özellikleri üzerinde de önemli etkilere sahiptir. Bununla birlikte proteinler pH deęişimine, yüksek iyonik güce, yüksek sıcaklığa, yoğun akış/kayma koşullarına, proteolitik ajanlara ve organik çözücülere karşı duyarlıdır. Bu çalışmanın amacı, bitkisel proteinlerde yapılan konjugasyon uygulamalarının ürün bileşimlerinde çözünürlük, termal stabilite, viskozite, emülsiyon oluşumu ve stabilitesi, köpük oluşumu ve stabilitesi, jelleşme gibi tekno-fonksiyonel özelliklerine nasıl katkı sağladığını araştırmaktır.

Anahtar Kelimeler: bitkisel protein, konjugasyon, çözünürlük, termal stabilite, emülsiyon oluşumu

ABSTRACT

Today, the adoption of healthy diets and lifestyles, coupled with consumers' increasing knowledge and awareness of food ingredients, is leading to an increase in the popularity of plant proteins. This is supported by the search for natural and lean proteins and the growing interest in environmentally friendly and sustainable food sources. Both plant and animal proteins have their advantages. Increasing demand for vegan products, orientation towards healthy eating, beliefs, socio-economic concerns, environmental safety, cost, and sustainability are important factors that increase the use of plant proteins in the food industry. Proteins are widely used as food ingredients because they contribute to foods' appearance and textural properties due to their various techno-functional properties such as solubility, water retention, fat binding, foaming, emulsification and gelling. Different physical, chemical, and biological methods are used to modify proteins' physicochemical, technofunctional, and nutritional properties. Among these methods, conjugation of proteins with polysaccharides using the Maillard reaction has been widely used in recent years due to improving the techno-functional properties of proteins. In conjugation, the Maillard reaction is used for the formation of covalent bonds between the ϵ -amino groups of amino acids, peptides, or proteins and the reducing groups of polysaccharides, and this reaction is considered a "green reaction" since no additives are required to initiate or maintain it. The conjugation of proteins with polysaccharides occurs in 2 different ways. The prepared protein-polysaccharide mixture is kept for several days or weeks at a specific relative humidity and temperature using the dry heating technique. The long reaction time and the formation of Maillard reaction products with yellow-brown color are disadvantages of the conjugation process carried out under dry heating conditions. In the wet heating technique, the reaction takes place in a short time by heating the prepared protein-polysaccharide solution for a few minutes or hours, and Schiff base compounds are formed at the initial level of the Maillard reaction. For this reason, the wet heating technique is preferred in conjugation applications in industry. However, the efficiency of the conjugation process and the properties of the products to be formed are affected by factors such as the type of protein, protein-polysaccharide ratio, reaction temperature and reaction time. Glycation reactions can increase the functional properties and antioxidant activity of proteins, peptides, and amino acids. Thanks to their emulsion, foam, film, and gel-forming properties, proteins are significant in product composition. They have important effects on foods' rheological behavior, sensory properties, and textural properties. However, proteins are sensitive to pH changes, high ionic strength, high temperature, intense flow/shear conditions, proteolytic agents and organic solvents. This study aims to investigate how the conjugation of plant proteins contributes to techno-functional properties such as solubility, thermal stability, viscosity, emulsion formation and stability, foam formation and stability, and gelation in product compositions.

Keywords: plant protein, conjugation, solubility, thermal stability, emulsion formation

NOHUT UNU VE KURU FASULYE UNU İKAME EDİLEREK ÜRETİLEN GLUTENSİZ EKMEKLERİN BAZI KİMYASAL, FİZİKSEL VE DUYUSAL ÖZELLİKLERİ

SOME CHEMICAL, PHYSICAL AND SENSORY PROPERTIES OF GLUTEN-FREE BREADS SUPPLEMENTED WITH CHICKPEA AND DRY BEAN FLOURS

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ÖZET

Bazı bireylerde gluten tüketimine bağlı olarak çölyak hastalığı, buğday alerjisi, gluten ataksisi, çölyak dışı gluten hassasiyeti ve dermatitis herpetiformis gibi rahatsızlıklar gelişebilmektedir. Bu hastalıkların tek tedavi yöntemi glutenin diyetten tamamen çıkarılmasıdır. Ancak glutensiz ürünler genellikle pirinç unu ve patates unu gibi bazı gıda bileşenlerini düşük miktarda bulduran kaynaklar kullanılarak üretildiğinden, son ürün protein ve diyet lifi gibi bazı önemli bileşenler açısından fakir olabilmektedir. Ayrıca glutensiz ürünlerin fiziksel ve duyuşal özelliklerinde bazı olumsuzluklar da görülmektedir. Bu problemlerin üstesinden gelmek için halen çeşitli çalışmalar yürütülmektedir.

Bu çalışmada, nohut unu (NU) (*Cicer arietinum* L.) ve kuru fasulye unu (KFU) (*Phaseolus vulgaris* L.) glutensiz ekmek üretiminde pirinç unu + mısır nişastasından oluşan un karışımına farklı oranlarda (%15 NU+%5 KFU, %10 NU+%10 KFU, %5 NU+%15 KFU) ikame edilmiştir. Ekmeklerin bazı kimyasal, fiziksel ve duyuşal özellikler araştırılmıştır. NU+KFU karışımının formülasyona eklenmesi ekmeklerde protein, diyet lifi ve kül oranını arttırırken, karbonhidrat oranını azaltmıştır. Ayrıca, yağ oranı, spesifik hacim ve enerji değerinde önemli bir farklılık gözlenmemiştir. Baklagil unlarının eklenmesi ile glutensiz ekmeklerin iç ve dış renklerinin kırmızılık ve sarılık değerlerinde önemli artışlar olmuştur. Duyuşal analizlere göre, KFU ve NU ilavesi ile ekmeklerin tüm duyuşal parametre puanlarında artışlar gözlenirse de tüm ekmek örneklerinin tat, gözenek yapısı, tekstür, çiğnenebilirlik ve genel kabul edilebilirlik puanlarının

istatistiksel olarak benzer ($p>0.05$) olduğu tespit edilmiştir. Tüm sonuçlar göz önünde bulundurulduğunda, glutensiz ekmeklerin bazı kimyasal ve duyuşsal özelliklerinin NU ve KFU kullanılarak iyileştirildiğı söylenebilir.

Anahtar Kelimeler: Glutensiz ekmek, zenginleştirme, nohut, kuru fasulye

ABSTRACT

Some individuals may develop disorders such as celiac disease, wheat allergy, gluten ataxia, non-celiac gluten sensitivity, and dermatitis herpetiformis due to gluten consumption. The only treatment for these diseases is to eliminate gluten from the diet. However, since gluten-free products are usually produced using nutrient-poor sources such as rice flour and potato flour, the final product is poor in important components such as protein and dietary fiber. In addition, some physical and sensory weaknesses are observed in gluten-free products. Various studies are being carried out to overcome these problems.

In this study, chickpea flour (CF) (*Cicer arietinum* L.) and dry bean flour (DBF) (*Phaseolus vulgaris* L.) were substituted into the rice flour + corn starch mixture at different rates (15% CF+5% DBF, 10% CF+10% DBF, 5% CF+ %15 DBF) during gluten-free bread production. Some chemical, physical and sensory properties of breads were investigated. The addition of CF+DBF mixture to the formulation increased the protein, dietary fiber and ash ratios and decreased the carbohydrate ratios. In addition, no significant differences observed in fat ratios, specific volumes and energy values. With the addition of legume flours, there were also significant increases in the redness and yellowness values of the crumb and crust colors of the gluten-free breads. According to sensory analysis, although increases were observed in all sensory parameter scores of the breads with the addition of DBF and CF, it was determined that taste, pore structure, texture, chewiness and overall acceptability scores of all bread samples were statistically similar ($p>0.05$). Considering all the results, it can be said that some chemical and sensory properties of gluten-free breads were improved by using CF and DBF.

Keywords: Gluten-free breads, enrichment, chickpea, dry bean

VERTICAL FARMING IN URBAN LANDSCAPES: ARCHITECTURAL APPROACHES TO SUSTAINABLE FOOD SYSTEMS

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Abstract:

The speed of urbanization and traditional agricultural methods reaching the edge of their natural limits have brought forth a push for creative, city-based solutions to food production. Thus, architectural innovations like vertical farming have emerged as a possible solution to join sustainable food production with dense urban living. This paper investigates the feasibility of vertical farming as to whether it provides a solution to food security, environmental sustainability and efficient land use within cities. An in-depth examination of crucial case studies, such as The Plant in Chicago, Sky Greens in Singapore and Plantagon CityFarm in Stockholm, show a number of architectural strategies will be investigated ranging from repurposing industrial buildings to modular vertical solutions, contemporary hydroponic and aquaponic technologies. By optimizing the use of scarce urban space these systems consume fewer resources (water, energy) while also significantly reducing the carbon footprint of food transportation.

The paper also explores how architectural designs could help the incorporation of vertical farming in current urban planning lines to encourage resilience and local food production. It critically evaluates challenges such as the need for high initial capital investment, energy demands and interdisciplinary collaboration between architects, urban planners and technologists. These findings indicate that vertical farming may not only improve the sustainability of urban systems, but it may also help to transform cities into self-sustaining ecosystems equipped to feed their inhabitants locally in the face of expanding global food needs. It should serve as a key indicator that in order to render vertical farming viable as a staple of future urban landscapes, support through policy, public attention and adaptable architectural paradigms is crucial. Bridging the gap between architecture, technology and agriculture, vertical farming presents a possible path to sustainability in light of such dual pressures facing cities.

Keywords: Vertical farming; Urban agriculture; Sustainable food systems; Environmental sustainability; Urban resilience.

DERİN YAĞDA KIZARTMA İŞLEMİ SIRASINDA AYÇİÇEK YAĞINDA OLUŞAN KİMYASAL DEĞİŞİMLERİN İNCELENMESİ

INVESTIGATION ON SOME CHEMICAL CHARACTERISTICS OF SUNFLOWER OIL DURING DEEP-FAT FRYING

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ÖZET

Bu çalışmada dondurulmuş et köftelerinin derin yağda kızartılması işlemi sırasında ayçiçek yağında meydana gelen kimyasal değişimlerin belirlenmesi amaçlanmıştır. Dondurulmuş et köfteleri sanayi tipi elektrikli bir fritözde 180°C’de 5 dakika boyunca kızartılmıştır. Fritöze taze yağ eklenmeksizin 70 kere kızartma işlemi tekrarlanmıştır. Kızartma işleminin 0-10-20-30-40-50-60 ve 70. tekrarlarında yağ örnekleri toplanmıştır. Bütün yağ örnekleri için konjuge dien, trien (K232 ve K270), karotenoid, klorofil ve renk değerleri belirlenmiştir. Aynı yağ ile kızartma işleminin tekrarlanması yağların konjuge dien ve trien değerlerini yükseltmiştir. Kızartma işlemi boyunca ayçiçek yağının karotenoid ve klorofil değerleri oldukça azalmıştır. Et köftelerinin 70 kez kızartılması, ayçiçek yağının kırmızılık/sarıklık renk değeri oranını arttırmıştır. Elde edilen veriler temel bileşenler analizi (TBA) ile açıklanmıştır. TBA kızartılmış yağ örneklerini kızartma tekrarı sayısına göre sınıflandırmıştır (3 BS, $R^2 = 0,99$).

Anahtar Kelimeler: derin yağda kızartma, ayçiçek yağı, oksidasyon, karotenoid

ABSTRACT

The purpose of this study is to investigate some chemical changes occurring in sunflower oil during deep fat frying process of frozen meatballs. Frozen meatballs were fried in an industrial electric fryer at 180°C for 5 minutes. Frying was performed for 70 times without addition of fresh oil. Oil samples were collected at the 0,10, 20, 30, 40, 50, 60, and 70th times of the frying process. Conjugated diene-triene (C232 and C270), carotenoid-chlorophyll contents and color changes of fried oils were determined. The conjugated diene and triene values of the samples increased by repeating the frying process. The carotenoid and chlorophyll values of sunflower oil decreased significantly. Frying the meatballs 70 times increased the redness/yellowness ratio of sunflower oil. The data were explained by principal component analysis (PCA). The PCA model with 3 PCs, $R^2 = 0.99$ revealed that there is a separation of samples with respect to frying times.

Keywords: deep fat frying, sunflower oil, oxidation, carotenoid

AGRICULTURE: THE PERENNIAL PRIORITY OF THE EUROPEAN UNION

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Abstract

The European Union defines its Common Agricultural Policy (CAP) as a multifaceted approach addressing food security, environmental conservation, and the prosperity of rural areas. The CAP serves as a collaborative platform between society and agriculture, aiming to ensure a consistent food supply, safeguard farmers' livelihoods, preserve the natural environment, and sustain the vibrancy of rural communities. The CAP seeks to bolster rural development and economic resilience through financial support and strategic initiatives. Furthermore, the CAP outlines a forward-looking vision focusing on three overarching goals: enhancing the competitiveness of agriculture and forestry, promoting the sustainable management of natural resources and climate action, and fostering equitable development across rural economies and communities. This paper provides an overview of previous EU agricultural reforms and a snapshot of the current agricultural situation.

Keywords: Common Agricultural Policy, European Union, Agricultural Reform, Rural Development, Food Security

Özet

Avrupa Birliği, Ortak Tarım Politikasını (OTP) gıda güvenliği, çevre koruma ve kırsal alanların refahını ele alan çok yönlü bir yaklaşım olarak tanımlar. OTP, toplum ve tarım arasında tutarlı bir gıda tedariki sağlamayı, çiftçilerin geçim kaynaklarını korumayı, doğal çevreyi korumayı ve kırsal toplulukların canlılığını sürdürmeyi amaçlayan bir iş birliği platformu görevi görür. OTP, finansal destek ve stratejik girişimler yoluyla kırsal kalkınmayı ve ekonomik dayanıklılığı güçlendirmeyi amaçlamaktadır. Ayrıca, OTP üç kapsamlı hedefe odaklanan ileriye dönük bir vizyon ortaya koymaktadır: tarım ve ormancılığın rekabet gücünü artırmak, doğal kaynakların sürdürülebilir yönetimini ve iklim eylemini teşvik etmek ve kırsal ekonomiler ve topluluklar arasında eşit kalkınmayı teşvik etmek. Bu araştırma, önceki AB tarım reformlarına genel bir bakışı ve mevcut tarımsal durumun görüntüsünü sunmaktadır.

Anahtar Sözcükler: Ortak Tarım Politikası, Avrupa Birliği, Tarım Reformu, Kırsal Kalkınma, Gıda Güvenliği

MENTHA LONGIFOLIA L. KOLON KANSERİNDE KOMBİNE TEDAVİSİNİN HÜCRE DÖNGÜSÜ ÜZERİNE ETKİSİNİN ARAŞTIRILMASI

INVESTIGATION OF THE EFFECT OF COMBINED TREATMENT OF MENTHA LONGIFOLIA L. ON CELL CYCLE IN COLON CANCER

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ÖZET

Nane (*Mentha* türleri), Lamiaceae familyasının bir üyesi olan uçucu yağlar ve sekonder metabolitler açısından zengin bir bitkidir. Yüksek miktarda fenolik ve flavonoid bileşikler içeren nane, hem sağlık sektöründe hem de ticari amaçlarla önemli bir bitki türü olarak öne çıkmaktadır. Esansiyel yağları ve toprak üstü kısımları, gastrointestinal ve solunum yolu hastalıklarının yanı sıra enfeksiyonlar ve inflamatuvar hastalıklar gibi çeşitli rahatsızlıkların tedavisinde, gıda koruyucu olarak ve iyileştirici bir alternatif olarak kullanılmaktadır. *M. longifolia* türü, güçlü antioksidan özellikleriyle bilinmektedir ve serbest radikalleri temizleyebilme kapasitesine sahip çok sayıda fenolik ve flavonoid bileşiği içerir. Bu bileşikler, metabolik yollarla inflamasyonu azaltabilir ve kanser riskini önleyici etkiler gösterebilir. Bu çalışmada; *Mentha longifolia* L. bitkisi Sivas ili Zara ilçesine bağlı Tepeköy ve Ütük köylerinden 2023 yılı Mayıs ve Eylül aylarında iki farklı dönemde toplanmıştır. Bitkilere ait uçucu yağlar çiçeksiz tüm gövde ve çiçek+gövde olmak üzere ayrı ayrı çıkarılmıştır. Uçucu yağlar bitkilerin belirtilen kısımlarının Clevenger aparatında 3 saat hidrodistilasyonu sonucunda elde edilmiştir. Clavenger aparatının kondenser kısmı mikrohiller cihazına bağlanarak soğutma suyunun 4°C'de kalması sağlanmıştır. Elde edilen yağın verimi v/W (mL yağ/g bitki) olarak belirlenmiştir. *Mentha longifolia* L. özütünün ve doxetakselin, HT-29 kolon kanseri hücre hattındaki hücre döngüsü üzerindeki gen ekspresyon etkileri incelenmiştir. HT-29 hücre hattı RPMI, ortamında ve CCD18-Co hücre hattı MEM ortamında, %10 fetal bovine serum (FBS), penisilin (100 U/mL) içeren ortamlarda, 37°C, %5 CO₂ ve %95 inkübatörde kültür edilmiştir. Daha önceki yapılan bir çalışmada (Mohamed Abdoul-Latif, F, Ainane, A.Houmed Aboubaker, I, Mohamed, J., & Ainane, T. (2023) belirlenen bu türün içeriğinin IC₅₀ dozları hücrelere uygulanmıştır. Ardından hücrelerden RNA izolasyonu ve cDNA sentezi gerçekleştirilmiştir. Hücre döngüsü ile ilgili genlerin ekspresyon seviyeleri RT-PCR yöntemi ile

belirlenmiştir. Sonuçlar incelendiğinde, *Mentha longifolia* L. özütünün tek başına uygulandığında hücre döngüsü gen ekspresyonunda belirgin bir değişiklik yapmadığını, ancak doxetaksel ile birlikte kullanıldığında bu genlerin ekspresyonunda anlamlı bir artışa yol açtığını göstermiştir. Bu bulgu, *Mentha longifolia* L.'nin doxetakselin etkinliğini artırarak kanser hücrelerinin ilaç direncini aşmada hücre döngüsü üzerinde potansiyel olarak önemli bir rol oynayabileceğini ve kolon kanserini ilerlemesinin engellenmesinde etkili olabileceği öngörülmektedir. Kanserin ilerlemesini engelleyebilecek yeni bir strateji olarak daha çok araştırmaya ihtiyaç duyulmaktadır.

Anahtar Kelimeler: *Mentha longifolia* L , kanser, hücre döngüsü.

ABSTRACT

Mint (*Mentha* species) is a plant rich in essential oils and secondary metabolites, belonging to the Lamiaceae family. With its high content of phenolic and flavonoid compounds, mint stands out as an important plant species in both the healthcare sector and for commercial purposes. Its essential oils and aerial parts have been used as a food preservative and as a healing alternative in the treatment of various disorders, including gastrointestinal and respiratory diseases, infections, and inflammatory diseases. The *M. longifolia* species is known for its strong antioxidant properties and contains numerous phenolic and flavonoid compounds capable of scavenging free radicals. These compounds can reduce inflammation through metabolic pathways and may exhibit cancer-preventive effects. In this study, the *Mentha longifolia* L. plant was collected from Tepeköy and Ütük villages in the Zara district of Sivas province in two different periods: May and September 2023. The essential oils of the plants were extracted separately from the entire stem without flowers and from the flower + stem. The essential oils were obtained by hydrodistillation for 3 hours in a Clevenger apparatus. The condenser part of the Clevenger apparatus was connected to a microchiller to maintain the cooling water at 4°C. The yield of the obtained oil was determined as v/W (mL oil/g plant). The effects of *Mentha longifolia* L. extract and docetaxel on gene expression related to the cell cycle in the HT-29 colon cancer cell line were investigated. The HT-29 cell line was cultured in RPMI medium and the CCD18-Co cell line in MEM medium, supplemented with 10% fetal bovine serum (FBS) and penicillin (100 U/mL), at 37°C with 5% CO₂ in a humidified incubator. The previously determined IC₅₀ doses of this species (Mohamed Abdoul-Latif, F., Ainane, A. Houmed Aboubaker, I., Mohamed, J., & Ainane, T. (2023)) were applied to the cells. RNA isolation and cDNA synthesis were then performed from the cells. The expression levels of genes related to the cell cycle were determined using the RT-PCR method. Upon examination of the results, it was found that the application of *Mentha longifolia* L. extract alone did not cause a significant change in cell cycle gene expression; however, when used in conjunction with docetaxel, it led to a significant increase in the expression of these genes. This finding suggests that *Mentha longifolia* L. may play a potentially important role in overcoming drug resistance in cancer cells by enhancing the efficacy of docetaxel and may be effective in preventing the progression of colon cancer. Further research is needed as a new strategy to prevent cancer progression.

Keywords: *Mentha longifolia* L, cancer, cell cycle.

KIZILÖTESİ KURUTMANIN HİNDİSTAN CEVİZİNİN (COCOS NUCIFERA L.) FİZİKOKİMYASAL ÖZELLİKLERİ ÜZERİNE ETKİLERİ VE İŞLEM OPTİMİZASYONU

Mühendisliği Anabilim Dalı) yüksek lisans tezi kapsamında gerçekleştirilmiştir. Bu çalışma, Eskişehir Osmangazi Üniversitesi Bilimsel Araştırma Projeleri Koordinasyon Birimi tarafından FYL-2024-3094 kodlu proje kapsamında desteklenmiştir.

THE EFFECTS OF INFRARED DRYING ON THE PHYSICOCHEMICAL PROPERTIES OF COCONUT(COCOS NUCIFERA L.)AND PROCESS OPTIMIZATION

This study is a part of master's thesis of Ceren BEKTAŞ (Eskişehir Osmangazi University, Graduate School of Natural And Applied Sciences, Department of Food Engineering). This study has been supported by Eskişehir Osmangazi University, Scientific Research Projects Coordination Unit with the project no: FYL-2024-3094.

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ÖZET

Kızılötesi kurutma işlemi, hızlı ve yenilikçi bir teknik olmasının yanı sıra diğer kurutma yöntemlerine kıyasla ısı enerjisinin ürüne direkt nüfuz etmesi, hızlı süreç kontrolü, kısa işlem süresi, alternatif enerji kaynağı olması, yüksek enerji verimliliğine sahip olması, iyi kalitede son ürün elde edilmesi, gıdada bulunan aktif bileşenlerin kurutma sırasında korunabilmesi, basit bir ekipman yapısı ile kolay kurulumu, işletme maliyetinin düşük olması ve çevre dostu olması gibi pek çok avantaj barındırmaktadır. Bu çalışmada, kızılötesi kurutmaya ilişkin farklı kurutma işlem parametreleri kullanılarak Hindistan cevizi kurutulmuş olup, kurutulan örneklerde çeşitli fizikokimyasal analizler yürütülmüş ve işlem optimizasyonu gerçekleştirilmiştir. Öğütülüp boyutu küçültülen Hindistan cevizleri 150, 200 ve 250 W olmak üzere üç adet kızılötesi lamba kullanılarak kurutulmaktadır. Kızılötesi kurutma işlemine ilişkin diğer parametreler ise kurutma süresi (30, 135 ve 240 dk), kızılötesi lamba ile kurutulacak numune arası mesafe (15, 20 ve 25 cm) ve numune kalınlığı (10, 15 ve 20 mm) olarak seçilmiştir, kurutma işlemi 2 tekerrürlü tekrar edilmektedir. Kurutulan Hindistan cevizi örneklerinde nem miktarı, su aktivitesi, pH değeri, serbest asitlik tayini, toplam fenolik madde analizi, renk analizi ve FTIR analizi yapılmaktadır. Ayrıca taze numunede de toplam yağ miktarı tayini ve yağ asidi kompozisyonu analizleri gerçekleştirilecektir. Kurutulan öğütülmüş Hindistan cevizlerinde en düşük su aktivitesi değeri ve en düşük nem değeri 250W, 240 dakika, 15 cm lamba mesafesi ve 10 mm örnek kalınlığında yapılan denemede saptanmıştır, su aktivitesi değeri 0.27 nem değeri ise %1.03 olarak bulunmuştur. Ayrıca 250W, 240 dakika, 15 cm lamba mesafesi ve 10 mm örnek kalınlığında

yapılan denemede pH değeri 5.79, serbest asitlik değeri 1,12 ve renk değerleri ise L değeri 41.67, a değeri 1.39, b değeri 12.40 olarak bulunmuştur. Çalışmadan elde edilen bulgular doğrultusunda, kızılötesi kurutma işleminin etkinliği ve işlem koşullarının kurutulmuş numuneler üzerindeki etkileri ortaya konacaktır.

Anahtar Kelimeler: kurutma, kızılötesi, hindistan cevizi, fizikokimyasal özellikler, optimizasyon

ABSTRACT

In addition to being a fast and innovative technique, infrared drying process has many advantages compared to other drying methods such as direct penetration of heat energy into the product, fast process control, short process time, alternative energy source, high energy efficiency, good quality end product, preservation of active ingredients in food during drying, easy installation with a simple equipment structure, low operating cost and environmentally friendly. In this study, coconut is dried using different drying process parameters related to infrared drying, various physicochemical analyses are carried out on dried samples and process optimisation is performed. The grounded and size-reduced coconuts were dried using three infrared lamps of 150, 200 and 250 W. Other parameters related to the infrared drying process were selected as drying time (30, 135 and 240 min), distance between the infrared lamp and the sample to be dried (15, 20 and 25 cm) and sample thickness (10, 15 and 20 mm). Moisture content, water activity, pH value, free acidity determination, total phenolic matter analysis, colour analysis and FTIR analysis were performed on dried coconut samples. In addition, total fat content determination and fatty acid composition analyses will be performed in the fresh sample. The lowest water activity value and the lowest moisture value of the dried ground coconuts were found in the experiment conducted at 250W, 240 minutes, 15 cm lamp distance and 10 mm sample thickness, the water activity value was 0.27 and the moisture value was 1.03%. In addition, pH value was 5.79, free acidity value was 1.12 and colour values were found as L value 41.67, a value 1.39, b value 12.40 in the experiment conducted at 250W, 240 minutes, 15 cm lamp distance and 10 mm sample thickness. In line with the findings obtained from the study, the effectiveness of the infrared drying process and the effects of the process conditions on the dried samples will be revealed.

Keywords: drying, infrared, coconut, physicochemical properties, optimization

KETOJENİK DİYET VE ALZHEİMER**KETOGENIC DIET AND ALZHEIMER'S****Doç. Dr. Fatma HASTAOĞLU**

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ÖZET

Ketojenik diyet, düşük karbonhidrat ve yüksek yağ içeren bir beslenme şeklidir. Bu diyetin temel amacı, vücudu ketozis adı verilen bir duruma sokarak yağları enerji kaynağı olarak kullanmaktır. Son yıllarda ketojenik diyetin Alzheimer hastalığı üzerindeki potansiyel etkileri üzerine artan bir ilgi bulunmaktadır.

Alzheimer, ilerleyici bir nörodejeneratif hastalıktır ve genellikle hafıza kaybı, düşünme becerilerinde azalma ve davranış değişiklikleri ile karakterizedir. Beyinde glukoz metabolizmasındaki bozulmalar, Alzheimer'ın gelişiminde önemli bir rol oynamaktadır. Ketojenik diyet, beyin enerji ihtiyacını karşılamak için alternatif bir kaynak sunarak bu durumu iyileştirmeyi vaat etmektedir.

Araştırmalar, keton cisimlerinin (yağ asitlerinin yan ürünleri) beyin hücreleri için enerji kaynağı olarak glukozdan daha verimli olabileceğini göstermektedir. Ketonlar, özellikle glukozun yeterince kullanılmadığı durumlarda, nöronal fonksiyonu destekleyebilir. Bu durum, Alzheimer hastalarının beyin işlevlerini artırmasına ve semptomların hafifletilmesine yardımcı olabilir.

Bununla birlikte, ketojenik diyetin Alzheimer üzerindeki etkileri konusunda daha fazla araştırmaya ihtiyaç vardır. Bazı çalışmalar, ketojenik diyetin bilişsel işlevi iyileştirebileceğini ve Alzheimer'ın ilerlemesini yavaşlatabileceğini öne sürerken, diğerleri bu diyetin uzun vadeli etkilerini sorgulamaktadır. Ayrıca, diyetin bireyler arasında farklı etkiler yaratabileceği ve herkes için uygun olmayabileceği de unutulmamalıdır.

Sonuç olarak, ketojenik diyetin Alzheimer hastalığı üzerindeki etkileri umut verici olsa da, kesin sonuçlar elde edebilmek için daha fazla klinik çalışma gereklidir. Bu nedenle, bu konuda farkındalık oluşturmak önemlidir.

Anahtar Kelimeler: Ketojenik Diyet, Alzheimer, Beslenme

ABSTRACT

The ketogenic diet is a low-carbohydrate and high-fat diet. The main goal of this diet is to utilise fats as an energy source by putting the body into a state called ketosis. In recent years, there has been increasing interest in the potential effects of the ketogenic diet on Alzheimer's disease.

Alzheimer's is a progressive neurodegenerative disease and is usually characterised by memory loss, reduced thinking skills and behavioural changes. Disturbances in glucose metabolism in the brain play an important role in the development of Alzheimer's disease. The ketogenic diet promises to improve this condition by providing an alternative source to meet the brain's energy needs.

Research shows that ketone bodies (by-products of fatty acids) may be more efficient than glucose as an energy source for brain cells. Ketones can support neuronal function, especially when glucose is underutilised. This may help Alzheimer's patients improve brain function and alleviate symptoms.

However, more research is needed on the effects of the ketogenic diet on Alzheimer's. While some studies suggest that the ketogenic diet may improve cognitive function and slow the progression of Alzheimer's, others question the long-term effects of this diet. It should also be noted that the diet may produce different effects between individuals and may not be suitable for everyone.

In conclusion, although the effects of the ketogenic diet on Alzheimer's disease are promising, more clinical trials are required to obtain definitive results. Therefore, it is important to raise awareness on this issue.

Keywords: Ketogenic Diet, Alzheimer's, Nutrition

KEMOTERAPİ ALAN HASTALARDA HİPOGEZİ

HYPOGENESIS IN CHEMOTHERAPY PATIENTS

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ÖZET

Kemoterapi, kanser tedavisinde yaygın olarak kullanılan etkili bir yöntemdir. Ancak, bu tedavi süreci birçok yan etkiyi de beraberinde getirir. Bu yan etkilerden biri, hipogezi olarak adlandırılan tat duyusunda azalma veya kayıptır. Kemoterapi ilaçları, kanser hücrelerini hedef alırken, sağlıklı hücrelere de zarar verebilir. Özellikle tat alma duyusunu etkileyen ilaçlar, hastaların tat algısında önemli değişikliklere yol açabilir.

Hipogezi, hastaların beslenme alışkanlıklarını olumsuz yönde etkileyebilir. Tat kaybı, yemek yeme isteğini azaltabilir ve bu durum, beslenme yetersizliklerine yol açabilir. Hastalar, daha önce sevdikleri yiyeceklerin tadını alamadıkları için yemek yemekten kaçınabilirler. Ayrıca, bazı hastalar belirli tatları daha yoğun veya farklı algılayabilir, bu da yemeklerin tadını kötüleştirebilir. Bu durum, hastaların genel yaşam kalitesini düşürebilir ve psikolojik sorunlara yol açabilir.

Araştırmalar, hipogezi yaşayan kemoterapi hastalarının tat duyusunu geri kazanmalarına yardımcı olabilecek bazı stratejiler geliştirebileceğini göstermektedir. Örneğin, yemeklerin hazırlanmasında farklı baharatlar kullanmak, tat algısını artırabilir. Ayrıca, hastaların psikolojik destek alması ve beslenme uzmanlarıyla çalışması önerilmektedir. Bu tür destekler, hastaların beslenme düzenlerini iyileştirebilir ve yaşam kalitelerini artırabilir.

Sonuç olarak, hipogezi, kemoterapi alan hastalar için önemli bir sorun olup, tedavi sürecinde dikkate alınması gereken bir durumdur. Bu konuda hastaların bilgilendirilmesi ve desteklenmesi, tedavi sürecini olumlu yönde etkileyebilir. Hastaların tat duyusunun korunması ve iyileştirilmesi, genel sağlık durumları üzerinde de önemli bir etki yaratabilir. Bu nedenle, sağlık profesyonellerinin bu durumu göz önünde bulundurarak hareket etmesi büyük önem taşımaktadır.

Anahtar Kelimeler: Kemoterapi, Hipogezi, Beslenme, Tat Kaybı

ABSTRACT

Chemotherapy is a commonly used and effective method for cancer treatment. However, this treatment process also brings many side effects. One of these side effects is hypogeusia, which refers to a reduction or loss of taste sensation. Chemotherapy drugs target cancer cells but can also harm healthy cells. Medications that specifically affect the sense of taste can lead to significant changes in patients' taste perception.

Hypogeusia can negatively impact patients' eating habits. Loss of taste may reduce the desire to eat, potentially leading to nutritional deficiencies. Patients may avoid eating because they cannot taste the foods they previously enjoyed. Additionally, some patients may perceive certain tastes more intensely or differently, which can worsen the flavor of meals. This situation can diminish patients' overall quality of life and lead to psychological issues.

Research indicates that chemotherapy patients experiencing hypogeusia may develop strategies to help regain their sense of taste. For example, using different spices in meal preparation may enhance taste perception. Furthermore, it is recommended that patients receive psychological

support and work with nutritionists. Such support can improve patients' dietary patterns and enhance their quality of life.

In conclusion, hypogeusia is a significant issue for patients undergoing chemotherapy and should be considered during the treatment process. Educating and supporting patients on this matter can positively influence their treatment journey. Preserving and improving patients' sense of taste can have a substantial impact on their overall health. Therefore, it is crucial for healthcare professionals to act with this situation in mind.

Keywords: Chemotherapy, Hypogeusia, Nutrition, Loss of taste.

FONKSİYONEL BİR BESİN OLAN KİNOA VE SAĞLIK ÜZERİNE ETKİLERİ

QUINOA, A FUNCTIONAL FOOD AND ITS EFFECTS ON HEALTH

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ÖZET

Kökü Güney Amerika'ya dayanan kinoanın geçmişi 7000 yıl öncesine kadar uzanmaktadır. Geniş yapraklı ve çift çenekli bir bitki olan kinoa, tam tahıllar grubunda yer alan ancak tahıllardan farklı besin ögesi kompozisyonuna sahip fonksiyonel bir besindir. Kinoa, tahılların temel özelliklerini taşısa da arpa, buğday, pirinç gibi geleneksel buğdaygiller ailesinde yer almaz. Kazein proteiniyle benzer kalitede protein içermesinin yanı sıra, doymamış yağ asitleri, çeşitli vitaminler, yüksek biyoyararlılığa sahip mineraller ve posa da bünyesinde barındırmaktadır. Yüksek protein kalitesine sahip olması sebebiyle alternatif protein kaynağı olarak tüketilebilmektedir. Kinoanın aminoasit örüntüsünün yetişkin bireylerin günlük gereksinimlerini karşılayabilecek yeterlilikte olduğu bildirilmektedir. Tahıllarda sınırlı miktarda olan lizin ve triptofan ile kurubaklagillerde sınırlı miktarda bulunan kükürtlü aminoasitlerin düzeyi kinoada oldukça yüksektir. Yaprak ve tohumları yenilebilen kinoa, önemli bir fitokimyasal kaynağı olması sebebiyle antikarsinogenik, antiobezite, antidiyabetik, antikarsinogenik, antiinflamatuar, antioksidan, hipokolesterolemik, antiaterosklerotik, etki göstererek kanser, obezite, kardiyovasküler hastalıklar ve diyabet gibi çeşitli hastalıkların oluşumunu önleyici etkilere sahiptir. Kinoanın sağlık üzerindeki bu etkileri biyoaktif içeriği sebebiyledir. Kinoanın çoğunlukla tohumlarının tüketildiği bilinmektedir. Haşlanan kinoa tohumları çorbalarda; kinoa tohumlarının öğütülmesiyle elde edilen un ise ekmek, makarna, kek, kurabiye, bisküvi gibi yiyeceklerin yapımında kullanılabilir. Bu derlemede, kinoanın özellikleri, besin ögesi içeriği, içerdiği biyoaktif bileşenler ve sağlık üzerindeki etkilerinden bahsedilmiştir. Bilimsel çalışmalardan elde edilen kanıtların uygulamaya dönüştürülebilmesi için iyi tasarlanmış daha fazla bilimsel araştırmaya ihtiyaç vardır.

Anahtar Kelimeler: Kinoa, fonksiyonel besin, tahıl, besin, besin ögesi

ABSTRACT

Originating in South America, quinoa has a history dating back 7,000 years. Quinoa, a broad-leaved and dicotyledonous plant, is a functional food that is included in the whole grain group but has a different nutritional composition than grains. Although quinoa has the basic characteristics of grains, it is not included in the traditional wheat family such as barley, wheat, and rice. In addition to containing protein of similar quality to casein protein, it also contains unsaturated fatty acids, various vitamins, minerals with high bioavailability, and fiber. Due to its high protein quality, it can be consumed as an alternative protein source. It is reported that the amino acid pattern of quinoa is sufficient to meet the daily requirements of adults. The levels of lysine and tryptophan, which are limited in grains, and sulfur amino acids, which are limited in legumes, are quite high in quinoa. Quinoa, whose leaves and seeds can be eaten, has anticarcinogenic, antiobesity, antidiabetic, anticarcinogenic, anti-inflammatory, antioxidant, hypocholesterolemik, antiatherosclerotic effects, and prevents the formation of various diseases such as cancer, obesity, cardiovascular diseases and diabetes, as it is an important source of

phytochemicals. These effects of quinoa on health are due to its bioactive content. It is known that quinoa is mostly consumed as its seeds. Boiled quinoa seeds can be used in soups; flour obtained by grinding quinoa seeds can be used in making foods such as bread, pasta, cake, cookies, and biscuits. In this review, the properties of quinoa, its nutritional content, its bioactive components and its effects on health are discussed. More well-designed scientific research is needed to translate the evidence obtained from scientific studies into practice.

Keywords: Quinoa, functional food, grain, food, nutrient

FONKSİYONEL BİR BESİN OLAN NARIN SAĞLIK ÜZERİNE ETKİLERİ**EFFECTS OF POMEGRANATE, A FUNCTIONAL FOOD, ON HEALTH****Duygu MATARACI DEĞİRMENCİ**Dr. Öğr. Üyesi, Ordu Üniversitesi, Sağlık Bilimleri Fakültesi, Beslenme ve Diyetetik Bölümü,
Ordu, Türkiye.ORCID ID: <https://orcid.org/0000-0003-2136-1545>**ÖZET**

Çok eski çağlardan (yaklaşık 7000 yıl öncesinden) günümüze kadar ulaşmış, bazı dönemlerde tıbbi amaçlı kullanılmış bir besin olan nar (*Punica Granatum*) Lythraceae familyasının *Punica* cinsine aittir. Anavatanı Pakistan, Hindistan ve İran olan bu meyvenin Türkiye’de de yetiştiriciliği yapılmaktadır. Taze meyve olarak tüketilebildiği gibi meyve suyu, reçel, nar ekşisi, şurup, şarap, likör gibi ürünlere dönüştürülerek de tüketilebilmektedir. Ayrıca tatlandırıcı ve renk verici olarak da kullanılmaktadır.

Nar; antioksidan, antiobezite, antidiyabetik, antikarsinojenik, antiaterosklerotik, antiinflamatuvar etkilere sahip yenilebilir bir meyvedir. Narın bu özellikleri yapısındaki fenolik bileşiklerden (polifenoller, flavonoidler, ellajitaninler) kaynaklanmaktadır. Yapısındaki bu bileşenler aracılığıyla kan glikoz seviyesi azalır, kandaki LDL ve total kolesterol düzeyinde düşüş sağlanır, kan hücrelerinde apoptozis artar, oksidatif stres azalarak antioksidan etki artar, vücuttaki inflamasyon azalır, vücut ağırlığında azalma sağlanır. Ayrıca nar tüketimi anjiyotensin dönüştürücü enzim (ACE) aktivasyonunu engelleyerek kan basıncını regüle eder, damarlarda oluşan hasarı iyileştirir. Güçlü bir antioksidan olarak kabul edilen bu meyve pek çok hastalığın tedavisinde iyileştirici etkiye sahiptir. Bu etki; narın suyu, kabuğu, kuru ve çekirdeklerindeki yüksek miktarda bulunan fenolik bileşenler aracılığıyla gerçekleşir. Yapılan bilimsel çalışmalar narın antitümör ve antioksidan özellik gösteren fenolik maddeleri fazlaca içermesi sebebiyle insan sağlığına etkisine vurgu yapmaktadır. Bu nedenle, günlük beslenmede nara yer verilmesi, toplumun bu konuda bilinçlendirilmesi önem arz etmektedir. Bu derlemede fonksiyonel bir besin olarak nitelendirilen narın özellikleri ve sağlık üzerindeki etkileri değerlendirilmiştir.

Anahtar Kelimeler: Nar, fonksiyonel besin, antioksidan, fenolik bileşikler**ABSTRACT**

Pomegranate (*Punica Granatum*), a food that has survived from ancient times (approximately 7000 years ago) to the present day and has been used for medicinal purposes in some periods, belongs to the *Punica* genus of the Lythraceae family. This fruit, whose homeland is Pakistan, India and Iran, is also cultivated in Turkey. It can be consumed as fresh fruit or converted into products such as fruit juice, jam, pomegranate syrup, wine, liqueur. It is also used as a sweetener and colorant. Pomegranate is an edible fruit with antioxidant, antiobesity, antidiabetic, anticarcinogenic, antiatherosclerotic, anti-inflammatory effects. These properties of pomegranate are due to the phenolic compounds (polyphenols, flavonoids, ellagitannins) in its structure. With these components in its structure, blood glucose levels decrease, LDL and total cholesterol levels in the blood decrease, apoptosis increases in blood cells, oxidative stress decreases and antioxidant effect increases, inflammation in the body decreases, and

body weight decreases. In addition, pomegranate consumption regulates blood pressure by preventing angiotensin converting enzyme (ACE) activation and improves damage in the vessels. This fruit, which is considered a strong antioxidant, has a healing effect in the treatment of many diseases. This effect occurs through the phenolic components found in high amounts in the juice, peel, dried fruit and seeds of the pomegranate. Scientific studies emphasize the effect of pomegranate on human health due to its high content of phenolic substances that have antitumor and antioxidant properties. Therefore, it is important to include pomegranate in daily nutrition and raise awareness in society on this issue. In this review, the properties of pomegranate, which is considered a functional food, and its effects on health are evaluated.

