BIOSYSFOODENG 2025

6TH INTERNATIONAL CONFERENCE ON

BIOSYSTEMS AND FOOD ENGINEERING

6th of June, 2025

BUDAPEST, HUNGARY

ORGANIZERS:

DEPARTMENT OF FOOD MEASUREMENT AND PROCESS CONTROL and DEPARTMENT OF FOOD PROCESS ENGINEERING OF THE HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES, INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY

in collaboration with the

AGRO- AND BIOSYSTEMS ENGINEERING RESEARCH COMMITTEE OF HUNGARIAN ACADEMY OF SCIENCES

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Conference programme

9:00-9:05 *Friedrich László*: **Conference opening**

Session I Chariperson: Zoltán Kókai

9:05-9:25 *Hermanova Sona*: A Versatile Journey: From Plastic Prototyping to Food Printing

9:25-9:45 *Damir Magdić*: Climate Change Patterns and Their Influence on Wheat Quality in Eastern Croatia

9:45-10:05 *Efaishe Tweuhanga Angaleni Kavela*: The Impact of Drying Technologies on the Polyphenols and Antioxidant Capacity in Chokeberry Pomace Tea Infusion

10:05-10:25 *Pramod Mahajan*: Sensors, modelling and digital twin applied to fruit packaging and storage

10:25-10:55 **Poster session – Coffee break**

Session II Chariperson: Patrick Siegfried

10:55-11:15 *Bernard Maringgal*: Temperature-Based Classification of Pork Meat During Storage Using Thermal Imaging and Machine Learning

11:15-11:35 *Myriam Catalá Rodríguez*: Lichen-symbiont microalgae potential for food and feed applications

11:35-11:55 *Kewei Chen*: Inhibitory effects of chlorophyll pigments on the bioaccessibility of beta-carotene, but what are the benefits of chlorophyll?

11:55-12:15 *Ákos Bartha*: Development and Consumer Acceptance of Functional Instant Coffee Enriched with Dietary Supplements

12:15-12:35 *Zinabu Hailu Siyum:* Non-destructive Evaluation of Bruised Plum Quality Changes During Storage Using Line-based Laser Light Backscattering Imaging

12:35-13:35 **Lunch break**

Session III Chariperson: Francesco Marra

13:35-13:55 *Damijan Kelc*: Frost Prevention in Vineyards Powered by Renewable Energy

13:55-14:15 *Rafat Al Afif*: Challenges and Solutions in Biogas Production from Food Processing Waste: A Case Study

14:15-14:35 *Balázs Boncsarovszki*: From subconscious reactions to consumer preferences: a multimodal sensory study investigating taste perception using galvanic skin response and facial expression analysis

14:35-14:55 *Hynek Roubík*: From Waste to Wealth: Circular Bioeconomy Pathways in Agri-Food Systems for Sustainable Global Development

14:55-15:15 *Jing Wang*: Control of the oil content of fried dough sticks through modulating structure change by reconstituted gluten fractions

15:15-15:45 **Poster session – Coffee break**

Session IV Chariperson: Vũ Ngọc Hà Vi

15:45-16:05 *John-Lewis Zinia Zaukuu*: Recent Approaches for Detecting Complex Food Adulteration with Machine Learning and VIS/NIR Maize, Wine, Melon seed, foam and Calcium carbide

16:05-16:25 *Walftor Dumin*: Primary Screening and Characterization of Disease Causal Agent Affecting Pineapple Plant in Northwestern Region Sarawak

16:25-16:45 *Abdul Hannan Bin Zulkarnain:* Seeing Green: Comparing Screen-Based Eye Tracking and Virtual Reality Eye Tracking on Sustainable Labels

16:45-17:05 *Tamás Zsom*: Conference Quiz (join with Kahoot)

17:05-17:10 *Zoltan Kovacs*: **Announcement of the Best Poster Presentation Award, Best Oral Presentation Award and Conference Quiz, Conference closing**

Posters presentations

E622: Rédey, Á., Zsom-Muha, V., Stefaniga, T. Bánvölgyi, Sz.: Recovery of valuable components from carrot peel as vegetable waste using microwave-assisted extraction

E623: Marđokić Ana, Máté Molnár, Bánvölgyi Szilvia: Microwave-Assisted vs. Traditional Extraction of Polyphenols from Olive Pomace: A Comparative Study

E624: Andrija Vukov, Matyas Lukacs, Zoltan Kovacs, Milan Vranes: Rapid detection of caffeine self-aggregation in aqueous solutions using near infrared spectroscopy and chemometrics