Keywords: Pomegranate, functional food, antioxidant, phenolic compounds

EVALUATION OF SUGAR INDUSTRY WASTES FOR WASTEWATER TREATMENT

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ÖZET

Birçok endüstri çevre kirliliğine neden olan oldukça fazla miktarda atık ve atıksu oluşturur. Endüstriyel atıksular, atıksuyun karakteristiğine göre farklı fiziksel, kimyasal ve /veya biyolojik atıksu arıtma yöntemleri kullanılarak arıtılabilmektedir. Yaygın olarak kullanılan arıtma yöntemlerinden biri de adsorpsiyondur. Genellikle ticari olan aktif karbon arıtmada tercih edilmesine rağmen ekonomik ve atıkların değerlendirilmesi açısından farklı tarımsal, endüstriyel, evsel vb atıklar adsorban malzeme olarak kullanılmaktadır. Yani bu atıklar çevresel sürdürülebilirlik açısından farklı alanlarda değerlendirilebilir.

Şeker endüstrisi de oldukça fazla miktarda küspe, şeker pancarası posası ve melas gibi atıklar meydana getirmektedir. Şeker pancarı endüstrisi atıkları doğal ya da modifiye edilerek atıksulardan çeşitli kirleticiler örneğin ağırmetal, renk, nitrat azotu, fosfat ve KOI vb giderilebilir. Yapılan çalışmalarda şeker endüstrisi atıklarının özellikle endüstriyel atıksu çıkışlarındaki KOI, ağırmetal ve renk gideriminde kullanıldığı ve başarılı olduğu görülmektedir. Özellikle sülfirik asit, NaOH vb ile modifiye edilmiş veya yüksek sıcaklığa tabi tutularak şeker endüstrisi atıklarından elde edilen aktif karbonun adsorban olarak kullanımı atıksudaki kirleticilerin giderim verimini artırmıştır.

Bu çalışmada şeker endüstrisi atıklarından elde edilen doğal ve modifiye adsorbentlerin özellikleri ve atıksu arıtımında kullanım alanları literatür dikkate alınarak değerlendirilecektir. Sıfır atık ve sürdürülebilirlik açısından atıkların değerlendirilmesi ve yeniden kullanılması ülke ekonomisi ve çevre açısından çok önemlidir.

Anahtar Kelimeler: Şeker endüstrisi atığı , adsorbent, modifiye, atıksu

ABSTRACT

Many industries produce a lot of waste and wastewater that causes environmental pollution. Industrial wastewater can be treated with different physical, chemical and/or biological wastewater treatment methods depending on the characteristics of the wastewater. One of the commonly used wastewater treatment methods is adsorption. Although commercial activated carbon is preferred in treatment, wastes are used as adsorbent material in different agricultural, industrial, domestic etc. in terms of economy and waste evaluation. So these wastes can be evaluated in different areas in terms of environmental sustainability.

The sugar industry also produces a lot of wastes such as bagasse, sugar beet pulp and molasses. Naturally or by modifying sugar beet industry wastes can be used in order to remove wastewater various pollutants such as heavy metals, color, nitrate nitrogen, phosphate and COD etc. Studies show that sugar industry wastes are used and successfully removed, especially in the removal of COD, heavy metals and color from industrial wastewater outlets. The use of activated carbon obtained from sugar industry wastes, especially modified with sulfuric acid, NaOH, etc. or subjected to high temperatures, as an adsorbent has increased the removal efficiency of pollutants in wastewater.

In this study, the properties of natural and modified adsorbents obtained from sugar industry wastes and their usage areas in wastewater treatment will be evaluated by taking into account the literature. The evaluation and reuse of waste in terms of zero waste and sustainability is very important for the country's economy and the environment.

Keywords: Sugar industry waste, adsorbent, modified, wastewater

THE ROLE OF ANTIMICROBIAL RESIDUES IN FOODBORNE PATHOGENS AND THE DEVELOPMENT OF AMR (ANTIMICROBIAL RESISTANCE)

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Background: The escalating prevalence of AMR pose a significant threat to global health. The major factor contributing to this issue is presence of antimicrobial residues in food which promote development of resistant microbes.

Objective: This abstract aims to highlight the role of antimicrobial residues in foodborne pathogens and their contribution to the development of AMR.

Discussion: Antimicrobials are used injudiciously in animal husbandry and agriculture to treat infections and to promote growth as well, which led to the accumulation of antimicrobial residues in food products. When humans consume these contaminated foods, they are exposed to sub-therapeutic levels of antimicrobials, which can put selective pressure for resistant strains of bacteria.

Foodborne pathogens, such as *Escherichia coli*, *Campylobacter*, and *Salmonella* are especially concerning as they can acquire and transfer these resistant genes through horizontal gene transfer. The presence of antimicrobial residues further facilitates this process and create an environment where resistant strains can survive and proliferate. Furthermore, the global food supply chain further accelerates the spread of these resistant pathogens, making it a worldwide concern.

Conclusion: It is crucial to address the issue of antimicrobial residues in food to mitigate the development of AMR. It requires a multi-faceted approach, including, improved surveillance of antimicrobial residues in food, strict regulations on antimicrobial use in agriculture and animal farming and proper public awareness about the risks associated with AMR.

THE ROLE OF THE MIND DIET IN NEURODEGENERATIVE DISEASE PREVENTION AND CARDIOVASCULAR HEALTH

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Abstract

The MIND (Mediterranean-DASH Diet Intervention for Neurodegenerative Delay) diet, a combination of the Mediterranean and DASH (Dietary Approaches to Stop Hypertension) diets, plays a crucial role in preserving cognitive function and delaying neurodegenerative diseases in older adults. This diet emphasizes the consumption of natural foods such as vegetables, berries, whole grains, nuts, legumes, fish, and moderate amounts of red wine. Olive oil is a key component, while butter, margarine, red meats, and sugar are avoided. The DASH diet, aimed at reducing hypertension, focuses on lowering salt intake, increasing fruit and vegetable consumption, and avoiding saturated fats. Studies have shown that the MIND diet not only supports cognitive health but also effectively prevents cardiovascular diseases. Additionally, the Mediterranean diet has been proven to aid in the prevention of chronic conditions such as obesity, type 2 diabetes, and Alzheimer's disease. Omega-3 fatty acid-rich seafood, whole grains, and the antioxidants in olive oil play a significant role in maintaining overall health and reducing disease risk. Keywords: MIND diet, Mediterranean diet, DASH diet, cognitive function, cardiovascular health

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SUSTAINABILITY RESTAURANTS AND GOOD PRACTICES IN NORTHEASTERN HUNGARY

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International trends also show that sustainability goals have become an important part of the hospitality industry, with more and more competitions including sustainability in their evaluation criteria. In addition to consciously preparing the menu, there are many other ways to make a restaurant sustainable, from packaging, to food waste and waste management. Packaging is one of the biggest waste generators in a catering operation. A few small steps are enough to reduce the amount of waste. For example, replace the polystyrene packaging material, prefer to use your own boxes and do not offer PET bottled soft drinks. Food waste in catering is not only the leftovers left by guests, but also the waste that accumulates in the kitchen. Through Munch, it can sell high-quality scraps, generating revenue it thought it had lost and saving the salary of a full-time employee. In 2016, the National Food Chain Safety Office launched its No Leftovers programme with the support of the European Union's LIFE, which has since become Hungary's national food waste prevention programme. Green restaurants should aim to serve their customers in energy-efficient buildings. They should also serve food and beverages that are largely sourced from local producers. It has less of an impact on the planet than those that use imported raw materials, as they avoid the pollution associated with transport. The research goal was to present in detail the sustainability indicators of some restaurants in the area. First, two restaurants were chosen in Heves county: Sulyom on Lake Tisza and Iszkor in the Bükk Mountains. Second, it was evaluated a questionnaire and sent it out to restaurants. Both restaurants are located in important domestic tourist destinations, in the Bükk Mountains and Lake Tisza; both are members of the Dining Guide's top 100 restaurants list in Hungary. At Iszkor, 90.0% of the food and drink ingredients are sourced domestically; a 60 m² building has 250 m² of green space. Culinary herbs are sourced locally, and some vegetables, chicken, beef, guinea fowl and geese are sourced from closer than 10 km. 80.0% of the wine comes from organic or natural farming and 100.0% of the meat from free-range herds. At Sulyom, 98.0% of the food and drink ingredients are sourced domestically; a 400 m² building has 4000 m² of green space. Cheeses, vegetables and fruit come from sustainable farms. The green waste generated is given to the residents of the nearby zoo. Both restaurants plan to install a solar power plant to increase energy efficiency in the future. More and more green restaurants are expected to open in the future and operators will be pay more attention to energy efficiency.

Keywords: hospitality, green restaurants, waste management, munch, reduce of food waste

THE INFLUENCE OF GROWING MEDIA COMBINATION ON MORPHOLOGY, PHYSIOLOGY AND GROWTH PERFORMANCE OF STEVIA REBAUDIANA

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ABSTRACT

Stevia is a slow growing herb and well known for its beneficial nutrients which are safe to consume as it is a calorie-free sweetener. Nevertheless, the growth performance and leaf production of *Stevia rebaudiana* by using common growing media is very low and little information is available on stevia growth performance. The main objectives are to study the influence of different combination of growing media on morphology, physiology, root development and growth performances of *S. rebaudiana*. In order to establish a great growth, stevia seedlings were planted into different ratio of top soil, coco peat, peat moss, BRIS soil and organic soil. The experiment had been conducted in Randomized Complete Block Design (RCBD) manner and used one-way ANOVA by SPSS-25 to analyse the data. Results showed that treatment T2 consisted of top soil and peat moss had a great effect and improvement in sugar content of leaf (0.14 mg/mL), total soluble solids (TSS) content (8.75 °Brix) and plant height (44.5 cm). Besides that, production of leaf was increased in T3 (combinations of top soil and coco peat) with average of 348 and chlorophyll content (44.1 $\mu\text{mol}/\text{m}^2$). Based on WinRhizo root analysis, the root length, root density and root volume were greatest in these treatments T1 (all top soil) and T4 (top soil, peat moss and coco peat). Lastly, concentration of macro nutrients (Na=1483 mg/kg and P = 49020 mg/kg) high in T3 and T4 while micro nutrients of Ca and Mg were the highest in T2. It can be concluded that T2 treatment was the best for stimulation of leaf and root growth which increased the biomass production of stevia.

Keywords: Stevia, growth performance, peat moss, coco peat, sugar.

EVALUATION OF NUTRITIONAL PROPERTIES OF COMPLEMENTARY FOOD PRODUCED FROM SELECTED SPICES, BAMBARA NUT AND MAIZE BLENDS

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Abstract

This study was carried out to investigate the nutritional composition and sensory qualities of complementary food produced from blends of Maize, Bambara groundnut and selected spices. Flours were produced from maize, Bambara groundnut, ginger and turmeric using traditional methods. The complementary food blends were formulated by mixing maize flour, Bambara nut flour, ginger powder and turmeric powder in the ratios of 100:0:0:0, 85:10:5:0, 70:20:10:0, 85:10:0:5 and 70:20:0:10 to obtain samples AAA, BBB, CCC, DDD and EEE respectively. These blends were evaluated for their nutritive value using standard methods. Sensory evaluation was also carried out to assess the acceptability of the blends. Results obtained showed that some significant difference ($p < 0.05$) existed in their quality parameters. The proximate analysis showed that the samples contained 15.02 – 20.27% moisture, 4.53-6.82% ash, 7.23 – 7.68% protein, 3.15 – 3.58% fat, 0.11 – 9.76% crude fiber and 55.50 – 60.21% carbohydrates. The overall acceptability results showed that sample AAA (7.50) was the most preferred after the control sample (7.88) in all the attributes assessed closely followed by samples BBB (7.08) while sample EEE (5.82) was the least accepted. It was therefore concluded that Bambara nut, ginger and turmeric could be potential cheap sources of alternative supplements to whole maize flour in the production of complementary foods. Consequently, their formulation could alternatively replace most commercial complementary food products, and as such play a key role in the diets of infants in Nigeria and in the world at large.

Keywords: complementary food, bambara nut, maize, spices.

AI-POWERED SMART AGRICULTURE FOR FOOD SAFETY AND SUPPLY CHAIN SECURITY

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Abstract

The integration of Artificial Intelligence (AI) into agriculture which is commonly referred to as smart agriculture, has become a significant technological advancement aimed at addressing food safety and supply chain security. As food demand rises and supply chains become increasingly complex, ensuring food safety and supply chain security is more challenging than ever. In recent years, technological advancements have accelerated drastically leading to the birth of many disruptive technologies. AI which is one of the key disruptive technologies has the potential to revolutionize agriculture by providing innovative solutions that address these challenges. Smart agriculture, powered by AI, encompasses automated systems for monitoring crops, detecting contaminants, and managing logistics to safeguard the supply chain from production to consumption. AI-powered systems provide real-time monitoring, predictive analytics, and automation in agricultural production, ensuring food quality and enhancing security across the supply chain. This paper examines how AI can be used to improve food safety standards, minimize contamination risks, and secure the agricultural supply chain. It delves into various AI models, such as machine learning algorithms for monitoring environmental conditions, analysing food quality, and tracking supply chain activities. The paper also explores how these technologies can help ensure compliance with food safety regulations and reduce the likelihood of disruptions in the supply chain.

Keywords: Artificial Intelligence, Smart Agriculture, Food Safety, Supply Chain Security, Predictive Analytics

ANNE SÜTÜNÜN KALİTESİNİ ARTIRAN BESİNLER

FOODS THAT IMPROVE BREAST MILK QUALITY

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ÖZET

Anne sütü, hemen hemen her yenidoğanın ve ilk altı aylık bebeğin büyüme ve gelişimi için en temel besin kaynağıdır. Bebek için ne zaman almak isterse hazır olması, sindiriminin kolay olması, içeriğinin günün vaktine ve bebeğin yaşına göre değişmesi, hem her zaman taze hem de temiz olması ve hiçbir ödeme gerektirmemesi anne sütünün eşsizliğini ortaya temel özelliklerdir. İçerdiği öğeler annenin beslenmesinden ve aldığı besinlerden doğrudan etkilenmektedir. Bu nedenle anne sütünün kalitesini artırmak ve bebeğe daha fazla besin sağlamak için annenin beslenme şekli ve aldığı besinler büyük bir öneme sahiptir. İçeriğinin % 87'si su olan anne sütünün miktarının yeterli olabilmesi için kadının su tüketimine (günlük ortalama 2,5-3 litre su) dikkat etmesi, bitki çayları ve sebze çorbaları gibi sıvı alımını artıran besinler tüketmesi ve sütün kalitesini artıran bazı önemli besin grupları bilerek ve bilinçli olarak alması önemlidir. Anne sütünün içeriğinde büyük bir rol oynayan besin gruplarından birisi sağlıklı yağlar ve Omega-3 yağ asitleridir. Somon gibi yağlı balıklar, ceviz, keten tohumu ve chia tohumu gibi besinler bu yağların zengin kaynaklarıdır. Omega-3 yağ asitleri bebeğin beyin gelişimi için kritik öneme sahiptir. Ayrıca, bu tür sağlıklı yağlar annenin enerji seviyesini artırarak laktasyonu destekler. Anne sütü içeriğinde rol oynayan diğer bir besin grubu ise proteinler ve demir içeriği yüksek olan besinlerdir. Bu grup kadının süt üretimini artırmanın yanı sıra genel sağlık durumunu da destekler. Et, yumurta, baklagiller, ıspanak ve tavuk gibi besinler bu gruba örnek olarak verilebilir. Özellikle kırmızı et ve baklagiller, demir eksikliği riskini azaltarak hem annenin hem de bebeğin gereksinim duyduğu besin öğelerini sağlar. Ayrıca, yeterli miktarda protein tüketimi anne sütünün besleyici değerini artırır. Bebeğin bağışıklık sistemi ve kemik gelişimi için olmazsa olmaz A ve B12 vitaminleri havuç, patates ve yeşil yapraklı sebzeler, et, balık ve süt ürünleri tüketilerek anne sütünde artırılabilir. Bu derlemenin amacı anne sütünün kalitesini artıran besinleri araştırmak ve alan yazın doğrultusunda tartışmaktır.

Anahtar Kelimeler: Anne sütü, Anne sütünün kalitesi, Emzirmede beslenme, Kadın doğum hemşireliği, Pediatri hemşireliği

ABSTRACT

Breast milk is the most basic source of nutrition for the growth and development of almost every newborn and baby in the first six months. The basic features that reveal the uniqueness of breast milk are that it is ready for the baby whenever he wants to take it, it is easy to digest, its content changes according to the time of day and the age of the baby, it is always fresh and

clean, and it does not require any payment. The elements it contains are directly affected by the mother's diet and the nutrients it takes. Therefore, in order to increase the quality of breast milk and provide more nutrients to the baby, the mother's diet and the nutrients she takes are of great importance. In order for the amount of breast milk, which is 87% water, to be sufficient, it is important for the woman to pay attention to her water consumption (an average of 2.5-3 liters of water per day), to consume foods that increase fluid intake such as herbal teas and vegetable soups, and to knowingly and consciously consume some important food groups that increase the quality of milk. One of the food groups that play a major role in the content of breast milk is healthy fats and Omega-3 fatty acids. Oily fish such as salmon, walnuts, flaxseed and chia seeds are rich sources of these fats. Omega-3 fatty acids are critical for baby's brain development. In addition, these types of healthy fats support lactation by increasing the mother's energy level. Another food group that plays a role in the content of breast milk is foods high in protein and iron. This group supports the woman's general health as well as increasing her milk production. Foods such as meat, eggs, legumes, spinach and chicken can be given as examples of this group. Red meat and legumes in particular reduce the risk of iron deficiency and provide the nutrients that both the mother and the baby need. In addition, consuming sufficient amounts of protein increases the nutritional value of breast milk. Vitamins A and B12, which are essential for the baby's immune system and bone development, can be increased in breast milk by consuming carrots, potatoes and green leafy vegetables, meat, fish and dairy products.

The aim of this review is to investigate the foods that increase the quality of breast milk and to discuss them in line with the literature.

Keywords: Breast milk, Quality of breast milk, Nutrition during breastfeeding, Obstetric nursing, Pediatric nursing.

ARTEMİSİA L.'NİN FİTOKİMYASAL KOMPOZİSYONU VE TERAPÖTİK ÖZELLİĞİ

PHYTOCHEMICAL COMPOSITION AND THERAPEUTIC PROPERTIES OF ARTEMISIA L

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ÖZET

Artemisia L., Anthemideae ailesine dahil, 500'den fazla türü kapsayan bitki topluluğudur. Bu bitkiler, Asya, Avrupa ve Kuzey Amerika'da çok yıllık ve iki yıllık otlar veya küçük çalılar şeklinde yetişebilmektedir. Artemisia türleri, anti-inflamatuar, antitümör, antispazmodik, antimikrobiyal, böcek öldürücü, antimalaryal ve antioksidan aktiviteler gösterirler. Geçmişten günümüze kadar, sıtma, hepatit, kanser, mide rahatsızlıkları gibi hastalıkları tedavi etmede, mantar, bakteri ve virüslerin neden olduğu iltihaplanma ve enfeksiyonları önlemede kullanılmışlardır. Artemisia türleri kimyasal bileşimleri bakımından birbirlerinden farklılık göstermektedirler. Bu türler, polifenoller, uçucu yağlar, kumarinler, asetlenler, alkoller, fenolik asitler, flavonoidler, monoterpenler, seskiterpenler ve türevleri gibi çok sayıda değerli fitokimyasal bileşiklere sahiptirler. Türlerin ortak özelliği, seskiterpenoid lakton içermeleridir. Artemisininin, *A. annua*, *A. abrotanum* ve *A. vulgaris*'te bulunan bir seskiterpenoid laktondur. 2015 yılında Nobel Tıp Ödülü'ne layık görülen sıtmanın tedavisinde etkili bir seskiterpenoid lakton olan artemisininin, *A. annua*'da keşfedilmiştir. Dünya sağlık örgütü (WHO), artemisinini sıtma önleyici ilaç olarak onaylamıştır. Bu madde, sıtma dışında öksürük, soğuk algınlığı ve ishal tedavisinde de başarıyla kullanılmaktadır. *A. argyi*, *A. echegaray*, *A. frigida*, *A. fukudo*, *A. vulgaris*, *A. dracuncululus*, *A. biennis*, *A. campestris* gibi bazı türler birçok ülkede, alkollü içeceklerde, çorbalarda aroma verici, gıda katkı maddesi ve baharat olarak kullanılmaktadır. Bu derlemede, Artemisia L.' ye dahil türlerin özellikleri, fitokimyasal içeriği ve sağlık üzerine etkileri tartışılmaktadır.

Anahtar Kelimeler: Şifalı bitki, Artemisia L., artemisininin, sağlık

ABSTRACT

Artemisia L., belonging to the Anthemideae family, encompasses over 500 species. These plants, which can grow as perennial and biennial herbs or small shrubs, are found in Asia, Europe, and North America. Species of Artemisia exhibit anti-inflammatory, antitumor, antispasmodic, antimicrobial, insecticidal, antimalarial, and antioxidant activities. Historically, they have been used to treat diseases such as malaria, hepatitis, cancer, and gastrointestinal disorders, and to prevent inflammation and infections caused by fungi, bacteria, and viruses. The chemical compositions of Artemisia species vary among themselves. These species possess a multitude of valuable phytochemical compounds including polyphenols, essential oils,

coumarins, acetylenes, alcohols, phenolic acids, flavonoids, monoterpenes, sesquiterpenes, and their derivatives. A common feature among the species is the presence of sesquiterpenoid lactones. Artemisinin, found in *A. annua*, *A. abrotanum*, and *A. vulgaris*, is a sesquiterpenoid lactone. In 2015, artemisinin was recognized with the Nobel Prize in Medicine for its effectiveness in treating malaria, discovered in *A. annua*. The World Health Organization (WHO) has approved artemisinin as an anti-malarial drug. Besides malaria, this compound is successfully used in the treatment of coughs, colds, and diarrhea. Some species like *A. argyi*, *A. echegaray*, *A. frigida*, *A. fukudo*, *A. vulgaris*, *A. dracunculus*, *A. biennis*, and *A. campestris* are used in many countries as flavor enhancers in alcoholic beverages and soups, food additives, and spices. This review discusses the characteristics, phytochemical content, and health effects of species belonging to *Artemisia L.*

Keywords: Medicinal plant, *Artemisia L.*, artemisinin, health

ABOUT AGRI-FOOD GOVERNANCE AND QUALITY – INSIGHTS FROM BULGARIA

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This presentation tries to answer several important academic and practical (business and policies forwarded) questions: how to define governance, what are the components of the system of agri-food governance, and how to measure the quality of agrifood governance. A new holistic GAMPOS (Good, Agents, Means, Processes, Order, Sustainability) framework is suggested for proper understanding and assessing the system of agri-food governance including: defining the components of the agri-food governance; formulating the principles of good agri-food governance; specifying the assessment criteria for each principle of agri-food governance; identifying the best indicators for measuring the quality of agri-food governance for each criterion; selecting the reference values for assessing the quality of agri-food governance for each indicator; deriving the agri-food governance quality score; determining the quality of agri-food governance.

Agri-food governance is studied as a complex system that includes five principal components: (1) agrarian and related agents involved in the governance decision-making; (2) means (rules, forms, and mechanisms) that govern the behavior, activities, and relationships of agri-food agents; (3) processes and activities related to making managerial decisions in agri-food sector; (4) a specific social order resulting from the governing process; and (5) outcomes of the functioning of the system in terms of maintaining sustainability and realization of sustainable development goals.

The suggested GAMPOS framework was adapted to the specific (socio-economic, institutional, natural, etc.) conditions of a major farming component of Bulgarian agri-food system. A multidimensional hierarchical system with good governance 11 Principles, 21 Criteria, 36 Indicators and Reference Values is used.

A first in kind holistic assessment, based on statistical and expert data, found that the overall quality of agrarian governance in Bulgaria is at a moderate EU level. There is a significant differentiation in the quality of individual elements of the governance system. In terms of sustainability, the agrarian governance in the country is at a good (European) level, while for the process, means, and order components is at a satisfactory level. The quality of agrarian governance is the highest in terms of equity and solidarity, and the good working public sector. In terms of functioning of public sector, agrarian governance is at medium level while for all other principles it is at satisfactory levels. The poorest performance of agrarian governance in the country is for the stakeholder's involvement, and good working private sector.

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**BALIKLARDA EMAMEKTİN BENZOAT KALINTISININ ÖNEMİ, TESPİTİ ve
ALTERNATİF UYGULAMALARI**

**IMPORTANCE, DETERMINATION, AND ALTERNATIVE APPLICATIONS OF
EMAMEKTİN BENZOATE RESIDUE IN FISH**

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ÖZET

Balıklardaki sıklıkla görülen parazit enfestasyonu olan copepodlar, su ürünleri yetiştiriciliği endüstrisinde önemli ekonomik kayıplara neden olabilmektedir. Bu hastalıklara karşı tüm dünya genelinde sıklıkla avermectin türevi olan emamectin benzoate kullanılmaktadır. Emamectin benzoat genellikle ağız yoluyla uygulanır. Son zamanlarda FDA, emamectin benzoatın su ürünleri yetiştiriciliğinde çeşitli ektoparazitik enfestasyonları kontrol etmek için sadece yem tedavisi yoluyla kullanılmasını onaylamıştır. EB başlangıçta yenilebilir bitki mahsullerindeki zararlıları kontrol etmek için kullanılmıştır, ancak daha sonraki bir tarihte, İngiltere, Norveç ve Kanada'daki çiftlik Atlantik somonlarında deniz biti tedavisine karşı etkili bir antiparazitik ilaç olduğu bulunmuştur. Yapılan çalışmalarda balıklarda, emamectin benzoatın, büyük ölçüde karaciğerde metabolize edildiği görülmektedir. Yapılan bir çalışmada test edilen dokular arasında en yüksek birikim konsantrasyonları karaciğer (≈ 1000 ppb) ve böbrekte (≈ 500 ppb) bulunmuştur. Bu nedenle, dokularda birikim çalışması yaparak bu tür antiparaziter ilaçların kullanımdan sonra arınma süresi belirlenmesi gıda güvenliği için önemlidir. Bu derlemede su ürünleri yetiştiriciliğinde yaygın olan copepod parazit enfestasyonlarına karşı etkili ve sürdürülebilir çözümler geliştirmeye odaklanılması amaçlanmıştır. Bu çalışmalar, özellikle emamectin benzoat gibi kimyasal ilaçların çevresel etkileri, optimal kullanım dozları ve çevre dostu alternatifler üzerine odaklanılmıştır. Ayrıca, yapılan araştırmaların bu ilaçların balıkların genel sağlığı üzerindeki etkilerini anlamak, lipid metabolizması için önemli bir rol oynayacağı düşünülmektedir. Bu sayede su ürünleri yetiştiriciliği endüstrisinde ekonomik kayıpları azaltma ve çevre dostu uygulamaların geliştirilmesine katkı sağlanacaktır.

Anahtar Kelimeler: Gıda Güvenliği, Balık Tüketimi, Emamectin Kalıntısı.

ABSTRACT

Copepods, a common parasitic infestation of fish, can cause significant economic losses in the aquaculture industry. Emamectin benzoate, a derivative of avermectin, is frequently used worldwide against these diseases. Emamectin benzoate is usually administered orally.

Recently, the FDA has approved the use of emamectin benzoate in aquaculture to control various ectoparasitic infestations, but only through feed treatment. EB was originally used to control pests in edible plant crops, but at a later date it was found to be an effective antiparasitic drug against sea lice treatment in farmed Atlantic salmon in the UK, Norway and Canada. Studies have shown that in fish, emamectin benzoate is largely metabolized in the liver. In one study, the highest accumulation concentrations among the tissues tested were found in liver (≈ 1000 ppb) and kidney (≈ 500 ppb). Therefore, it is important for food safety to determine the clearance time of such antiparasitic drugs after use by conducting accumulation studies in tissues. This review aims to focus on developing effective and sustainable solutions against copepod parasite infestations common in aquaculture. These studies focused on the environmental impacts of chemical pesticides, especially emamectin benzoate, optimal doses of use and environmentally friendly alternatives. In addition, it is thought that these studies will play an important role in understanding the effects of these drugs on the overall health of fish and lipid metabolism. This will contribute to the development of environmentally friendly practices and reduce economic losses in the aquaculture industry.

Key Words: Food Safety, Fish Consumption, Emamectin Residue.

BEYAZ KİRAZ SAPLARININ MUFFİN KEKLERİN FİZİKOKİMYASAL VE DUYUSAL ÖZELLİKLERİNE ETKİSİ

THE EFFECT OF WHITE CHERRY STEM ON PHYSICOCHEMICAL AND SENSORY PROPERTIES OF MUFFIN CAKES

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ÖZET

Değişen yaşam koşulları ve yaygınlaşan sağlıksız beslenme alışkanlıkları nedeniyle insanların kronik hastalıklara yakalanma risklerini arttırmaktadır. Tüketicilerin sağlıklı beslenme konusunda bilinçlenmesiyle beraber hastalıkların tedavisinde kiraz sapı, mısır püskülü, öksü otu gibi bitkilerin kullanımı giderek artmaktadır. Tarımsal gıda atıkları genellikle diyet takviyelerinin ve ilaç ürünlerinin hazırlanmasında kullanılan biyoaktif moleküller gibi değerli bileşikler açısından zengindir. Özellikle bazı meyve ve sebze endüstrisi atıkları veya yan ürünleri (örneğin posa, çekirdek, sap ve yaprak) içermiş olduğu bileşenler nedeniyle öneme sahiptir. Bu gıda yan ürünlerinin geri kazanılması ve matrislerdeki biyoaktif bileşiklerin değerlendirilmesi ekonomik ve çevresel konular söz konusu olduğunda gereklidir. Son yıllarda, hem bilimsel hem de endüstriyel alanlarda biyoatıkların ham madde olarak kullanımı büyük ilgi görmektedir. Yapılan araştırmalarda Konya İli Ereğli İlçesinde önemli miktarda yetiştirilen tatlı kiraz diğer ismiyle beyaz kiraz saplarının fonksiyonel bileşikler içermesi nedeniyle önemli olduğu belirtilmiştir. Bu çalışmada farklı oranlarda beyaz kiraz sapı unu içeren muffin keklerin biyoaktif bileşimi, tekstürel ve duyuşal özelliklerinin belirlenmesi amaçlanmıştır. Bu amaçla muffin keklerin üretimi sırasında kontrol (%0), %20 ve %40 oranlarında beyaz kiraz sapı içeren kekler üretilmiştir. Farklı oranlarda beyaz kiraz sapı unu içeren muffin kek örneklerinde kiraz sapı unu miktarı arttıkça toplam fenolik madde miktarında artış meydana gelmiştir. Yapılan duyuşal değerlendirme sonucunda %40 oranında kiraz sapı unu içeren örneklerde tadında değişim meydana geldiği için tercih edilmemiştir.

Anahtar Kelimeler: Beyaz kiraz sapı, Muffin kek, Tekstürel özellikleri, Duyusal değerlendirme

ABSTRACT

Changing living conditions and widespread unhealthy eating habits increase people's risk of developing chronic diseases. With consumers becoming more aware of healthy eating, the use of plants such as cherry stalks, corn silk, and mistletoe in the treatment of diseases is increasing. Agricultural food wastes are generally rich in valuable compounds such as bioactive molecules used in the preparation of dietary supplements and pharmaceutical products.

Especially some fruit and vegetable industry wastes or by-products (e.g. pulp, seed, stem and leaf) are important due to the components they contain. The recovery of these food by-products and the evaluation of bioactive compounds in matrices are necessary when it comes to economic and environmental issues. In recent years, the use of biowastes as raw materials has attracted great interest in both scientific and industrial fields. Studies have shown that sweet cherry, also known as white cherry stalks, grown in significant amounts in the Ereğli District of Konya Province are important because they contain functional compounds. In this study, it was aimed to determine the bioactive composition, textural and sensory properties of muffin cakes containing different amounts of white cherry stalk flour. For this purpose, during the production of muffin cakes, cakes containing white cherry stalks at control (0%), 20% and 40% were produced. In muffin cake samples containing different amounts of white cherry stalk flour, as the amount of cherry stalk flour increased, the amount of total phenolic substance increased. As a result of the sensory evaluation, samples containing 40% cherry stalk flour were not preferred because their taste changed.

Keywords: White cherry stem, Muffin cake, Textural properties, Sensory evaluation

**BİBERİYE (*Rosmarinus officinalis* L.) BİTKİSİNİN EKSTRAKSİYON YÖNTEMLERİ,
ANALİZLERİ VE BİYOLOJİK AKTİVİTELERİ****EXTRACTION METHODS, ANALYSES AND BIOLOGICAL ACTIVITIES OF
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ÖZET

Tıbbi bitkiler, zengin bir doğal biyoaktif bileşik kaynağı sağlayarak tarih boyunca sağlık hizmetlerinde hayati bir rol oynamıştır. Dahası, bu bitkiler ve uçucu yağları geleneksel tıpta çok önemli bir yere sahip olmuştur ve ilaç, kozmetik ve gıda endüstrilerindeki modern uygulamalarda önemli olup umut vaat etmeye devam etmektedir. Biberiye (*Rosmarinus officinalis* L.), Lamiaceae familyasının ekonomik açıdan en önemli türlerinden biridir. Akdeniz bölgesine özgü olan bitki, günümüzde koku ve gıda endüstrileri de dahil olmak üzere tıbbi, yiyecek ve ticari kullanımları nedeniyle tüm dünyada yaygın olarak bulunmaktadır. Biberiye, katma değerli ürünler üretmek için gıda, ilaç ve kozmetik endüstrileri tarafından yüksek talep gören biyoaktif moleküllerden oluşur. Uçucu yağların endüstriyel ekstraksiyonundan sonra, hammadde hala diğer ticari ürünler için ilginç olan uçucu olmayan bileşiklere sahiptir. Uçucu olmayan kısım, ekonomik olarak değerli olan terpenler ve fenolik asitlerden (rosmarinik asit, karnosik asit ve türevleri) oluşur. Bu bitki matrisinden iyi değerlendirilmiş ürünler elde etmek için biyofabrikadaki diğer işlemlerle entegre edilmiş modern ekstraksiyon tekniklerine büyük ihtiyaç vardır. Bu çalışma, biberiye ekstraktları ve uçucu yağlarının çeşitli biyolojik aktivitelerinin yanı sıra antioksidatif, anti-enflamatuar ve antimikrobiyalden bilişsel geliştirmeye ve antikanserojenik etkilerine kadar çok sayıda biyoaktif bileşiklerine tam bir genel bakış sunmaktadır. Buna ek olarak, yüksek kaliteli biberiye ekstraktları ve uçucu yağlar elde etmek için son teknoloji ekstraksiyon, damıtma, fraksiyonlama ve karakterizasyon tekniklerinin yanı sıra antioksidatif, antimikrobiyal, anti-enflamatuar ve antikanserojenik potansiyellerini belirleme yöntemleri de sunulmaktadır.

Anahtar Kelimeler: Biberiye, *Rosmarinus officinalis* L., Ekstraksiyon, Analiz, Biyolojik Aktiviteler.

ABSTRACT

Medicinal plants have been essential in healing historically, offering a substantial source of natural bioactive chemicals. Furthermore, these plants and their essential oils have been crucial in traditional medicine and continue to offer substantial potential in contemporary uses within the pharmaceutical, cosmetic, and food sectors. Rosemary (*Rosmarinus officinalis* L.) is among the most economically significant plants of the Lamiaceae family. The plant, originally from the Mediterranean region, is now extensively dispersed globally, mostly because to its medicinal, culinary, and commercial applications in the fragrance and food industries. Rosemary has bioactive compounds that are highly sought after by the food, pharmaceutical, and cosmetic sectors for the creation of value-added goods. Following the industrial extraction

of essential oils, the residual raw material retains nonvolatile chemicals that are valuable for alternative commercial goods. The nonvolatile fraction consists of terpenes and phenolic acids, including rosmarinic acid, carnosic acid, and its derivatives, which hold economic significance. Contemporary extraction methods combined with additional procedures in the biorefinery are essential for acquiring thoroughly assessed products from this plant matrix. This study offers a comprehensive examination of the various biological activities of rosemary extracts and essential oils, along with their multiple bioactive constituents, encompassing antioxidative, anti-inflammatory, antibacterial, cognitive enhancing, and anticarcinogenic effects. Furthermore, advanced techniques for extraction, distillation, fractionation, and characterization of high-quality rosemary extracts and essential oils, along with methods for assessing their antioxidative, antimicrobial, anti-inflammatory, and anticarcinogenic properties, are also discussed.

Keywords: Rosemary, *Rosmarinus officinalis* L., Extraction, Analysis, Biological Activities.

BESİN ZİNCİRİNDE İKLİM DEĞİŞİKLİĞİ İLE MİKROPLASTİK ARASINDAKİ ETKİLEŞİMLERİ

THE INTERACTIONS BETWEEN CLIMATE CHANGE AND MICROPLASTIC IN FOOD CHAIN

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ÖZET

Farklı çevre alanlarındaki mikroplastikler, kalıcı organik kirleticileri yoğunlaştıran önemli bir ekolojik sorundur. Bu kirleticilerin besin zinciri yoluyla taşındığı çok iyi bilinmektedir. Bu mikroskobik parçacıklar ve iklim değişikliği, fitoplankton ve zooplanktonu etkileyerek karbon tutulmasını bozmak, deniz buzı dinamiklerini değiştirmek ve sera gazı emisyonlarına katkıda bulunmak gibi çeşitli şekillerde etkileşime girer. Toprak, hava ve su gibi farklı çevresel ortamlardaki mikroplastik kirliliği, asitleşme ve sürekli yağmur yoluyla iklim değişikliğinden giderek etkileniyor. Çünkü ışık, sıcaklık ve asitlik, plastiğin mikro boyuta kadar bozunmasını ve dolayısıyla bu faktörlerden etkilenen gıda zincirindeki birikimi etkiler. Mikroplastiklerin kimyasal kirletici maddelere yönelik emme kapasitesi, polimer yapısı, kristallik ve yüzey hava koşulları gibi parametreler tarafından belirlenmekte olup, bu durum bunların su ortamlarında kirletici vektörler olarak rolleri hakkında endişelere yol açmaktadır. Birbiriyle ilişkili bu endişelerin yalnızca akademisyenler için değil aynı zamanda tarım, ulaştırma ve gıda imalatı gibi çeşitli endüstriler için de ele alınması gerekmektedir. Bu derlemede, mikroplastik biyobirikiminin gıda maddeleri üzerindeki etkileşim mekanizmaları ve bunların birleşik etkileri derinlemesine araştırılmıştır. Bu etkileşimlerin mevcut sonuçlarının yanı sıra, bu kalıcı ilişkilerin potansiyel sonuçları da değerlendirilmiştir.

Anahtar Kelimeler: Mikroplastik, besin zinciri, asitlik, sıcaklık, biyolojik birikim.

ABSTRACT

Microplastics in the different environmental areas are a major ecological problem, concentrating persistent organic contaminants. It is very known that transporting these contaminants through the food chain. These microscopic particles and climate change interact in several ways, such as disturbing carbon sequestration by influencing phytoplankton and zooplankton, modifying sea ice dynamics, and contributing to greenhouse gas emissions. Microplastic contamination on the different environmental media such as soil, air, and water impacted by climate change progressively via acidification and permanent rain. Since the light, temperature, and acidity impact the degradation of plastic to micro-size and therefore accumulation in the food chain impacted by these factors. Microplastics' sorption capacity for chemical contaminants is determined by parameters such as polymer structure, crystallinity, and surface weathering, raising concerns about their role as pollutant vectors in aquatic settings. These interrelated concerns need to be addressed for not only academics but also for several industries such as agriculture, transportation, and food manufacturing. In this review,

the interaction mechanisms of microplastic bioaccumulation on food items and their combined effects were deeply investigated. Besides the current results of these interactions, the potential outcomes of these permanent relationships were evaluated.

Keywords: Microplastic, food chain, acidity, temperature, bioaccumulation

GIDALARDAKİ MİKROPLASTİK BİRİKİMİNDE BESİN KOMPOZİSYONU ETKİLERİ

THE IMPACT OF PROXIMATE COMPOSITION OF FOOD ON THE MICROPLASTIC BIOACCUMULATION

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ÖZET

Gıda numunesindeki MP'lerin biyobirikimi, ham maddenin yakın bileşiminden, işleme yöntemlerinden, paketleme malzemelerinden ve saklama koşullarından etkilenir. Yaklaşık bileşim, yani protein, lipit ve nem seviyeleri, kızartma, tütüleme, fırında pişirme ve konserveleme gibi termal ve termal olmayan işlemlerle de değişir. Bazı araştırmalar, yakınsal değerlerin farklı gıdalardaki mikroplastik biyobirikiminde farklılıklara neden olduğunu ortaya çıkardı. Özellikle lipit ve nem seviyeleri MP birikiminde farklılaşmaya neden olur. Mikroplastikler, yağlı diyetlerde daha yaygın olabilecek hidrofobik kirleticileri emebilir. Balık veya süt ürünleri gibi daha fazla yağ içeren gıdalar daha fazla mikroplastik içerebilir. Gıdanın protein bileşimi ve yapısı, mikroplastiklerin gıda matrisiyle nasıl asimile edildiğini veya etkileşime girdiğini etkileyebilir. Daha yüksek protein içeriği, mikroplastikleri daha hafif, daha gözenekli yemeklerden daha iyi yakalayabilir. Daha yüksek nem içeriğine sahip gıdalar, mikroplastiklerin taşınmasına ve birikmesine yardımcı olabilir; çünkü nem, kirleticileri çözebilir veya dağıtabilir ve böylece biyoyararlılığı artırabilir. Lipit düzeyi ve dolayısıyla lipit oksidasyonu, mikroplastikler ile lipit ve protein konsantrasyonları arasında güçlü bir etkileşime sahiptir. Bazı araştırmalar, gıdanın TBA değerlerinin gökkuşağı alabalığında MP'lerin varlığı ile pozitif korelasyonunu ortaya çıkardı. Bildirildiği gibi, mikroplastiklerin varlığı depolama sırasında gıdadaki lipit peroksidasyonunu artırma potansiyeline sahiptir. Bu derlemede, farklı gıda maddelerinin gıda üzerindeki mikroplastik biyobirikimi üzerindeki yaklaşık bileşimi ayrıntılı olarak incelenmiştir.

Anahtar Kelimeler: Mikroplastik, besin zinciri, asitlik, sıcaklık, biyolojik birikim

ABSTRACT

The bioaccumulation of MPs in the food sample is influenced by the proximate composition of the raw material, processing methods, packing materials, and storage conditions. The proximate composition, namely the protein, lipid, and moisture levels, also changed by thermal and non-thermal processing such as frying, smoking, baking, and canning. Some research revealed that the proximal values cause the variation in microplastic bioaccumulation in different foods. Especially lipid and moisture levels cause the differentiation in MP accumulation. Microplastics can absorb hydrophobic pollutants, which may be more common in fatty diets. Foods with a greater fat content, such as fish or dairy products, may contain more microplastics. The protein composition and structure of food can affect how microplastics are assimilated or interact with the food matrix. The higher protein content may trap microplastics better than lighter, more porous meals. Foods having a higher moisture

content may aid in the transport and accumulation of microplastics, as moisture can dissolve or scatter pollutants, thereby increasing bioavailability. Lipid level and therefore, lipid oxidation has a strong interaction between microplastics and lipid and protein concentrations. Some research revealed the positive correlation of TBA values of food with the occurrence of MPs in the rainbow trout. The presence of microplastics has the potential to increase lipid peroxidation in food during storage, as reported. In this review, the proximate composition of different food items on the microplastic bioaccumulation on food has been reviewed in detail.

Keywords: Microplastic, food chain, acidity, temperature, bioaccumulation

ASKORBİK ASİT MİKROKAPSÜLLERİNİN FİZİKOKİMYASAL ÖZELLİKLERİ VE ANTIOKSİDAN AKTİVİTESİNİN DEĞERLENDİRİLMESİ

EVALUATION OF THE PHYSICOCHEMICAL PROPERTIES AND ANTIOXIDANT ACTIVITY OF ASCORBIC ACID MICROCAPSULES

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ÖZET

Gıdalarda bulunan biyoaktifler besin değerlerinin yanı sıra sağlık üzerine olumlu etkileri olan fizyolojik olarak aktif bileşiklerdir. Proteinler, lipidler, fitosteroller, fitokimyasallar, antioksidanlar, mineraller ve vitaminler gıdalarda bulunan biyoaktif bileşikler arasında yer almaktadır. C vitamini en iyi bilinen biyoaktif bileşenlerden biridir, vücut fonksiyonları için esansiyeldir. Ne yazık ki insan vücudunda sentezlenemez ve depolanamaz, bu sebeple dışarıdan alınması elzemdir. Askorbik asit kararsız bir yapıya sahiptir, gıda endüstrisinde işleme ve depolama esnasında önemli kayıplar yaşanmaktadır. Bu probleme çözüm önerilerinden bir tanesi de mikrokapsülasyon teknolojisidir. Bu çalışmadaki amacımız emülsiyon ve dondurarak kurutma tekniği ile elde edilen askorbik asit mikrokapsüllerinin fizikokimyasal karakteristikleri ve antioksidan aktivitesini belirlemektir. Maltodekstrin (MD) ve gam arabik (GA) kabuk materyal olarak kullanılmıştır. En yüksek ve en düşük enkapsülasyon etkinliği sırasıyla GA (%87.85) ve MD (%75.88) formülasyonlarında belirlenmiş, MD ve GA'nın farklı kombinasyonlarının denendiği formülasyonlarda ise GA'nın miktarı arttıkça etkinliğin arttığı gözlemlenmiştir. Morfolojik yapı taramalı elektron mikroskobu ile incelenmiş ve tüm kapsüllerde düzensiz cam kırığı benzeri kapsül görüntüleri elde edilmiştir. Antioksidan aktivite DPPH reaktifi ile zamana bağlı olarak 90 dakika takip edilmiş, yüzde inhibisyon olarak ifade edilmiştir. Serbest askorbik asit test sonunda ortamdaki reaktifin %78.74'ünü süpürürken, mikrokapsüle askorbik asidin reaktif süpürme gücünde belirgin bir azalma tespit edilmiştir. Mikrokapsül formülasyonları arasında en başarılı formülasyon %55.46 inhibisyon ile GA olarak belirlenmiş, bunu %52.27 inhibisyon gücü ile MD:GA (0.25/0.75) takip etmiştir. En düşük antioksidan kapasite MD:GA (0.75/0.25) formülasyonunda (%42.09 inhibisyon gücü) belirlenmiştir.

Anahtar Kelimeler: Askorbik asit, Enkapsülasyon, Maltodekstrin, Gam Arabik, Antoksidan aktivite

ABSTRACT

Bioactives found in foods are physiologically active compounds that have positive effects on health, in addition to their nutritional value. Proteins, lipids, phytosterols, phytochemicals, antioxidants, minerals, and vitamins are among the bioactive compounds found in foods. Vitamin C is one of the best-known bioactive components and is essential for bodily functions. Unfortunately, it cannot be synthesized or stored in the human body, making it necessary to obtain from external sources. Ascorbic acid has an unstable structure, leading to significant losses during processing and storage in the food industry. One solution to this problem is microencapsulation technology. The aim of this study is to determine the physicochemical characteristics and antioxidant activity of ascorbic acid microcapsules obtained through the emulsification and freeze-drying technique. Maltodextrin (MD) and gum arabic (GA) were used as shell materials. The highest and lowest encapsulation efficiencies were determined in the GA (87.85%) and MD (75.88%) formulations, respectively, and it was observed that the efficiency increased as the amount of GA increased in formulations where different combinations of MD and GA were tested. The morphological structure was examined with a scanning electron microscope, and irregular, glass-like capsule images were obtained in all capsules. Antioxidant activity was monitored over time for 90 minutes using the DPPH reagent and expressed as percentage inhibition. While free ascorbic acid scavenged 78.74% of the reagent at the end of the test, a significant decrease in the scavenging power of microencapsulated ascorbic acid was observed. Among the microcapsule formulations, the most successful formulation was GA with 55.46% inhibition, followed by MD (0.25/0.75) with 52.27% inhibition. The lowest antioxidant capacity was determined in the MD (0.75/0.25) formulation (42.09% inhibition).

Keywords: Ascorbic acid, Encapsulation, Maltodextrin, Gum Arabic, Antioxidant activity

**INVESTIGATING THE EFFECTS OF HOT WATER SOAKING ON THE
PROXIMATE AND ANTI-NUTRITIONAL COMPOSITION OF MORINGA
(*Moringa oleifera*) LEAVE**

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ABSTRACT

This study aimed to assess the impact of hot water soaking on the proximate and anti-nutritional compositions of *Moringa oleifera* leaf meal. *Moringa* leaves were soaked in hot water at 90°C for varying durations (6 hours, 12 hours, and 24 hours), with untreated leaves serving as the control. The results revealed significant differences ($p < 0.05$) across the treatments. The crude protein content of the raw leaves (31.25%) was significantly higher ($p < 0.05$) than that of the treated samples. The 6-hour treatment resulted in the lowest crude protein content (26.21%), while the 12-hour (29.92%) and 24-hour (28.09%) treatments showed higher values, though they were not significantly different from each other ($p > 0.05$). The tannin content was significantly lower ($p < 0.05$) in the raw leaves (23.54 mg/100g), but increased in the 12-hour (27.38 mg/100g), 6-hour (36.45 mg/100g), and 24-hour (36.45 mg/100g) treatments. Similarly, saponin levels were lower in the raw leaves (23.14 mg/100g) and significantly higher ($p < 0.05$) in the 12-hour (25.96 mg/100g), 6-hour (31.88 mg/100g), and 24-hour (35.15 mg/100g) treatments. The flavonoid content was also significantly lower ($p < 0.05$) in the raw leaves (19.80 mg/100g), but increased in the 12-hour (24.71 mg/100g), 6-hour (27.37 mg/100g), and 24-hour (32.13 mg/100g) treatments. Similar patterns were observed for alkaloids and flavonoids. The findings suggest that hot water soaking at 90°C reduces the crude protein content while increasing the levels of anti-nutritional compounds compared to the raw moringa leaf meal.

Keywords: Anti-nutritional factors, Crude protein, Hot water soaking, *Moringa oleifera*, Proximate composition, Tannins and saponins

**DONDURMA VE BİTKİSEL YAĞLI SÜTLÜ BUZ ÖRNEKLERİNDE YAPILAN
LİSANSÜTÜ TEZ ÇALIŞMALARINA YÖNELİK İÇERİK ANALİZİ; 2004-2024
YILLARI**

**CONTENT ANALYSIS OF UNDERGRADUATE THESIS STUDIES ON ICE CREAM
AND VEGETABLE FAT MILK ICE SAMPLES; 2004-2024**

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ÖZET

Bu çalışmada, Yüksek Öğretim Kurulu Başkanlığı Ulusal Tez Merkezi veri tabanında Gıda Mühendisliği bölümünde, tez başlığında anahtar kelime olarak “Dondurma” ve “Sütlü Buz” kelimeleri geçen tezler formülasyonuna eklenen fonksiyonel katkı malzemelerinin belirlenmesi amacıyla incelenmiştir. YÖK tez veri tabanının sunduğu tezlerden oluşturulan veri havuzu incelenmiştir (f=84) ve yapılan araştırma sonucunda dondurma başlığı altında çıkan tezlerden, dondurma=sütlü buz üretimi ile ilgili olmayan ve görüntüleme izni verilmeyen tezler, veri havuzundan elenmiştir (f=28). Elemeler sonucunda 56 adet yüksek lisans ve doktora tezine ulaşılmış ve bu tezler incelenmiştir. Elde edilen bulgulara göre tezler 2004 ve 2023 yılları arasında yapılmıştır. Bu tez çalışmalarının en fazla 2018, 2019, 2021 ve 2023 yıllarında yoğunlaştığı görülmüştür. Dondurmanın fonksiyonel hale getirilmesi amacıyla probiyotik, prebiyotik ve sinbiyotik açıdan zenginleştirme çalışmaları yapılmış ve bu çalışmalar tüm tezlerin %25'ine tekabül etmektedir. Toplam tezlerin 24 tanesinde hammadde olarak süt tozu kullanılmıştır. Buna karşın hammadde olarak; bitkisel sütlerin, manda sütünün ve keçi sütünün tez çalışmalarında incelenmesi oranının oldukça düşük olduğu görülmüştür. Formülasyona eklenen malzemeler genelde fonksiyonel ürün elde, sertlik gibi tekstürel özelliklere fayda sağlamak, yağı azaltmak ve besinsel açıdan zenginleştirme sağlama amaçlarıyla katılmıştır. İçerik analizi yapılan tez çalışmalarının neredeyse tamamında fiziksel, kimyasal ve duyu analizin yapıldığı görülmüştür. İstatistiksel analizler toplam tezlerin %73.21 ine yapılmıştır. Mikrobiyolojik analizler ise 8 tezde olmak üzere çok az sayıda tezde analiz yöntemi olarak kullanılmıştır.

Anahtar Kelimeler: Dondurma, Sütlü Buz, Süt Tozu, İçerik Analizi, Katkı Maddesi

ABSTRACT

In this study, theses in the Department of Food Engineering in the National Thesis Center database of the Council of Higher Education (YÖK) were examined in order to determine the functional additives added to the formulation of the theses with the words “Ice Cream” and “Milk Ice” as keywords in the thesis title. The data pool created from the theses offered by the YÖK thesis database was examined (f=84) and as a result of the research, among the theses that

appeared under the title of ice cream, theses that were not related to ice cream=milk ice production and were not allowed to be viewed were eliminated from the data pool (f=28). As a result of the elimination, 56 master's and doctoral theses were reached and these theses were examined. According to the findings, the theses were conducted between 2004 and 2023. It was observed that these thesis studies were mostly concentrated in 2018, 2019, 2021 and 2023. In order to make ice cream functional, probiotic, prebiotic and synbiotic enrichment studies were carried out and these studies correspond to 25% of all theses. Milk powder was used as raw material in 24 of the total theses. On the other hand, it was observed that the rate of examining vegetable milk, buffalo milk and goat milk as raw materials in thesis studies was quite low. The ingredients added to the formulation were generally added to obtain functional products, to benefit textural properties such as hardness, to reduce fat and to provide nutritional enrichment. It was observed that physical, chemical and sensory analyses were performed in almost all of the thesis studies for which content analysis was performed. Statistical analyses were performed in 73.21% of the total theses. Microbiological analysis was used as an analysis method in very few theses, including 8 theses.

Keywords: Ice Cream, Milk Ice, Milk Powder, Content Analysis, Additives

JAPANESE CULTURE FEATURES IN WAGASHI, OR TRADITIONAL SWEETS

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ABSTRACT

The purpose of this paper is to understand Japanese traditional sweets, called in their language wagashi, as part of what Baciu (2012) has called the culture identity manifestations grid, including symbols, values, rituals, traditions and practices, as well as personalities. The Japanese traditional sweets clearly correlate with the rituals, traditions, and practices, once we consider those sweets which are part of wagashi that are served during the Japanese tea ceremony, called namagashi, literally translated as raw sweets. Namagashi, or jo-namagashi, indeed consist of rice flour, as well as of a sweet bean paste filling, and they are available in their raw, uncooked form. What is more these sweets are made into shapes to represent the current season, and moulded by the hand. They are moulded by hand in such a way as to look like small pieces of art. This is because the ingredients for these sweets are softer than for other types of sweets from the wagashi category, allowing them to take the wanted shapes. The red or white bean paste is soft, but, most of all, it is light and easily enjoyed even by those that do not have a sweet tooth. The red or white bean paste functions as part of a sweet treat for the Japanese, while in the West it is considered savory instead. Those having these treats enjoy the beauty of each season. Focusing on each season means focusing on the here and now, a practice present in Zen Buddhist meditation and in haiku poetry writing, where there should be a kigo, or a clue as to the season where the haiku poem is written and when nature is observed.

Keywords: Zen Buddhism, present moment, ephemeral, culinary arts.

DETERMINATION OF THE CAPSAICIN AMOUNT OF THREE RED PEPPER SPICES PRODUCED BY DIFFERENT MANUFACTURING METHODS IN TÜRKİYE**Elif TUNÇİL**

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ORCID ID: <https://orcid.org/0000-0002-8704-8263>**ABSTRACT**

Capsaicin is the main active ingredient in red pepper that is responsible for its pungent flavor and has potential health benefits such as anti-obesity, anti-cancer, pain relief, etc. This study aimed to detect the amount of capsaicin in three commercially available red peppers used as spices, each of which has a different manufacturing process. There are commercially available three common forms of red pepper spices with different manufacturing processes in Türkiye: Hot Chili Powder (HCP; none), Red Pepper Flakes (RPF; salt+sunflower oil) and Isot Pepper (IP; salt+sunflower oil+extended drying process). The spice samples were extracted and then analyzed via the high performance liquid chromatography (HPLC) method. Extraction was carried out with spice samples (2 g) and methanol (10 ml), heated at 50 °C for 20 min. The extract was filtered by using a 0.45 µm membrane filter, and then capsaicin was quantified by HPLC method (total run time: 20 min, injection volume: 10 µl, flow rate: 1ml/min) coupled with an Intersil ODS-3V column (250mm×4.6mm ID, 5 µm particle size) and UV/VIS detector (wavelength: 222-280 nm) at 30°C. The mobile phase was a gradient consisting of 27% solvent A (dH₂O) and 73% solvent B (MeOH). The concentration of capsaicin was calculated from the reference capsaicin that is used for standard curve calculation. Descriptive statistics were used as mean±SD. The capsaicin amounts in HCP, RPF, and IP were 0.63±0.01 mg/g, 0.45±0.01 mg/g and 0.28±0.03 mg/g, respectively. In conclusion, HCP form was contain more abundant capsaicin than other forms. This means treatment with oil and salt during the manufacturing process may cause a reduction the amount of capsaicin in red pepper. Thus, proper production and cooking techniques are important in terms of preserving the capsaicin content.

Keywords: capsaicin, red pepper, active ingredient, functional food, health

ALTERNATIF ET TÜRÜ: TAVŞAN ETİ**ALTERNATIVE MEAT TYPE: RABBIT MEAT****Emre HASTAOĞLU**Doçent, Sivas Cumhuriyet Üniversitesi Turizm Fakültesi Gastronomi ve Mutfak Sanatları
Bölümü, Sivas, TürkiyeORCID ID: <https://orcid.org/0000-0001-8802-6632>**ÖZET**

Et, yüksek ve zengin protein, vitamin ve mineral içeriğinden dolayı hemen hemen her toplumun vazgeçilmez besin kaynağı olmuştur. Ancak tüketilen hayvan türleri o toplumunun dini inanışları, bölgenin coğrafi ve ekonomik koşullarına bağlı olarak değişkenlik göstermektedir. Dünyada eti en çok tüketilen et türü büyükbaş sığır eti olup onu tavuk eti ve domuz eti takip etmektedir. Türk toplumları göçebe hayattan yerleşik hayata kadar çoğunlukla sığır ve at eti tercih etmiş, yerleşik hayata geçtikten sonra sığır etini küçükbaş hayvan etleri ve kanatlı etleri takip etmiştir. Bilhassa kuzu eti, saray mutfağında vazgeçilmezi olmuştur. Günümüzde de eti en çok tüketilen hayvanlar sırasıyla, sığır eti, tavuk eti ve kuzu etidir. Gastronomi, yemek ve kültür arasındaki ilişkiyi, zengin veya hassas ve iştah açıcı yiyecekleri hazırlama ve sunma sanatı, belirli bölgelerin pişirme stilleri ve iyi yeme biliminin incelenmesidir. Bireylerin yenilikçi mutfak ürünlerine merakı ve yeni yemek keşifleri sonucunda popülerliği artan gastronomi turizmi sayesinde yiyecek içecek işletmeleri mutfaklarına farklı ürünler sunma gayreti oluşmuştur. Son yıllarda sığır, piliç ve kuzu etine alternatif olarak tavşan eti de tüketilmeye başlanmıştır. Tavşan eti, beyaz, gevrek ve kemik oranı düşük bir et çeşididir. Protein oranı yüksek olan tavşan eti, kolay bir şekilde pişirilir. Tavşan etinden hemen hemen her çeşit yemek yapılabilir. Bu çalışma kapsamında tavşan etinin özellikleri, tavşan etinden yapılan yemek alternatifleri derlenmiştir.

Anahtar Kelimeler: tavşan eti, beslenme, gastronomi**ABSTRACT**

Meat has been an indispensable food source for almost every society due to its high and rich protein, vitamin and mineral content. However, the types of animals consumed vary depending on the religious beliefs of that society and the geographical and economic conditions of the region. The most consumed meat type in the world is bovine beef, followed by chicken and pork. Turkish societies mostly preferred cattle and horse meat from nomadic life to settled life, and after settling down, cattle meat was followed by small cattle meat and poultry meat. Lamb, in particular, was indispensable in the palace kitchen. Today, the most consumed animals are beef, chicken and lamb, respectively. Gastronomy is the study of the relationship between food and culture, the art of preparing and presenting rich or delicate and appetizing foods, the cooking styles of particular regions and the science of good eating. Thanks to gastronomy tourism, which has increased in popularity as a result of individuals' curiosity about innovative culinary products and new food discoveries, food and beverage businesses have endeavored to offer different products to their kitchens. In recent years, rabbit meat has started to be consumed as an alternative to beef, chicken and lamb. Rabbit meat is white, crispy and low in bone content. Rabbit meat, which has a high protein content, is easily cooked. Almost all kinds of dishes can be made from rabbit meat. In this study, the properties of rabbit meat and food alternatives made from rabbit meat were compiled.

Keywords: rabbit meat, nutrition, gastronomy

GIDA DOSTU OTEL KONSEPTİ**FOOD FRIENDLY HOTEL CONCEPT****Emre HASTAOĞLU**Doçent, Sivas Cumhuriyet Üniversitesi Turizm Fakültesi Gastronomi ve Mutfak Sanatları
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Gelişmiş ve gelişmekte olan ülkelerde, turizm sektörü en hızlı büyüyen sektörlerdendir. Her ne kadar küresel ve bölgesel olumsuzluklardan en hızlı etkilenen sektörlerin de başında gelse de turizm, toplumların etkileşiminde önemli rol oynamaktadır. Konaklama işletmeciliğinin standartları ülkeden ülkeye değişmekle birlikte otelcilik sistemlerinin ortak değerlendirme ve kıyaslamaya yönelik puanlama sistemleri bulunmaktadır. Bunlar yıldız, puanlama, yorum sıralama, oda sayısına göre sıralama, yiyecek içecek servis sayısı, çocuk veya doğa dostu olma gibi birçok niteliğe göre oteller kategorize edilebilmekte ve karşılaştırılmaktadır. Son yıllarda gıdaların bilinçsizce ve tüketilmeden ya da yanlış taşıma/nakliye/işleme gibi operasyonlardan dolayı israf edilmesi hem Gıda ve Tarım Örgütü'nün hem de birçok otoritenin gündemi olmuştur. Gıdaların israfının en sık yaşandığı yerlerin başında her şey dahil oteller ve açık büfe servisler yer almaktadır. Otellerde görülen ve gıda güvencesini doğrudan etkileyen bu durumun yanı sıra büyük otel işletmelerinde hızlı yiyecek ve içecek operasyonları sırasında, gıda güvenliğinin sağlanamaması, gıda atıklarının yanlış bertaraf edilmesi gibi insan sağlığına zarar verebilecek durumlar da yaşanabilmektedir. Bunları önleyebilmek adına, gıda dostu otel yönetim anlayışının benimsenmesi, müşteri bilincinin sağlanması ve personelin bilinçlendirilmesi temel yollar arasında yer almaktadır. Bu çalışma kapsamında, otellerde oluşan gıda israfının azaltılması, gıda güvencesinin ve gıda güvenliğinin korunmasını sağlayabilecek sistemlerin kurulabilmesi açısından "gıda dostu otel" konsepti ve bu konseptin detaylarına yönelik tavsiyeler araştırılmıştır.

Anahtar Kelimeler: gıda dostu otel, gıda güvencesi, otel işletmesi, gıda güvenliği**ABSTRACT**

Tourism is one of the fastest growing sectors in developed and developing countries. Although it is also one of the sectors most rapidly affected by global and regional adversities, tourism plays an important role in the interaction of societies. Although the standards of hospitality management vary from country to country, hotel management systems have common scoring systems for evaluation and comparison. Hotels can be categorized and compared according to many qualities such as stars, ratings, review ranking, ranking by number of rooms, number of food and beverage services, child or nature friendliness. In recent years, the wastage of food unconsciously and unconsumed or due to operations such as improper handling/transportation/processing has been on the agenda of both the Food and Agriculture Organization and many authorities. All-inclusive hotels and open buffet services are the most common places where food is wasted. In addition to this situation in hotels, which directly affects food security, during fast food and beverage operations in large hotel establishments,

situations that can harm human health such as food safety and improper disposal of food waste can also occur. In order to prevent these, adopting a food-friendly hotel management approach, raising customer awareness and raising staff awareness are among the main ways to prevent these problems. Within the scope of this study, the concept of “food friendly hotel” and recommendations for the details of this concept have been investigated in order to establish systems that can reduce food waste in hotels and ensure the protection of food security and food safety.

Keywords: food friendly hotel, food safety, food security, hotel business, food safety

**YENİ BİR FONKSİYONEL İÇECEK OLARAK FERMENTE SEMİZOTU
(PORTULACA OLERACEA L.) SUYU: DERLEME**

**FERMENTED PURSLANE (PORTULACA OLERACEA L.) JUICE AS A NOVEL
FUNCTIONAL BEVERAGE: A REVIEW**

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ÖZET

Fermente gıdalar, zengin biyoaktif bileşenler ve probiyotik içerikleri sayesinde sağlık üzerindeki olumlu etkileriyle son yıllarda büyük ilgi görmektedir. Semizotu (*Portulaca oleracea* L.), yüksek besin değeri, güçlü antioksidan kapasitesi, fenolik bileşenleri ve ω -3 ile ω -6 yağ asitleri bakımından zengin bir bitkidir. Bu bitki fermente edilerek, biyoaktif özellikleri daha da artırılmış fonksiyonel bir içeceğe dönüştürülebilir.

Fermentasyon, gıdaların doğal yollarla korunmasını sağlarken, besin değerlerini de artıran bir süreçtir. Laktik asit bakterileri gibi faydalı mikroorganizmalarla gerçekleştirilen fermentasyon, gıdaların sindirilebilirliğini ve biyoaktivitesini artırır. Bu süreç, semizotu gibi yüksek besin değerine sahip bitkilerde bulunan vitaminlerin, minerallerin ve antioksidanların biyoyararlanımını artırarak sağlık üzerinde çeşitli olumlu etkiler oluşturmaktadır.

Semizotu, A, C ve E vitaminleri, flavonoidler, fenolik asitler, ligninler, antrakinonlar, stilbenler, tanenler ve kumarinler gibi fenolik bileşenler bakımından zengin bir bitkidir. Ayrıca, ω -3 ve ω -6 yağ asitleri ve Fe, Zn, K, B, N, Mn, Ca, Cu, Mg, P, S ve Na gibi önemli mineralleri içerir. Son yıllarda, laktik asit fermentasyonu, semizotunun biyojenik bileşik profilini zenginleştirmek için biyoteknolojik bir seçenek olarak önerilmiştir.

Laktik asit fermentasyonunun, semizotunun antioksidan kapasitesini ve fenolik bileşen içeriğini artırdığı, alkaloid ve çoklu doymamış yağ asitlerinin yapısını değiştirdiği, γ -aminobütirik asit (GABA) ve linalool seviyelerini yükselttiği tespit edilmiştir. Bu süreçte oluşan yeni bileşikler, fermente semizotu suyunun sağlık açısından faydalarını daha da güçlendirmektedir.

Fermentasyon süreci, semizotunun duyuşsal ve besleyici özelliklerini de iyileştirir. Laktik asit fermentasyonu, ürünün daha hoş bir tat ve aroma kazanmasını sağlar. Ayrıca, fermentasyon sürecinde gelişen mikroorganizmalar, semizotu suyunun raf ömrünü uzatmakta, böylece ürünün taze kalma süresi artmaktadır. Bu özellikler, fermente semizotu suyunu hem besleyici hem de lezzetli bir fonksiyonel içecek haline getirmektedir.

Fermente gıdalar, sürdürülebilir gıda üretimi açısından da önem taşır. Fermentasyon süreci, doğal bir koruyucu görevi görerek ürünlerin raf ömrünü uzatır ve katkı maddesi kullanımını azaltır. Bu durum, çevresel etkileri azaltmakta ve daha doğal, sağlıklı gıdalara erişimi

kolaylaştırmaktadır. Fermente semizotu suyu, bu yönleriyle sürdürülebilir beslenmeye katkı sağlayabilecek yenilikçi bir fonksiyonel içecek olarak değerlendirilmektedir.

Fermente semizotu suyu, zengin besin içeriği, yüksek antioksidan kapasitesi ve probiyotik potansiyeli ile fonksiyonel içecekler arasında değerli bir alternatif olarak öne çıkmaktadır. Bu derleme, fermente semizotu suyunun besin değerlerinin fermantasyon süreciyle nasıl iyileştiğini ve sağlık üzerindeki olumlu etkileri incelenmektedir. Özellikle sindirim sistemi sağlığı, bağışıklık güçlendirme ve oksidatif stresin azaltılması gibi alanlardaki olumlu etkileri dikkat çekicidir. Fonksiyonel gıdalara olan talebin arttığı günümüzde, fermente semizotu suyu inovatif bir seçenek olarak önemli bir potansiyele sahiptir.

Anahtar Kelimeler: Fermente semizotu suyu, laktik asit, fonksiyonel içecek

ABSTRACT

Fermented foods have attracted great attention in recent years due to their positive effects on health thanks to their rich bioactive components and probiotic content. Purslane (*Portulaca oleracea* L.) is a plant rich in high nutritional value, strong antioxidant capacity, phenolic compounds and ω -3 and ω -6 fatty acids. This plant can be fermented and turned into a functional beverage with increased bioactive properties.

Fermentation is a process that preserves foods naturally while also increasing their nutritional value. Fermentation, carried out by beneficial microorganisms such as lactic acid bacteria, increases the digestibility and bioactivity of foods. This process increases the bioavailability of vitamins, minerals and antioxidants found in plants with high nutritional value such as purslane, creating various positive effects on health.

Purslane is a plant rich in phenolic compounds such as vitamins A, C and E, flavonoids, phenolic acids, lignins, anthraquinones, stilbenes, tannins and coumarins. It also contains ω -3 and ω -6 fatty acids and important minerals such as Fe, Zn, K, B, N, Mn, Ca, Cu, Mg, P, S and Na. In recent years, lactic acid fermentation has been proposed as a biotechnological option to enrich the biogenic compound profile of purslane.

It has been determined that lactic acid fermentation increases the antioxidant capacity and phenolic compound content of purslane, changes the structure of alkaloids and polyunsaturated fatty acids, and increases the levels of γ -aminobutyric acid (GABA) and linalool. The new compounds formed in this process further strengthen the health benefits of fermented purslane juice.

The fermentation process also improves the sensory and nutritional properties of purslane. Lactic acid fermentation gives the product a more pleasant taste and aroma. In addition, the microorganisms that develop during the fermentation process extend the shelf life of purslane juice, thus increasing the freshness of the product. These properties make fermented purslane juice a functional beverage that is both nutritious and delicious.

Fermented foods are also important for sustainable food production. The fermentation process acts as a natural preservative, extending the shelf life of products and reducing the use of additives. This reduces environmental impacts and facilitates access to more natural, healthy foods. Fermented purslane juice is considered an innovative functional beverage that can contribute to sustainable nutrition in these aspects.

Fermented purslane juice stands out as a valuable alternative among functional beverages with its rich nutritional content, high antioxidant capacity and probiotic potential. This review examines how the nutritional values of fermented purslane juice improve with the fermentation process and its positive effects on health. In particular, its positive effects in areas such as digestive system health, immune strengthening and reducing oxidative stress are remarkable. In today's world where demand for functional foods is increasing, fermented purslane juice has significant potential as an innovative option.

Keywords: Fermented purslane juice, lactic acid, functional beverage

THE YIELD RESPONSE OF PISTACHIO TREES TO FOLIAR SPRAY OF SOME MICRO-NURRIENTS AT TIME OF POST-BLOOM

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Foliar fertilization is a rapid, efficient way to improve crop nutrient status when soil conditions (salinity, pH) render soil nutrients and soil-applied fertilizers less available to the plant. For this purpose, to investigate the yield response of pistachio trees to foliar spray of zinc (Zn), copper (Cu) and iron (Fe) at time of post-bloom, the orchard study was conducted over two consecutive seasons. Tests were done at a commercial orchard in the region of Rafsanjan in Iran and treatments tested in the study were control, zinc sulfate (2000 mg L⁻¹), copper sulfate (200 mg L⁻¹) and iron sulfate (300 mg L⁻¹) with four replications. All treatments were applied at the time of post-bloom (end of Apr. to early May). Trees were hand sprayed to the point of runoff with treatments and Tween 20 was used as a wetting agent. The results indicated that the application of zinc, copper and iron increased the fresh and dry yield (g mm⁻² shoot across area) of pistachio trees. The highest amount of fresh and dry yield was observed in zinc sulfate (2000 mg L⁻¹) treatment. However, spray of zinc, copper and iron increased yield of pistachio trees by 22, 18 and 15 %, in comparison to the control. These results show that Zn, Cu and Fe applications can increase fresh and dry yield of pistachio, especially when grown in calcareous soils. The observations of this research demonstrated that micro-nutrients foliar application at time of post-bloom, in addition to increasing the yield of pistachio trees, can also lead to greater economic efficiency for farmers.

ENHANCING CASHEW APPLE UTILIZATION: A STUDY ON EXTRACTION METHODS AND TANNIN REDUCTION

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ABSTRACT

Introduction and Purpose: The cashew apple (*Anacardium occidentale* L.), a pseudofruit accompanying the cashew nut on the cashew tree, is rich in nutrients and bioactive compounds. Despite its nutritional value, its high perishability and astringent taste have hindered its use in the food industry. This study assessed the impacts of different extraction methods - hydraulic pressing, screw pressing, and grinding - on the quality of cashew apple juice. It also compared the efficacy of gelatin powder versus gelatin solution in removing astringent tannins.

Materials and Methods: Cashew apples were harvested in Van Gia District, Khanh Hoa Province, Vietnam. Gelatin powder (240 bloom, 30 mesh) was sourced from Ewald (Germany). The cashew apple juices were analyzed for the following parameters: total tannin content (mg/100 mL), tannin mitigation efficiency (%), total polyphenol content (mg/100 mL), vitamin C content (mg/100mL), and turbidity (NTU).

Results and conclusion: The results revealed that there were no significant differences in total tannin content and total polyphenol content of juices extracted by hydraulic pressing, screw pressing, and grinding ($p > 0.05$). However, hydraulic pressing minimally affected the fruit skin, yielding the clearest treated juice at 15.65 ± 0.07 NTU. The study showed that using a gelation solution required less than 12.5 times the amount of gelatin compared to using gelatin powder to achieve the same tannin mitigation efficiency. Furthermore, using gelatin solution also improved the overall visual clarity of the treated cashew apple juice. A strong correlation ($r = 0.992$) was established between the required gelatin dosage and the initial tannin content of the cashew apples, indicating successful tannin removal of 48-49%.

Key Words: Juice extraction, Cashew apple juice, Tannin removal/Detanninification

GEBE İNEK SÜTÜNDEKİ ÖSTROJEN, PROGESTERON VE KADIN SAĞLIĞI ESTROGEN, PROGESTERONE IN PREGNANT COW'S MILK AND WOMEN'S HEALTH

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ÖZET

Süt ve süt ürünleri zengin besin içeriği sayesinde farklı yaş grupları için günlük olarak belli bir miktarda tüketilmesi önerilen bir besin grubudur. Üretim teknolojisindeki gelişmeler, maksimum süt ve yavru verimi elde etmek amacıyla bu memelilerin daha sık gebe kalması ve daha uzun dönemlerde süt elde edilmesi sağlanmaktadır. İneklerde süt veriminin yüksek olması ve besi hayvancılığına daha kolay uyum sağlaması amacıyla ülkemizde ve dünyanın birçok yerinde en çok süt elde edilen memelilerdir. Gebe ineklerin serum hormon profilinde görülen değişiklikler sütte de gözlemlenmektedir. Bu çalışmada gebe olan ve olmayan inek sütlerinde bulunan östrojen ve progesteronun kadın sağlığına etkisini inceleyen çalışma sonuçlarının gözden geçirilmesi amaçlanmaktadır. Literatürde inek sütünün östrojen ve progesteron içeriğini inceleyen çalışmalar gebelik durumu belirtilen ve gebelik durumu belirtilmeyen olarak iki farklı şekilde sınıflandırıldı ve östrojen (Estron, Estradioller ve Estriol), progesteron miktarları ayrı ayrı incelendi. Farklı kuruluşların önerileri doğrultusunda günlük en fazla alınabilecek eksojen hormon miktarı, endojen ve eksojen hormonların başta kadınlar olmak üzere sağlık üzerine etkileri ve konu hakkındaki literatür verileri bu amaç doğrultusunda değerlendirildi. Sonuç olarak eksojen olarak farklı kaynaklardan alınan östrojen ve progesteronun, başta kadınlarda olmak üzere, bir dizi hastalık ile ilişkilendirildiği görüldü. Bu bağlamda, gebe inek sütünün sağlık üzerindeki etkilerinin farkındalığı sağlanarak önlemler konusunda alternatif yaklaşımlara dikkat çekildi.

Anahtar Kelimeler: Gebe inek sütü, kadın sağlığı, östrojen, progesteron

ABSTRACT

Milk and dairy products are a food group recommended to be consumed in a certain amount daily for different age groups due to their rich nutritional content. Developments in production technology ensure that these mammals get pregnant more frequently and obtain milk for longer periods in order to obtain maximum milk and offspring yield. Cows are the mammals that produce the most milk in our country and many parts of the world due to their high milk yield and easier adaptation to livestock farming. Changes in serum hormone profile of pregnant cows are also observed in milk. In this study, it is aimed to review the results of studies examining the effects of estrogen and progesterone in pregnant and non-pregnant cow milk on women's health. Studies examining estrogen and progesterone content of cow's milk

in the literature were classified into two different categories as pregnancy status specified and non-pregnancy status specified and estrogen (Estrone, Estradiols and Estriol) and progesterone amounts were examined separately. In line with the recommendations of different organizations, the maximum daily intake of exogenous hormones, the effects of endogenous and exogenous hormones on health, especially on women, and literature data on the subject were evaluated for this purpose. As a result, it was observed that exogenous estrogen and progesterone intake from different sources is associated with a number of diseases, especially in women. In this context, awareness of the effects of pregnant cow's milk on health was provided and attention was drawn to alternative approaches to precautions.

Keywords: Estrogen, pregnant cow's milk, progesterone, women's health

GLUTENSİZ DİYETLE GEBELİK DİYABETİ ÖNLENEBİLİR Mİ?

CAN GESTATIONAL DIABETES BE PREVENTED WITH A GLUTEN-FREE DIET?

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ÖZET

Gebelik diyabeti, kadında hamilelik sırasında ortaya çıkan bir hastalıktır. Bu hastalık genellikle doğumdan sonra ortadan kalkan geçici bir sağlık sorunu olmakla birlikte kalıcı hale gelerek kadında doğum sonrası tip 2 diyabete neden olabilmektedir. Gebelik diyabeti, hem kadın hem de fetal sağlığı olumsuz yönde etkileyebileceği için, bu durumun gelişmeden önlenmesi kadın doğum hemşirelerinin ve ebelerin önemli sorumluluklarından birisidir. Alan taramasında glutensiz diyetlerin gebelik diyabetini önleyip önleyemeyeceği üzerine yapılan çok sınırlı sayıda çalışmaya rastlanılmıştır. Bazı çalışmalarda yüksek düzeyde gluten alımının kadınlarda gebelik diyabetinin ve çocuklarda da tip 1 diyabetinin görülme olasılığını artırdığı belirtilmektedir. Araştırmalar, glutenin bağırsak geçirgenliğini artırarak inflamasyona yol açabileceğini ve böylece diyabet riskini tetikleyebileceğini öne sürmektedir. Bu nedenle gebelik döneminde gluten alımının azaltılması ya da glutensiz bir beslenme şekli hem kadın hem de çocuk sağlığı üzerinde olumlu etkiler yaratarak diyabet riskini azaltabilir. Ancak glutensiz diyetin gebelik diyabetini önlemedeki etkileri konusunda kesin bir sonuca varmak için daha fazla araştırmaya ihtiyaç vardır. Glutensiz beslenme, diyetten yalnızca glutenin çıkarılması olarak değerlendirilmemelidir, genel olarak daha sağlıklı besin seçimlerine yönelinmelidir. İşlenmiş ve katkılı glutensiz ürünlerin gebelikte getireceği riskler düşünülerek bunların yerine taze ve doğal besinler tercih edilerek kan şekeri kontrolü sağlanabilir ve hem gebe olan kadın hem de fetus sağlığı korunmuş ve yükseltilmiş olur. Ancak gebelik diyabeti riskini azaltmak için yalnızca dengeli bir diyet yeterli olmayabilir. Kadın doğum hemşirelerinin ve ebelerin gebe olan kadınları hem daha az gluten içeren besinler konusunda bilinçlendirmesi hem de onlara düzenli egzersiz ve sağlıklı kilo yönetimini nasıl kazanacaklarını öğretmesi bakım sorumluluklarındandır. Özellikle kadın doğum hemşire ve ebelerin gebelik diyabeti riskini azaltmak için kadınlar ve aileleri ile birlikte onların koşullarına uygun gebelik beslenme (karbonhidrat alımının kontrol altına alındığı, sağlıklı yağlarla dengelenmiş, kadın ve fetusun gereksinimlerini karşılayacak yeterli ve dengeli bir diyet) planları yapmaları önemlidir.

Bu derlemenin amacı gluteni azaltılmış ya da glutensiz bir diyetin gebelik diyabetini önleyip önleyemeyeceğini alan yazın doğrultusunda tartışmaktır.

Anahtar Kelimeler: Gebelik diyabeti, Gebelik diyabetini önleme, Glutensiz beslenme, Glutensiz diyet, Kadın doğum hemşireliği.

ABSTRACT

Gestational diabetes is a disease that occurs in women during pregnancy. Although this disease is usually a temporary health problem that disappears after birth, it can become permanent and cause type 2 diabetes in women after birth. Since gestational diabetes can negatively affect both the health of the woman and the fetus, preventing this condition before it develops is one of the important responsibilities of obstetric nurses and midwives. In the field scan, a very limited number of studies were found on whether gluten-free diets can prevent gestational diabetes. Some studies indicate that high levels of gluten intake increase the likelihood of gestational diabetes in women and type 1 diabetes in children. Studies suggest that gluten can increase intestinal permeability, leading to inflammation and thus triggering the risk of diabetes. Therefore, reducing gluten intake during pregnancy or adopting a gluten-free diet can have positive effects on both women's and children's health and reduce the risk of diabetes. However, more research is needed to reach a definitive conclusion about the effects of a gluten-free diet in preventing gestational diabetes. Gluten-free diet should not be considered as just removing gluten from the diet, but in general, healthier food choices should be made. Considering the risks that processed and additive-free gluten-free products will bring during pregnancy, fresh and natural foods can be preferred instead, and blood sugar control can be achieved, and both the health of the pregnant woman and the fetus will be protected and increased. However, a balanced diet alone may not be enough to reduce the risk of gestational diabetes. It is among the care responsibilities of obstetrics and gynecology nurses and midwives to inform pregnant women about foods that contain less gluten, and to teach them how to achieve regular exercise and healthy weight management. It is especially important for obstetrics and gynecology nurses and midwives to make pregnancy nutrition plans suitable for their conditions (a diet where carbohydrate intake is controlled, balanced with healthy fats, and sufficient and balanced to meet the needs of the woman and the fetus) together with women and their families in order to reduce the risk of gestational diabetes. The purpose of this review is to discuss whether a gluten-reduced or gluten-free diet can prevent gestational diabetes in line with the literature.

Keywords: Gestational diabetes, Preventing gestational diabetes, Gluten-free nutrition, Gluten-free diet, Obstetric nursing.