E625: Anna Mária Nagy, Éva Stefanovits-Bányai, Mónika Máté: Effect of carrier materials on the properties of vacuum-dried fruit powder mixtures

E626: Attila Csighy, Kenbon Beyene Abdisa, Moh Moh Zin, Adrienn Tóth, András Koris, Krisztina Takács, Feiyue Ren , Hongzi Liu, Arijit Nath, Szilvia Bánvölgyi: Enrichment of the Antioxidant Capacity of Stirred Type Yoghurt with Beetroot Juice

E627: Attila Csighy, Arijit Nath, Emőke Szerdahelyi, Sintayehu Tamirat, Boglárka Varga–Boda, Kinga Ujfalusi, András Koris: Screening of ceramic membranes for MBR based production of separated whey and casein derived peptides

E628: Azin Omid Jeivan, Mónika Máté and Beatrix Szabó-Nótin: Sustainable Packaging: Application of Response Surface Methodology in the Optimization of Chitosan-Based Edible Coatings with Soy Protein and Rice Bran Oil

E629: Bálint Góczán, Ágnes Szemerédi, Karina Hidas, Beatrix Szabó-Nótin, Judit Friedrich-Ivanics, Mónika Máté: Monitoring the quality characteristics of canned vegetables stabilized with rosemary extracts during storage

E630: BÁZÁR György, FÉBEL Hedvig: Electronic nose detects off-odor of pork caused by lucerne protein concentrate feeding

E631: Mahmuti B.,. Kovacs Z.,. Outaira M.,. Tormasi. J., Varga-Tóth, A.: The examination of the digestibility and sensory properties of high protein cream

E632: Boros, A., Friedrich, F. L., Sallainé Bajkai, A., De Groot, S., Novák, A., Vargáné Tóth, A.: Assessing chicken breast fillet quality: a sensory-instrumental approach

E633: V. Breznyán, L. Makay, G. Szurovecz, T. Papp, H. Ilyefalvi: Exploring the Role of Protein in Student Nutrition: A Workshop Overview

E634: Carlo Cusatelli, Debora Cazzetta, Filomena Corbo, Andrea Troisi: Dietary Habits and Use of Nutritional Supplements Among Amateur Athletes in Southern Italy

E635: Chaimae El Hathat, Judit Kosztik, Zsolt Zalán, Ildikó Bata-Vidács: Lactic Acid Bacteria from Animal Microbiota as Natural Inhibitors of Mycotoxin-Producing Fungi

E636: Tao, C., Zulkarnian, H.B., Boncsarovszki, B., Hoti, E., Beselica, E., Gere, A: Taste perception in VR and microgravity

E637: ChenWang, Dianxuan Wang, Fangfang Zeng, Liang Chen: Oviposition Behavior of Plodia interpunctella (Hübner) on Nuts and Dried Fruits and the Identification of Key Volatile Compounds

E638: Dalma Radványi, Zsófia Fekete-Frojimovics: Unveiling the potential of the electronic nose in the determination of E. coli indicator compounds

E639: J., Beyene, I., Dalmadi, Gy., Kenesei: Effect of raw material quality on the properties of sous-vide cooked chicken breasts

E6400: Iserliyska, D., R., Chochkov, G. Zsivanovits: Utilization of wine industries' spent grain in wheat bread enrichment

E641: Szakál, D., Fehér, O., Gere, A.: The difference between imagination and reality - Testing Nutri-Score label using emotion recognition software

E642: Duy H. Truong, Chuong Viet Pham, Vuong Thuy Duong, Ly Thanh Nguyen, Tien Thuy Thi Pham, Thuyen Van Huynh, Ky Khac Lam: Development of sprouted soybean powder combined with brown rice powder and black sesame powder

E643: Duy H. Truong, Chi Hao Nguyen, Lan Anh Vu, Quoc Khai Vuong, Van Quan Truong: Development of the matcha cereal milk product

E644: Efaishe Kavela, Mónika Máté, Lilla Szalóki-Dorkó: The Impact of Drying Technologies and Market Tea Integration on the Polyphenols and Antioxidant Capacity of Chokeberry Pomace Tea Infusion

E645: Manjola Kuliçi, Elena Kokthi, Fatmir Guri: From Hive to Policy: The Sustainable Beekeeping Practices Index (SBPI) as a Decision-Making Tool

E646: Elena Kokthi, Debora Cazzetta, Enkeleda Berberi, Fatjon Hoxha: Modelling Food Waste: A Recursive Partitioning Approach to Food Behaviour Segmentation