INCORPORATION OF BLACK CHOKEBERRY (ARONIA MELANOCARPA L.) EXTRACTS INTO BREAD FORMULATIONS: EFFECTS ON GLYCEMIC INDEX, ANTIOXIDANT PROPERTIES, AND IN VITRO BIOACCESSIBILITY OF BIOACTIVE COMPOUNDS

ARONYA (ARONIA MELANOCARPA L.) EKSTRAKTLARININ EKMEK FORMÜLASYONLARINA DAHİL EDİLMESİ VE GLİSEMİK İNDEKS, ANTİOKSİDAN ÖZELLİKLER VE İN VİTRO BİYOAKTİF MADDELERİN BİYOYARARLILIĞI ÜZERİNE ETKİLERİ

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ABSTRACT

The edible part of black chokeberry (*Aronia melanocarpa* L.) mainly comprises small, dark, berry-like fruits, which are seldom eaten fresh because of their intense astringency. Nevertheless, they are extensively processed into various food products like juices, syrups, jams, fruit teas, and dietary supplements. In this study, extracts obtained from black chokeberry fruits using 80% ethanol as a solvent were lyophilized, and their antidiabetic, anti-Alzheimer, and cytotoxic activities against HEK-293, MIA PaCa-2, and CaCo-2 cell lines were determined. These extracts were then incorporated into bread formulations at concentrations of 0%, 0.5%, 1%, and 1.5% (w:w), and the glycemic index and bioactive properties of the breads were investigated. Furthermore, the effects of in vitro digestion on the bioactive properties of the breads with the highest bioactive content were examined. The findings revealed that the extracts (58.29%) were less effective than acarbose (92.66%) in inhibiting α -glucosidase from *Saccharomyces cerevisiae*, and similarly, they exhibited lower inhibition of α -amylase from porcine pancreas (35.60%) compared to acarbose (88.60%). The acetylcholinesterase enzyme inhibition activity of the extracts (80.37%) was also less potent than galanthamine (94.62%). The half-maximal inhibitory concentrations (IC₅₀) of the extracts against HEK-293, MIA PaCa-2, and CaCo-2 cell lines were 1584.14, 1283.72, and 1030.39 μ g/mL, respectively. Breads containing 0% (pGI=89.54%) and 0.5% (pGI=75.35%) extract exhibited high glycemic indices, while those with 1.0% extract had a medium glycemic index, and those with 1.5% extract (pGI=53.24%) had a low glycemic index. The total phenolic content (TPC) of the black chokeberry extracts measured 225.64 mg GAE/100 g, while the TPC in the black chokeberry extract-enriched breads varied between 12.52 and 89.45 mg GAE/100 g. For DPPH radical scavenging activity, the extracts showed a value of 563.34 μ mol TE/100 g, whereas the breads exhibited values ranging from 55.73 to 194.62 μ mol TE/100 g. The extracts demonstrated a FRAP activity of 173.52 μ mol TE/100 g, with the breads displaying FRAP activities between 14.62 and 80.56 μ mol TE/100 g. Likewise, CUPRAC activity in the extracts was recorded at 165.34 μ mol TE/100 g, while the breads had CUPRAC values spanning from 26.35 to 118.19 μ mol TE/100 g. TPC values decreased under in vitro gastrointestinal conditions compared to the initial values, with the greatest reduction observed in the IN (serum-available fraction) phase (5.31 mg GAE/100 g extract) and the lowest in the OUT (colon-available fraction) phase (54.62 mg GAE/100 g extract). Similarly, decreases were observed in DPPH radical scavenging activities, with values recorded at 6.23 μ mol TE/g in the oral phase, 19.58 μ mol TE/g in the gastric phase, 16.40 μ mol TE/g in the IN phase, and 95.03 μ mol TE/g in the OUT phase. FRAP activity also declined during in vitro gastrointestinal digestion but increased from

8.48 to 32.24 $\mu\text{mol TE/g}$ from the oral to the intestinal phase. CUPRAC activity values in the oral, gastric, IN, and OUT phases were 6.53, 16.56, 26.64, and 34.54 mg TE/g, respectively. The bioaccessibility index values were 8.86% for TPC, 14.71% for DPPH radical scavenging activity, 38.64% for FRAP activity, and 43.55% for CUPRAC activity. The results of this study suggest that incorporating black chokeberry extracts into bread formulations can enhance the bioactive properties and lower the glycemic index values of the breads. Despite reductions in bioactive content during in vitro digestion, the enriched breads retained significant antioxidant activity, demonstrating their potential as functional food products with health-promoting benefits.

Keywords: Black chokeberry, functional bread, glycemic index, in vitro bioaccessibility, enzyme inhibition activity, in vitro cytotoxic activity.

ÖZET

Aronya (*Aronia melanocarpa* L.) bitkisinin yenilebilir kısmı, genellikle küçük, koyu renkli ve üzüm benzeri meyvelerden oluşmaktadır. Bu meyveler, güçlü buruk tatları nedeniyle nadiren taze olarak tüketilmektedir. Ancak aronya, gıda endüstrisinde yaygın olarak meyve suları, şuruplar, reçeller, meyve çayları ve diyet takviyeleri gibi çeşitli ürünlere işlenmektedir. Bu çalışmada, %80 etanol kullanılarak aronya meyvelerinden elde edilen ekstraktlar liyofilize edilmiş ve bu ekstraktların antidiyabetik, anti-Alzheimer ve HEK-293, MIA PaCa-2 ve CaCo-2 hücre hatlarına karşı sitotoksik aktiviteleri belirlenmiştir. Bu ekstraktlar daha sonra %0, %0,5, %1 ve %1,5 (w:w) oranlarında ekmek formülasyonlarına dahil edilmiş ve ekmeklerin glisemik indeksleri ile biyoaktif özellikleri incelenmiştir. Ayrıca, en yüksek biyoaktif içeriğe sahip ekmekler belirlenerek bu ekmeklerin biyoaktif özellikleri üzerine in vitro sindirim koşullarının etkileri araştırılmıştır. Bulgular, *Saccharomyces cerevisiae*'dan elde edilen α -glukosidazın inhibisyonunda ekstraktların (%58,29) akarboz standardına (%92,66) kıyasla daha az etkili olduğunu benzer şekilde domuz pankreasından elde edilen α -amilaz inhibisyonunda da ekstraktların (%35,60) akarboza (%88,60) göre daha düşük inhibisyon gösterdiğini ortaya koymuştur. Ayrıca, ekstraktların asetilkolinesteraz enzim inhibisyon aktivitesinin (%80,37) standart galantamin (%94,62) ile karşılaştırıldığında daha az etkili olduğu belirlenmiştir. Ekstraktların HEK-293, MIA PaCa-2 ve CaCo-2 hücre hatlarına karşı yarı maksimum inhibisyon konsantrasyonları (IC_{50}) sırasıyla 1584,14, 1283,72 ve 1030,39 $\mu\text{g/mL}$ olarak belirlenmiştir. %0 (%pGI=89,54) ve %0,5 (%pGI=75,35) ekstrakt içeren ekmeklerin yüksek glisemik indekse sahip olduğu, %1,0 ekstrakt içeren ekmeklerin orta glisemik indekse ve %1,5 ekstrakt içeren ekmeklerin (%pGI=53,24) ise düşük glisemik indekse sahip olduğu tespit edilmiştir. Ekstraktların toplam fenolik madde (TPC) içeriği 225,64 mg GAE/100 g iken aronya ile zenginleştirilmiş ekmeklerin TPC değerleri 12,52-89,45 mg GAE/100 g aralığında değişmiştir. Ekstraktların TPC içeriği 225,64 mg GAE/100 g olarak belirlenirken, aronya ile zenginleştirilmiş ekmeklerin TPC değerleri 12,52 ile 89,45 mg GAE/100 g arasında değişiklik göstermiştir. Benzer şekilde, ekstraktların DPPH radikal süpürme kapasitesi 563,34 $\mu\text{mol TE/100 g}$ olarak ölçülmüş olup, ekmeklerde bu değerler 55,73 ile 194,62 $\mu\text{mol TE/100 g}$ arasında kaydedilmiştir. Ekstraktların FRAP aktivitesi 173,52 $\mu\text{mol TE/100 g}$ iken ekmeklerdeki FRAP değerleri 14,62 ile 80,56 $\mu\text{mol TE/100 g}$ arasında değişim göstermiştir. Aynı şekilde, ekstraktların CUPRAC aktivitesi 165,34 $\mu\text{mol TE/100 g}$ olarak belirlenmiş, ekmeklerde ise bu aktivite 26,35 ile 118,19 $\mu\text{mol TE/100 g}$ arasında tespit edilmiştir. In vitro gastrointestinal koşullar altında TPC değerlerinde azalmalar gözlenmiş olup, en büyük düşüş IN (seruma geçebilen fraksiyon) fazında (5,31 mg GAE/100 g ekstrakt), en küçük düşüş ise OUT (kolonda kalabilen fraksiyon) fazında (54,62 mg GAE/100 g ekstrakt) tespit edilmiştir. Benzer şekilde, DPPH radikal süpürücü aktivitesi de ekstraktın başlangıç DPPH aktivite değerine göre azalmış ve bu değerler ağız fazında 6,23 $\mu\text{mol TE/g}$, mide fazında 19,58 $\mu\text{mol TE/g}$, IN fazında 16,40 $\mu\text{mol TE/g}$, OUT fazında ise 95,03 $\mu\text{mol TE/g}$ olarak kaydedilmiştir. FRAP aktivitesi sindirim sürecinde azalsa da ağız fazından bağırsak fazına doğru 8,48 μmol

TE/g'den 32,24 $\mu\text{mol TE/g}$ 'e kadar artış göstermiştir. CUPRAC aktivite deęerleri aęız, mide, IN ve OUT fazlarında sırasıyla 6,53, 16,56, 26,64 ve 34,54 $\mu\text{mol TE/g}$ olarak belirlenmiştir. Biyoyararlanım indeksi deęerleri ise TPC için %8,86, DPPH radikal süpürücü aktivitesi için %14,71, FRAP aktivitesi için %38,64 ve CUPRAC aktivitesi için %43,55 olarak hesaplanmıştır. Bu çalışmanın sonuçları, aronya ekstraktlarının ekmek formülasyonlarına dahil edilmesinin, ekmeklerin biyoaktif özelliklerini artırabileceğini ve glisemik indekslerini düşürebileceğini göstermektedir. In vitro sindirim sırasında biyoaktif içerikte meydana gelen azalmaya rağmen, zenginleştirilmiş ekmekler önemli düzeyde antioksidan aktiviteyi koruyarak, sağlık açısından faydalı fonksiyonel gıda ürünleri olarak potansiyel taşıdığını göstermiştir.

Anahtar Kelimeler: Aronya, fonksiyonel ekmek, glisemik indeks, in vitro biyoyararlılık, enzim inhibisyonu aktivitesi, in vitro sitotoksik aktivite.

PHENOLIC ACID PROFILE ALTERATIONS IN AQUEOUS AND ETHANOLIC STEVIA EXTRACTS ACROSS SEQUENTIAL PURIFICATION STAGES

FARKLI SAFLAŞTIRMA AŞAMALARINA TABİ TUTULAN SULU VE ETANOLİK STEVIA EKSTRAKTLARININ FENOLİK ASİT PROFİLİNDEKİ DEĞİŞİMLER

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ÖZET

Stevia ekstraktı içerdiği antioksidan özelliğe sahip fenolik asitler sayesinde tatlılık unsuru olarak kullanılmasının ötesinde sağlık açısından da önemli bir değer taşımaktadır. Bu çalışmada, çeşitli saflaştırma işlemlerine tabi tutulan sulu ve etanolik stevia ekstraktlarının fenolik asit kompozisyonundaki değişim incelenmiştir. Buna göre; saf su veya etanol ile mauamele edilen kurutulmuş stevia yapraklarından elde edilen stevia ekstraktları daha sonra santrifüj edilmiş, filtrelenmiş, 50°C'de sıcak durultma işlemine tabi tutulmuş ve sonrasında sırasıyla 30 kDa ultrafiltrasyon ve 5 kDa nanofiltrasyon membranlarından geçirilmiştir. Örneklerin fenolik asit kompozisyonu %75 metanol ve formik asit çözeltisi ile ekstrakte edilmiş ve santrifüjlenerek C18 kolona sahip bir LC-MS/MS cihazı kullanılarak analiz edilmiştir. Elde edilen bulgulara göre, hem sulu hem de etanolik stevia ekstraktlarında en baskın fenolik asidin klorojenik asit olduğu; özellikle de etanolik ekstraktta, sulu ekstraktta kıyasla daha yüksek konsantrasyonda klorojenik asit bulunduğu (yaklaşık 600 mg/kg) tespit edilmiştir. Santrifüj ve berraklaştırma işlemleri sonrasında her iki ekstraktın da fenolik asit konsantrasyonlarında önemli bir azalma gözlenmiştir. Özellikle 30 kDa retentate akısı klorojenik ve kafeik asitlerin zenginleştirilmesinde kritik bir rol oynamıştır. Sulu stevia ekstraktı yaklaşık olarak 120 mg/kg klorojenik asit içerirken, etanolik ekstraktta bu miktar yaklaşık 400 mg/kg seviyesine ulaşmıştır. Öte yandan nanofiltrasyon aşamaları (5 kDa permeat ve retentat), bu asitlerin seviyelerini önemli ölçüde azaltmıştır. Luteolin, apigenin ve rutin gibi diğer fenolik asitler ise tüm saflaştırma aşamaları boyunca düşük seviyelerde kalmıştır. Sonuç olarak ekstraksiyonda kullanılan çözücünün fenolik asit profili üzerinde önemli bir etkisi olduğu ve etanolik ekstraktlarda klorojenik asidin daha yüksek konsantrasyonlarda elde edildiği görülmektedir. Ayrıca özellikle ultrafiltrasyon işleminin 30 kDa retentat fazı fenolik asitlerin zenginleştirilmesinde etkili olurken, çözücü türü genel profilin şekillenmesinde önemli bir rol oynamıştır.

Anahtar Kelimeler: Stevia rebaudiana, fenolik asitler, sulu, etanolik, aşamalı saflaştırma

ABSTRACT

Stevia extracts are valued for their health benefits, primarily due to the phenolic acids they contain, which contribute to the antioxidant properties of stevia. This study investigated the alterations in the phenolic acid composition of aqueous and ethanolic stevia extracts across several purification stages. Accordingly, dried stevia leaves were mixed with distilled water or ethanol, centrifuged, filtered, clarified at 50°C with aids, and then passed through stepwise membrane filtration using 30 kDa ultrafiltration and 5 kDa nanofiltration membranes. The phenolic acid composition was analyzed by extracting samples with a 75% methanol and formic acid solution, followed by centrifugation. Detection was performed using an LC-MS/MS device equipped with a C18 column. Chlorogenic acid was the most prevalent in both aqueous and ethanolic stevia extracts. However, the ethanolic extract exhibited a higher concentration (approx. 600 mg/kg) compared to the aqueous extract (approx. 100 mg/kg). After centrifugation and clarification, the phenolic acid concentrations in both extracts significantly decreased. The 30 kDa retentate phase was crucial for the enrichment of chlorogenic and caffeic acids. The aqueous extract reached approximately 120 mg/kg chlorogenic acid, while the ethanolic extract reached about 400 mg/kg. Nanofiltration phases (5 kDa permeate and retentate) significantly reduced the levels of these acids. Other phenolic acids, such as luteolin, apigenin, and rutin, remained at low levels throughout all phases. The solvent used had a significant impact on the phenolic profile, with ethanol being more effective in retaining chlorogenic acid. While the 30 kDa retentate phase concentrated phenolic acids, the type of solvent used played a key role in shaping the overall profile.

Keywords: Stevia rebaudiana, phenolic acids, aqueous, ethanolic, stepwise purification

**PINUS PINASTER REÇİNESİ ESANSİYEL YAĞI İLE ZENGİNLEŞTİRİLMİŞ
BEZELYE PROTEİNİ İZOLATI ESASLI YENİLEBİLİR FILMLERİN
GELİŞTİRİLMESİ**

**DEVELOPMENT OF EDIBLE FILMS BASED ON PEA PROTEIN ISOLATE
ENRICHED WITH ESSENTIAL OIL OF PINUS PINASTER RESIN**

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ÖZET

Bu çalışmada, Pinus pinaster (sahil çamı) reçinesi esansiyel yağı (PEO) ile zenginleştirilmiş bezelye proteini izolatı esaslı yenilebilir filmlerin geliştirilmesi hedeflenmiştir. Bu amaçla, farklı konsantrasyonlarda PEO (%0: PEO-0, %0.5: PEO-0.5, %1: PEO-1, %1.5: PEO-1.5 ve %2: PEO-2, a/h) içeren bezelye proteini esaslı filmler üretilmiştir. Elde edilen filmlerde kalınlık, nem, suda çözünürlük, su buharı geçirgenliği, opaklık, mekanik ve FTIR analizleri gerçekleştirilmiştir. PEO ilavesinin filmlerin kalınlık ve opaklık değerleri üzerindeki etkisi istatistiksel olarak önemli bulunmamıştır ($p>0.05$). Bununla birlikte, nem içeriği, suda çözünürlük, su buharı geçirgenliği ve mekanik özellikler PEO ilavesinden önemli ölçüde etkilenmiştir ($p<0.05$). %1 ve %1.5 PEO ilavesi filmlerin nem içeriğinde belirgin bir artışa neden olmuştur ($p<0.05$). %2 PEO içeren filmin suda çözünürlüğü kontrol örneğine kıyasla önemli ölçüde artmıştır ($p<0.05$). Sonuçlar, PEO ilavesinin belirli konsantrasyonlarda filmlerin mekanik ve su buharı bariyer özelliklerini iyileştirdiğini göstermiştir. En düşük su buharı geçirgenliği değeri %1.5 PEO içeren filmde tespit edilmiştir. %0.5 ve %1.5 PEO ilavesi filmlerin gerilme direncini artırırken, yalnızca %0.5 PEO ilavesi elastikiyet üzerinde belirgin bir artışa neden olmuştur ($p<0.05$). Tüm bunlara ek olarak, test edilen filmlerin benzer FTIR spektrumları sergilediği belirlenmiştir. Sonuç olarak, geliştirilen filmler biyoesaslı yenilebilir ambalaj materyallerinin geliştirilmesine katkıda bulunabilir. Bununla birlikte, filmlerin yapısal özelliklerinin ve antimikrobiyal aktivitelerinin incelenmesi ve gıda sistemlerindeki kullanılabilirliğinin değerlendirilmesi ürünün potansiyelinin daha iyi anlaşılmasına katkı sağlayacaktır.

Anahtar Kelimeler: biyoesaslı film, bitkisel protein, esansiyel yağ, sahil çamı, reçine

ABSTRACT

This study aims to develop edible films based on pea protein isolate enriched with essential oil from Pinus pinaster resin (PEO). For this purpose, pea protein isolate-based films containing different concentrations of PEO (0%: PEO-0, 0.5%: PEO-0.5, 1%: PEO-1, 1.5%: PEO-1.5, and 2%: PEO-2, w/v) were produced. The films were analyzed for thickness, moisture content, water solubility, water vapor permeability, opacity, mechanical properties, and FTIR properties. PEO had no significant ($p>0.05$) effect on the thickness and opacity of the films. However, moisture content, solubility in water, water vapor permeability, and mechanical properties were significantly affected by PEO addition ($p<0.05$). The addition of 1% and 1.5% PEO resulted in a notable increase in the moisture content of the films ($p<0.05$). The water solubility of the film containing 2% PEO was significantly higher compared to the

control sample ($p < 0.05$). The results demonstrated that PEO, at certain concentrations, improved the mechanical and water vapor barrier properties of the films. The lowest water vapor permeability was observed in the film containing 1.5% PEO. While the addition of 0.5% and 1.5% PEO increased the tensile strength of the films, only the 0.5% PEO addition led to a significant increase in elasticity ($p < 0.05$). Moreover, the FTIR spectra of the tested films were found to be similar. It can thus be concluded that the developed films could contribute to the advancement of bio-based edible packaging materials. However, further investigation of the structural properties, antimicrobial activities, and applicability of these films in food systems would provide a better understanding of their potential.

Keywords: bio-based film, plant protein, essential oil, maritime pine, resin

KOLAJEN: SAĞLIK ETKİLERİ, TEKNOLOJİK ÖZELLİKLERİ VE SÜT ÜRÜNLERİNİN ZENGİNLEŞTİRİLMESİNDE KULLANIM POTANSİYELİ

COLLAGEN: HEALTH EFFECTS, TECHNOLOGICAL PROPERTIES, AND USAGE POTENTIAL IN THE FORTIFICATION OF DAIRY PRODUCTS

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ÖZET

Kolajen deri, kemik, tendon ve bağ dokularında en bol bulunan yapısal bir proteindir. Kolajen, mükemmel parçalanabilirliği ve biyolojik uyumluluğu nedeniyle dokuların oluşumunda önemli bir rol oynamaktadır. Bu nedenle, kolajen pek çok sağlık alanındaki (diş, kardiyovasküler cerrahi, plastik cerrahi, ortopedi, üroloji, nöroloji, oftalmolojide vb.) tıbbi uygulamalarda biyomateryal olarak yaygın bir şekilde kullanılmaktadır. Yapılan in vitro ve in vivo çalışmalarda hidrolize kolajenin antioksidan, osteoblastik aktivitede artış, kemik rejenerasyonu, yara iyileşme hızında artış ve yaşlanmayı geciktirici gibi pek çok sağlık faydalarının olduğu rapor edilmiştir. Kolajen türleri, dokulardaki dağılım, işlev ve boyut açısından önemli ölçüde farklılık gösterse de temelde hidrojen bağlarıyla birbirine bağlanan üç polipeptit zincirinin oluşturduğu kararlı bir sarmal yapıdan oluşmaktadır. Kolajen α -sarmal yapısının bileşimine bağlı olarak çeşitlenmektedir. Günümüze kadar çeşitli dokularda yaklaşık 29 tip kolajen (I-XXIX) tanımlanmış olup, biyolojik dokularda en fazla bulunan tip-I kolajendir. Glisin (Gly, %35) ve prolin (Pro, %12) kolajenin yapısında en fazla bulunan aminoasitlerdir. Kolajenin küresel pazar değeri giderek artan bir eğilim göstermekte olup büyük oranda sağlık (%48) ve gıda (%32) sektörlerinde kullanılmaktadır. Yüksek protein içeriğiyle (%84-90) kolajen; köpürme, jel oluşturma, koloidal stabilizasyon sağlama, emülsifiye etme ve biyolojik olarak parçalanabilir film oluşturma gibi sahip olduğu teknolojik özellikleriyle gıda endüstrisinde geniş bir kullanım alanı bulmaktadır. Süt ürünleri, günümüzde fonksiyonel gıdaların yaklaşık %40'ını temsil etmekte olup temel beslenmede, sağlıklı yaşamda ve hastalıkların önlenmesinde önemli etkilere sahiptir. Yapılan araştırmalarda, süt ürünlerinin (yoğurt, peynir, dondurma, fermente süt, vb.) zenginleştirilmesinde kolajen ve türevlerinin kullanımının ürünlere fonksiyonel özellikler (antioksidan aktivite, ACE-I inhibitörü, protein zenginleştirme, prebiyotik etki, vb.) ve teknolojik faydalar (viskoziteyi artırma, sinerezisi azaltma, erime direncini artırma ve çökelti oluşumunu azaltma gibi özelliklere bağlı olarak tekstürel ve reolojik özellikleri geliştirme) sağladığı ve ürünlerin duyu özelliklerini geliştirdiği belirlenmiştir. Bu çalışmada, hayvansal yan ürün kolajen ve kolajen peptitlerinin insan sağlığı ve beslenmesindeki önemi ile teknolojik özelliklerine dikkat çekerek, kolajen ile zenginleştirilmiş süt ve süt ürünleri üzerinden genel bir bakış sunmak amaçlanmıştır. Böylece, kolajenin gıda işleme, ambalajlama ve fonksiyonel gıdalarda kullanımını yaygınlaştırmak hedeflenmiştir.

Anahtar Kelimeler: Fonksiyonel gıda, Kolajen, Kolajen ve sağlık, Zenginleştirilmiş süt ürünleri, Gıda kalitesi, Teknolojik özellikler.

ABSTRACT

Collagen is a structural protein most abundant in skin, bone, tendon, and connective tissues. Collagen plays an important role in the formation of tissues due to its excellent degradability and biocompatibility. Therefore, collagen is widely used as a biomaterial in medical applications in many health fields (dental, cardiovascular surgery, plastic surgery, orthopedics,

urology, neurology, ophthalmology, etc.). In vitro and in vivo studies have reported that hydrolyzed collagen has many health benefits such as antioxidant, increase in osteoplastic activity, bone regeneration, increase in wound healing rate, and anti-aging. Although collagen types vary considerably in terms of distribution, function, and size in tissues, they mainly consist of a stable helical structure formed by three polypeptide chains linked together by hydrogen bonds. Collagen is diversified depending on the composition of its α -helix structure. Approximately 29 types of collagen (I-XXIX) have been identified in various tissues to date, and type-I collagen is the most abundant in biological tissues. Glycine (Gly, 35%) and proline (Pro, 12%) are the most abundant amino acids in the structure of collagen. The global market value of collagen shows a growing trend and is largely utilized by the health (48%) and food industries (32%). With its high protein content (84-90%), collagen is widely used in the food industry due to its technological aspects such as foaming, gel formation, colloidal stabilization, emulsification, and biodegradable film formation. Dairy products represent about 40% of functional foods today and have important effects on basic nutrition, healthy living, and disease prevention. Studies have shown that the use of collagen and its derivatives in the enrichment of dairy products (yogurt, cheese, ice cream, fermented milk, etc.) provides functional properties (antioxidant activity, ACE-I inhibitor, protein enrichment, prebiotic effect, etc.) and technological benefits (improving textural and rheological properties due to properties such as increasing viscosity, reducing syneresis, increasing melt resistance and reducing sediment formation) and improving the sensory characteristics of the products. This study aims to provide an overview of collagen-enriched milk and dairy products by drawing attention to the importance and technological aspects of animal by-product collagen and collagen peptides in human health and nutrition. Thus, it is targeted to promote the use of collagen in food processing, packaging, and functional foods.

Keywords: Collagen, Functional food, Collagen and health, Fortified dairy products, Food quality, Technological properties

GIDALARDA BİYOJEN AMİN VARLIĞINI AZALTMAYA YÖNELİK YÖNTEMLER

METHODS TO REDUCE THE PRESENCE OF BIOGENIC AMINES IN FOODS

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ÖZET

Biyojen aminler, bazı amino asitlerin mikrobiyal dekarboksilasyonu veya aldehit ve ketonların aminasyonu ve transaminasyonu sonucu oluşan biyolojik olarak aktif organik bazlar olarak tanımlanmaktadır. Nitelik ve nicelik olarak gıdalarda bulunan en önemli biyojen aminler histamin, tiramin, putresin, kadaverin, triptamin, 2-feniletilamin, spermin, spermidin ve agmatindir. Biyojen aminler protein sentezi, hormon sentezi ve DNA replikasyonu gibi organizmanın metabolik süreçlerinde önemli rol oynamaktadır. Normal koşullar altında, organizma, monoamin oksidazlar ve diamin oksidazların etkisiyle, gıda ile alınan biyojen aminleri parçalayabilmektedir. Ancak yüksek miktarda biyojen amin içeren gıdaların tüketilmesi ile baş edilememekte ve baş ağrısı, kalp çarpıntısı, kaşıntı, döküntü, kusma, ateş ve hipertansiyon ile karakterize alerjik reaksiyonlara neden olabilmektedir. Biyojen aminler meyve, sebze ve balık gibi fermente edilmemiş gıdalarda doğal olarak bulunabileceği gibi özellikle fermente gıdaların üretimi sırasında da üretilebilmektedir. Bu nedenle, biyojen aminlerin konsantrasyonu genellikle fermente gıdaların güvenlik ve kalitesinin değerlendirilmesi için önemli bir gösterge olarak kabul edilmektedir. Gıdalarda, biyojen aminlerin yüksek düzeyde bulunması; bozulmanın, düşük kalitenin, kötü üretim uygulamalarının ve yetersiz hijyen koşullarının göstergesi olarak kabul edilmektedir.

İnsan sağlığı ve gıda kalitesi üzerindeki etkileri nedeniyle gıdalarda bulunan biyojen aminler ile ilgili son yıllarda yapılan çalışmalar; biyojen amin üretimini azaltmak veya engellemek için depolama ve dağıtım koşulları dahil olmak üzere işleme ve çevresel faktörlerin modülasyonu veya fermente gıdalarla ilişkili mikrobiyotanın kontrolü olmak üzere iki temel stratejiye dayanmaktadır. Bu amaçla günümüzde, gıda katkı maddelerinin veya biyoaktif bileşiklerin kullanımı, depolamada düşük sıcaklık-uygulamaları, yüksek hidrostatik basınçlı işleme (HHP), modifiye atmosfer paketleme (MAP), ışınlama, biyojenik aminleri parçalayan diamin oksidaz (DAO) gibi enzimlerin veya bu enzimlere sahip bakterilerin kullanımı gibi uygulamalar öne çıkmaktadır. Bu derlemede gıdaların biyojen amin içeriğinin azaltılması amacıyla son yıllarda kullanılan yeni teknik ve yöntemler açıklanacak ve bu yöntemlerin avantajları, sınırlamaları ve birlikte kullanılabilirlikleri ele alınacaktır.

Anahtar Kelimeler: Biyojen amin, Gıda güvenliği, Starter kültürler

ABSTRACT

Biogenic amines are defined as biologically active organic bases formed through the microbial decarboxylation of some amino acids or the amination and transamination of aldehydes and ketones. The most important biogenic amines found in foods in terms of quality and quantity are histamine, tyramine, putrescine, cadaverine, tryptamine, 2-phenylethylamine, spermine, spermidine and agmatine. Biogenic amines play a crucial role in metabolic processes such as protein synthesis, hormone synthesis, and DNA replication within organisms. Under normal conditions, the organism is able to degrade biogenic amines ingested with food through the action of monoamine oxidases and diamine oxidases. However, the consumption of foods containing high amounts of biogenic amines cannot be coped with and can cause allergic reactions characterized by headache, heart palpitations, itching, rash, vomiting, fever and hypertension. Biogenic amines can be found naturally in unfermented foods such as fruits, vegetables and fish, but can also be produced during the production of fermented foods. Therefore, the concentration of biogenic amines is generally recognized as an important indicator for assessing the safety and quality of fermented foods. High levels of biogenic amines in foods are recognized as indicators of spoilage, poor quality, poor production practices and inadequate hygiene conditions.

Due to their impact on human health and food quality, recent studies on biogenic amines in foods have focused on two main strategies: modulating processing and environmental factors, including storage and distribution conditions, or controlling the microbiota associated with fermented foods to reduce or prevent biogenic amine production. Current practices for this purpose include the use of food additives or bioactive compounds, low-temperature storage, high hydrostatic pressure processing (HHP), modified atmosphere packaging (MAP), irradiation, and the application of enzymes like diamine oxidase (DAO), or bacteria possessing these enzymes, to degrade biogenic amines. In this review, new techniques and methods used in recent years to reduce the biogenic amine content of foods will be described and their advantages, limitations and interoperability will be discussed.

Keywords: Biogenic amine, Food safety, Starter cultures

KARAMÜRVER MEYVE POSASI VE MÜRVER ÇİÇEĞİ TOZU İLE ZENGİNLEŞTİRİLMİŞ KEKLERİN BAZI FİZİKOKİMYASAL VE DUYUSAL ÖZELLİKLERİ

SOME PHYSICOCHEMICAL AND SENSORY PROPERTIES OF CUP CAKES INCORPORATED IN DRIED ELDERBERRY POMACE AND ELDERFLOWER

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ÖZET

Halk arasında Karamürver olarak bilinen Sambucus nigra, Adoxceae familyasına ait, bahar mevsimi sonlarında beyaz çiçek açan, yeşil yapraklı, sonbahar mevsimi başında üzüm gibi küçük koyu renkli meyveleri olan bir bitki cinsidir. Çiçeği ve meyveleri geleneksel tıpta kullanıldığı gibi son zamanlarda çokça tüketilen gıda takviyeleri arasında yer almaktadır. Meyve yapısında bulunan flavonoidler, polifenoller, fenolik asitler, antosiyaninler ve tanenler gibi biyoaktif bileşenlerin zenginliği, çiçeklerinin ise içerdiği flavonoid ve fenolik asitlerle anti-kanserojen, immün sistem uyarıcı, antibakteriyel, antiinflamatuvar gibi birçok biyolojik etki gösterdikleri bilinmektedir. Diğer taraftan, mürver kök, kabuk ve yapraklarının bir siyanojenik glikozit olan, toksik ve siyanür zehirlenmesine neden olabilen sambunigrin içerdiği, bununla beraber ısı işlem uygulandığında dekompoze olarak toksik tesirini kaybettiği bilinmektedir. Bu nedenle, mürver meyvelerinin taze olarak tüketiminden daha çok reçel, marmelat, meyve suyu, çay, sirke, şarap ve likör gibi tüketim şekilleri tercih edilmektedir. Bu çalışmada, karamürver meyvesi soğuk sıkımından arta kalan posa ve mürver çiçeğinin düşük sıcaklık uzun süre ısı işlemle (37 °C'de 10 saat) kuru forma getirilmesi, yine ısı işlem görmüş bir gıda modeli olarak kek formülüne 4 farklı oranda (%1, 2, 3 ve %4) ilavesiyle hazırlanan ürünlerin biyoaktif, fizikokimyasal ve duyusal nitelikleri araştırılmıştır. Karamürver meyve posası ve çiçeğinin toz formda keklerle ilave oranına bağlı olarak, ürünlerin rutubetlerinde azalma olurken, toplam mineral madde, selüloz ve antioksidan aktivitelerinde önemli ($p<0,05$) artış tespit edilmiştir. %4 mürver meyve posası tozu ilavesi (83,86 %inhibisyon) çiçek tozu ilavesine (48,97 %inhibisyon) göre daha yüksek antioksidan aktivite göstermiştir. Meyve posası ve çiçek tozu ilavesinin artan oranlarda ilavesi ürünlerin iç doku a* renk değerlerinde artışa neden olmuştur. 5 adet kara mürver meyve posalı, 5 adet de mürver çiçek tozlu kek örneği şekil simetrisi, renk, pişme düzgünlüğü, görünüş, doku, çiğneme özellikleri, tatlılık, iç renk ve lezzet olmak üzere 9 duyusal kriter açısından panelistler tarafından 1-5 arası hedonik skala ile değerlendirilmiştir. Duyusal analiz skorlarına göre kümelenme eğilimi ve benzerliklerinin ifadesi için sonuçlar, Temel Bileşen Analizi ile yorumlanmıştır. Mürver çiçeği ilaveli keklerde pişme düzgünlüğü, doku, görünüş ve şekil simetrisi açısından K1 örneğinden (%1 kullanım oranı) itibaren ilave oranındaki artışa bağlı olarak K3 (%3 kullanım oranı) örneğine kadar skorlarda artış, bu seviyeden sonra düşüş görülmüş ve en az K4 örneği beğenilmiştir. Karamürver meyve tozu ilavesi için K1 örneği (%1 kullanım oranı) kontrol kekine en yakın örnek olarak değerlendirilmiştir. Pişme düzgünlüğü ve renk haricindeki diğer duyusal kalite nitelikleri %1 ilave oranından sonra düşmüştür. Veri analizi sonuçlarına göre mürver çiçeği tozu için en yüksek %3, mürver meyve posası tozu için en fazla %1 kullanım oranı kabul edilebilir

bulunmuştur. Bu çalışmayla, geleneksel halk tıbbında yer bulan ve günümüzde gıda takviyesi formlarıyla tüketime sunulan mürverin, suyunun alınmasından sonra atık olarak çıkan meyve posası ile ülkemizde ekonomik olarak değerlendirilmeyen çiçek tozu formlarının bir gıda modeline ilavesiyle günlük diyetteki kullanımına alternatif alan oluşturulması hedeflenmiştir. Elde edilen sonuçlar her iki hammaddenin de fonksiyonel gıda üretiminde potansiyel kullanımına işaret etmektedir.

Anahtar Kelimeler: Mürver, mürver çiçeği, kek, fırıncılık ürünleri, fonksiyonel gıda

ABSTRACT

Commonly known as Elderberry, *Sambucus nigra* is a species belonging to the Adoxaceae family. It is a deciduous plant with green leaves, which produces small dark berries resembling grapes in early autumn, following the blossoming of white flowers at the end of spring. Both its flowers and berries have been traditionally used in folk medicine and are now widely available in the form of dietary supplements due to their health benefits. It's fruits is rich in bioactive compounds such as flavonoids, polyphenols, phenolic acids, anthocyanins, and tannins, while the flowers contain flavonoids and phenolic acids. These components are known for their biological effects, including anti-carcinogenic, immune-stimulating, antibacterial, and anti-inflammatory properties. On the other hand, it is known that elderberry roots, bark and leaves contain sambunigrin, a cyanogenic glycoside that is toxic and can cause cyanide poisoning, but it decomposes and loses its toxic effect when heat treated. Therefore, elderberries are more commonly consumed in processed forms such as jams, marmalades, juices, teas, vinegars, wines, and liqueurs rather than fresh. In this study, elderberry pomace, a by-product of cold-pressed elderberry juice, and elderflower were dried into powder form through low-temperature, long-duration heat treatment (37°C for 10 hours). The bioactive, physicochemical, and sensory properties of the products prepared by incorporating four different concentrations (1%, 2%, 3%, and 4%) of these powders into a cake formulation, which was also subjected to heat treatment, were investigated. As the concentration of elderberry fruit pomace and flower powder in the cakes increased, moisture content decreased, while total mineral matter, cellulose, and antioxidant activity showed significant increases ($p < 0.05$). A 4% addition of elderberry fruit pomace powder exhibited a higher antioxidant activity (83.86% inhibition) compared to elderflower powder (48.97% inhibition). Increasing concentrations of both powders resulted in increased a^* color values in the internal structure of the cakes. Sensory evaluations of five elderberry fruit pomace cakes and five elderflower powder cakes were conducted by panelists, who rated the samples on nine sensory criteria, including shape symmetry, color, baking uniformity, appearance, texture, chewiness, sweetness, internal color, and flavor, using a 1-5 hedonic scale. Principal Component Analysis was used to interpret the clustering trends and similarities in the sensory scores. For elderflower cakes, sensory scores for baking uniformity, texture, appearance, and shape symmetry increased up to sample K3 (3% adding rate) before decreasing, with K4 being the least preferred. For elderberry fruit powder cakes, K1 (1% adding rate) was evaluated as the sample most similar to the control cake, while sensory quality scores for all criteria except baking uniformity and color decreased after a 1% addition rate. Based on the data analysis, the most acceptable inclusion rates were 3% for elderflower powder and 1% for elderberry fruit pomace powder. This study aims to explore alternative applications of elderberry, a plant traditionally accepted in folk medicine and now commonly consumed in the form of dietary supplements. Specifically, the study focuses on utilizing elderberry pomace, a by-product left after juice extraction, and elderflower powder, which has little economic value in Turkey, as ingredients in cake formulations. By incorporating these forms into a food model like cake, the goal is to provide alternative uses for elderberry in daily diets. The results obtained indicate that both raw materials hold potential for use in the production of functional foods.

Keywords: Elderberry, elderflower, cake, bakery products, functional food

SÜT SIĞIRI İŞLETMELERİNDE SAĞIM HIJYENİN SÜTTE KALINTI SORUNU ÜZERİNE ETKİLERİ

THE EFFECTS OF MILKING HYGIENE ON RESIDUE ISSUES IN DAIRY CATTLE ENTERPRISES

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ÖZET

Süt ve süt ürünleri, insan beslenmesinde hayati bir öneme sahip olup, tüm insanlar için yaşamlarının ilk yılından itibaren gereklidir. Ancak, bu temel gıda, birçok kalıntı maddesini içerebilir. Bu kalıntı maddeleri arasında, çeşitli kimyasal kalıntılar, özellikle antibiyotikler, hormonlar, pestisitler, mikotoksinler ve dioksinler gibi veteriner ilaçları yer alır. Tüm bu kalıntıların, insan sağlığı üzerinde olumsuz etkileri vardır. Halk sağlığı açısından, bu kimyasal kalıntıların varlığı, potansiyel bir tehlike oluşturmaktadır. Süt işletmelerinde, etkin temizlik ve dezenfeksiyon sistemlerinin uygulanması, hem ürün kalitesini artırmakta hem de halk sağlığı için potansiyel riskleri azaltmaktadır. Bu derlemede, süt ve süt ürünlerinde kimyasal kalıntıların kaynağı ve bu kalıntıların kontrol altına alınması, yasal düzenlemeler, sağım hijyenin önemi ve sağım hijyeni ile kalıntıların önlenmesi, ele alınmıştır. Süt işletmelerinde uygulanan sağım işlemleri ve yöntemleri, çiğ sütün kalitesini önemli ölçüde etkilemektedir. Ön sağımın gerçekleştirilmesi, sağım öncesi ve sonrası meme başlarında dezenfektan kullanımı ile işletmelerin merkezi sağım sistemine geçişi, daha kaliteli çiğ süt elde etmek açısından faydalı olacaktır. Bir sürünün meme sağlığını ve süt kalitesini belirleyen en önemli faktörler, mastitis, tank sütündeki somatik hücre sayısı ve toplam bakteri sayısıdır. Özellikle mastitis tedavisinde kullanılan ilaçlar ve hayvan sağlığına yönelik ilaçlar, halk sağlığını tehdit ederek, sütte antibiyotik kalıntısı riskini oluşturur. Süt sığırçılığı işletmelerinde süt hijyenine yeterince dikkat edildiğinde, sütteki kalıntı sorunları da büyük ölçüde çözülmüş olacaktır.

Anahtar Kelimeler: Sağım Hijyeni, Kalıntı, Halk Sağlığı.

ABSTRACT

Milk and dairy products play a vital role in human nutrition and are essential for everyone from the first year of life. However, this basic food can contain various residues. These residues include various chemical contaminants, particularly veterinary drugs such as antibiotics, hormones, pesticides, mycotoxins, and dioxins. All these residues have negative effects on human health. The presence of these chemical contaminants poses a potential risk to public health. Implementing effective cleaning and disinfection systems in dairy enterprises enhances product quality and reduces potential health risks. This review addresses the sources of chemical residues in milk and dairy products, their control through legal regulations, the importance of milking hygiene, and the prevention of residues. The milking practices and methods applied in dairy farms significantly affect the quality of raw milk. Performing pre-milking procedures, using disinfectants on the teats before and after milking, and transitioning to a central milking system will contribute to obtaining higher quality raw milk. The most important factors determining a herd's udder health and milk quality are mastitis, the somatic

cell count in tank milk, and the total bacterial count. Particularly, medications used for mastitis treatment and those aimed at animal health pose risks to public health by increasing the risk of antibiotic residues in milk. When sufficient attention is paid to milk hygiene in dairy farming, the problems related to residues in milk can be largely resolved.

Keywords: Milking Hygiene, Residues, Public Health.

OPTIMIZATION OF EXTRACTION CONDITIONS OF SARGASSUM ACICULARIS PROTEINS: INVESTIGATION OF ANTIOXIDANT ACTIVITY OF PROTEIN EXTRACTS

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ÖZET

Bu çalışmada, *Sargassum acicularis*'ten proteinlerin ekstraksiyonu için ultrases destekli enzimatik ekstraksiyon yapılmış ve protein ekstraktlarının antioksidan aktivitesi ilk kez araştırılmıştır. Ultrases uygulama süresi ve enzim/substrat/(E/S) oranının protein içeriği (PC), toplam fenolik içerik (TPC) ve antioksidan aktivite (AOA) üzerindeki etkisi, merkezi kompozit tasarıma dayalı yanıt yüzey metodolojisi (RSM) kullanılarak araştırılmıştır. Sonuçlara göre, optimum koşullar 8,09 dk ultrases uygulama süresi ve 0,75 E/S olarak belirlenmiştir. Optimum koşullar altında elde edilen ekstraktların PC, TPC ve AOACUPRAC değerleri sırasıyla kuru ağırlıkta 65,99 mg/g, 118,40 mg GAE/g ve 54,59 mg TE/g olarak bulunmuştur.

Anahtar Kelimeler: Deniz yosunu, makroalg, protein, ekstraksiyon, antioksidan aktivite.

ABSTRACT

In this study, ultrasound-assisted enzymatic extraction was performed to extract proteins from *Sargassum acicularis* and investigated antioxidant activity of the protein extracts for the first time. The effect of ultrasound application duration and enzyme/substrate/ (E/S) ratio on protein content (PC), total phenolic content (TPC) and antioxidant activity (AOA) was investigated using response surface methodology (RSM) based on Central Composite design. According to the results, optimum conditions were determined as ultrasound application duration of 8.09 min and E/S of 0.75. The PC, TPC and AOACUPRAC of the extracts obtained under optimum conditions were 65.99 mg/g dw, 118.40 mg GAE/g dw and 54.59 mg TE/g dw, respectively.

Keywords: Seaweed, macroalgae, protein, extraction, antioxidant activity.

AKKERMANSIA MUCINIPHILA'NIN BESLENMEDEKİ ROLÜ**THE ROLE OF AKKERMANSIA MUCINIPHILA IN NUTRITION****Edanaz ADAŞIROĞLU**Yüksek Lisans Öğr., Erzincan Binali Yıldırım Üniversitesi Sağlık Bilimleri Fakültesi,
Beslenme ve Diyetetik Bölümü, Erzincan, Türkiye**Nazife YILMAZ**Dr. Öğr. Üyesi, Erzincan Binali Yıldırım Üniversitesi Sağlık Bilimleri Fakültesi, Beslenme ve
Diyetetik Bölümü, Erzincan, TürkiyeORCID No: <https://orcid.org/0000-0002-3000-7874>**ÖZET**

Son yıllarda yapılan çalışmalar, diyabet, obezite, yaşlanma ve kanserler gibi çeşitli hastalıklar sürecinde bağırsak mikrobiyotasında belirgin değişiklikler olduğunu göstermiştir. Özellikle bağırsak mikrobiyotası, yeni terapötiklerin potansiyel bir kaynağı olarak görülmektedir. Memeli bağırsağında en bol bulunan mikroorganizmalardan biri olan Akkermansia Muciniphila, normal bağırsak mikrobiyotasının bir parçası olarak, bağırsak mukoza bütünlüğünü sağlayan bazal metabolizmayı düzenleyen iyi karakterize edilmiş, toksin üretmeyen, avirulan bir mikroorganizmadır. A. muciniphila'nın keşfedilmesinden bu yana çok sayıda çalışma bu komensal bakterinin eksikliğinin veya azalmasının birden fazla hastalıkla (obezite, diyabet, karaciğer yağlanması, iltihaplanma gibi) bağlantılı olduğunu göstermektedir. Mevcut çalışmalar çoğunlukla A. muciniphila'nın hastalıklarla olan ilişkisine ve sonuçlarına odaklanmaktadır. Bakterinin bağırsaktaki miktarı obezite, diyabet, inflamasyon ve metabolik bozukluk görülme riski ile ters orantılıdır. A. muciniphila'nın metabolik hastalıkları hafifletmek için potansiyel bir aday suş olarak işlevsel aktivitesinin de bolluğuna bağlı olduğu çalışmalarla da ortaya konulmuştur. Diyetin içeriği bağırsak mikrobiyotasını önemli ölçüde etkileyebilir. Uzun süreli yüksek şekerli veya yüksek yağlı diyet tüketimi bağırsak mikrobiyotasının yapısını ve bileşimini olumsuz etkiler ve A. muciniphila miktarını azaltır buna karşın tam tersi kısıtlayıcı bir diyetin bakteri miktarı üzerinde olumlu bir etkisi olduğu ileri sürülmüştür. Bu çalışma, A. muciniphila'nın özelliklerini, güvenliğini, ayrıca bağırsak mikrobiyotası üzerine etkilerini ve obezite, diyabet, kardiyovasküler hastalıkları ile nedensel ilişkisini incelemeyi amaçlamaktadır.

Anahtar Kelimeler: Akkermansia muciniphila, bağırsak mikrobiyotası, diyabet, obezite**ABSTRACT**

Recent studies have shown that there are significant changes in the gut microbiota during various diseases such as diabetes, obesity, aging and cancers. In particular, the gut microbiota is seen as a potential source of new therapeutics. Akkermansia Muciniphila, one of the most abundant microorganisms in the mammalian gut, is a well-characterized, non-toxin-producing, avirulent microorganism that regulates basal metabolism, ensuring intestinal mucosal integrity, as part of the normal intestinal microbiota. Since the discovery of A. muciniphila, numerous studies have shown that the absence or reduction of this commensal bacterium is associated with multiple diseases (such as obesity, diabetes, fatty liver, inflammation). Current studies mostly focus on the relationship and consequences of A. muciniphila in diseases. The amount of the bacterium in the gut is inversely proportional to the risk of obesity, diabetes, inflammation, and metabolic disorders. Studies have also shown that the functional activity of

A. muciniphila as a potential candidate strain for alleviating metabolic diseases depends on its abundance. The content of the diet can significantly affect the intestinal microbiota. Long-term consumption of high-sugar or high-fat diets negatively affects the structure and composition of the intestinal microbiota and reduces the amount of *A. muciniphila*, whereas it has been suggested that a restrictive diet has a positive effect on the amount of bacteria. This study aims to investigate the properties and safety of *A. muciniphila*, as well as its effects on intestinal microbiota and its causal relationship with obesity, diabetes, and cardiovascular diseases.

Keywords: *Akkermansia muciniphila*, gut microbiota, diabetes, obesity

CANDIDA ENFEKSİYONLARINDA BESLENME YAKLAŞIMLARI**NUTRITIONAL APPROACHES IN CANDIDA INFECTIONS****Elif POLAT**

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ÖZET

Beslenme vücuttaki bağışıklık sisteminin oluşmasında ve sürdürülebilmesinde en önemli araçtır. Diyetle alınan tüm besinlerin yeterli ve dengeli alımı vücutta dengenin sürdürülebilmesi açısından önemlidir. Besin öğelerinin fazla veya eksik alınması bağışıklık durumu ve çeşitli patojenlere karşı duyarlılık üzerinde olumsuz sonuçlara yol açabilir. Ayrıca enfeksiyöz patojenlere karşı konak savunmasını özel olarak düzenleyebilecek besinlerde bulunmaktadır. Candidiyozis en yaygın fırsatçı maya enfeksiyonudur. Bu karmaşık maya enfeksiyonunda Candida türleri ve diğer mikroorganizmalar rol oynamaktadır ancak Candida albicans en yaygın olan Candida türü olmaya devam etmektedir. Candida albicans vücudumuzda bulunan bir mayadır, bakteri ve maya dengesinin sağlığının bozulmasıyla aşırı çoğalan maya enfeksiyonu oluşturur. Ağız, bağırsak ve vajina Candida'dan en çok etkilenen bölgelerdir. İç organlarda da enfeksiyona neden olan Candida mantarı özellikle böbrek, kalp, beyinde tutunur. Candidayı kontrol altında tutanlar bağışıklık sistemiyle patojen olmayan bağırsak florası bakterileridir. Candida mantarı enfeksiyonu tedavisinde antifungal ilaçlar kullanılmaktadır. Candida enfeksiyon belirtilerinin azalması için etkili yöntemlerden biri de beslenmenin düzenlenmesidir. Glukoz Candida albicans için temel besindir. Candida mantarı veya diğer ismiyle anılan Candidayı hızla besleyen besinler beyaz un ve türevleridir, Candida tedavisi sürecince mayayı aç bırakmakta ilaç ile tedavi kadar önemlidir. Bu çalışmada Candida enfeksiyonları ve beslenme yaklaşımları hakkında bilgi verilecektir.

Anahtar Kelimeler: Candida, Candida albicans, Bağışıklık, Beslenme yaklaşımları.

ABSTRACT

Nutrition is the most important tool in the formation and maintenance of the immune system in the body. Adequate and balanced intake of all nutrients taken in the diet is important for maintaining balance in the body. Excessive or insufficient intake of nutrients can have negative consequences on immune status and susceptibility to various pathogens. There are also nutrients that can specifically regulate host defenses against infectious pathogens. Candidiasis is the most common opportunistic yeast infection. Candida species and other microorganisms play a role in this complex yeast infection, but Candida albicans remains the most common Candida species. Candida albicans is a yeast found in our body, and when the balance between bacteria and yeast is disrupted, the yeast that multiplies excessively causes a fungal infection. The mouth, intestines and vagina are the areas most affected by Candida. The Candida fungus, which also causes infection in internal organs, especially clings to the kidneys, heart and brain. Those who keep Candida under control are the immune system and the non-pathogenic intestinal flora bacteria. Antifungal drugs are used in the treatment of Candida fungal infection. One of the effective methods to reduce Candida infection symptoms is to regulate nutrition.

Glucose is the main food for *Candida albicans*. Foods that rapidly feed the *Candida* fungus or *Candida*, as it is also known, are white flour and its derivatives. In the *Candida* treatment process, starving the yeast is as important as treating it with medication. This study will provide information about *Candida* infections and nutritional approaches.

Keywords: *Candida*, *Candida albicans*, Immunity, Nutritional approaches

LONICERA CAUCASICA BİTKİSİNİN ANTIOKSİDAN KAPASİTESİ, TOPLAM FENOLİK VE MİNERAL İÇERİĞİNİN DEĞERLENDİRİLMESİ

EVALUATION OF THE TOTAL PHENOLIC CONTENT, ANTIOXIDANT ACTIVITY, AND MINERAL CONTENT OF LONICERA CAUCASICA

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ÖZET

Mevcut araştırmada Caprifoliaceae familyasına ait türlerden biri olan *Lonicera caucasica* Pall. meyvelerinin antioksidan kapasitesi, fenolik bileşik ve mineral içeriği incelenmiştir. *Lonicera L.* cinsi dünyanın çeşitli bölgelerinde doğal olarak bulunan, zengin antioksidan ve fenolik bileşik içeriğiyle bilinen bir meyvedir. *L. caucasica* meyveleri Türkiye'nin Bayburt ilinden temin edilmiş ve taksonomik olarak tanımlaması yapılmıştır. Meyveler temin edildikten sonra ultrason destekli ekstraksiyon yöntemi kullanılarak etanol ile ekstraktlar elde edilmiştir. Çalışma kapsamında elde edilen ekstraktların antioksidan kapasitesini tespit etmek amacıyla DPPH (2,2-diphenyl-2-picrylhydrazyl) ve FRAP (iron-reducing antioxidant activities) analizleri yapılmıştır. Toplam fenolik (TPC) ve flavonoid içerikleri (TFC) ise sırasıyla Folin-Ciocalteu yöntemi ve alüminyum klorür spektrometrik tekniği ile ölçülmüştür. Ayrıca meyvenin makro ve mikro mineral madde içeriği ICP-MS cihazı ile tespit edilmiştir. Çalışma sonucunda örneğin toplam fenolik içeriği 16.69 ± 0.42 mg GAE/g, toplam flavonoid içeriği 11.54 ± 0.57 mg QE/g olarak belirlenmiştir. DPPH ve FRAP değerleri ise sırasıyla 9.06 ± 0.05 mg TE/g ve 32.11 ± 0.52 mg TE/g şeklindedir. Ayrıca meyvenin mineral madde içeriği açısından oldukça zengin olduğu ve özellikle K, Na, P, Mg, Ca, Al ve Fe minerallerini önemli miktarda içerdiği tespit edilmiştir. Bu kapsamda *L. caucasica*'nın önemli bir fenolik bileşik ve doğal antioksidan kaynağı olduğu ayrıca mineral madde içeriği yönünden de zengin olduğu söylenebilmektedir. Bu durum mevcut meyvenin yeni bir işlevsel gıda veya süper meyve olarak potansiyelini vurgulamakta ve daha ileri klinik çalışmalar için iyi bir aday olabileceğini göstermektedir.

Anahtar Kelimeler: *Lonicera caucasica*, antioksidan aktivite, fenolik bileşikler, ICP-MS

ABSTRACT

The present study investigated the antioxidant capacity, phenolic compound, and mineral content of the fruits of *Lonicera caucasica* Pall., a species belonging to the Caprifoliaceae family. The *Lonicera L.* genus is naturally found in various regions of the world and is known

for its rich antioxidant and phenolic compound content. The *L. caucasica* fruits were obtained from Bayburt province in Turkey and were taxonomically identified. After collection, extracts were obtained using ethanol through the ultrasound-assisted extraction method. To determine the antioxidant capacity of the extracts obtained in the study, DPPH (2,2-diphenyl-2-picrylhydrazyl) and FRAP (ferric-reducing antioxidant power) analyses were performed. The total phenolic content (TPC) and total flavonoid content (TFC) were measured using the Folin-Ciocalteu method and aluminum chloride spectrometric technique, respectively. In addition, the macro and micro mineral content of the fruit was determined using an ICP-MS device. As a result of the study, the total phenolic content of the sample was determined to be 16.69 ± 0.42 mg GAE/g, and the total flavonoid content was 11.54 ± 0.57 mg QE/g. The DPPH and FRAP values were found to be 9.06 ± 0.05 mg TE/g and 32.11 ± 0.52 mg TE/g, respectively. Moreover, it was found that the fruit was quite rich in mineral content, especially containing significant amounts of K, Na, P, Mg, Ca, Al, and Fe minerals. Based on these findings, it can be stated that *L. caucasica* is an important source of phenolic compounds and natural antioxidants, as well as being rich in mineral content. This highlights the potential of the fruit as a new functional food or superfruit and suggests that it could be a good candidate for further clinical studies.

Keywords: *Lonicera caucasica*, antioxidant activity, phenolic compounds, ICP-MS

AROMATİK BİTKİLERİN GIDA GÜVENLİĞİNDE VE DOĞAL KORUYUCU OLARAK KULLANIMI

THE USE OF AROMATIC PLANTS IN FOOD SAFETY AND AS NATURAL PRESERVATIVES

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ÖZET

Son yıllarda gıda güvenliği, tüketici sağlığı açısından büyük bir endişe kaynağı haline gelmiştir. Gıdalarda mikrobiyal gelişimi önlemek amacıyla geleneksel olarak kullanılan kimyasal koruyucuların olumsuz sağlık etkileri ve artan talep, doğal alternatiflere yönelimi artırmıştır. Bu bağlamda, aromatik bitkilerden elde edilen ekstraktlar, gıda ürünlerinde doğal koruyucular olarak önemli bir potansiyele sahiptir. Kekik, adaçayı, biberiye ve nane gibi bilinen bitkilerin yanı sıra, sarımsak, zerdeçal, zencefil, fesleğen, taze soğan ve defne yaprağı gibi aromatik bitkiler de gıda koruyuculuğunda etkili rol oynamaktadır.

Bu bitkilerde bulunan fenolik bileşikler ve uçucu yağlar, mikrobiyal büyümeyi inhibe ederek gıdaların raf ömrünü uzatır ve patojenlerin çoğalmasını engeller. Özellikle sarımsak, güçlü antimikrobiyal özellikleri ile öne çıkarken, zerdeçalın anti-inflamatuar etkileri sağlık açısından önem taşır. Fesleğen, hem lezzet katmakta hem de mikrobiyal gelişimi engelleyen bileşikler içermektedir. Biberiye ve kekik gibi bitkiler ise yüksek antioksidan içerikleriyle bilinir, bu da gıdaların tazeliğini korumaya yardımcı olur.

Aromatik bitkilerin gıdalarda kullanımı, yalnızca mikrobiyal koruma sağlamakla kalmaz, aynı zamanda kimyasal koruyuculara kıyasla daha güvenli bir seçenek sunar. Kimyasal koruyucuların aşırı kullanımı, uzun vadede kanser gibi ciddi sağlık sorunlarına yol açabilirken, bitkisel ekstraktlar genellikle düşük toksisiteye sahip olup sağlık açısından faydalıdır. Örneğin, biberiyeden elde edilen ekstraktların güçlü antioksidan etkisi, vücuttaki serbest radikalleri azaltarak kalp hastalıkları ve kansere karşı koruma sağlar.

Sonuç olarak, aromatik bitkiler, kimyasal koruyuculara karşı güvenli ve etkili bir alternatif olarak gıda endüstrisinde giderek daha fazla kullanılmaktadır. Kekik, adaçayı, biberiye, sarımsak, zerdeçal, zencefil, fesleğen ve defne yaprağı gibi bitkiler, hem doğal hem de sağlıklı olmaları nedeniyle tüketicilerin bu ürünlere olan ilgisini artırmaktadır.

Anahtar Kelimeler: Gıda güvenliği, antimikrobiyal, aromatik bitkiler.

ABSTRACT

In recent years, food safety has become a major concern for consumer health. The negative health effects of chemical preservatives traditionally used to prevent microbial growth in food, along with increasing demand for natural alternatives, have driven the shift towards more natural solutions. In this context, extracts from aromatic plants have significant potential as

natural preservatives in food products. Besides well-known plants such as thyme, sage, rosemary, and mint, other aromatic plants like garlic, turmeric, ginger, basil, green onions, and bay leaves also play an effective role in food preservation.

These plants contain phenolic compounds and essential oils that inhibit microbial growth, extending the shelf life of food and preventing the proliferation of pathogens. Garlic, in particular, stands out for its strong antimicrobial properties, while turmeric offers important health benefits due to its anti-inflammatory effects. Basil adds flavor and contains compounds that inhibit microbial growth. Plants like rosemary and thyme are known for their high antioxidant content, which helps maintain food freshness.

The use of aromatic plants in food not only provides microbial protection but also offers a safer alternative compared to chemical preservatives. Excessive use of chemical preservatives can lead to serious health issues, such as cancer, while plant-based extracts typically have low toxicity and are beneficial to health. For example, extracts from rosemary have strong antioxidant effects, reducing free radicals in the body and protecting against heart disease and cancer.

In conclusion, aromatic plants are increasingly used in the food industry as a safe and effective alternative to chemical preservatives. Plants such as thyme, sage, rosemary, garlic, turmeric, ginger, basil, and bay leaves are gaining popularity due to their natural and healthy properties, enhancing consumer interest in these products.

Keywords: Food safety, antimicrobial, aromatic plants.

THE EFFECT OF FLOUR ON THE NOODLE PROPERTIES: A COMPARATIVE STUDY OF PURPLE FLOUR AND PURPLE WHEAT FLOUR

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ABSTRACT

Recently, purple flour gained much attention due to its anthocyanin-rich ingredients, which enhance antioxidant potential. While purple flour is obtained by adding fruit extracts into the wheat flour, there is also a different type of flour in the market that receives interest, is rich in anthocyanins, and is obtained from purple wheat. This study aimed to compare the effects of purple flour and purple wheat flour on the properties of noodles. The control noodle (WN) was made from wheat flour. The other noodles coded as PN, WPWN, and PWN were prepared with purple flour, whole purple wheat flour, and purple wheat flour, respectively. Flour samples were analyzed for moisture content, water, and sodium carbonate retention capacities. Regarding the dried noodles, first, the noodles' optimal cooking time (OCT) was determined, then weight gain, volume increase, and cooking loss values were ascertained as cooking properties. Furthermore, raw noodles' moisture content, total anthocyanin content, and antioxidant activity were determined, and color values were measured. While the lowest water (55.44%) and sodium carbonate (72.32%) retention capacities were observed for purple flour, the same parameters were the highest for whole purple wheat flour (76.52%) and purple wheat flour (97.26%), respectively ($p < 0.05$). No significant differences existed between the OCT of PN, WPWN, and PWN. However, WN had significantly higher OCT values ($p < 0.05$). While the highest weight gain (181.27%) was observed for WPWN ($p < 0.05$), no significant differences were found between the weight gain of other noodles. The order of the volume increase of the noodles was found as WPWN > PWN > PN > WN ($p < 0.05$). Cooking loss values of noodles ranged between 6.6-9.7%, of which the highest loss was observed for PN and WPWN. The total anthocyanin content (306.36 mg CGE/kg) and antioxidant activity (3198.28 $\mu\text{mol TE/kg}$) of PN were the highest ($p < 0.05$). Compared to the control, the darkness, and redness of the noodles were increased ($p < 0.05$), however, the highest and lowest yellowness were observed for PWN and PN, respectively. Results indicated that purple flour was more effective in enhancing the functional properties (in terms of anthocyanin content and antioxidant activity) of the noodles, purple wheat flour, on the other hand, was better for preserving the cooking properties.

Keywords: Noodle, cooking characteristics, anthocyanin, antioxidant, functional, color.

GIDA ANALİZLERİNDE MOLEKÜLER BASKILANMIŞ POLİMERLER (MIPS)**MOLECULARLY IMPRINTED POLYMERS (MIPS) IN FOOD ANALYSIS****Nurten CENGİZ**

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ÖZET

Son yıllarda gıda üretiminde kullanılan hammaddeler ve nihai ürünler, üretim, paketlenme ve depolama süreçlerinde giderek artan bir şekilde kontaminasyona maruz kalmaktadır. Bu nedenle, gıda güvenliği halk sağlığı ve ekonomik büyüme açısından kritik bir öneme sahip olmuş ve hızlı, güvenilir analiz yöntemlerine olan ihtiyaç artmıştır. Moleküler Baskılanmış Polimerler (MIPs), gıdalardaki kirleticilerin seçici olarak tespit edilmesinde ve izole edilmesinde büyük bir potansiyele sahiptir. MIPs, "plastik antikorlar" olarak da adlandırılmakta ve gıdalardaki pestisit kalıntıları, antibiyotikler, yapay hormonlar gibi çeşitli kirleticileri yüksek hassasiyetle tespit edebilmektedir.

MIPs, katı faz ekstraksiyonu (SPE), kromatografik ayırma ve kimyasal sensörler gibi analitik yöntemlerde seçici sorbentler olarak yaygın şekilde kullanılmaktadır. Gıda analizi için geliştirilen bu polimerler, gıdalarda bulunan hedef moleküllerle mükemmel bir uyum gösteren özgül bağlanma bölgeleri oluşturarak yüksek seçicilik ve duyarlılık sağlar. Özellikle katı faz ekstraksiyonunda (MISPE) MIPs'in kullanımı, numunelerden potansiyel safsızlıkları ve gürültü faktörlerini ortadan kaldırarak, iz analizi ve örnek ön hazırlığı süreçlerinde yüksek doğruluk sağlar. Ayrıca, MIPs kromatografi ve elektro-kromatografi gibi tekniklerle de analitik ayırıştırmalarda kullanılmakta ve enantiyomerlerin ayrılmasında önemli bir rol oynamaktadır.

Geleneksel analiz yöntemleri (HPLC, MS, NMR gibi) yüksek doğruluk sunsa da, karmaşık örnek hazırlığı ve uzun süren analiz süreleri sebebiyle hızlı saha analizleri ve geniş ölçekli taramalar için uygun değildir. Bu nedenle, MIPs'in yeni nesil taşınabilir sensörler ile entegrasyonu, gıda güvenliğinde devrim niteliğinde bir ilerleme sunmaktadır. Özellikle elektro-kimyasal sensörler ve biyosensörler gibi teknolojiler ile birleştirilen MIPs, yüksek duyarlılık ve seçicilikte analizler gerçekleştirebilmektedir. Ayrıca, spektral görüntüleme ve kütle spektrometrisi ile kombine edilmiş MIPs gibi yeni yöntemler, gıda analizlerinde hızlı ve yerinde tespit imkanı sunar. Bu tür yöntemler, hem saha analizleri hem de büyük hacimli örneklerin kısa sürede taranması için uygun maliyetli ve etkin çözümler sunmaktadır. Özellikle pestisit kalıntıları, veteriner ilaçları ve gıdalardaki mikrobiyal toksinler gibi ultra-iz düzeyindeki kirleticilerin tespit edilmesinde bu yöntemlerin kullanımının yaygınlaşması, gıda güvenliği kontrollerini daha hızlı ve etkili hale getirmiştir.

Sonuç olarak, MIPs'in geleneksel yöntemlerle karşılaştırıldığında, daha hızlı, taşınabilir ve uygun maliyetli yeni teknolojilerle entegrasyonu, gıda analizinde yeni bir standart oluşturmakta ve gıda güvenliğini sağlama sürecine büyük katkı sunmaktadır.

Anahtar Kelimeler: Moleküler baskılı polimerler (MIPs), gıda analizleri, gıda güvenliği

ABSTRACT

In recent years, raw materials used in food production and final products have been increasingly exposed to contamination during production, packaging, and storage processes. Therefore, food safety has become critically important for public health and economic growth,

increasing the demand for rapid and reliable analytical methods. Molecularly Imprinted Polymers (MIPs) hold great potential for the selective detection and isolation of contaminants in food. MIPs, also known as "plastic antibodies," can detect various contaminants such as pesticide residues, antibiotics, and artificial hormones in food with high sensitivity.

MIPs are widely used as selective sorbents in analytical methods such as solid-phase extraction (SPE), chromatographic separation, and chemical sensors. These polymers, developed for food analysis, exhibit high selectivity and sensitivity by forming specific binding sites that perfectly match the target molecules found in food. Particularly in solid-phase extraction (MISPE), the use of MIPs enhances sample preparation and trace analysis by eliminating potential impurities and noise factors. Additionally, MIPs play a crucial role in analytical separations through techniques like chromatography and electrochromatography and in the separation of enantiomers.

While traditional analytical methods (such as HPLC, MS, NMR) offer high accuracy, they are unsuitable for rapid on-site analyses and large-scale screening due to their complex sample preparation and lengthy analysis times. Therefore, the integration of MIPs with next-generation portable sensors offers revolutionary advancements in food safety. When combined with technologies such as electrochemical sensors and biosensors, MIPs enable highly sensitive and selective analyses. Moreover, new methods combining MIPs with spectral imaging and mass spectrometry provide fast, on-site detection in food analysis. These methods offer cost-effective and efficient solutions for both field analyses and large-scale sample screening. The growing use of these methods, particularly for detecting ultra-trace contaminants such as pesticide residues, veterinary drugs, and microbial toxins in food, has made food safety control faster and more effective.

In conclusion, the integration of MIPs with faster, portable, and cost-effective new technologies compared to traditional methods sets a new standard in food analysis and greatly contributes to ensuring food safety.

Keywords: Molecularly Imprinted Polymers (MIPs), food analysis, food safety

YOZGAT İLİ COĞRAFI İŞARETLİ ÜRÜNLERİN ÇEVİRİMİÇİ YAZILI BASINDAKİ YERİ İLE İLGİLİ GENEL BİR DEĞERLENDİRME

A GENERAL EVALUATION OF YOZGAT PROVINCE GEOGRAPHICALLY INDICATION PRODUCTS IN ONLINE PRINTING PRESS

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ÖZET

Bu çalışma, Yozgat iline ait coğrafi işaretli ürünlerin, çevrimiçi ulusal yazılı basındaki temsilini ortaya koymayı amaçlamaktadır. Çalışma kapsamına alınan Yozgat iline ait coğrafi işaretli ürünler, Akdağmadeni Salebi, Sorgun Yağlısı, Yozgat Arabaşısı, Yozgat Aydıncık Bağrıbutün Kavunu, Yozgat Desti Kebabı, Yozgat Parmak Çöreği, Yozgat Tandır Kebabı, Yozgat Çanak Peyniridir. Coğrafi işaret, yöreyle özdeşleşmiş ve benzer ürünlerden farkıyla dikkat çeken, yerel nitelikleriyle belirli bir üne kavuşmuş ürünlere, Türk Patent Enstitüsü tarafından ürünlerin korunması amacıyla verilir. Coğrafi işaretler, turizme katkıda bulunmak, yerel üretimle kırsal kalkınmayı desteklemek gibi amaçlara hizmet eder. Çalışmada, Yozgat iline ait coğrafi işaretli ürünlere ait çevrimiçi ulusal yazılı basında yer alan haberler niteliksel ve niceliksel olarak ele alınmıştır. Ayrıca bu veriler bütünsel bir yaklaşımla da değerlendirilmiştir. Çalışma amacı doğrultusunda elde edilen veriler nitel araştırma yöntemlerinden içerik analizi tekniği ile analiz edilmiştir. İçerik analizi, görsel, metinsel veya sözlü verilerin analizine dayanır. Mevcut çalışmada metinsel veriler analiz edilmiştir. Çalışmada, bilgi paylaşımı, ürün tanıtımı, farkındalık yaratma gibi konularda etkili araçlardan olan internet ve medyada Yozgat iline ait coğrafi işaretli ürünlerle ilgili haberlerin mevcut durumunun ortaya koyulmasına çalışılmıştır. Bu bağlamda çalışmanın, bölge turizmi ve yerel kalkınma açısından önemli olan bu ürünlerin tanıtılması, pazarlanması ile ilgili neler yapılabileceğinin tartışılmasına katkı sağlayacağı düşünülmektedir.

Anahtar kelimeler: Yozgat, Yozgat coğrafi işaretli ürünler, gastronomi turizmi

ABSTRACT

This study aims to reveal the representation of geographically indicated products of Yozgat province in online print press. The study encompasses the following geographically indicated products from Yozgat province: Akdağmadeni Salep, Sorgun Oil, Yozgat Arabaşı, Yozgat Aydıncık Bağrıbutün Melon, Yozgat Desti Kebab, Yozgat Finger Bun, Yozgat Tandır Kebab, and Yozgat Çanak Cheese. The Turkish Patent Institute assigns geographical indications to products that are associated with a region, stand out from similar products, and have developed a reputation for their particular qualities in order to preserve them. Geographical indications serve a variety of functions, including promoting tourism and aiding rural development through local manufacture. The study examined news in the online national written press about geographical indication products from Yozgat province, both qualitatively and quantitatively. In addition, these data were evaluated with a holistic approach. The data collected in accordance with the study's goal were examined using the content analysis approach, which is a qualitative research method. Content analysis is based on the analysis of visual, textual or verbal data. In the current study, textual data were analyzed. In the study, it was attempted to reveal the current status of news about geographically indicated products belonging to Yozgat

province on the internet and media, which are effective tools in issues such as information sharing, product promotion and awareness raising. Given the importance of these products for local development and tourism in the area, it is anticipated that the study will add to the conversation on how to market and promote them.

Keywords: Yozgat, Yozgat geographically indicated products, gastronomy tourism

SU KAYNAĞINDAN ARITMA TESİSİNE DAĞITIM SİSTEMLERİNDEN TÜKETİCİLERE GİDEN YOLDA BİYOJENİK TAT VE KOKU YÖNETİMİ

BIOGENIC TASTE AND ODOUR MANAGEMENT FROM WATER SOURCE TO TREATMENT PLANT, THROUGH DISTRIBUTION SYSTEMS TO CONSUMERS

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ÖZET

Günümüzde alg patlamaları ve diğer mikrobiyal olayların gerçekleşme sıklığının artması nedeniyle ortaya çıkan biyogenik tat ve koku (T&O) problemi içme sularının tüketiminde önemli bir endişe kaynağı oluşturmaktadır. Yeşil algler, siyanobakteriler, aktinomisetler, mantarlar ve diatomlar gibi birçok farklı organizma biyogenik T&O bileşikleri üretebilir. Mikrobiyal olarak üretilen bu bileşikler arasında terpenoidler, çoklu doymamış yağ asidi türevleri, aldehytlar, karotenoid türevleri ve eterler bulunur. Geosmin ve 2-metilizoborneol (MIB), en sık tespit edilen ve üzerinde en çok çalışılan iki biyogenik T&O bileşigidir. Bunların yanı sıra halofenoller ve dimetil sülfür gibi diğer koku bileşikler de sularda tespit edilmektedir. Biyogenik T&O bileşikler; içme suyu kaynaklarını, içme suyu arıtma tesislerini ve dağıtım sistemlerini etkilemektedir. İçme suyundaki biyogenik T&O bileşikler genellikle toksik değildir ancak hoş olmayan tatları veya kokuları su kalitesinin bozulmasının erken bir uyarısı olarak değerlendirilir. Kaynaktan tüketiciye gelen T&O'nun varlığı içme suyu güvenliği için soru işaretleri oluşturur. Bu nedenle içme suyundaki tüm biyogenik T&O kaynaklarını yönetmek için T&O'ya neden olan organizmaların çeşitli ekofizyolojisini ve endişe duyulan tüm T&O bileşiklerinin akıbetini anlamak önemlidir. Bu derleme çalışmasında, içme suyu kaynak sularındaki risk faktörleri, içme suyu arıtma tesislerinde tercih edilen T&O giderim proseslerinin etkinliği, su dağıtım sistemlerinde ortaya çıkan biyofilm oluşum riskleri ve T&O'nun tüketiciler üzerindeki etkileri hakkında yapılmış olan literatür kaynakları incelenmiştir.

Anahtar Kelimeler: Biyogenik tat ve koku, içme suyu, su arıtma, su dağıtım sistemleri

ABSTRACT

In recent years, the issue of biogenic taste and odour (T&O), driven by the increasing prevalence of algal blooms and other microbial events, has emerged as a significant concern in the context of drinking water consumption. A wide range of organisms, including green algae, cyanobacteria, actinomycetes, fungi, and diatoms, are known to produce biogenic T&O compounds. These microbially derived compounds encompass terpenoids, polyunsaturated fatty acid derivatives, aldehydes, carotenoid derivatives, and ethers. Among these, geosmin and 2-methylisoborneol (MIB) are the most frequently detected and extensively studied biogenic T&O compounds. Additionally, other odour-causing compounds such as halophenols and dimethyl sulfide are commonly identified in water sources. The presence of biogenic T&O compounds poses challenges not only for drinking water sources but also for treatment plants and distribution networks. While these compounds are generally nontoxic, their unpleasant taste and odour are often regarded as early indicators of deteriorating water quality. The persistence of T&O compounds from source to consumer raises critical questions regarding the

safety and acceptability of drinking water. Therefore, a comprehensive understanding of the diverse ecophysiology of T&O-producing organisms, as well as the fate and transport of these compounds, is essential for effective management of biogenic T&O across all stages of drinking water production and distribution. This review synthesizes the existing literature on risk factors associated with drinking water sources, the effectiveness of preferred T&O removal techniques in treatment facilities, the potential for biofilm formation within distribution systems, and the implications of T&O for consumer perception and water safety.

Key Words: Biogenic taste and odour, drinking water, water treatment, water distribution systems

İÇME SULARINDA MİKRO PLASTİKLER VE İNSAN SAĞLIĞI ÜZERİNE ETKİLERİ

MICRO PLASTICS IN DRINKING WATER AND THEIR EFFECTS ON HUMAN HEALTH

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ÖZET

Plastik ürünler, düşük maliyet, işlenebilirlik ve dayanıklılık konusundaki avantajları sayesinde günlük yaşamda yaygın olarak kullanılmaktadır. Plastikler aynı zamanda hafif ve dayanıklı olmaları, esnek ve kolay işlenebilir olmaları, çok yönlü ve kapsamlı, pratik kullanım alanları olması sebebiyle insanlar tarafından yaygın ve yoğun bir şekilde tercih edilmektedir. Standart bir tanımı olmamakla birlikte genellikle mikroplastikler 5 mm'den küçük ancak 1 µm veya 100 nm'den büyük plastik partiküller olarak kabul edilir. Mikroplastikler 1950'li yıllardan itibaren sağladığı birçok avantaj sayesinde her alanda yaygın olarak kullanılmaktadır. Çevrede bulunan plastikler biyolojik, mekanik, kimyasal değişim sonucu 0.1-5000 mikrometre (µm) boyutlarında mikroplastik parçacıklara dönüşmektedir. Mikroplastikler hafif yapıda olduklarından her yere kolaylıkla taşınabilmektedir, bu sebeple mikroplastikler hava, kara ve suda bulunabilirler. Dünya genelinde su kaynaklarını kirletme konusunda giderek daha fazla endişe yaratmaktadır. Özellikle içme sularında tespit edilen mikroplastikler, hem çevresel hem de insan sağlığı açısından ciddi tehditler oluşturmaktadır. Mikroplastikler endüstriyel atıklar, tarımsal faaliyetler, kentsel akıntılar ve evsel atıklar yoluyla su kaynaklarına ulaşabilir. Nano ve mikro plastikler insan besin zincirine özellikle su ürünleri ile beslenme yoluyla ve/veya inhalasyon yoluyla girebilmektedir. Mikroplastiklerin insan sağlığı üzerinde toksik etkilere, bağışıklık sistemi üzerinde olumsuz etkilere neden olabileceği ve insan vücuduna girmesi halinde sindirim sistemi sorunlarına yol açabileceği düşünülmektedir. Su kaynaklarının korunması ve kirlenmenin önlenmesi için kapsamlı stratejilerin geliştirilmesi hayati öneme sahiptir.

Anahtar Kelimeler: Mikroplastik, İçme suyu, Çevre kirliliği

ABSTRACT

Plastic products are widely used in daily life due to their advantages of low cost, processability and durability. Plastics are also widely and intensively preferred by people because they are light and durable, flexible and easy to process, versatile, comprehensive and practical. Although there is no standard definition, microplastics are generally accepted as plastic particles smaller than 5 mm but larger than 1 µm or 100 nm. Microplastics have been widely used in every field since the 1950s due to the many advantages they provide. Plastics found in the environment turn into microplastic particles with sizes of 0.1-5000 micrometers (µm) as a result of biological, mechanical and chemical changes. Since microplastics are lightweight, they can be easily transported everywhere, so they can be found in air, land and water. There is an increasing concern about polluting water resources worldwide. Microplastics, especially detected in drinking water, pose serious threats to both the environment and human health. Microplastics can reach water resources through industrial waste, agricultural activities, urban

runoff and domestic waste. Nano and microplastics can enter the human food chain, especially through ingestion of aquatic products and/or inhalation. It is thought that microplastics can have toxic effects on human health, negative effects on the immune system and cause digestive system problems if they enter the human body.

It is vital to develop comprehensive strategies to protect water resources and prevent pollution.

Keywords: Microplastic, Drinking water, Environmental pollution

ALTERNATİF PROTEİN KAYNAĞI: YENİLEBİLİR BÖCEKLER

ALTERNATIVE PROTEIN SOURCE: EDIBLE INSECTS

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ÖZET

Son yıllarda, doğal kaynaklarının azalması, insan nüfusundaki artış ve protein kaynaklarının yetersizliği alternatif protein kaynaklarına olan ilgiyi arttırmıştır. Bu çalışmanın amacı, alternatif bir protein kaynağı olarak yenilebilir böcekler ile ilgili kapsamlı ve sistematik bir inceleme sunmaktır. Yüzyıllardır yenilebilir böcekler dünyanın birçok yerinde insan beslenmesinde kullanılmaktadır. Yenilebilir böceklerin besin değeri böceğin türü, çevresel koşullar ve beslenme gibi faktörlerden etkilense de dengeli bir amino asit içeriğine sahip yüksek kaliteli protein kaynağı olarak kabul edilmektedirler. Esansiyel yağ asitleri, mikro elementler ve diğer biyoaktif bileşikler bakımından zengin olan yenilebilir böcekler, besleyici bileşenler açısından oldukça değerlidir. Çoğu böcek, potasyum, kalsiyum, demir, magnezyum ve selenyum gibi mikro besin elementleri bakımından zengindir. Böcekler, sığır, domuz ve tavuktan daha fazla demir ve kalsiyum içermektedir. Besin değerinin yanı sıra, böcek proteinleri köpüklenme, emülsifiye etme ve jelleşme gibi geniş bir yelpazede fonksiyonel özelliklere sahiptirler. Bu durum gıda endüstrisinde kullanım ve sürdürülebilirlik için önemlidir. Birleşmiş Milletler Gıda ve Tarım Örgütü'nün (FAO), böcek kaynaklarının kullanımına yönelik son dönemdeki teşvikleri, böceklerin gıda veya gıda bileşeni olarak kullanımına yönelik ilgiyi arttırmıştır. Sürdürülebilirlik açısından küresel protein açığını giderilmesinde yenilebilir böcekler diğer hayvansal protein kaynaklarına karşı en güçlü alternatifi olabilir. Tüketicilerin kabulünü artırmak için, böceklerden elde edilecek proteini, toz, un veya fraksiyon formunda tüketime sunmak etkili bir yöntem olabilir. Ancak, böceklerin farklı gıdalara entegre edilebilmesi için, çeşitli işlem ve işleme yöntemlerinin ardından fonksiyonel özelliklerinin kapsamlı bir şekilde değerlendirilmesi gerekmektedir. Gelecekte, böcek proteini tüketimi, sadece hızlı nüfus artışı ve kaynak yetersizliği olan bölgelerde gıda güvenliğini sağlamak için değil, aynı zamanda yüksek besin değerine sahip, sürdürülebilir gıda üretimini iyileştirmek için de dikkat çekici olacaktır. Böcek proteinlerinin fonksiyonel özelliklerine yönelik araştırmalar devam etmektedir. Böcek proteinlerinin yapı-fonksiyon ilişkisini ve bu fonksiyonların böcek işleme süreci ile tüketici kabulünü nasıl artırabileceğini açıklığa kavuşturmak için daha fazla çalışmaya ihtiyaç vardır.

Anahtar Kelimeler: yenilebilir böcekler, sürdürülebilirlik, alternatif protein.

ABSTRACT

In recent years, the depletion of natural resources, the increase in human population, and the insufficiency of protein sources have heightened interest in alternative protein sources. The aim of this study is to provide a comprehensive and systematic review of edible insects as an alternative protein source. For centuries, edible insects have been used in human nutrition in various parts of the world. Although the nutritional value of edible insects is influenced by factors such as the species of insect, environmental conditions, and diet, they are considered a high-quality protein source with a balanced amino acid profile. Rich in essential fatty acids, micronutrients, and other bioactive compounds, edible insects are highly valuable in terms of their nutritional components. Most insects are rich in micronutrients such as potassium, calcium, iron, magnesium, and selenium. Insects contain more iron and calcium than beef, pork, and chicken. In addition to their nutritional value, insect proteins exhibit a wide range of functional properties, such as foaming, emulsifying, and gelling, which are important for their use and sustainability in the food industry. Recent encouragement by the Food and Agriculture Organization of the United Nations (FAO) for the use of insect resources has increased interest in using insects as food or food ingredients. From a sustainability perspective, edible insects could be the strongest alternative to other animal protein sources in addressing the global protein deficit. To enhance consumer acceptance, offering insect-derived protein in forms such as powder, flour, or fractions could be an effective approach. However, to integrate insects into various foods, their functional properties must be thoroughly evaluated following various processing methods. In the future, insect protein consumption will not only be notable for ensuring food security in regions with rapid population growth and resource scarcity but also for improving sustainable food production with high nutritional value. Research on the functional properties of insect proteins continues. Further studies are needed to clarify the structure-function relationship of insect proteins and how these functions, along with processing methods, can enhance consumer acceptance.

Keywords: edible insects, sustainability, alternative protein.

**NUTRITIONAL ASSESSMENT, BIOACCESSIBILITY OF ANTIOXIDANTS, AND
ANTIDIABETIC POTENTIAL OF THE TRADITIONALLY USED WILD PLANT
BERBERIS CRATAEGINA DC**

**GELENEKSEL OLARAK KULLANILAN YABANI BITKİ BERBERIS
CRATAEGINA’NIN BESİN DEĞERİ, ANTIOKSIDAN BİYOERİŞİLEBİLİRLİĞİ VE
ANTIDIABETİK POTANSİYELİ**

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ABSTRACT

Berberis crataegina DC., thriving on arid and rocky slopes at altitudes between 800 and 1500 meters, is renowned for its rich content of bioactive compounds, including tannins, organic acids, vitamin C, anthocyanins, and berberine. This study aimed to investigate the physicochemical properties, in vitro bioaccessibility of bioactive compounds, and antidiabetic activities of *B. crataegina*. The moisture content was found to be 89.46%, with a total soluble solid content of 28.35%, vitamin C content of 51.75 mg/L, glucose content of 47.36 mg/L, total sugar content of 186.24 g/L, crude protein content of 6.2 g/100 g, crude fiber content of 3.1 g/100 g, and crude ash content of 4.2 g/100 g. Among the minerals tested, calcium (28,934.30 ppm) was the most abundant, followed by potassium (1079.69 ppm), iron (517.71 ppm), zinc (50.28 ppm), sodium (45.23 ppm), phosphorus (33.25 ppm), magnesium (13.34 ppm), and copper (5.45 ppm). The total phenolic content (mg GAE/g dry extract) of the extracts initially measured 126.37, but decreased to 16.01 mg in the oral phase, 56.63 mg in the gastric phase, 23.71 mg in the intestinal IN phase, and 54.63 mg in the intestinal OUT phase after digestion. Similarly, DPPH scavenging activity was 423.34 $\mu\text{mol TE/g}$ before digestion and decreased to 18.16, 60.44, 40.50 and 95.03 $\mu\text{mol TE/g}$ during the respective digestion stages. FRAP activity peaked in the gastric phase (64.29 $\mu\text{mol Fe}^{2+}\text{E/g}$) after initially declining in the oral phase (22.80 $\mu\text{mol Fe}^{2+}\text{E/g}$), before decreasing again in the intestinal phases (IN phase: 14.59 $\mu\text{mol Fe}^{2+}\text{E/g}$; OUT phase: 32.24 $\mu\text{mol Fe}^{2+}\text{E/g}$). CUPRAC activity followed a similar trend, starting at 162.90 mg TE/g and decreasing across the phases, with the highest activity observed in the gastric phase (69.09 mg TE/g). Inhibition percentages for α -glucosidase from *Saccharomyces cerevisiae* were 40.77%, while the inhibition of α -amylase from porcine pancreas was 45.57%. However, the extracts showed limited inhibition against *S. cerevisiae* α -amylase and porcine pancreatic α -amylase at 2 mg/mL. These findings suggest that *B. crataegina* DC. extracts possess promising bioactive properties, making them a potential candidate for further research in functional food development.

Keywords: Berberis crataegina DC., physicochemical properties, in vitro gastrointestinal digestion, antidiabetic activity.

ÖZET

Berberis crataegina DC., 800 ile 1500 metre arasındaki yüksekliklerde kurak ve kayalık yamaçlarda yetişen, tanenler, organik asitler, C vitamini, antosiyaninler ve berberin gibi biyoaktif bileşenler açısından zengin bir bitki olarak bilinmektedir. Bu çalışma, *B. crataegina*'nın fizikokimyasal özelliklerini, biyoaktif bileşiklerinin in vitro biyoerişilebilirliğini ve antidiyabetik aktivitelerini araştırmayı amaçlamıştır. Elde edilen bulgulara göre nem içeriği %89,46, toplam çözünür katı madde içeriği %28,35, C vitamini içeriği 51,75 mg/L, glikoz

içeriği 47,36 mg/L, toplam şeker içeriği 186,24 g/L, ham protein içeriği 6,2 g/100 g, ham lif içeriği 3,1 g/100 g ve ham kül içeriği 4,2 g/100 g olarak tespit edilmiştir. Mineral analiz sonucuna göre test edilen mineraller arasında en yüksek oran kalsiyum (28,934.30 ppm) mineraline ait olup bunu sırasıyla potasyum (1,079.69 ppm), demir (517.71 ppm), çinko (50.28 ppm), sodyum (45.23 ppm), fosfor (33.25 ppm), magnezyum (13.34 ppm) ve bakır (5.45 ppm) takip etmektedir. Ekstraktların toplam fenolik madde içeriği başlangıçta 126.37 mg GAE/g kuru ekstrakt iken, sindirim sonrası oral fazda 16.01 mg GAE/g kuru ekstrakt, mide fazında 56.63 mg GAE/g kuru ekstrakt, bağırsak IN fazında 23.71 mg GAE/g kuru ekstrakt ve bağırsak OUT fazında 54.63 mg GAE/g kuru ekstrakt olarak düşmüştür. Benzer şekilde, DPPH radikal temizleme aktivitesi sindirim öncesi 423.34 $\mu\text{mol TE/g}$ 'den sindirim fazlarına göre sırasıyla 18.16, 60.44, 40.50 ve 95.03 $\mu\text{mol TE/g}$ olarak azalmıştır. FRAP aktivitesi mide fazında (64.29 $\mu\text{mol Fe}^{2+}\text{E/g}$) zirveye ulaşmış, oral fazda düşüş gösterdikten (22.80 $\mu\text{mol Fe}^{2+}\text{E/g}$) sonra bağırsak fazlarında tekrar düşmüştür (IN fazı: 14.59 $\mu\text{mol Fe}^{2+}\text{E/g}$; OUT fazı: 32.24 $\mu\text{mol Fe}^{2+}\text{E/g}$). Öte yandan, CUPRAC aktivitesi başlangıçta 162.90 mg TE/g olup, sindirim fazlarında düşüş göstermiş ve en yüksek aktivite mide fazında (69.09 mg TE/g) gözlenmiştir. *Saccharomyces cerevisiae*'den elde edilen α -glukozidaz için inhibisyon yüzdesi %40.77 iken, porcine pankreasından elde edilen α -amilaz için inhibisyon yüzdesi %45.57 olarak tespit edilmiştir. Ancak, ekstraktlar 2 mg/mL seviyesinde *S. cerevisiae* α -amilaz ve porcine pankreatik α -amilaz üzerinde sınırlı inhibisyon göstermiştir. Bu bulgular, *B. crataegina* DC. ekstraktlarının umut verici biyoaktif özelliklere sahip olduğunu ve fonksiyonel gıda geliştirme çalışmalarında potansiyel bir aday olabileceğini göstermektedir.

Anahtar kelimeler: *Berberis crataegina* DC., fizikokimyasal özellikler, in vitro gastrointestinal sindirim, antidiyabetik aktivite.

MANDA SÜTÜNDE BULUNAN BÜYÜME FAKTÖRLERİNİN ÖNEMİ

THE IMPORTANCE OF GROWTH FACTORS IN BUFFALO MILK

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ÖZET

Manda sütü, yeni doğan memeliler için bir besin maddesi olmasının yanı sıra içerdiği besin maddeleri ile insan tüketimi için eşsiz özelliklere sahiptir. İnek sütüne göre daha yüksek protein ve yağ oranı ile manda sütü ve ürünleri tüketimi gün geçtikçe artmaktadır. Manda sütlerinin verim ve kalitesinin belirlenebilmesi için bazı fizyolojik parametrelerin takibine ihtiyaç duyulmaktadır. Bu parametrelerin başında yapısal ve fonksiyonel olarak, EGF (Epidermal growth factor) IGF-1 (Insulin-like growth factor), TGF- β (Transforming growth faktör beta), ve PDGF (Platelet-derived growth factor) gibi büyüme faktörleri gelmektedir. Büyüme faktörlerinin, doku onarımında, kemik ve kıkırdak oluşumunda, bağışıklık sisteminin kontrolünde, organ ve merkezi sinir sisteminin gelişiminde rol oynadığı bilinmektedir. Bu nedenle hem insan sağlığında hem de yeni doğan yavruların beslenmesinde çok önemli biyoaktif bileşenlerdir. Günümüzde yapılan birçok çalışmada büyüme faktörlerinin hayvan türlerine göre miktarları, önemi ve hayvan sağlığı, laktasyon dönemi gibi çevresel faktörlerin büyüme faktörlerine etkisi araştırılmaktadır. Bu derlemede manda sütü içeriğinde bulunan büyüme faktörlerinin önemi ve çevresel faktörlerin sütün bileşimindeki büyüme faktörlerine etkisi ele alınmaktadır.

Anahtar Kelimeler: Büyüme faktörleri, Manda sütü

ABSTRACT

In addition to being a nutrient for newborn mammals, buffalo milk has unique properties for human consumption with the nutrients it contains. Consumption of buffalo milk and its products is increasing day by day, with a higher protein and fat ratio than cow's milk. In order to determine the yield and quality of buffalo milk, some physiological parameters need to be followed. At the beginning of these parameters, structurally and functionally, growth factors such as EGF (Epidermal growth factor) IGF-1 (Insulin-like growth factor), TGF- β (Transforming growth faktör beta), ve PDGF (Platelet-derived growth factor) come first. It is known that growth factors play a role in tissue repair, formation of bone and cartilage, control

of immune system, development of organs and central nervous system. For this reason, they are very important bioactive components both in human health and in the nutrition of newborn puppies. In many studies conducted today, the amount and importance of growth factors according to animal species and the effects of environmental factors such as animal health and lactation period on growth factors are investigated. In this review, the importance of growth factors in buffalo milk and the effect of environmental factors on growth factors in the composition of milk are discussed.

Key Words: Buffalo Milk, Growth Factors

SAVUNMASIZ GRUPLARDA GIDA GUVENSIZLIGI VE SAGLIK CIKTILARI: LITERATUR DERLEMESI

FOOD INSECURITY AND HEALTH OUTCOMES IN VULNERABLE GROUPS: A LITERATURE REVIEW

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ÖZET

Giriş: Gıda güvensizliği, sınırlı maddi kaynaklar nedeniyle yeterli gıdaya sürekli erişimin olmaması durumu olarak tanımlanmaktadır ve dünya genelinde milyonlarca insanı etkileyen önemli bir halk sağlığı sorunudur. Yetersiz beslenme, kronik hastalıklar ve ruh sağlığı bozuklukları gibi çeşitli olumsuz sağlık sonuçlarıyla ilişkilidir. Düşük gelirli aileler, çocuklar ve yaşlılar gibi savunmasız gruplar bu durumdan daha fazla etkilenmektedir. Gıda güvensizliği ile sağlık çıktıları arasındaki ilişkinin anlaşılması, etkilerini azaltmaya yönelik müdahalelerin geliştirilmesi için önem arz etmektedir. Bu çalışmanın amacı, savunmasız gruplarda gıda güvensizliği ile sağlık çıktıları arasındaki ilişkiyi literatür aracılığı ile ortaya koymak, gıda güvensizliğine yol açan anahtar faktörleri belirlemek ve olası çözüm yollarını sunmaktır.

Bulgular: Literatürdeki çalışmalar gıda güvensizliği ile olumsuz sağlık çıktıları arasında güçlü bir ilişki olduğunu göstermektedir. Gıda güvensizliği yaşayan bireylerde ve özellikle savunmasız gruplarda yetersiz beslenme, demir eksikliği, anemi, astım, anksiyete ve depresyon, obezite ve diyabet, hipertansiyon, ağız ve diş sağlığı hastalıkları gibi hastalıkların gıda güvensizliği olmayanlara göre daha yüksek oranlarda olduğu belirtilebilir. Özellikle tek ebeveynli aileler, çocuklar ve yaşlıların savunmasız gruplar içinde gıda güvensizliğinden en fazla etkilenen gruplar olduğu görülmektedir. Gıda güvensizliğinin nedenleri arasında ekonomik krizler, hanehalkı gelirlerinin düşüklüğü, artan gıda fiyatları, eğitim düzeyinin düşüklüğü, işsizlik ve bu konudaki politikaların yetersizliği gösterilmektedir.

Sonuç: Gıda güvensizliği, hem fiziksel hem de ruhsal sağlık üzerinde olumsuz sonuçları olan önemli bir halk sağlığı sorunu olarak varlığını sürdürmektedir. Gıda güvensizliğiyle mücadelenin ekonomik, sosyal ve sağlıkla ilgili müdahaleleri içeren çok yönlü bir yaklaşım gerektirdiği belirtilebilir. Düşük gelirli haneler için gıda destek programlarının kapsamının genişletilmesi, gıda fiyatlarının kontrol altında tutulması, beslenme eğitimlerinin verilmesi, gıda güvensizliği taramalarının yapılması, gıda erişimini iyileştirmeyi amaçlayan politikaların geliştirilmesi, uluslararası işbirliklerinin yapılması ve ülkelerin tarımsal kalkınma projelerine yatırım yapması, gıda güvensizliğini azaltmaya katkı sağlayacaktır.

Anahtar Kelimeler: Gıda güvensizliği, sağlık çıktıları, hastalıklar, yetersiz beslenme, savunmasız gruplar

ABSTRACT

Introduction: Food insecurity is defined as the lack of sustained access to adequate food due to limited material resources and is a major public health problem affecting millions of people worldwide. Malnutrition is associated with a variety of adverse health outcomes such as chronic diseases and mental health disorders. Vulnerable groups such as low-income families, children and the elderly are more affected. Understanding the relationship between food

insecurity and health outcomes is important for the development of interventions to reduce its effects. The aim of this study is to explore the relationship between food insecurity and health outcomes in vulnerable groups through the literature, to identify key factors leading to food insecurity and to suggest possible solutions.

Results: Studies in the literature show that there is a strong relationship between food insecurity and negative health outcomes. It can be stated that malnutrition, iron deficiency, anaemia, asthma, anxiety and depression, obesity and diabetes, hypertension, oral and dental diseases are at higher rates in individuals experiencing food insecurity and especially in vulnerable groups than in those who are not food insecure. In particular, single-parent families, children and the elderly are among the vulnerable groups most affected by food insecurity. Among the causes of food insecurity, economic crises, low household incomes, rising food prices, low education level, unemployment and inadequate policies on this issue are shown.

Conclusion: Food insecurity continues to be an important public health problem with negative consequences on both physical and mental health. It can be stated that combating food insecurity requires a multifaceted approach including economic, social and health interventions. Expanding the scope of food support programmes for low-income households, keeping food prices under control, providing nutrition education, conducting food insecurity screenings, developing policies aimed at improving food access, international cooperation and investing in agricultural development projects will contribute to reducing food insecurity.

Keywords: Food insecurity, health outcomes, diseases, malnutrition, vulnerable groups

GROWTH PERFORMANCE OF CHILI PEPPER UNDER RAIN SHELTER MICROCLIMATE CONDITION

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Abstract

Growing chili pepper (*Capsicum* spp.) in rain shelters is becoming more and more popular as a way to lessen the negative impacts of high moisture and erratic rainfall on crop productivity. With the controlled environment that rain shelters offer, chili plants are shielded from disease-causing factors including flooding, strong rains, and high humidity. This review focuses on important growth metrics such plant height, biomass accumulation, fruit production, and quality criteria as it methodically investigates the growth performance of chili grown under rain shelters. Many factors have been taken into consideration, including as cultivar selection, irrigation schedules, and rain shelter construction. Understanding how these regulated conditions affect physiological and morphological aspects, like photosynthetic rate, water use efficiency, and nutrient intake, is possible through a thorough examination of scientific material published in the past ten years. Research shows that rain shelter cultivation can enhance the performance of chili plants by lowering stress levels and fostering ideal growth environments. Nevertheless, several difficulties including possible changes in the microclimate.

Keywords; Rain shelter microclimate, Environmental hazards, crop growth, yield, protected cultivation

METALİK NANOPARTİKÜLLERİN GIDA ENDÜSTRİSİNDE UYGULANMASI**APPLICATION OF METALIC NANOPARTICLES IN FOOD INDUSTRY****Tolunay YÜCEL**

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ÖZET

Metalik nanopartiküller, 1 ila 100 nanometre arasında değişen boyutlarda olan, metallerin atomik veya moleküler yapıdaki formlarıdır ve yüksek yüzey alanları ile özel optik, elektriksel ve antimikrobiyal özelliklere sahiptir. Gıda endüstrisinde, metalik nanopartiküller gıda güvenliği, ambalajlama ve kalite kontrol süreçlerinde devrim niteliğinde yenilikler sunmaktadır. Özellikle gümüş nanopartiküller, geniş spektrumlu antimikrobiyal etkileriyle öne çıkar ve gıda ambalajlarında kullanılarak mikrobiyal bozulmaları engeller. Gümüş nanopartiküller, bakteri hücre zarlarını bozarak mikroorganizma gelişimini durdurur, bu sayede raf ömrünü uzatır ve gıdaların tazeliğini korur. Altın nanopartiküller, biyosensör teknolojilerinde sıklıkla kullanılarak gıdalardaki zararlı patojenlerin ve kimyasal kalıntıların hızlı ve hassas bir şekilde tespit edilmesine olanak sağlar. Altın nanopartiküllerin yüksek iletkenlik ve biyoyumluluk özellikleri, onları bu sensör sistemlerinde ideal bir malzeme haline getirir. Manyetik nanopartiküller ise gıdalardan ağır metaller, toksinler ve diğer zararlı bileşenlerin ayrıştırılmasında önemli bir araç olarak kullanılır. Manyetik özellikleri sayesinde bu nanopartiküller, hedeflenen bileşenleri tutarak ayrıştırılmalarını kolaylaştırır. Ayrıca, kontrollü salınım sistemlerinde metalik nanopartiküller kullanılarak, gıdalara eklenen vitamin, mineral ve diğer biyoaktif maddelerin daha verimli bir şekilde salınımı sağlanmaktadır. Metalik nanopartiküller, gıda güvenliği ve raf ömrü optimizasyonu açısından önemli avantajlar sunarken, gıda üretim süreçlerinde daha sürdürülebilir ve verimli yöntemlerin geliştirilmesine katkıda bulunmaktadır. Metalik nanopartiküller birçok avantajının yanı sıra dezavantajlar da getirmektedir. Bu teknolojinin en büyük dezavantajlarından biri üretim maliyetleri çok yüksektir. Bu durum geniş çaplı kullanımı etkilemektedir. Bir diğer yönden nanopartiküllerin biyolojik sistemler üzerindeki birikimi ve çevreye olası zararları konusunda daha fazla araştırmaya ihtiyaç vardır.

Anahtar Kelimeler: Metalik Nanopartikül, Antimikrobiyal Etki, Gıda.

ABSTRACT

Metallic nanoparticles are atomic or molecular forms of metals ranging in size from 1 to 100 nanometers, known for their high surface area and unique optical, electrical, and antimicrobial properties. In the food industry, metallic nanoparticles offer groundbreaking innovations in food safety, packaging, and quality control processes. Silver nanoparticles, in particular, stand out for their broad-spectrum antimicrobial effects and are used in food packaging to prevent microbial spoilage. These nanoparticles disrupt bacterial cell membranes, halting microbial

growth, thereby extending shelf life and preserving food freshness. Gold nanoparticles are frequently employed in biosensor technologies, allowing for the rapid and precise detection of harmful pathogens and chemical residues in food. Their high conductivity and biocompatibility make gold nanoparticles ideal for use in sensor systems. Magnetic nanoparticles, on the other hand, play a crucial role in the removal of heavy metals, toxins, and other harmful substances from food. Their magnetic properties enable them to capture and isolate targeted compounds efficiently. Additionally, metallic nanoparticles are used in controlled release systems to ensure the efficient delivery of vitamins, minerals, and other bioactive compounds added to food products. By leveraging these technologies, metallic nanoparticles provide significant advantages in optimizing food safety and extending shelf life, contributing to more sustainable and efficient food production processes. Metallic nanoparticles, in addition to their numerous advantages, also bring some disadvantages. One of the biggest drawbacks of this technology is the high production costs, which affect its large-scale use. Furthermore, more research is needed regarding the accumulation of nanoparticles in biological systems and their potential environmental impacts.

Keywords: Metallic Nanoparticles, Antimicrobial Effect, Food.

MODERN EKSTRAKSİYON TEKNİKLERİNİN TIBBİ BİTKİLERDEKİ UYGULAMALARI VE ANALİZİ

UTILIZATION AND ANALYSIS OF MODERN EXTRACTION TECHNIQUES IN MEDICINAL PLANTS

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ÖZET

Modern (Nonkonvansiyonel) ekstraksiyon yöntemleri, eczacılıkta tıbbi bitkilerden biyolojik aktif bileşiklerin daha verimli, sürdürülebilir ve çevre dostu bir şekilde elde edilmesini sağlayan yenilikçi analiz tekniklerdir. Geleneksel ekstraksiyon yöntemlerine (örn. soxhlet, maserasyon, hidrodistilasyon) kıyasla, bu yöntemler genellikle daha az çözücü kullanımı, kısa işlem süreleri ve düşük enerji tüketimi gibi avantajlar sunar. Modern ekstraksiyon teknikleri arasında ultrasonik ekstraksiyon (UAE), mikrodalga destekli ekstraksiyon (MAE), süperkritik sıvı ekstraksiyonu (SFE) ve yüksek basınçlı ekstraksiyon (HPE) gibi yöntemler yer almaktadır. Bu yöntemlerin tıbbi bitkilerde kullanımı giderek artmaktadır. Ultrasonik ekstraksiyon, ses dalgalarının bitki hücre duvarlarını parçalamasıyla etken maddelerin çözülmesini hızlandırır. Düşük sıcaklıklarda işlem görmesi, ısıya duyarlı bileşiklerin korunmasına olanak tanır. Mikrodalga destekli ekstraksiyon, mikrodalga enerjisinin bitki hücrelerindeki su moleküllerini hedef alarak hızlı ısıtma sağlar ve bu da bileşiklerin daha kısa sürede ekstre edilmesine olanak verir. Süperkritik sıvı ekstraksiyonu, genellikle karbondioksit gibi süperkritik çözücülerin kullanılmasıyla, çevre dostu ve toksik olmayan bir yöntem olarak ön plana çıkar. Yüksek basınçlı ekstraksiyon ise bitki hücrelerini fiziksel olarak parçalayarak daha yüksek ekstre verimi sağlar. Bu tekniklerin tercih edilme nedenleri arasında, özellikle çevresel faktörlere duyarlılık ve daha saf biyolojik aktiviteye sahip ekstraktların elde edilmesi isteği bulunmaktadır. Geleneksel yöntemler genellikle uzun süre gerektirir ve yüksek sıcaklık gibi faktörler nedeniyle biyolojik bileşiklerde bozulmalara neden olabilir. Nonkonvansiyonel yöntemler ise kısa sürede yüksek verim sağladıkları için hem endüstriyel hem de akademik çalışmalarda giderek daha fazla tercih edilmektedir. Bu çalışmada, bir bitkisel materyalden etken maddenin ekstraksiyonu için kullanılacak modern ekstraksiyon yöntemlerinin tanımlanması, ekstraksiyon basamaklarının oluşturulması ve bu yöntemlerin diğer yöntemlere göre avantajları ve dezavantajlarının ortaya konulması amaçlanmıştır.

Anahtar Kelimeler: Modern, Nonkonvansiyonel, Ekstraksiyon, Tıbbi bitki, Eczacılık.

ABSTRACT

Modern (non-conventional) extraction methods are innovative analytical techniques that enable more efficient, sustainable and environmentally friendly extraction of biologically active compounds from medicinal plants in pharmacy. Compared to conventional extraction methods (e.g. soxhlet, maceration, hydrodistillation), these methods often offer advantages such as less solvent usage, short processing times and low energy consumption. Modern extraction techniques include ultrasonic extraction (UAE), microwave-assisted extraction (MAE), supercritical fluid extraction (SFE) and high-pressure extraction (HPE). The use of these methods in medicinal plants is increasing. Ultrasonic extraction accelerates the dissolution of active substances by the disintegration of plant cell walls by sound waves. Processing at low temperatures allows the preservation of heat-sensitive compounds. Microwave-assisted extraction enables rapid heating by targeting microwave energy to water molecules in plant cells, which allows compounds to be extracted in a shorter time. Supercritical fluid extraction, usually using supercritical solvents such as carbon dioxide, is an environmentally friendly and non-toxic method. High-pressure extraction provides higher extract yield by physically breaking plant cells. Among the reasons why these techniques are preferred are sensitivity to environmental factors and the desire to obtain purer extracts with biological activity. Conventional methods usually require a long time and may cause degradation of biological compounds due to factors such as high temperature. Nonconventional methods are increasingly preferred in both industrial and academic studies because they provide high yields in a short time. In this study, it was aimed to define modern extraction methods that can be used for the extraction of an active substance from a plant material, to establish the extraction steps, and to reveal the advantages and disadvantages of these methods compared to other methods.

Keywords: Modern, Nonconventional, Extraction, Medicinal Plant, Pharmacy.

EFFECT OF INPUT SUBSIDIES ON OUTPUT OF RICE FARMERS UNDER VALUE CHAIN DEVELOPMENT PROGRAMME IN NIGER STATE, NIGERIA

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ABSTRACT

The study assessed the effect of input subsidies on output of rice farmers under value chain development programme in Niger State, Nigeria. A multi-stage sampling technique was used to select 185 registered youth rice farmers using Yamane formular for appropriate sample size determination and data collected through a semi-structured questionnaire were analyzed using descriptive statistics (such as frequency count, percentages, mean) and Ordinary Least Square regression model to examine the effects of input subsidies on rice farmers' output. The results obtained shows that rice farmers in the study area were mostly males (85.4%) and formally educated (70.8%) with an average age of 42years among rice farmers in Niger state. The results also shows that increase in machine hiring services (94.1%), access to rice production modern technologies (86.5%), access to training on rice farming (85.9%), access to post-harvest handling and processing technologies (82.7%) and increase in the use of fertilizer and agrochemicals (81.1%) are the major input subsidies benefited among the rice farmers in Niger state. The result further shows that farm size, use of mechanization, cost of labour, number of trainings received, quantity of seed used, quantity of fertilizer used, and farm income were the significant factors influencing the output of the rice farmers in the study area. Hence, it was recommended that Value Chain Development Programmed should continue and expand the provision of subsidized inputs such as rice seeds, fertilizers agrochemicals, post-harvest technologies and increase trainings to rice farmers as they are crucial for farmers in Niger state and strengthen extension services to provide continuous support and innovation dissemination in rice farming techniques.

Key words: Value-chain, Inputs, Subsidies, Rice-farmers and Development

ZEHİRLİ MANTARLAR VE ZEHİRLENME BELİRTİLERİ**POISONOUS MUSHROOMS AND POISONING SYMPTOMS****Nesrin İÇLİ**

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ÖZET

Doğada mevsimlere bağlı olarak kendiliğinden yetişen yenilebilir mantarlar, özellikle kırsal kesimde yaşayan halk için önemli bir besin maddesidir. Dünya çapında bilinen yaklaşık 5000 mantar türünden yaklaşık birkaç yüzü yenilebilir, potansiyel olarak ölümcül olan birkaçı da dahil olmak üzere yaklaşık Avrupa'da yetişenlerin 150'sinin ve ülkemizde yetişenlerin yaklaşık 110'unun zehirli olduğu bilinmektedir. Bunun için besin değeri yüksek ve sevilen yiyeceklerden biri olan mantarı, yenilebilir mi yoksa zehirli mi olduğunu bilmeden yemek ölüme yol açabilir. Her yıl dünyada ve ülkemizde birçok insan zehirli mantarlardan olumsuz etkilenmekte veya mantar zehirlenmesinden ölmektedir. Ülkemizde mantar zehirlenmelerinin sık görülmesinin nedeni yabani mantar türlerinin besin olarak yaygın kullanımınıdır. Özellikle amanitinler; ayrıca gyromitrin, ibotenik asit, muskarin, muskimol, orellanın vb gibi bazı zehirli bileşikleri içerdiği tanımlanan mantarların hayatı tehdit eden zehirlenmelere neden olduğu görülmektedir. Ciddi mantar zehirlenmeleri arasında, amatoksin zehirlenmesi birincil öneme sahiptir çünkü mantarla ilgili tüm ölümlerin %90-95'ini oluşturur. Zehirlenme belirtilerinin görülmesine kadar geçen süre göz önüne alındığında kısa latent dönemli (<6 saat) zehirlenme sendromları arasında muskarinik zehirlenme, Panthercap/Sinek mantarı zehirlenmesi, gastrointestinal tahriş edici sendrom, Psilocybin veya Sihirli Mantar zehirlenmesi (halüsinojenik sendrom), paxillus zehirlenmesi (Brown Rollrim) ve koprin zehirlenmesi sendromları yer alır. Amatoksin zehirlenmesi, orellanın zehirlenmesi, jiromitrin zehirlenmesi ve rabdomiyoliz sendromu ise daha uzun latent dönemli (6 ila 24 saat) zehirlenme sendromları arasında yer almaktadır. Bu bildiri çalışmasında özellikle Avrupa'da ve ülkemizde görülen toksisitesi ile çeşitli sendromlara yol açabilen yüksek mantarlar ve ortaya çıkardıkları zehirlenme belirtileri ele alınacaktır.

Anahtar Kelimeler: Mantar zehirlenmesi, amanitin, psilocybin, giromitrin, orellanın, muskarin, koprin.

ABSTRACT

Edible mushrooms that grow naturally in nature depending on the seasons are an important food item, especially for people living in rural areas. Of the approximately 5000 species of mushrooms known worldwide, about a few hundred of which are edible, including a few that are potentially deadly, it is known that about 150 of those growing in Europe and about 110 of those growing in our country are poisonous. For this reason, eating mushrooms, which are one of the most popular foods with high nutritional value, without knowing whether they are edible or poisonous can lead to death. Every year, many people in the world and in our country are adversely affected by poisonous mushrooms or die from mushroom poisoning. The reason why mushroom poisonings are frequently seen in our country is the widespread use of wild mushroom species as food. It is observed that mushrooms that are identified to contain some

poisonous compounds such as amanitins, as well as gyromitrin, ibotenic acid, muscarin, muscimol, orellanin, etc., cause life-threatening poisonings. Among serious mushroom poisonings, amatoxin poisoning is of primary importance because it accounts for 90-95% of all mushroom-related deaths. Considering the time until the symptoms of poisoning appear, the short latent period (<6 hours) poisoning syndromes include muscarinic poisoning, Panthercap/Fly mushroom poisoning, gastrointestinal irritant syndrome, Psilocybin or Magic Mushroom poisoning (hallucinogenic syndrome), paxillus poisoning (Brown Rollrim) and coprine poisoning syndromes. Amatoxin poisoning, orellanin poisoning, gyromitrin poisoning and rhabdomyolysis syndrome are among the poisoning syndromes with longer latent periods (6 to 24 hours). In this report, especially in Europe and our country, high toxicity mushrooms that can cause various syndromes and the poisoning symptoms they cause will be discussed.

Keywords: Mushroom poisoning, amanitin, psilocybin, gyromitrin, orellanin, muscarin, coprine.

ARI SÜTÜ VE BAĞIŞIKLIK DÜZENLEYİCİ ETKİLERİ**ROYAL JELLY AND IMMUNITY REGULATORY EFFECTS****Nesrin İÇLİ**Doç. Dr., Kastamonu Üniversitesi, Sağlık Bilimleri Fakültesi, Beslenme ve Diyetetik Bölümü,
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Son yıllarda sağlık sorunları için doğal ürünlerin kullanımı giderek daha fazla yer bulmaya başlamış olup geleneksel ve modern tıpta yaygın olarak kullanılan doğal arı ürünleri de bu doğal ürünler içinde öne çıkmaktadır. Doğal arı ürünlerinden olan arı sütü de günümüzde insan sağlığını korumak için sıklıkla kullanılmaktadır. Arı sütü, genç işçi arıların (*Apis mellifera* Hymenoptera, Apidae) alt ve üst yutak bezlerinin salgısı olan, süt beyazı ile sarımsı kremi ve asidik, hafif keskin kokulu ve lezzetli bir maddedir. Kraliçe arının tüm yaşam süresi boyunca tükettiği özel besin olan ve ilk 2-3 gün boyunca olgunlaşma sürecindeki genç larvalara verilen tek besin arı sütüdür. Bu nedenle kraliçe arı diğer arılara kıyasla daha uzun ömürlüdür. İnsanlar için en etkili ve faydalı ilaçlardan biri olarak görülen arı sütü hem halk hekimliğinde hem de resmi tıpta yaygın olarak kullanılmaktadır. Arı sütünün çok sayıda antioksidan ve farmakolojik aktiviteye sahip olmasının sebebi sahip olduğu doğal antibiyotikler, lipitler, karbonhidratlar, proteinler, amino asitler, vitaminler, mineraller, enzimler, hormonlar ve oligo elementlerden oluşan karmaşık bileşimi olarak görülmektedir. Arı sütü ve bileşenlerinin biyoaktif etkilerinden bağışıklık sistemi üzerindeki destekleyici etkileri çeşitli in vitro ve in vivo deneyler ile araştırılmış ve kanıtlamıştır. Amino ve gama globulin, enzimler, proteinler, hormonlar, bağışıklık sisteminin enfeksiyonlarla savaşmasına yardımcı olan A ve E vitamini arı sütünde bulunan bağışıklık düzenleyici bileşenlerdendir. Yine yakınlarda, arı sütünden izole edilen yağ asitlerinin (10-hidroksi-2 dekenoik asit ve 3-10 dihidroksidekanoik asit) sıçan T hücresi ve dendritik hücre kokültürlerinde bağışıklık tepkisini düzenlediği gösterilmiştir. Bu bildiride arı sütünün bağışıklık üzerinde etkili bileşenleri ve bağışıklık düzenlemedeki rolleri ele alınacaktır.

Anahtar Kelimeler: Arı sütü, bağışıklık, globulin, 10-hidroksi-2 dekenoik asit, 3-10 dihidroksidekanoik asit.

ABSTRACT

In recent years, the use of natural products for health problems has increasingly become widespread, and natural bee products widely used in traditional and modern medicine also stand out among these natural products. Royal jelly, one of the natural bee products, is also frequently used to protect human health today. Royal jelly is a milky white to yellowish creamy and acidic, slightly pungent and delicious substance that is the secretion of the lower and upper pharyngeal glands of young worker bees (*Apis mellifera* Hymenoptera, Apidae). Royal jelly is the only food consumed by the queen bee throughout her entire life and given to young larvae in the maturation process for the first 2-3 days. For this reason, the queen bee has a longer lifespan compared to other bees. Royal jelly, which is considered one of the most effective and beneficial medicines for humans, is widely used both in folk medicine and in official medicine. The reason why royal jelly has many antioxidant and pharmacological activities is seen as its complex composition consisting of natural antibiotics, lipids, carbohydrates, proteins, amino acids, vitamins, minerals, enzymes, hormones and oligoelements. The bioactive effects of royal

jelly and its components, such as their supportive effects on the immune system, have been investigated and proven by various in vitro and in vivo experiments. Amino and gamma globulin, enzymes, proteins, hormones, and vitamins A and E, which help the immune system fight infections, are among the immunomodulatory components found in royal jelly. Again, recently, it has been shown that fatty acids isolated from royal jelly (10-hydroxy-2 decenoic acid and 3-10 dihydroxydecanoic acid) regulate the immune response in rat T cell and dendritic cell cocultures. In this report, the components of royal jelly that are effective on immunity and their roles in immune regulation will be discussed.

Keywords: Royal jelly, immunity, globulin, 10-hydroxy-2 decanoic acid, 3-10 dihydroxydecanoic acid.

GIDALARDA DERİN ÖĞRENME

DEEP LEARNING IN FOOD

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ÖZET

Yapay zeka, her alanda olduğu gibi gıda alanında da kullanılmaya başlamıştır. Bu alan da sorunlara çözüm üretmek, kullanımda pratiklik sağlamak, iş gücü ve maliyet açısından tasarruf yapmak, hastalıkları ve kusurlu ürünleri tespit etmek için kullanılmaktadır.

Derin öğrenme kelimesi; görüntü işleme, konuşmanın tanımlanması ve anlaşılması alanlarında kademeli olarak öğrenen yapay sinir ağlarının simülasyonu ve hatta kendi kararlarını vermesiyle ilgili öğrenme yöntemi ve veri miktarının artması, bilgisayar alanında işlem gücü ve grafik işlemcilerindeki gelişmelerle birlikte, özellikle büyük veride tahmine dayalı analitik çözümleri sağlayan öğrenme yöntemi olarak tanımlanmıştır. Dijital görüntüler kullanılarak nesne algılama, yarım asrı aşkın bir gelişme sürecinden geçerek günümüze ulaşmış ve oldukça başarıların elde edildiği bir teknolojidir. Derin öğrenme teknikleri, görüntüler üzerinden nesne algılama alanında kullanılan teknikler arasındadır.

Gıdalarda derin öğrenmede öncelikle veri seti oluşturulmaktadır. Daha sonra algılayıcı yöntemi seçilmektedir. Evrimsel sinir ağları çok katmanlı algılayıcıların bir türüdür ve en çok kullanılan derin öğrenme yöntemlerinden biridir (CNN). CNN genellikle görüntü işlemede kullanılan ve girdi olarak görselleri alan bir derin öğrenme algoritmasıdır. Farklı yapıdaki görsellerdeki özellikleri yakalayan ve onları sınıflandıran bu algoritma farklı katmanlardan oluşmaktadır. Yöntemde; ilk olarak girdi verileri alınır, ardından her katmandaki nitelik özelliklerini çıkararak öğrenme işlemi gerçekleştirir. Her katmanda yeni özellik çıkarımı ile devam eder.

Gıdaların kalite parametrelerine göre sınıflandırılması, tat ve aroma bileşenlerinin tanımlanması, raf ömrünün belirlenmesi gibi bir çok alanda kullanılmaktadır.

Anahtar Kelimeler: derin öğrenme, gıda, yapay zeka

ABSTRACT

The word deep learning is used in the fields of image processing, speech recognition and understanding simulation of artificial neural networks that gradually learn and even make their own decisions learning method and the increasing amount of data, computer with advances in computing power and graphics processors, especially in big data is defined as a learning method that provides predictive analytical solutions. Object detection using digital images is a technology that has been developed over more than half a century and has achieved great success. Deep learning techniques are among the techniques used in the field of object detection over images.

In deep learning in food, the data set is first created. Then the perceptron method is selected. Convolutional neural networks are a type of multilayer perceptron and one of the most widely used deep learning methods (CNN). CNN is a deep learning algorithm that is generally used in image processing and takes images as input. This algorithm, which captures features in images with different structures and classifies them, consists of different layers. In the method; first, the input data is received, then it performs the learning process by extracting the attribute features in each layer. It continues with new feature extraction in each layer.

It is used in many areas such as classification of foods according to quality parameters, identification of taste and aroma components, determination of shelf life.

Keywords: deep learning, food, artificial intelligence.

POSTBİYOTİKLERİN KULLANIM ALANLARI**USES OF POSTBIOTICS****Özlem Pelin CAN**

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Postbiyotikler, hücre metabolitleri, biyojenikler, hücre dışı süpernatant, fonksiyonel proteinler/enzimler, hücre dışı polisakkaritler (EPS), teikoik asit, pili tipi yapılar, metabiyotikler (mikrobiyota metabolitleri) ve probiyotik aktivitenin metabolik atıkları olarak tanımlanmaktadır. Postbiyotikler canlı mikroflora tarafından salgılanan veya mikrobiyal hücre parçalanmasından sonra salınan düşük moleküler ağırlıklı çözünür bileşiklerdir. Farklı mikroorganizmaların kültürlerinden elde edilen postbiyotikler, farklı aktiviteler gösterebilmektedir. Laboratuvarda hazırlanan postbiyotikler, organik asitler, kısa zincirli yağ asitleri, karbonhidratlar, antimikrobiyal peptitler, enzimler, vitaminler, kofaktörler, immün sinyal bileşikleri ve kompleks ajanlar gibi çeşitli biyoaktif metabolitler içermektedir.

Postbiyotiklerin gıda kullanımlarında bakteriyosinler ve diğer biyoaktif peptitler, ekzopolisakkaritler (EPS), ve antioksidan moleküller öne çıkmaktadır. EPS, mikroorganizmalar tarafından üretilen ve hücre dışına salgılanan biyopolimerlerdir. Probiyotik organizmaları sert çevre koşullarına karşı korumakla birlikte hücre tanıma ve biyofilm oluşumunda da görev alırlar. Jelleştirici, stabilizatör, koyulaştırıcı ve emülgatör olarak kullanılabilen bu biyopolimerler aynı zamanda gıda ambalajlanmasında da kullanılabilirler. Süt ürünleri grubunda su tutma kapasitesini, viskoziteyi, reolojiyi geliştirmede kullanılırlar. Hububat ürünleri grubunda da benzer reolojik özelliklerin geliştirilmesinde kullanılmaktadır.

Postbiyotikler yenilebilir ambalaj üretiminde, antikanserojen etki oluşturma gibi farklı alanlarda da kullanılmaktadır. Probiyotiklere kullanım kolaylıklarının olması son zamanlarda talebin artmasına sebep olmuştur. Et ürünlerinde doğal katkı maddelerin kullanımına yönelik çalışmalar son yıllarda hız kazanmıştır. Bu kapsamda postbiyotik kullanımının özellikle antioksidan ve antimikrobiyal etkileri araştırılmıştır. Postbiyotik varlığının gıda matriksinin duyuşal ve tekstürel özellikleri üzerine etkileri de bulunmaktadır.

Anahtar Kelimeler: gıda, postbiyotik**ABSTRACT**

Postbiotics are defined as cell metabolites, biogenics, cell-free supernatant, functional proteins/enzymes, extracellular polysaccharides (EPS), teichoic acid, pili-type structures, metabiotics (metabolites of microbiota) and metabolic wastes of probiotic activity. Postbiotics are low molecular weight soluble compounds secreted by living microflora or released after microbial cell lysis. Postbiotics obtained from cultures of different microorganisms can show different activities. Postbiotics prepared in the laboratory contain various bioactive metabolites such as organic acids, short-chain fatty acids, carbohydrates, antimicrobial peptides, enzymes, vitamins, cofactors, immune signaling compounds and complex agents.

Bacteriocins and other bioactive peptides, exopolysaccharides (EPS), and antioxidant molecules are prominent in food uses of postbiotics. EPS are biopolymers produced by

microorganisms and secreted outside the cell. They protect probiotic organisms against harsh environmental conditions and are also involved in cell recognition and biofilm formation. These biopolymers can be used as gelling agents, stabilizers, thickeners and emulsifiers and can also be used in food packaging. They are used to improve water holding capacity, viscosity and rheology in dairy products. They are also used to improve similar rheological properties in the cereal products group.

Postbiotics are also used in different areas such as edible packaging production and anticarcinogenic effects. The ease of use of probiotics has recently led to an increase in demand. Studies on the use of natural additives in meat products have gained momentum in recent years. In this context, especially antioxidant and antimicrobial effects of postbiotic use have been investigated. The presence of postbiotics also has effects on the sensory and textural properties of the food matrix.

Keywords: food, postbiotics, use

**PAMUK YAĞI VE KARNAUBA WAX İLE HAZIRLANAN MATERYALLERLE
KAPLANAN TAVUK YUMURTALARINDA BAZI PARAMETRELERİN
DEĞERLENDİRİLMESİ**

**EVALUATION AND SOME PARAMETERS IN EGGS COATED WITH MATERIALS
PREPARED FROM COTTONSEED OIL AND CARNAUBA WAX**

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ÖZET

Bu çalışma, pamuk yağı ve karnauba wax (%1 ve %2) kullanılarak hazırlanan materyallerle kaplanan tavuk yumurtalarında ağırlık kaybı (%), albumen pH'sı ve yumurta sarısı TBARs değeri üzerine etkilerini belirlemek üzere yürütüldü. Bu amaçla, günlük (taze) Nick Brown hibrit tavuk yumurtaları her bir grupta 10'ar adet ve toplam 40 adet olmak üzere 4 gruba ayrıldı. Kontrol (K) grubundaki yumurtalar herhangi bir kaplama materyali ile kaplanmadı. Deneme grupları (PY, PYKW-1 ve PYKW-2) ise sırasıyla sadece pamuk yağı, pamuk yağı-karnauba wax (%1) kombinasyonu ve pamuk yağı-karnauba wax (%2) kombinasyonu ile kaplandı. Kaplanan yumurtalar ve K grubu yumurtaları oda sıcaklığında 4 hafta depolandı. 4 haftalık süre sonunda yumurtalarda ağırlık kaybı, yumurta sarısı TBARs değeri ve albumen pH'sı değerlendirildi. Haftalık yumurta ağırlık kaybı ($P<0.001$) ve genel yumurta ağırlık kaybı ($P<0.001$) bakımından gruplar arasında anlamlı bir fark olduğu tespit edildi. Kaplama materyallerinin yumurta sarısı L, b değerleri ve yumurta sarısı TBARs düzeyi üzerine önemli bir etkilerinin olmadığı belirlendi. Albumen pH'sı ve yumurta sarısı a değerinin ise kaplama materyallerinden etkilendiği tespit edildi. Tüm kaplama materyallerinin kontrol grubuna göre yumurta ağırlık kaybını önlediği ortaya konuldu. Ayrıca yumurta tazeliğinin önemli bir göstergesi olan pH'nın kaplama gruplarında daha düşük olması dikkat çekici bulundu. Sonuç olarak, yumurta ağırlık kaybının önlenmesi ve depolama süresince yumurta tazeliğinin korunabilmesi için karnauba wax ve pamuk yağı kombinasyonunun yumurta kaplama materyali olarak kullanılabilceği düşünülmektedir.

Anahtar Kelimeler: Yumurta kaplama, ağırlık kaybı, TBARs, pamuk Yağı, karnauba wax.

ABSTRACT

This study was conducted to determine the effects of coated chicken eggs with materials prepared using cottonseed oil and carnauba wax (1% and 2%) on weight loss (%), albumen pH, and egg yolk TBARs value. For this purpose, daily (fresh) Nick Brown hybrid chicken eggs were divided into 4 groups as 10 in each group and 40 in total. Eggs in the control (K) group were not coated with any coating material. Experimental groups (PY, PYKW-1, and PYKW-2) were coated with only cottonseed oil, cottonseed oil-carnauba wax (1%) combination, and cottonseed oil-carnauba wax (2%) combination, respectively. Coated eggs and K group eggs were stored at room temperature for four weeks. At the end of the 4-week period, weight loss,

egg yolk TBARs value, and albumen pH in eggs were evaluated. A significant difference was found between the groups in terms of weekly egg weight loss ($P<0.001$) and overall egg weight loss ($P<0.001$). It was determined that the coating materials did not have a significant effect on egg yolk L, b values and egg yolk TBARs levels. It was determined that albumen pH and egg yolk a value were affected by the coating materials. It was revealed that all coating materials prevented egg weight loss compared to the control group. In addition, it was found remarkable that pH, which is an important indicator of egg freshness, was lower in the coating groups. As a result, it is thought that the combination of carnauba wax and cottonseed oil can be used as an egg coating material to prevent egg weight loss and maintain egg freshness during storage.

Keywords: Egg coating, weight loss, TBARs, cottonseed oil, carnauba wax.

PROBİYOTİKLERİN SAĞLIK ÜZERİNDEKİ ROLÜ**THE ROLE OF PROBIOTICS ON HEALTH****Çağlar AKÇALI**

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ÖZET

Probiyotikler, konakçıya sağlık yararı sağlayan ve yeterli miktarda alındığında hastalıkların önlenmesini ve iyileşmesini sağlayan, patojenik olmayan mikroorganizmalardır. En yeni ve kapsamlı tanımı konakçıya sağlık yararı vermesinin yanında, yeterli miktarlarda alındığında bazı hastalıkların önlenmesini veya iyileşmesini sağlayan, çoğunlukla patojenik olmayan mikroorganizmalar oldukları yönünde genişletilmiştir. Dünya Sağlık Örgütü (DSÖ), Birleşmiş Milletler Gıda ve Tarım Örgütü (FAO) ve Avrupa Gıda Güvenliği Otoritesi (EFSA)'nın önerilerine göre, probiyotik seçim sürecinde, probiyotik suşların hem güvenilirlik ve işlevsellik kriterlerini hem de teknolojik kullanılabilirlik kriterlerini karşılaması gerekir. Günümüzde en yaygın kullanılan probiyotikler arasında; laktobasiller, bifidobakteriler ve bazı patojenik olmayan suşlar bulunmaktadır. Probiyotik kullanımının sağlık üzerindeki etkisi bakımından en çok çalışılan probiyotikler: *Lactobacillus rhamnosus*, *Saccharomyces boulardii*, *Lactobacillus casei*, *Bifidobacterium animalis*'dir. Probiyotikler, çeşitli mekanizmalarla değişmiş bağırsak mikrobiyotasının olumlu yönde modülasyonunu destekleyebilmektedir. Bu mekanizmalar; antimikrobiyal maddelerin üretimi, bağırsak mukozal adezyona müdahale ederek patojenlerin sayısının azaltılması, safra tuzlarının metabolizmasının modüle edilmesi, düşük dereceli inflamasyonun azaltılması ve bağırsak motilitesinin yanı sıra immün aktivasyonun düzenlenmesidir. Ayrıca probiyotikler, kısa zincirli yağ asitlerinin ve biyosümfaktanların üretimiyle patojenlerin bağırsak epiteline yapışmasının engellenmesini, mukozal bağışıklık aktivasyonunun regülasyonunu, mukus tabakasının artırılması ve tight-junction proteinlerinin üretimi ile bağırsak mukozasının bağırsak bariyeri işlevinde gelişmesini, proinflamatuvar sitokinlerin baskılanması yoluyla anti-inflamatuvar etkiyi, IgA üretimini uyararak ve bağırsak-beyin etkileşimini artırarak bağışıklığın artırılmasını sağlamaktadır. Probiyotikler, temel beslenme ve klinik takviye ile alımları gereksinimlerimizin çoğunu karşılayabilecek önemli fonksiyonel özelliklere sahiptir. Probiyotikler, ülseratif kolit, Crohn hastalığı ve irritabl bağırsak sendromu dahil olmak üzere inflamatuvar hastalıkların tedavisinde yardımcı olabilir. Ayrıca, probiyotiklerin diyabet, obezite, kanser ve patojenik mikroorganizmalar ile ilgili hastalıkların önlenmesinde ve tedavisinde kullanılmaktadır. Çeşitli katabolik ve anabolik süreçlerde enerjinin düzenlenmesi, asit ve safra toleransı, bağırsak epitel hücrelerine bağlı kalma, patojenlerle mücadele etme ve insan sağlığı için yararlı olması gibi bazı özelliklere sahiptir. Bu derleme probiyotiklerin sağlık üzerindeki rolü ve potansiyel avantajlarına ilişkin çalışmalarını özetlemektedir.

Anahtar Kelimeler: Probiyotikler, bağırsak mikrobiyotası, bağışıklık modülasyonu, sağlık

ABSTRACT

Probiotics are non-pathogenic microorganisms that provide health benefits to the host and prevent and cure diseases when taken in sufficient quantities. The most recent and comprehensive definition has been expanded to include mostly non-pathogenic microorganisms that, in addition to providing health benefits to the host, prevent or cure certain diseases when taken in sufficient quantities. According to the recommendations of the World Health Organisation (WHO), the Food and Agriculture Organisation of the United Nations (FAO) and the European Food Safety Authority (EFSA), in the probiotic selection process, probiotic strains must meet both safety and functionality criteria and technological usefulness criteria. The most widely used probiotics today include lactobacilli, bifidobacteria and some non-pathogenic strains. The most studied probiotics in terms of the effect of probiotic use on health: *Lactobacillus rhamnosus*, *Saccharomyces boulardii*, *Lactobacillus casei*, *Bifidobacterium animalis*. Probiotics can support the favourable modulation of altered gut microbiota by various mechanisms. These mechanisms include production of antimicrobial substances, reduction of the number of pathogens by interfering with intestinal mucosal adhesion, modulation of bile salt metabolism, reduction of low-grade inflammation and regulation of intestinal motility as well as immune activation. In addition, probiotics prevent the adhesion of pathogens to the intestinal epithelium by the production of short-chain fatty acids and biosurfactants, regulate mucosal immune activation, improve the intestinal mucosa in the intestinal barrier function by increasing the mucus layer and the production of tight-junction proteins, provide anti-inflammatory effect by suppressing pro-inflammatory cytokines, increase immunity by stimulating IgA production and increasing gut-brain interaction. Probiotics have important functional properties that may fulfil many of our basic nutritional and clinical supplementation requirements. Probiotics may help in the treatment of inflammatory diseases, including ulcerative colitis, Crohn's disease and irritable bowel syndrome. In addition, probiotics are used in the prevention and treatment of diabetes, obesity, cancer and diseases related to pathogenic microorganisms. Probiotics have some properties such as regulating energy in various catabolic and anabolic processes, acid and bile tolerance, adherence to intestinal epithelial cells, fighting pathogens and being beneficial for human health. This review summarises studies on the role and potential advantages of probiotics on health.

Keywords: Probiotics, gut microbiota, immune modulation, health

"RED WEAVER ANTS: A SUSTAINABLE AND NUTRITIOUS FOOD SOLUTION FOR THE FUTURE"

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Abstract:

Oecophylla smaragdina, better known as the red weaver ant, is being recognized as a promising and sustainable food option for the future. As the global population grows and food security becomes more urgent, we need alternative sources of nutrition, and these ants could play an important role. They are packed with protein, healthy fats, vitamins, and minerals, offering a nutrient-rich option that could help address food shortages while reducing the environmental impact of food production.

Red weaver ants have been eaten in many parts of Southeast Asia for generations. Locals value them for their tangy, citrus-like flavor and the health benefits they provide. This traditional knowledge could be a key to helping other parts of the world embrace insects as food. While the idea of eating ants might seem unfamiliar to some, they are already enjoyed by millions of people and could become a global food trend as we rethink how to feed the planet.

One of the biggest advantages of red ants is their low environmental footprint. Farming traditional livestock, like cattle or poultry, requires vast amounts of land, water, and feed, all of which strain our planet's resources. In contrast, red weaver ants can be farmed with minimal resources, producing fewer greenhouse gases and requiring much less land. As climate change and resource shortages become more pressing, these ants offer a sustainable alternative to meet growing food demands without harming the environment.

By incorporating red weaver ants into our diets, we can enjoy a nutritious, eco-friendly protein source while contributing to a more sustainable future. The shift toward insect-based food might seem small, but it could be a big step in solving some of the world's most urgent food and environmental challenges

Keywords: Red weaver ants, Alternative food sources, Nutritional insects, Eco-friendly farming

KOMBUCHA VE YEŞİL ÇAY İLE FERMENTE EDİLMİŞ POLENİN BİYOAKTİVİTE VE EKZİN TABAKASINDAKİ DEĞİŞİMLER

CHANGES IN BIOACTIVITY AND EXIN LAYER OF POLEN FERMENTED WITH KOMBUCHA AND GREEN TEA

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ÖZET

Arı poleni, bal arılarının yavrularını beslemek için kullandıkları önemli bir arı ürünüdür. Arı poleni kovana getirilip petek gözlerinde depolandıktan sonra laktik asit fermentasyonuna uğrar ve beslenmeye hazır hale getirilir. Polenin eksin tabakası yüksek sıcaklıklara ve basınca dayanıklıdır. Fermentasyonun polenin ekzin tabakasında kırılmalara sebep olduğu ve polenin besin içeriğinin dışarı çıktığı bilinmektedir. Bu nedenle bu çalışmada laboratuvar ortamında farklı ürünlerle fermente edilmiş polenin antioksidan kapasitesindeki değişim ve ekzin tabakasında meydana değişimleri belirlemek amaçlanmıştır. Bunun için Yeşil çay infüzyonu (%1) ve hibiscus çay infüzyonu (%0.5) kaynamış suda hazırlanmış üzerine şeker ve polen eklenerek 28 °C de fermentasyon sağlandı. Farklı zaman aralıklarında (0, 1, 3, 5, 7, 9 gün) örnekler alınarak fosfomolibdenum metodu ile antioksidan aktivitesi belirlendi ve elektron mikroskobu ile polenin ekzin strüktürü incelendi. Kontrol, yeşil çay ve hibiscus grubu örneklerin antioksidan aktivitesi 31.15-57.07,35.90-113.50 ve 12.25-42.66 mgAAE/g arasında tespit edilmiştir. Yeşil çay ve hibiscus ile fermentasyon neticesinde eksin strüktüründe kırılmalar meydana geldiği belirlendi. Bu sonuçlar polenin yeşil çay ile fermentasyonunun fermente ürünler elde etmek için iyi bir seçenek olabileceğini göstermiştir.

Anahtar Kelimeler: arı poleni, fermentasyon, yeşil çay, kombuçya, ekzin

ABSTRACT

Bee pollen is an important bee product that honey bees use to feed their young bees. After the bee pollen is brought to the hive and stored in the honeycomb cells, it undergoes lactic acid fermentation and is made ready for feeding. The exine layer of the pollen is resistant to high temperatures and pressure. It is known that fermentation causes breaks in the exine layer of pollen and the nutrient content of the pollen comes out. Therefore, in this study, it was aimed to determine the changes in the antioxidant capacity of pollen fermented with different products in the laboratory conditions and the changes in the exine layer. For this, green tea infusion (1%) and hibiscus tea infusion (0.5%) were prepared in boiled water, and sugar and pollen were added to fermentation at 28 °C. Antioxidant activity was determined by the phosphomolybdenum method by taking samples at different time intervals (0, 1, 3, 5, 7, 9 days) and the exine structure of pollen was examined by electron microscopy. Antioxidant activities of control, green tea and hibiscus group samples were determined between 31.15-57.07, 35.90-113.50 and 12.25-42.66 mgAAE/g. As a result of fermentation with green tea and hibiscus, it was determined that there were breaks in the exin structure. These results showed that the fermentation of pollen with green tea can be a good option to obtain fermented products.

Key words: bee pollen, fermentation, green tea, kombucha, exin

ENDOCRINE DISRUPTING EFFECT OF HONEY BEE PRODUCTS (ROYAL JELLY AND APILARNİL)**ARI ÜRÜNLERİNİN (ARI SÜTÜ VE APILARNİL) ENDOKRİN BOZUCU ETKİSİ****Sibel SİLİCİ**

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Abstract

Today, early puberty is one of the most important problems that concern parents regarding the growth and development of children. Royal jelly is a unique food that is given in the honey bee colony from the egg to the maturity period of the queen bee, and only during the egg period of the other castes. Although both develop from a fertilized egg, the morphological and physiological differences between the worker bee and the queen bee are the result of royal jelly feeding. Royal jelly, which has many beneficial biological activities, has gained importance as a functional food. Apilarnil is obtained by filtration and pulverization of the homogenate of drone larvae harvested at the 7-day larval stage, before the honeycomb cells close. Scientific research has shown that royal jelly and apilarnil is effective on growth and sex hormones. Its effect on hormonal changes, especially during adolescence, should be taken into consideration, and hormonal changes that will occur in male and female individuals should be taken into account.

Key words: royal jelly, apilarnil, hormone, endocrine adolescence, arı sütü, apilarnil, endokrin, hormon, adölesan

ÖZET

Günümüzde erken ergenlik, çocukların büyümesi ve gelişimi konusunda ebeveynleri ilgilendiren en önemli sorunlardan biridir. Arı sütü, bal arısı kolonisinde yumurtadan kraliçe arının olgunluk dönemine kadar, diğer kастların ise sadece yumurta döneminde verilen benzersiz bir besindir. Her ikisi de döllenmiş bir yumurtadan gelişse de, işçi arı ile kraliçe arı arasındaki morfolojik ve fizyolojik farklılıklar arı sütü beslenmesinin sonucudur. Birçok faydalı biyolojik aktiviteye sahip olan arı sütü, fonksiyonel bir besin olarak önem kazanmıştır. Apilarnil, petek hücreleri kapanmadan önce, 7 günlük larval aşamada hasat edilen drone larvalarının homojenatının filtrelenmesi ve toz haline getirilmesiyle elde edilir. Bilimsel araştırmalar, arı sütü ve apilarnilin büyüme ve cinsiyet hormonları üzerinde etkili olduğunu göstermiştir. Özellikle ergenlik dönemindeki hormonal değişiklikler üzerindeki etkisi dikkate alınmalı, erkek ve dişi bireylerde meydana gelecek hormonal değişiklikler göz önünde tutulmalıdır.

Anahtar Kelimeler: arı sütü, apilarnil, endokrin, hormon, adölesan

AKILLI VE SÜRDÜRÜLEBİLİR GIDA AMBALAJI İÇİN KARBON NOKTALARIN KULLANIMI

HARNESSING CARBON DOTS FOR SMART AND SUSTAINABLE FOOD PACKAGING

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ÖZET

Gıda ambalajı, gıda güvenliğini garanti altına almada hayati bir rol oynar. Polistiren, polietilen gibi petrol bazlı plastik polimerler, gıdayı kontaminasyondan ve bozulmadan korumak ve ayrıca nakliye ve depolamayı kolaylaştırmak amacıyla kullanılmaktadır. Ancak, bu biyolojik olarak parçalanmayan plastik malzemelerin yaygın kullanımı, yalnızca çevre kirliliğiyle ilgili önemli ekolojik sorunlara değil, aynı zamanda ciddi sağlık risklerine de yol açmaktadır. Bu dezavantajlar göz önüne alındığında, gıda ambalajlama teknolojileri için yeni ve ileri teknolojilerin geliştirilmesi hayati bir gerekliliktir. Bu bağlamda, sıfır boyutlu floresan nanopartiküller olarak tanımlanan karbon noktaları (CDs), gıdanın besin değerini azaltmadan gıdanın raf ömrünü artırmak için umut verici bir alternatif sunmaktadır. Düşük toksisite, biyoyoumluluk, suda çözünürlük, düşük maliyet, kimyasal ve fotostabilite, yeşil yöntemlerle kolay sentezlenme, antimikrobiyal, antioksidan ve UV koruma özellikleri vb. gibi olağanüstü özellikleri, CDs gıda ambalajı için ideal hale getirmiştir. Böylece gıda kalitesini korumak, tazeliğini sürdürmek ve gıdanın raf ömrünü uzatmak için yeni, biyolojik olarak parçalanabilir, UV-koruyucu, antibakteriyel, antioksidan özellikte ve biyoyoumlu filmler geliştirilmektedir. Ayrıca, paketlenmiş gıdaların kalite değişiminin gerçek zamanlı izlenmesini sağlamak için karbon nokta tabanlı algılama sistemlerinin pakete entegre edilmesiyle akıllı ambalaj malzemeleri üretilebilir. Çünkü şimdiye kadar CDs gıda teknolojisi için önemli olan ağır metal iyonları, antibiyotikler, pestisit kalıntıları, katkı maddeleri, patojenlerin tespiti için uygulanmıştır. Avantajlarına rağmen, karbon nokta tabanlı gıda ambalaj sistemlerinin geliştirilmesi henüz emekleme aşamasındadır ve daha fazla araştırma gerekmektedir. Bu nedenle, bu çalışmada CD'lerin özellikleri ve sentezi ile ilgili çalışmalar özetlenecek ve ardından CD'lerin gıda ambalajında potansiyel kullanımı araştırılacaktır.

Anahtar Kelimeler: gıda paketleme, karbon noktalar, akıllı gıda paketleme, aktif gıda paketleme

ABSTRACT

Food packaging plays a vital role in guaranteeing food safety. Petroleum-based plastic polymers such as polystyrene, polyethylene, have been used to protect food from contamination and spoilage, as well as to facilitate transportation and storage. However, the extensive use of these non-biodegradable plastic materials has led to not only significant ecological issues with environmental pollution but also severe health risks. Given these drawbacks, the development of new and advanced technologies is a crucial requirement for food packaging technologies. In this context, carbon dots (CDs), defined as zero-dimensional fluorescent nanoparticles, present a promising alternative to enhance the shelf life of food without reducing the nutritional quality of food. Their outstanding characteristics, including low toxicity, biocompatibility, water solubility, low cost, chemical and photostability, easy synthesizing via green methods,

antimicrobial, antioxidant, and UV-shielding properties, and so on, have made CDs ideal for food packaging. Thus, novel, biodegradable, UV-protective, antibacterial, antioxidant, and biocompatible films have been developed to preserve food quality, maintain freshness, and extend the shelf life of food. In addition, smart packaging materials can be fabricated by the integration of carbon dots-based detection systems into the package to provide real-time monitoring of the quality change of packaged foods. Because CDs have been applied for the detection of heavy metal ions, antibiotics, pesticide residues, additives, and pathogens which are important for food technology so far. Despite their advantages, the development of carbon dot-based food packaging systems is at the infant stage, and further research is required. Therefore, in this study, the properties and synthesis of CDs will be summarized, and then the potential utilization of CDs in food packaging will be investigated.

Keywords: food packaging, carbon dots, smart food packaging, active food packaging.

HAZIR YEMEK SEKTÖRÜNDE KARŞILAŞILAN SORUNLAR

PROBLEMS ENCOUNTERED IN THE CATERING SECTOR

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ÖZET

Bu çalışma hazır yemek sektöründe karşılaşılan sorunların tespit edilmesi amacıyla planlanmıştır. Basit tesadüfi örnekleme yöntemine göre yapılan bu anket çalışması, hazır yemek sektöründe faaliyet gösteren 102 firmanın çalışanları ile yüz yüze/çevrimiçi görüşmeler yapılarak gerçekleştirilmiştir. Elde edilen sonuçlarda, sektör açısından kamuya hizmet vermenin (%58,82) özel sektöre kıyasla daha zor olduğu ve bu alanda yapılan denetlenme/yaptırımların (%81,37) yetersiz olduğu ortaya çıkmıştır. Ayrıca firmaların işletmelerde hijyen/sanitasyon uygulamaları sırasında en çok eğitimsiz personel nedeniyle (%65,69) zorluklar yaşadığı saptanmıştır. Diğer taraftan, firmaların depolamada en çok zorlandığı (%43,14) ve daha hızlı bozulma gördüğü (%44,12) ürün grubunun meyve/sebze bazlı ürünler olduğu ve bozulmanın daha çok uygun olmayan depolama koşulları nedeniyle ortaya çıktığı belirtilmiştir. Bununla birlikte, katılımcıların %73,53'üne göre çiğ ya da az pişmiş et ve et ürünlerinin gıda kaynaklı hastalıklar açısından en riskli ürün grubu olarak belirtilirken %46,08'ine göre gıda güvenliğine yönelik en büyük tehdidin kayıt dışı üretim olduğu ifade edilmiştir. Ayrıca, sektörde haksız rekabetin yüksek olduğu (%98,04) ve yüksek maliyet nedeniyle modern tesislerin kurulamadığı (%75,49) belirlenmiştir. Yürütülen bu çalışmada sonuçları, hazır yemek üretimi yapan firmalarda yaşanan zorlukların önüne geçilebilmesi adına, firmaların denetlenmesi, sektörün kalifiye işgücü açısından desteklenmesi, haksız rekabetin önüne geçilmesi ve tüketicilerin bilinçlendirilmesi gerektiği ortaya konulmuştur.

Anahtar Kelimeler: Hazır yemek sektörü, Problemler, Toplu beslenme, Yemek hizmeti.

ABSTRACT

This study was planned to detect the problems encountered in the catering sector. This survey study which was conducted through a simple random sampling method, was performed by face-to-face/online interviews with employees of 102 companies operated in the catering sector. The results of the study revealed that it was more difficult to serve the public sector

(58.82%) than the private sector and inspections/sanctions (81.37%) applied in these sectors were insufficient. It was also determined that companies had difficulties in providing hygiene/sanitation in the business due to mostly untrained personnel (65.69%). On the other hand, it was stated that the product group that companies had the most difficulty (43.14%) in storage and observed the faster deterioration (44.12%) was fruit/vegetable-based products, and the deterioration mostly occurred due to inappropriate storage conditions. However, according to 73.53% of the participants, raw or undercooked meat and meat products are the most risky groups in terms of foodborne diseases, while according to 46.08% of them, the biggest threat to food safety is unregistered production. It was also determined that unfair competition was high in the sector (98.04%) and that modern facilities could not be established due to high costs (75.49%). In this study, it was revealed that to prevent the difficulties experienced in producing ready-to-eat foods, companies should be inspected, the sector should be supported in terms of qualified labor force, unfair competition should be prevented and the awareness of the consumers should be raised.

Keywords: Ready-to-eat food, Problems, Mass Feeding, Food service.

THE MORE INFORMATION AGENT: THE INTELLIGENT FOOD PACKAGING

DAHA FAZLA BİLGİ: AKILLI GIDA AMBALAJI

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ABSTRACT

Packaging is a multidisciplinary field focused on ensuring product safety, quality, and integrity throughout its lifecycle, from production to end-use. With growing consumer expectations and the urge for sustainability, traditional packaging methods are no longer sufficient. Innovative packaging designs, such as intelligent and active packaging systems, are gaining attention for their advanced functionalities, including product tracking, extending shelf life, and enhancing safety. Intelligent packaging systems incorporate indicators, sensors, and data carriers (traceability devices), which offer real-time monitoring and feedback on the condition of packaged goods. Indicators, such as time-temperature and freshness or ripeness indicators, visually display changes in food quality, while sensors such as biosensors and gas sensors, detect specific biological or chemical conditions. On the other hand, data carriers, including barcodes and Radio Frequency Identification (RFID), enable efficient product tracking and information storage. These technologies not only help in preserving food quality but also improve supply chain efficiency and minimize food waste. The integration of these advanced packaging technologies is expected to meet consumer demands for safe, fresh, and high quality food, while also supporting sustainable and efficient food production and distribution practices. This study aims to provide a general overview of intelligent packaging systems in the food technology.

Keywords: Intelligent packaging, indicators, sensors, data carriers

ÖZET

Ambalaj, üretimden son kullanıma kadar yaşam döngüsü boyunca ürün güvenliği, kalitesi ve bütünlüğünü sağlamaya odaklanan multidisipliner bir alandır. Artan tüketici beklentileri ve sürdürülebilirlik dürtüsü ile geleneksel ambalajlama yöntemleri artık yeterli değildir. Akıllı ve aktif ambalajlama sistemleri gibi yenilikçi ambalaj tasarımları, ürün takibi, raf ömrünün uzatılması ve güvenliğin artırılması gibi gelişmiş işlevleriyle dikkat çekiyor. Akıllı ambalaj sistemleri, paketlenmiş ürünlerin durumu hakkında gerçek zamanlı izleme ve geri bildirim sunan indikatörler, sensörler ve veri taşıyıcıları (izlenebilirlik araçları) içermektedir. Zaman-sıcaklık ve tazelik veya olgunluk indikatörleri gibi indikatörler gıda kalitesindeki değişiklikleri görsel olarak gösterirken, biyosensörler ve gaz sensörleri gibi sensörler belirli

biyolojik veya kimyasal kořulları tespit eder. Dięer bir yandan, barkodlar ve Radyo Frekans Tanımlama (RFID) gibi veri taşıyıcıları, verimli ürün takibi ve bilgi depolamayı mümkün kılar. Bu teknolojiler sadece gıda kalitesinin korunmasına yardımcı olmakla kalmaz, aynı zamanda tedarik zinciri verimliliğini artırır ve gıda israfını en aza indirir. Bu gelişmiş ambalajlama teknolojilerinin entegrasyonunun, tüketicilerin güvenli, taze ve yüksek kaliteli gıda taleplerini karşılarırken, sürdürülebilir ve verimli gıda üretim ve dağıtım uygulamalarını da desteklemesi beklenmektedir. Bu çalışma, gıda teknolojisinde akıllı ambalaj sistemlerine genel bir bakış sağlamayı amaçlamaktadır.

Anahtar Kelimeler: Akıllı ambalaj, indikatörler, sensörler, veri taşıyıcıları

TRADITIONAL FRUIT SNACKS OF ERZINCAN: “ŞEFTALİ (PEACH) SARUCU” AND “UZUM (GRAPE) SARUCU”

ERZİNCAN'IN GELENEKSEL MEYVE ATIŞTIRMALIKLARI: “ŞEFTALİ SARUCU” VE “ÜZÜM SARUCU”

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ABSTRACT

Traditional foods are defined as products with a traditional composition or production method, natural, accepted by the public, and time-tested, with potential health effects. Saruc is a traditional snack product produced by combining walnuts (*Juglans regia* L.) with various dried fruits (apricot, plum, pear, etc.), especially “Karaerik” grape (*Vitis vinifera* ssp., Cimin) and peach (*Prunus persica* L.) in the Erzincan region, which has the characteristic taste and aroma of the fruit it is produced and has high nutritional value. “Erzincan Üzümlü Sarucu” was registered as a geographical indication by the Turkish Patent and Trademark Office on 05.09.2022. In this study, it was aimed to determine some physical and chemical properties of Saruç samples [PS: Şeftali (Peach) Sarucu, GS: Üzüm (Grape) Sarucu] produced from peach and grape and to compare them in terms of composition and color properties. According to the analysis results, the pH value was 4.54-3.92, dry matter content 89.98-89.13%, ash content 3.09-3.37%, protein content 8.32-6.52%, fat content 30.20-25.84% and water activity value 0.51-0.45 in PS and GS samples, respectively. The L*, a*, and b* values of PS and GS samples were measured as 53.92-32.02, 9.16-3.99, and 24.54-(-0.50), respectively. The H° value (69.29) determined in the PS sample indicates a color tone closer to yellow, while the H° value (353.04) determined in the GS sample indicates a color tone closer to red. The highest browning index (BI) value (72.63) was determined in the PS sample. Consequently, Saruc samples were determined to be good sources of protein, fat, and ash and had characteristic color properties. It is thought that the results of this research will contribute to the importance, promotion, and increasing the value of PS and GS in terms of gastronomy tourism and cultural sustainability.

Keywords: Traditional foods, Fruit snack, Üzüm Sarucu, Şeftali Sarucu, Nutritional value.

ÖZET

Geleneksel gıdalar, geleneksel bir bileşime veya üretim yöntemine sahip, doğal, halk tarafından kabul görmüş ve zaman içinde test edilmiş, potansiyel sağlık yararları olan ürünler olarak tanımlanmaktadır. Saruç, Erzincan yöresinde ceviz (*Juglans regia* L.) ile başta “Karaerik” üzümü (*Vitis vinifera* ssp., Cimin) ve şeftali (*Prunus persica* L.) olmak üzere çeşitli kuru meyvelerin (kayısı, erik, armut vb.) birleştirilmesiyle üretilen, üretildiği meyvenin karakteristik tat ve aromasına sahip, besin değeri yüksek geleneksel bir atıştırmalık/çerez ürünüdür. “Erzincan Üzümlü Sarucu” 05.09.2022 tarihinde Türk Patent ve Marka Kurumu tarafından coğrafi işaret olarak tescil edilmiştir. Bu çalışmada, şeftali ve üzümünden üretilen Saruç örneklerinin (PS: Şeftali Sarucu, GS: Üzüm Sarucu) bazı fiziksel ve kimyasal özelliklerinin belirlenerek, bileşim ve renk özellikleri bakımından karşılaştırılması amaçlanmıştır. Analiz

sonuçlarına göre, sırasıyla PS ve GS örneklerinde pH değeri 4.54-3.92, kuru madde miktarı %89.98-89.13, kül miktarı %3.09-3.37, protein miktarı %8.32-6.52, yağ miktarı %30.20-25.84 ve su aktivitesi değeri 0.51-0.45 olarak belirlenmiştir. PS ve GS örneklerinin L*, a* ve b* değerleri sırasıyla 53.92-32.02, 9.16-3.99 ve 24.54-(-0.50) olarak ölçülmüştür. PS numunesinde belirlenen H° değeri (69.29) sarıya daha yakın bir renk tonuna temsil ederken, GS numunesinde belirlenen H° değeri (353.04) kırmızıya daha yakın bir renk tonunu göstermektedir. En yüksek kahverengileşme indeksi (BI) değeri (72.63) PS örneğinde belirlenmiştir. Sonuç olarak, Saruç örneklerinin iyi birer protein, yağ ve kül kaynağı olduğu ve karakteristik renk özelliklerine sahip olduğu belirlenmiştir. Bu araştırma sonuçlarının PS ve GS'nin gastronomi turizmi ve kültürel sürdürülebilirlik açısından önemine, tanıtımına ve değerinin artırılmasına katkı sağlayacağı düşünülmektedir.

Anahtar Kelimeler: Geleneksel gıdalar, Meyveli atıştırmalığı, Üzüm Sarucu, Şeftali Sarucu, Besin değeri.

UÇUCU YAĞLARIN GIDA KORUMA VE SAĞLIK ÜZERİNDEKİ ROLÜ

THE ROLE OF ESSENTIAL OILS IN FOOD PRESERVATION AND HEALTH

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ÖZET

Günümüzde, tüketicilerin gıdaların sağlık üzerine etkilerine yönelik endişeleri, uçucu yağlar gibi doğal ürünlere karşı ilgisinin artmasına neden olmuştur. Uçucu yağlar yaprak, kabuk, çiçek ve kök gibi farklı bitki kısımlarından solvent ekstraksiyonu, damıtma, solventsiz ve kombinasyon yöntemi gibi çeşitli yöntemlerle elde edilen sekonder, yağ içeren aromatik metabolitlerdir. Birçok bitki uçucu yağı kozmetiklerde, gıda katkı maddelerinde, sabunlarda, plastik reçinelerde ve parfümlerde lezzet veya aroma artırıcı olarak kullanılmaktadır. Ayrıca, doğal kökenleri ve uçucu yağların genel olarak güvenli (GRAS) olarak kabul edilen durumu nedeniyle antimikrobiyal ajanlar olarak hareket edebilecek uçucu yağ uygulamalar artmaktadır. Şu anda, uçucu yağlar antimikrobiyal, antifungal, antiülser, antihelmintik, antioksidan, anti-inflamatuar, böcek öldürücü, antifeedan, sitotoksik, antiviral, ovisidal, anestetik ve gıda koruyucu olarak kullanılmaktadır. Fenolik asitler, terpenler, aldehitler, terpenoidler ve ketonlar gibi biyolojik olarak aktif bileşiklerin varlığı ile mikrobiyal patojenlerin büyümesi engellenmektedir. Gıda ürünlerindeki uçucu yağların organoleptik etkisi nedeniyle, uçucu yağların kullanımı baharat veya otlarla ilişkili gıdalarla sınırlı kalmaktadır. Bu nedenle aktif paketleme, modern kapsülleme teknolojileri ve birleşik stratejiler, organoleptik etkileri en aza indirmek ve uçucu yağların özelliklerinden ödün vermeden daha geniş bir gıda ürünü yelpazesinde kullanımını kolaylaştırmak için değerlendirilebilir. Bitkisel ve baharat türevli ekstraktlar, uçucu yağlar ve diğer sekonder metabolitler olarak bulunan doğal bileşikler günümüzde giderek önem kazanmakta ve hala büyük ölçüde yeterince kullanılmamaktadır. Bu nedenle, gıda endüstrisi uygulamalarında uçucu yağların kullanımları için daha çok araştırmaya ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Uçucu yağlar, doğal gıda, sekonder metabolit

ABSTRACT

Nowadays, consumers' concerns about the health effects of foods have led to an increased interest in natural products such as essential oils. Essential oils are secondary, oil-containing aromatic metabolites obtained from different plant parts such as leaves, bark, flowers and roots by various methods such as solvent extraction, distillation, solvent-free and combination methods. Many plant essential oils are used as flavour or aroma enhancers in cosmetics, food additives, soaps, plastic resins and perfumes. Furthermore, applications of essential oils that can act as antimicrobial agents are increasing due to their natural origin and the generally recognised as safe (GRAS) status of essential oils. Currently, essential oils are used as

antimicrobial, antifungal, antiulcer, antihelminthic, antioxidant, anti-inflammatory, insecticidal, antifeedant, cytotoxic, antiviral, ovicidal, anaesthetic and food preservative. The growth of microbial pathogens is inhibited by the presence of biologically active compounds such as phenolic acids, terpenes, aldehydes, terpenoids and ketones. Due to the organoleptic effect of essential oils in food products, the use of essential oils is limited to foods associated with spices or herbs. Active packaging, modern encapsulation technologies and combined strategies can therefore be evaluated to minimise organoleptic effects and facilitate the use of essential oils in a wider range of food products without compromising their properties. Natural compounds present as herbal and spice-derived extracts, essential oils and other secondary metabolites are becoming increasingly important and still largely underutilised. Therefore, more research is needed for the utilisation of essential oils in food industry applications.

Keywords: Essential oils, natural food, secondary metabolite

NEONICOTINOIDS AND BRAIN HEALTH: DISRUPTIONS IN LEARNING, MEMORY, AND BEHAVIOR FROM CHRONIC EXPOSURE

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Abstract

The widespread use of neonicotinoids, particularly imidacloprid, in agriculture has raised concerns about its potential impact on animal and human health. This study aims to assess the neurotoxic effects of chronic exposure to imidacloprid on Wistar rats, focusing on neurobehavioral alterations related to learning, memory, and motor function. Over a 90-day period, Wistar rats were administered imidacloprid orally at two different doses (5 mg/kg/day and 50 mg/kg/day). Behavioral tests, including the Open Field (OF), Elevated Plus Maze (EPM), and Novel Object Recognition (NOR) tests, were used to evaluate anxiety-like behavior, locomotor activity, and cognitive function.

The results demonstrated significant neurobehavioral impairments in rats exposed to imidacloprid, with dose-dependent effects. Treated rats exhibited heightened anxiety and reduced exploratory behavior in the OF and EPM tests. Additionally, the NOR test indicated a marked decline in recognition memory, suggesting severe cognitive deficits. These findings reveal the potential risks posed by chronic exposure to neonicotinoids, particularly concerning neurodevelopment and cognitive function.

This research underscores the importance of regulating neonicotinoid use in agricultural practices to minimize risks to both animal welfare and human health.

Key words: Imidacloprid, Neonicotinoids, Neurotoxicity, Learning and Memory Impairment, Chronic Exposure.

**ETİLEN VİNİL ALKOL BARIYERİNİN MODİFİYE ATMOSFERDE PAKETLENMİŞ
PİLİÇ ETİ ÜRÜNLERİNE ETKİSİ****THE EFFECT OF ETHYLENE VINYL ALCOHOL BARRIER ON MODIFIED
ATMOSPHERE PACKAGED CHICKEN MEAT PRODUCTS****Buse Renkli**

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ÖZET

Gıda endüstrisinde ambalaj malzemeleri, gıdaların mikrobiyal, kimyasal ve fiziksel bozulmalardan korunarak güvenli bir şekilde tüketiciye ulaşmasını sağlamada kritik bir rol oynamaktadır. Özellikle tavuk eti, yüksek su aktivitesi ve besin içeriği nedeniyle bozulmaya karşı oldukça hassas bir yapıdadır. Uygun ambalajlama tekniklerinin kullanımı, ürünlerin raf ömrünün uzatılması ve besin değerlerinin korunması açısından büyük önem taşımaktadır. Modifiye atmosfer paketlenme (MAP) teknolojisi, ambalaj içerisindeki gaz kompozisyonunu değiştirerek mikroorganizma gelişimini baskılayarak ürünlerin raf ömrünü uzatmayı amaçlayan bir tekniktir. Bu çalışmada, Etilen Vinil Alkol (EVOH) bariyerli ambalaj malzemesinin ileri işlenmiş tavuk eti ürünlerinde raf ömrü, mikrobiyolojik kalite ve duyu özelliklerindeki etkileri incelenmiştir. Çalışmada, Keskinoğlu Tavukçuluk ve Damızlık İşletmeleri A.Ş.'de üretilen dört farklı ileri işlenmiş piliç eti ürünü (piliç yaprak döner, piliç acılı kebab, piliç nugget ve piliç kokteyl sos) kullanılmıştır. Ürünler, iki farklı ambalaj malzemesi olan PET/PE/EVOH/PE ve PVC/PE (kontrol grubu) ile modifiye atmosferde paketlenmiş ve %59-60 azot (N₂), %39-40 karbondioksit (CO₂) ve %1 oksijen (O₂) gaz karışımı ile ambalajlanmıştır. Ürünler +4°C'de depolanmış ve belirli periyotlarla mikrobiyolojik, pH, nem, renk ve duyu analizleri yapılmıştır. PET/PE/EVOH/PE ambalaj malzemesi, düşük oksijen ve su buharı geçirgenliği sağlayarak ürünlerin raf ömrünü ve duyu özelliklerini, kontrol grubu olan PVC/PE ambalaj malzemesine kıyasla daha etkin bir şekilde korumuştur. Mikrobiyolojik analizler, PET/PE/EVOH/PE ile paketlenen ürünlerde toplam bakteri, maya ve küf gelişiminin minimum seviyede olduğunu göstermiştir. Buna karşın, PVC/PE ambalajlı ürünlerde mikrobiyal yükün daha yüksek oranlarda bulunduğu gözlemlenmiştir. Renk analizlerinde, PET/PE/EVOH/PE ile paketlenen ürünlerin L*, a* ve b* değerlerinde minimal değişiklikler tespit edilirken, PVC/PE ambalajlı örneklerde bu değerlerde belirgin bozulmalar meydana gelmiştir. Duyusal analizlerde ise PET/PE/EVOH/PE ambalaj malzemesi kullanılan ürünlerin, tat, koku ve genel beğeni açısından kontrol grubuna göre daha yüksek puanlar aldığı belirlenmiştir. Çalışma sonuçları, PET/PE/EVOH/PE ambalaj malzemesinin ileri işlenmiş tavuk eti ürünlerinde raf ömrünü uzatma ve kaliteyi koruma açısından önemli avantajlar sunduğunu ortaya koymuştur. Aynı zamanda, alt folyolarda PET/PE/EVOH/PE ambalaj yapısına geçilmesi, hem maliyet iyileştirmesine hem de ürün kalitesinin korunmasına olanak sağlamıştır. Sonuç olarak, EVOH bariyerli ambalaj materyalleri, gıda güvenliğini artırma ve ekonomik kayıpları azaltma potansiyeline sahip olduğu saptanmıştır.

Anahtar Kelimeler: Etilen Vinil Alkol (EVOH), Raf ömrü, Gıda güvenliği, Piliç Eti.

ABSTRACT

In the food industry, packaging materials play a critical role in protecting food from microbial, chemical, and physical spoilage, ensuring safe delivery to consumers. Poultry meat, in particular, is highly susceptible to spoilage due to its high water activity and nutrient content. Therefore, the use of appropriate packaging techniques is crucial for extending product shelf life and preserving nutritional value. Modified atmosphere packaging (MAP) technology is a method that aims to extend the shelf life of products by altering the gas composition inside the package, suppressing microbial growth. In this study, the effects of Ethylene Vinyl Alcohol (EVOH) barrier packaging materials on the shelf life, microbiological quality, and sensory properties of further processed poultry products were investigated. The study involved four different processed poultry products (poultry döner, spicy poultry kebab, poultry nuggets, and poultry cocktail sausages) produced by Keskinöglü Tavukçuluk ve Damızlık İşletmeleri A.Ş. The products were packaged using two different packaging materials, PET/PE/EVOH/PE and PVC/PE (control group), with a gas mixture of 59-60% nitrogen (N₂), 39-40% carbon dioxide (CO₂), and 1% oxygen (O₂). The products were stored at +4°C, and microbiological, pH, moisture, color, and sensory analyses were conducted at regular intervals. The PET/PE/EVOH/PE packaging material provided lower oxygen and water vapor permeability, thus more effectively preserving the shelf life and sensory properties of the products compared to the control group, which used PVC/PE packaging material. Microbiological analyses showed that total bacteria, yeast, and mold growth were minimal in the products packaged with PET/PE/EVOH/PE, whereas microbial load was higher in the PVC/PE-packaged products. Color analyses indicated minimal changes in L*, a*, and b* values for the products packaged with PET/PE/EVOH/PE, while more significant deterioration was observed in the PVC/PE-packaged products. Sensory analyses revealed that products packaged with PET/PE/EVOH/PE received higher scores for taste, odor, and overall acceptability compared to the control group. The results of the study demonstrated that the PET/PE/EVOH/PE packaging material offered significant advantages in extending the shelf life and preserving the quality of further processed poultry products. Additionally, switching to PET/PE/EVOH/PE packaging in lower films resulted in both cost improvements and better product quality preservation. In conclusion, EVOH barrier packaging materials were found to have the potential to enhance food safety and reduce economic losses.

Keywords: Ethylene Vinyl Alcohol (EVOH), Shelf life, Food safety, Chicken meat.

GIDA ATIKLARINDAKİ FENOLİK BİLEŞİKLER**PHENOLIC COMPOUNDS IN FOOD WASTE****SENA AKBAŞ**Erzincan Binali Yıldırım Üniversitesi, Mühendislik ve Mimarlık Fakültesi, Gıda Mühendisliği,
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programı,Erzincan**ÖZET**

Son yıllarda gıda işleme sürecinde açığa çıkan gıda atıklarının yönetimi ve tarımsal gıda yan ürünlerinin değerlendirilmesi en fazla araştırma yapılan konulardan biridir. Gıda işleme sırasında büyük miktarlarda gıda atığı üretilir ve bu atıkların bertarafı çevre sorunlarına neden olmakla beraber fenolik bileşikler gibi değerli bileşenlerin kaybına neden olur. Gıda atıklarının değerlendirilmesi, bu değerli bileşenlerin korunması ve onların fonksiyonel özelliklerinden yararlanılması, formülasyon maliyetlerinin düşürülmesi, çevrenin korunması, tarımsal gıda endüstrilerinin sürdürülebilirliği ve ekonomik rekabet gücüne katkısı gibi çeşitli nedenlerle önem taşımaktadır. Ayrıca sentetik bileşen içeren gıdalara tüketiciler tarafından şüphe ile yaklaşılması ve doğal kaynaklı katkı maddelerine olan ihtiyaç, bu atıklardaki bileşenlerin doğal katkı maddesi potansiyelinin araştırılmasına neden olmuştur. Günümüzde gıda atıkları; polisakkarit içeriği, diyet lif miktarı, çeşitli biyoaktif bileşen ve fenolik bileşiklerin geri kazanımı, bu maddelerin farklı yöntemlerle ekstrakte edilmesi ve gıdalarda özellikle doğal katkı bileşeni olarak çeşitli amaçlarla kullanımı şeklinde değerlendirilmektedir. Genellikle antioksidan özellikleriyle tanınan fenolik bileşikler, çeşitli gıda atıklarında yaygın olarak bulunur ve gıda, ilaç ve kozmetik endüstrilerinde değerlendirilmeleri önemli fırsatlar sunar. Gıda atık ürünlerinden elde edilen fenolik bileşiklerin tespiti, potansiyel sağlık yararları ve çeşitli endüstrilerdeki uygulamaları nedeniyle önemli ilgi görmektedir. Bu bileşikler yalnızca sağlık yararları için değil, aynı zamanda gıda ürünlerinin kalitesini artırma ve gıda üretiminde sürdürülebilir uygulamalara katkıda bulunma yetenekleri için de değerlidir. Bu çalışmada gıda atıklarındaki fenolik bileşiklerin önemi araştırılmış ve çeşitli gıdalarda bu konuda yapılan çalışmalar incelenmiştir.

Anahtar kelimeler: Gıda atıkları, tarımsal gıda yan ürünleri, fenolik bileşikler**ABSTRACT**

In recent years, the management of food waste generated during food processing and the evaluation of agricultural food by-products are among the most researched topics. Large amounts of food waste are produced during food processing and the disposal of these wastes causes environmental problems and the loss of valuable components such as phenolic compounds. The evaluation of food waste is important for various reasons such as the protection of these valuable components and the use of their functional properties, the reduction of formulation costs, the protection of the environment, the sustainability of agricultural food industries and the contribution to economic competitiveness. In addition, the skepticism of consumers towards foods containing synthetic components and the need for natural additives have led to the investigation of the natural additive potential of the components in these wastes. Today, food waste is evaluated in terms of polysaccharide content, dietary fiber content, recovery of various bioactive components and phenolic compounds, extraction of these

substances by different methods and use of these substances for various purposes, especially as natural additives in foods. Phenolic compounds, which are generally known for their antioxidant properties, are commonly found in various food wastes and their evaluation in the food, pharmaceutical and cosmetic industries offers significant opportunities. The determination of phenolic compounds obtained from food waste products is of significant interest due to their potential health benefits and applications in various industries. These compounds are valuable not only for their health benefits but also for their ability to improve the quality of food products and contribute to sustainable practices in food production. In this study, the importance of phenolic compounds in food waste was investigated and studies conducted on this subject in various foods were examined.

Keywords: Food waste, agro-food by-products, phenolic compounds

AGRI-FOOD TOURISM AND LOCAL CUISINE IN NIGERIA

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ABSTRACT

Agri-food tourism is an emerging sector globally, integrating agriculture, tourism, and food experiences into a unique travel and economic development niche. In Nigeria, a country with diverse cultural heritage and agricultural resources, the potential for agri-food tourism is vast. Local cuisine in Nigeria, which reflects the nation's varied cultural landscape, serves as a critical component of the tourism experience, attracting both domestic and international tourists. This research review paper explores the intersection of agri-food tourism and local cuisine in Nigeria, highlighting the opportunities, challenges, and impacts of this sector on rural development, cultural preservation, and economic growth. By examining case studies, existing literature, and empirical data, this paper provides insights into how agri-food tourism can be harnessed to promote sustainable development in Nigeria.

Keywords: Agriculture; Food; Local cuisine; Tourism; Nigeria

ALTERNATİF PROTEİN KAYNAĞI: YENİLEBİLİR BÖCEKLER**ALTERNATIVE PROTEIN SOURCE: EDIBLE INSECTS****Dr. Öğr. Üyesi Tuba Eda ARPA ZEMZEMOĞLU**Gümüşhane Üniversitesi, Sağlık Bilimleri Fakültesi, Beslenme ve Diyetetik Bölümü,
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Gümüşhane.**ÖZET**

Son yıllarda, doğal kaynaklarının azalması, insan nüfusundaki artış ve protein kaynaklarının yetersizliği alternatif protein kaynaklarına olan ilgiyi arttırmıştır. Bu çalışmanın amacı, alternatif bir protein kaynağı olarak yenilebilir böcekler ile ilgili kapsamlı ve sistematik bir inceleme sunmaktır. Yüzyıllardır yenilebilir böcekler dünyanın birçok yerinde insan beslenmesinde kullanılmaktadır. Yenilebilir böceklerin besin değeri böceğin türü, çevresel koşullar ve beslenme gibi faktörlerden etkilense de dengeli bir amino asit içeriğine sahip yüksek kaliteli protein kaynağı olarak kabul edilmektedirler. Esansiyel yağ asitleri, mikro elementler ve diğer biyoaktif bileşikler bakımından zengin olan yenilebilir böcekler, besleyici bileşenler açısından oldukça değerlidir. Çoğu böcek, potasyum, kalsiyum, demir, magnezyum ve selenyum gibi mikro besin elementleri bakımından zengindir. Böcekler, sığır, domuz ve tavuktan daha fazla demir ve kalsiyum içermektedir. Besin değerinin yanı sıra, böcek proteinleri köpüklenme, emülsifiye etme ve jelleşme gibi geniş bir yelpazede fonksiyonel özelliklere sahiptirler. Bu durum gıda endüstrisinde kullanım ve sürdürülebilirlik için önemlidir. Birleşmiş Milletler Gıda ve Tarım Örgütü'nün, böcek kaynaklarının kullanımına yönelik son dönemdeki teşvikleri, böceklerin gıda veya gıda bileşeni olarak kullanımına yönelik ilgiyi arttırmıştır. Sürdürülebilirlik açısından küresel protein açığını giderilmesinde yenilebilir böcekler diğer hayvansal protein kaynaklarına karşı en güçlü alternatifi olabilir. Tüketicilerin kabulünü artırmak için, böceklerden elde edilecek proteini, toz, un veya fraksiyon formunda tüketime sunmak etkili bir yöntem olabilir. Ancak, böceklerin farklı gıdalara entegre edilebilmesi için, çeşitli işlem ve işleme yöntemlerinin ardından fonksiyonel özelliklerinin kapsamlı bir şekilde değerlendirilmesi gerekmektedir. Gelecekte, böcek proteini tüketimi, sadece hızlı nüfus artışı ve kaynak yetersizliği olan bölgelerde gıda güvenliğini sağlamak için değil, aynı zamanda yüksek besin değerine sahip, sürdürülebilir gıda üretimini iyileştirmek için de dikkat çekici olacaktır. Böcek proteinlerinin fonksiyonel özelliklerine yönelik araştırmalar devam etmektedir. Böcek proteinlerinin yapı-fonksiyon ilişkisini ve bu fonksiyonların böcek işleme süreci ile tüketici kabulünü nasıl artırabileceğini açıklığa kavuşturmak için daha fazla çalışmaya ihtiyaç vardır.

Anahtar kelimeler: yenilebilir böcekler, sürdürülebilirlik, protein**ABSTRACT**

In recent years, the depletion of natural resources, the increase in human population, and the insufficiency of protein sources have heightened interest in alternative protein sources. The aim of this study is to provide a comprehensive and systematic review of edible insects as an alternative protein source. For centuries, edible insects have been used in human nutrition in various parts of the world. Although the nutritional value of edible insects is influenced by factors such as the species of insect, environmental conditions, and diet, they are considered a high-

quality protein source with a balanced amino acid profile. Rich in essential fatty acids, micronutrients, and other bioactive compounds, edible insects are highly valuable in terms of their nutritional components. Most insects are rich in micronutrients such as potassium, calcium, iron, magnesium, and selenium. Insects contain more iron and calcium than beef, pork, and chicken. In addition to their nutritional value, insect proteins exhibit a wide range of functional properties, such as foaming, emulsifying, and gelling, which are important for their use and sustainability in the food industry. Recent encouragement by the Food and Agriculture Organization of the United Nations (FAO) for the use of insect resources has increased interest in using insects as food or food ingredients. From a sustainability perspective, edible insects could be the strongest alternative to other animal protein sources in addressing the global protein deficit. To enhance consumer acceptance, offering insect-derived protein in forms such as powder, flour, or fractions could be an effective approach. However, to integrate insects into various foods, their functional properties must be thoroughly evaluated following various processing methods. In the future, insect protein consumption will not only be notable for ensuring food security in regions with rapid population growth and resource scarcity but also for improving sustainable food production with high nutritional value. Research on the functional properties of insect proteins continues. Further studies are needed to clarify the structure-function relationship of insect proteins and how these functions, along with processing methods, can enhance consumer acceptance.

Keywords: edible insects, sustainability, alternative protein

**BİYOAKTİF BİLEŞENLERİN POTANSİYELLERİ VE ÇEŞİTLİ GIDALARIN
ZENGİNLEŞTİRİLMESİNDE KULLANIMLARI****THE POTENTIAL OF BIOACTIVE COMPONENTS AND THEIR APPLICATION IN
THE ENHANCEMENT OF VARIOUS FOODS****Murat İŞÇİ**

Sivas Cumhuriyet Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim dalı

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ÖZET

Günümüzde insanlar hastalıklarının medikal ve cerrahi tedavilerini desteklemek veya hali hazırdaki sağlık durumlarını koruyabilmek için doğru beslenmenin önemini farkındadırlar. Yeterli ve dengeli beslenmeye yardım etmesinin yanı sıra sağlığa olumlu etkisi bulunan biyoaktif bileşen içeren fonksiyonel gıdaların tüketimi de gün geçtikçe artmaktadır. Fonksiyonel gıdaların içeriğinde bulunan bu biyoaktif bileşenlerin antihipertansif, antioksidan, antihiperlipidemik, antikarsinojenik, antidiyabetik etkilerinin olduğu birçok farklı çalışmada gösterilmiştir. Hayat kalitesi ve sağlık üzerine birçok olumlu etkisi bulunan biyoaktif bileşenler; toplumların çokça tükettiği tahıl ve et grubu gıdalara farklı yöntemlerle eklenmekte ve bu gıdalar zenginleştirilebilmektedir. Son dönemlerde, çağımız insanının stresli ve hızlı yaşamına biyoaktif bileşenleri entegre edebilmek amacıyla gıda endüstrisi fonksiyonel içeceklerin üretimine yoğunlaşmıştır. Bu çalışmada fonksiyonel gıdaların içerdiği biyoaktif bileşenlerin sağlık üzerine etkisiyle ilgili yapılmış çalışmalar; bazı gıdaların zenginleştirme yöntemleri ve zenginleştirmelerin sonuçları derlenmiştir. Araştırma sonuçlarına göre fonksiyonel gıdalar artık çağımız insanının beslenmesinin önemli yapıtaşlarından. Biyoaktif bileşenlere erişim zenginleştirme yöntemleri ve gıda endüstrisinin bu yöndeki yatırımları sayesinde oldukça kolaylaşmıştır. Ancak bu gıdaların insan vücudundaki sindirilebilirliği ve bioerişilebilirliği üzerinde daha fazla ve daha geniş çaplı çalışmalar yapılarak biyoaktif bileşenlerin zenginleştirilmiş gıdalarda olması gereken optimal miktar ve oranları belirlenmelidir.

Anahtar kelimeler: fonksiyonel gıdalar, biyoaktif bileşenler, antioksidan, zenginleştirme**ABSTRACT**

Nowadays, people are aware of the crucial role a healthy diet plays in maintaining their current state of health or aiding in the medical and surgical treatments of diseases. Consumption of functional foods, which include bioactive compounds with favorable health effects, is increasing in addition to appropriate and balanced diet. Multiple studies have demonstrated that bioactive compounds found in functional food exhibit antihypertensive, antioxidant, antihyperlipidemic, anticancer, and antidiabetic properties. Bioactive compounds, which confer several benefits to quality of life and health, can be included into widely consumed grain and meat products through various methods, thereby enhancing these diets. Recently, to include bioactive compounds into the fast-paced and hectic lifestyles of contemporary individuals, the food sector has concentrated on developing functional beverages. This study abstracts research on the health impacts of bioactive compounds in functional foods, methods for food enrichment, and the subsequent effects of these enhancement. The findings indicate that functional foods are integral to contemporary human nutrition. The accessibility of bioactive compounds has been improved due to enrichment techniques and investments by the food sector in this domain. Nevertheless, comprehensive and large-scale research must be undertaken to ascertain the ideal quantities and ratios of bioactive components in fortified meals by evaluating their digestibility and bioavailability in the human organism.

DISPLACEMENT DUE TO ARMED BANDITRY AND ITS EFFECTS ON FOOD SECURITY: A COMPREHENSIVE REVIEW

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ABSTRACT

Armed banditry has emerged as a significant source of insecurity and displacement in various regions worldwide, particularly in Sub-Saharan Africa. This phenomenon has far-reaching implications for food security, a critical component of human survival and development. This review explores the relationship between displacement due to armed banditry and its effects on food security. It synthesizes existing literature, identifies key themes, and provides insights into how armed conflict-induced displacement disrupts agricultural activities, reduces food availability, and exacerbates food insecurity. The paper also discusses the socioeconomic and psychological impacts of displacement on food security and highlights potential policy responses.

Keywords: Armed-Banditry; Displacement; Food Security; sub-Saharan Africa

THERMOMIX KULLANILARAK FARKLI SICAKLIKLARDA HAZIRLANAN MAYONEZLERİN DEPOLAMA SÜRESİNE BAĞLI EMÜLSİYON ÖZELLİKLERİNİN İNCELENMESİ

INVESTIGATION OF EMULSION PROPERTIES DEPENDING ON STORAGE TIME OF MAYONNAISE PREPARED AT DIFFERENT TEMPERATURES USING THERMOMIX

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ÖZET

Teknoloji ve yapay zeka destekli mutfak ekipmanlarının hayatımıza girmesi ile yeni yemek hazırlama alternatifleri geliştirilmiştir. Bu ekipmanların emülsiyon kalitesini nasıl değiştirdiği ve tüketici kabul edilebilirliğini nasıl etkilediği yeterince bilinmemektedir. Bu çalışmanın amacı, ev tipi yemek robotu olan Thermomix'te mayonez hazırlayarak cihazın emülsiyon hazırlama yeteneğini farklı sıcaklıklarda hammaddeler kullanarak belirlemek, hazırlanan emülsiyonun depolama stabilitesini ölçmek ve mayonezin duyu özelliklerini değerlendirmektir. Elde edilen sonuçlara göre en sert, en kıvamlı, en yapışkan ve viskozitesi en yüksek olan örnekler Thermomix ile hazırlanan mayonezlerdir. En düşük değerler ise 30°C'de malzemeler kullanılarak blender ile hazırlanan örneklerde ölçülmüştür. Duyusal değerlendirmede tüm Thermomix'te hazırlanan örnekler lezzet açısından aynı ve en yüksek olarak puanlanmış 15°C ve daha sıcak malzemeler ile blender yardımıyla hazırlanan örneklerin lezzet puanları ise en düşük bulunmuştur. Genel kabul edilebilirlik açısından en iyi örneğin 4°C'de Thermomix'te hazırlanan mayonezler olduğu en düşük skorlanan örneğin sıcak (30°C) ve blender ile hazırlanan mayonez olduğu tespit edilmiştir. Thermomix ile hazırlanan örneklerin daha yüksek stabiliteye sahip olduğu özellikle iki günlük sıcak depolamada blender ile hazırlananlardan daha stabil bir emülsiyona sahip olduğu belirlenmiştir. Thermomix'in sonuçlardaki üstünlüğünün nedeni emülsiyonu kırmadan karıştırmaya olanak sağlayan bıçak takımı şekli ve konumlanması olabilir.

Anahtar kelimeler: emülsiyon, mayonez, stabil, robot, yemek.

ABSTRACT

With the introduction of technology and artificial intelligence-supported kitchen equipment into our lives, new food preparation alternatives have been developed. It is not well known how these equipment change emulsion quality and affect consumer acceptability. The aim of this study is to prepare mayonnaise in Thermomix, a home food processor, to determine the emulsion preparation ability of the device using raw materials at different temperatures, to measure the storage stability of the prepared emulsion and to evaluate the sensory properties of mayonnaise. According to the results obtained, the hardest, most consistent, most cohesive and highest viscosity samples are the mayonnaises prepared with Thermomix. The lowest values were measured in samples prepared with a blender using materials at 30°C. In sensory evaluation, all samples prepared in Thermomix were scored the same and highest in terms of taste, while the taste scores of samples prepared with 15°C and hotter ingredients and blender were found to be the lowest. In terms of general acceptability, it was determined that the best sample was

mayonnaise prepared in Thermomix at 4°C, and the lowest scored sample was mayonnaise prepared hot (30°C) and with a blender. It was determined that the samples prepared with Thermomix had higher stability and had a more stable emulsion than those prepared with the blender, especially in two-day hot storage. The reason for Thermomix's superiority in results may be the shape and positioning of the blade set, which allows mixing without breaking the emulsion.

Keywords: emulsion, mayonnaise, stable, robot, food.

NOVEL COOKIE FORMULATIONS DEVELOPED WITH FLAXSEED MEAL AND WILD FRUITS

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ABSTRACT

Nowadays consumers are more interested in functional food products enriched with healthy and nutritious ingredients. Flaxseed meal (FM), a waste of flaxseed oil production process, is a functional ingredient with rich protein, dietary fiber, mineral, and phenolic contents. Wild fruits including blueberry and cherry laurel are a good option to prepare healthy food products. They contain great amounts of phenolic compounds, vitamins, and minerals. In this study, novel cookie formulations were developed using FM, FM+freeze-dried blueberry powder (50:50, w/w), and FM+freeze-dried cherry laurel powder (50:50, w/w) separately at 0, 5, and 10% levels. Color, diameter, thickness, and spread ratio values and sensory characteristics of samples were investigated. The incorporation of FM and wild fruits decreased color L^* and b^* values of cookies compared to the control. The greatest a^* value was obtained in cookies enriched with 10% FM+blueberry powder. Increasing levels of FM and fruit powders increased ΔE values of cookies. The diameter values of cookies containing 5% FM and 5% FM+blueberry powder were greater than the control. Besides that, thickness values of cookies did not change with the addition of FM and fruit powders. The spread ratio values of cookies made with 10% FM+blueberry powder and 5% FM+cherry laurel powder were higher than the control. All cookie samples (except for 10% FM+cherry laurel powder) showed similar overall acceptability scores to the control. The data demonstrated that novel cookie formulations can be developed with FM and wild fruit powders with acceptable physical and sensory quality.

Keywords: Blueberry, Cherry laurel, Cookies, Flaxseed, Functional foods

**DETERMINATION OF CHEMICAL COMPOSITION AND ANTIMICROBIAL
POTENTIAL OF *Lentinula edodes* MUSHROOM**

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ABSTRACT

This research aimed to determine the chemical composition and antimicrobial potential of shiitake (*Lentinula edodes*) mushroom extracts. All of the values for the chemical composition of the dried shiitake mushroom are ranged according to the literacy data. Thus, the total water content is 7.90%, the total acids are presented with 0.43%, the mineral matter is about 4.70%, the vitamin C has a value of 14.70%. The concentration of carbohydrates is 6.40%. In terms of the mineral elements, with the highest concentration is characterized the presence of Ca (4.00%). The content of proteins is 10.63%. Water extract showed higher ($p < 0.05$) antimicrobial potential against most of the tested microorganisms, compared to the ethanol extract (against *Staphylococcus aureus*, *Bacillus cereus*, *Listeria monocytogenes*, *Enterococcus faecalis*, *Shigella sonnei*, *Proteus vulgaris*, and *Pseudomonas aeruginosa*). Both of the extracts showed higher ($p < 0.05$) antimicrobial potential against *Bacillus cereus*, *Enterococcus faecalis*, *Escherichia coli*, *Shigella sonnei*, and *Pseudomonas aeruginosa* compared to one or both positive controls (well-known synthetic antibiotics). All of the values ranged between 9.4 and 20.1 mm.

Keywords: Shiitake, Wild Mushroom, Drying, Extraction, Antibacterial Activity.

GASTRONOMİ ETKİLEŞİMİ ÇERÇEVESİNDE KIRGIZ MUTFAĞININ İNCELENMESİ: YOZGAT İLİ ÖRNEĞİ

EXAMINATION OF KYRGYZ CUISINE WITHIN THE FRAMEWORK OF GASTRONOMY INTERACTION: YOZGAT PROVINCE EXAMPLE

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ÖZET

İnsanların yaşam alanlarının coğrafi olarak değiştirilmesi şeklinde tanımlanan göçler, bireysel olarak gerçekleşebileceği gibi büyük gruplar halinde de olabilmektedir. Göçlerle birlikte her alanda olduğu gibi mutfak kültüründe de yeni etkileşimler meydana gelmektedir. Bu araştırmayla Kırgız Türklerinin mutfak kültürü araştırılmıştır. Afganistanın Pamir yaylasından ayrılıp Yozgat Yenifakılı ilçesine yerleşen Kırgız Türklerinin Yozgat mutfağından etkilenip etkilenmediği, özel günlerdeki mutfak uygulamaları ve özel yemekleri araştırılmıştır. Bu şekilde geleneklerine bağlı olan Kırgız yemeklerinin kökenlerini ve orijinallerini kaybetmeden sürdürülebilirliği sağlanacaktır. Araştırmada yarı yapılandırılmış mülakat yöntemi kullanılmıştır. Çalışma sonucunda, kültürene bağlı olan Kırgız Türklerinin kendi yöresel yemeklerini yapmaya devam ettikleri ve yemek kültürlerini daha çok et ve hamur işlerinin oluşturduğu tespit edilmiştir.

Anahtar Kelimeler: Yemek Kültürü, Kültürel Etkileşim, Kırgız Mutfağı

ABSTRACT

Migrations, which are defined as the geographical change of people's living spaces, can take place individually or in large groups. With migrations, new interactions occur in culinary culture as in every field. In this study, the culinary culture of Kyrgyz Turks was investigated. Whether the Kyrgyz Turks who left the Pamir plateau of Afghanistan and settled in Yozgat Yenifakılı district were affected by Yozgat cuisine, culinary practices and special dishes on special occasions were investigated. In this way, the sustainability of Kyrgyz dishes, which are connected to their traditions, will be ensured without losing their origins and originals. Semi-structured interview method was used in the research. As a result of the study, it was determined that Kyrgyz Turks, who are attached to their culture, continue to make their own local dishes and their food culture consists mostly of meat and pastries.

Key Words: Food Culture, Cultural Interaction, Kyrgyz Cuisine.

GIDA MEVZUATI VE MEVCUT DURUM DEĞERLENDİRMESİ**FOOD LEGISLATION AND EVALUATION OF THE CURRENT SITUATION****Dr. Öğr. Üy. Mehmet Çağlar FIRAT**Erzincan Binali Yıldırım Üniversitesi, Turizm ve Otelcilik MYO, Aşçılık Programı, Erzincan
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Tarım ve Orman Bakanlığı'nın verilerine göre gıda sektöründe yarım milyondan fazla kişi çalışmaktadır. Gıda sektörünün büyüklüğü ve insan sağlığını doğrudan etkilemesi nedeniyle kapsamlı düzenlemeler yapılması zorunludur. Gıda mevzuatı 2004'e kadar bir bütün olarak ele alınmamış ve 5996 sayılı Veteriner Hizmetleri Bitki Sağlığı, Gıda ve Yem kanunu ile genel bir bütünlüğe kavuşmuş olup 200'den fazla ikincil mevzuat bu kanuna dayanılarak hazırlanmıştır. Hiyerarşik mevzuatta yönetmelikler ile gıdalara yönelik özel kriterleri belirleyen çok sayıda tebliğ bulunmaktadır. Gıda işletmelerinin açılma izinlerinin verilmesi, denetimlerin yapılması ve cezai işlemlerin uygulanması gibi işlemler Tarım ve Orman Bakanlığı'nda Gıda ve Kontrol Genel Müdürlüğü tarafından yapılmaktadır. Gıda işletmeleri, 'Gıda İşletmelerinin Kayıt ve Onay İşlemlerine Dair Yönetmelik'in yayımlanmasıyla işletmenin onay ya da kayıt kapsamına girmesine bağlı olarak farklı kriterlere tabi tutulmaktadır. Bal dışındaki hayvansal gıdaların üretimini yapan işletmeler onay kapsamında değerlendirilirken bakkal kafe ve restoran gibi perakende işletmeler kayıt kapsamında değerlendirilmektedir. Bu çalışmada Resmî Gazete'de yayımlanmış olan gıda ile alakalı olan mevzuat, Devlet Teşkilatı Merkezi Kayıt Sistemi'nde kurum olarak Tarım ve Orman bakanlığı seçilerek filtrelenmiş ve elde edilen mevzuatlar derlenmiş ve konu hakkında tavsiyeler verilmiştir.

Anahtar kelimeler: Gıda mevzuatı, Gıda Kontrolü, GKGM,**ABSTRACT**

According to the data of the Ministry of Agriculture and Forestry, more than half a million people work in the food sector. Due to the size of the food sector and its direct influence on human health, comprehensive regulations are mandatory. Food legislation was not addressed as a whole until 2004 and it gained a general integrity with the Veterinary Services, Plant Health, Food And Feed Law No:5996, and more than 200 secondary legislations were prepared based on this law. There are numerous regulations and communiqués determining special criteria for food with in the hierarchical legislation. Procedures such as opening food businesses, granting permits, conducting inspections and implementing penalties are carried out by the General Directorate of Food and Control in the Ministry of Agriculture and Forestry. Procedures such as granting opening permits for food businesses, conducting inspections and implementing penal sanctions are carried out by the General Directorate of Food and Control in the Ministry of Agriculture and Forestry. With the entry into force of the 'Regulation on Registration and Approval Procedures of Food Businesses', food businesses are subjected to different criteria depending on whether the business is included in the scope of approval or registration. While businesses producing food of animal origin other than honey are evaluated within the scope of 'approval', retail businesses such as grocery stores, cafes and restaurants are evaluated within the scope of 'registration'. In this study, the food-related legislation published in the Official Gazette was filtered by selecting the Ministry of Agriculture and Forestry as an institution in the State Organization Central Registration System, and the resulting legislation was compiled and recommendations were given on the subject.

Keywords: Food Legislation, Food Control, GDFC

IMPROVING FOAM PROPERTIES OF SOY PROTEIN ISOLATE: TAGUCHI-DEAR HYBRID OPTIMIZATION

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ABSTRACT

In this study, it was aimed to improve the foaming properties of soy protein isolate foams. For this purpose, sonication time (5, 15, 25 min), gum concentration (0.5, 1.0, 1.5%) and temperature (15, 30, 45 min) were selected as process variables. The experiments were conducted according to Taguchi L₉ experimental matrix with 3 factors and 3 levels. The effects of process variables on density and foam stability responses were investigated by Taguchi optimization method. According to the results obtained, the optimal levels of sonication time, gum concentration and temperature parameters for density and foam stability were determined as 25 min, 0.5%, 60 °C and 15 min, 1.5%, 60 °C, respectively. However, since there were different optimization conditions for the responses, Data Envelopment Analysis Based Ranking (DEAR) method was used for multiple response optimization. The results showed that the parameter levels of 15 min sonication time, 1.5% gum concentration and 30 °C temperature were the optimal levels for both density and foam stability. Moreover, the effect of the sonication time variable on the optimization process was found to be higher than the other parameters. The Taguchi-DEAR hybrid optimization method was successfully used to improve the soy protein isolate foam system.

Keywords: Taguchi, DEAR, optimization, soy protein isolate, sonication

TOBACCO GROWTH ENABLEMENT BY INDOLE ACETIC ACID (IAA) FOR THE CONTROL OF SOIL ORGANIC POLLUTION**Anyasi, R.O.**

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Abstract

To improve the growth of tobacco (*Nicotiana tabacum*) seedlings by Indole Acetic Acid (IAA) hormone was the reason behind this study. Seedlings of *N. tabacum* treated with equal quantities of IAA hormone (0.7%) were grown in 1kgs of vermiculate, perlite, planting soil, sand, and equal mixture of all media. The set up were treated equally with water and organic manure. Control set up was made with a mixture of different rooting media without IAA. Data on shoot development were noted for 6 weeks and root length was measured on the day of harvest. The parameters measured were analysed statistically using ANOVA, and it was found out that root and shoot lengths were significant at $p>0.05$ in the entire rooting media and the highest percentage development (49 and 51%) respectively for root and stem respectively, was observed in the rooting media that has equal measure of each constituent (i.e. the mixed constituents). Germination rate among the media were 100, 70, 60, 50 and 40% for mixed, sand, planting soil and vermiculate, perlite and control respectively. Different sections of mature stem tested with IAA hormone were not significant in their root and stem development, although basal cutting stems tend to mature faster than apical. This therefore means that propagating *N. tabacum* by seedlings can be optimally achieved through mixture of 0.7% of IAA in a collection of different rooting media.

Key words: *Nicotiana tabacum*, Indole Acetic acid, Root formation, Rooting media, Growth enhancement

THE APPLICATION OF BIOSENSOR IN DETECTION OF FOOD CONTAMINANTS

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ABSTRACT

The successful integration of nanotechnology as a platform for food sensors offers tremendous benefits in detecting contaminants, particularly in their applications for food quality and safety. The sensors based on biosensors (nanobiosensors), can be used online and integrated into existing manufacturing process and distribution line or off-line as rapid, simple, and portable, as well as disposable, sensors for food contaminants. Food contaminants could be residues of pesticides, veterinary and human drugs, microbial toxins, preservatives, contaminants from food processing and packaging, and other residues. This milieu of compounds can pose difficulties in the detection of food contaminants. Biosensors with their novel uses are the emerging method that could be used for the detection of many food contaminants, even mycotoxins and many food allergens. Whether it used as online or off-line, the biosensor can be integrated with wireless technology and used for real-time transmission of contaminant alarm or test results to remote servers, providing rapid screening and reporting. Thus biosensors are more cost-effective, rapid, and more sensitive than instrumental and conventional procedures. Recent developments in biosensors may provide more applications for their use in food contaminant detection. The future role of these biosensors will become even more important as the food laboratory is faced with the increasing pressure to reduce cost, time, and complexity. The objective of this chapter is to give a general overview of the possible application of biosensors in the food contaminant detection and analysis.

TOURISM AS A CATALYST FOR ORGANIC FARMING AND AGRO-ENTREPRENEURSHIP IN NIGERIA

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ABSTRACT

Tourism has increasingly been recognized as a powerful tool for stimulating various sectors of the economy. In the context of Nigeria, a nation with vast agricultural potential and rich cultural heritage, tourism holds the key to unlocking the potential of organic farming and agro-entrepreneurship. This research review paper explores how tourism can serve as a catalyst for the growth of organic farming and agro-entrepreneurship in Nigeria. It examines the current state of agriculture and tourism in the country, the nexus between the two sectors, and the opportunities for leveraging tourism to promote sustainable agricultural practices and foster agro-entrepreneurship. By analyzing case studies, existing literature, and empirical data, this paper highlights the challenges and strategies needed to harness the potential of tourism for organic farming and agro-entrepreneurship in Nigeria.

Keywords: Agro-entrepreneurship; Culture; Organic farming; Tourism; Nigeria

ERZİNCAN TULUM VE PEYNİRİ VE RAF ÖMRÜ ÇALIŞMALARI

ERZİNCAN TULUM AND CHEESE AND SHELF LIFE STUDIES

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ÖZET

Bu çalışmada, Türkiye'nin en çok üretilen yerel peynirlerinden biri olan tulum peynirinin çeşitlerini, üretim tekniklerini, kimyasal bileşimini ve raf ömrünü incelemektedir. Özellikle Erzincan tulum peyniri, coğrafi işaret tescili ile öne çıkmakta olup, geleneksel ve ticari yöntemlerle üretilmektedir. Geleneksel üretim genellikle koyun sütü kullanılarak yapılırken ticari üretimde farklı süt türleri ve hazır maya tercih edilmektedir. Çalışmada; peynirin olgunlaşma süreci, kullanılan ambalaj malzemeleri ve bu süreçlerin ürün kalitesine etkisi ele alınmıştır. Ayrıca peynirin raf ömrünün uzatılmasında ambalajlama yöntemleri ve koruyucu maddelerin etkisi vurgulanmıştır. Erzincan tulum peynirinin standardizasyonu ve hijyenik koşulların iyileştirilmesi gerektiği önerilmektedir.

Anahtar Kelimeler: Erzincan tulum peyniri, Raf ömrü, Geleneksel peynir üretimi, Ticari peynir üretimi

SUMMARY

This study examines the types, production techniques, chemical composition and shelf life of tulum cheese, one of the most produced local cheeses in Turkey. Especially Erzincan tulum cheese stands out with its geographical indication registration and is produced by traditional and commercial methods. While traditional production is generally done using sheep's milk, different types of milk and instant yeast are preferred in commercial production. In the study; The ripening process of cheese, the packaging materials used and the effects of these processes on product quality are discussed. Additionally, the effect of packaging methods and preservatives on extending the shelf life of cheese was emphasized. It is suggested that Erzincan tulum cheese should be standardized and hygienic conditions should be improved.

Key Words: Erzincan tulum cheese, Shelf life, Traditional cheese production, Commercial cheese production

INFLUENCE OF EXTENSION AND FORMAL EDUCATION ON INCOME OF RICE PROCESSORS IN BOSSO AND CHANCHAGA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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ABSTRACT

This study examined the influence of extension and formal education on income of rice processors in Bosso and Chanchaga Local Government Area of Niger State. The study covered eight (8) extension cells in the study area, Four (4) from each of them. Data were collected by means of a structured questionnaire from a total of one hundred and forty-four (144) processors. The data collected were analysed using descriptive analysis (frequencies and Percentages and mean) and inferential (ordinary least square (OLS)). Results revealed that half of (50.7%) rice processors had mean age of 42 years, mostly female (77.8%), married (81.3%) with secondary education (55%) and mean household size of 5persons. More so the result revealed that radio (50.7%), extension agent (34.0%) and mobile phone (20.1%) were the major sources of information on rice processing activities in the study area. Results of OLS revealed an R-squared of 81% and Prob > F was significant at 0.01 implying the entire model is fit the study. The coefficient of Age (1114.508), processing experience (1147.203) agrochemical usage (24907.68), access to credit and extension contacts (8801.962) were positive and statistically significant at 1% probability level indicating that increase in any of this variable by one unit will increase the income of the rice processors. Based on findings of this study, it was recommended that financial institutions and government agencies should provide credit facilities with favourable terms for small-scale processors as the study found the access to credit in the study area was very low.

Keywords: Influence, extension education, Formal education, Rice Processors and Income

ISOLATION AND PREVALENCE OF *VIBRIO PARAHAEMOLYTICUS* FROM READY-TO-EAT FRUIT COCKTAILS SOLD IN PUBLIC MARKETS WITHIN OGHARA NEXUS, NIGERIA

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Abstract

The desire to improve livelihood and provide ready to eat food of various types including fruits has been the notable interest of various local populace, however such desire has been implicated with the distribution of diverse infections and emerging enteric diseases. One of such implicated food-borne infectious organism which is seldom reported in the tropics is *Vibrio parahaemolyticus*. This study determines the occurrence of *V. parahaemolyticus* in ready-to-eat fruit cocktail which are sold in local and public commercial places in Oghara nexus. Briefly, freshly prepared cock-tails of farm products were sampled and collected from four local communities and sixteen public commercial shops in Oghara community Delta State for the isolation and molecular characterization of *V. parahaemolyticus* with fruit cocktails consisting; spinach, carrot, gabbage, watermelon, and cucumber. These vegetable mixes are commonly prepared, sold and used in Oghara community as well as its environs as small scale business enterprise/resource. Briefly, fruit cocktails and/or samples were collected, microbiologically analyzed using *in vitro* biochemical and virulent phenotypic determination while isolates were further characterized using molecular biology techniques. A total of Sixty-five presumptive isolates were obtained from samples, while thirteen (20%) isolates were confirmed using polymerase chain reaction. Other phenotypic virulent and antibiotic susceptibility testing revealed that isolates harbours diverse virulent phenotype and multiple antibiotic resistant determinants ranging from beta-lactam into cephalosporines with high resistance observed amongst ampicillin (69.2%). Observing such potential pathogens and their subsequent antibiotic resistance prevalence to various group of antibiotics amongst isolates from such ready-to-eat fruit cocktails pose health risk to consumers of such ready-to-eat food products. The need for prompt implementation of hygienic practices policy for preparation of such food products types and preparation remains a way forward for appropriate control.

Keywords: *Vibrio parahaemolyticus*; ready-to-eat fruits; fruit cocktails; vegetables mix; farm products; food-borne infections