E647: John-Lewis Zinia Zaukuu, Eric Tetteh Mensah, Abena Achiaa Boakye, Eric Kuuna Dery: Varietal discrimination of cocnut using deep learning algorithms: a UV-VIS spectrophotometry approach

E648: Ernestine Fabiola Djouche, Lukács Mátyás Krisztián, Dr. Mukaddes Kiliç Bayraktar, Dr. Kovács Zoltán: Saffron Adulteration: Innovative Detection Techniques

E649: Fatma Elzhraa, Gabriella Kiskó, Ágnes Belák: Prevalence, Antibiotic Resistance, and Virulence Traits of Escherichia coli in Fermented Dairy Products During Ramadan in Dakahliya, Egypt: A Public Health Concern

E650: S. Fekete, G. Jónás, J. Felföldi, Z. Kovács, L. Friedrich: Fitting and evaluating diffusion models for dry salting, wet curing and ultrasonic curing

E651: Firas Alarawi, Erika Bujna, Botond Süli, Quang D. Nguyen: Enhancement of Antioxidant Activity in Milk Protein Concentrate Hydrolysates via Enzymatic Hydrolysis Using Streptomyces griseus Protease

E652: G. Bitó, B. Lemmer, Z. Jákói, S. Beszédes: Dielectric parameters of vegetable oils during storage

E653: Nga Thi Thanh Ha, Hoa Xuan Mac, Tung Thanh Pham, Lien Le Phuong Nguyen, László Baranyai, László Ferenc Friedrich, Adrienn Tóth, Csaba Németh and Quang Duc Nguyen: Quick fraud detection in shell egg freshness declaration using a handheld NIR spectrometer combined with random forest algorithm

E654: Hannah Moncon Farr, Béla Urbányi, Koppány Majzinger, Balázs Csorbai, Tamás Bartucz, IldikóNyulas-Zeke: Comparison of raw and fried African catfish meat supplemented with black soldier fly meal

E655: Hristovski, K., Bujna, E., Nguyen, D.Q.: Isolation, Partial Purification, and Characterisation of β-Galactosidase from Limosilactobacillus fermentum LF08

E656: Hunor Gyurcsok, Viktoria Zsom-Muha, Timea Kaszab: Possible uses of coffee by-products

E657: H. Ilyefalvi, L. Makay, G. Szurovecz, T. Papp, V. Breznyán: Does your education have an impact on your protein-mindfulness? – a case study among E^3UDRES^2 students

E658: Muncan, J.: Next-Generation Water Spectroscopy: Mapping Water Absorbance Bands for Biosystems and Food Engineering

E659: Dias Jessica, Barkó György: Investigation of space soil simulants

E660: John-Lewis Zinia Zaukuu, Nelson Quarshie Attipoe, Patricia Bourba Korneh, Eric Tetteh Mensah, Donald Bimpong, Lois Adofowaa Amponsah: Detection of bissap calyces and bissap juices adulteration with sorghum leaves using NIR spectroscopy and VIS/NIR spectroscopy

E661: William Appaw, John-Lewis Zinia Zaukuu, Balkis Aouadi, Eric Tetteh Mensah, Ibok Nsa Oduro and Zoltan Kovacs: Predicting Aflatoxin contamination in white and yellow maize using Vis/NIR spectroscopy combined with PCA-LDA and PLSR Models through Aquaphotomics Approaches

E662: John Lewis Zinia Zaukuu, Philomena Ataa Amponsah, Donald Bimpong, Lois Amponsah and Eric Tetteh Mensah: Detection of foam adulteration in honey using ultraviolet-visible spectroscopy (UV-VIS)

E663: Dan Li, Yuyu Du , Liya Su, Yaqiu Lin, Jiong Zheng, Fidel Toldrá, Chenglin Zhu, Muying Du, Yuan Liu, Juan Chen: Effects of Staphylococcus cohnii 129 on lipid hydrolysis and oxidation of fermented sausage

E664: Mazár, J., Albert, K., Pelhrimovszky, Zs., Bánvölgyi, Sz.: Investigation of the extraction of peppermint (Menthae piperitae folium) active ingredients using microwave-assisted extraction

E665: Lajos Annamária Lilla, Szabó István, Csenki-Bakos Zsolt Imre, Griffitts Jeffrey Daniel: Toxicological Profiles of Polyethylene Terephthalate (PET) and Its Additives: A Systematic Review Across Ecosystems and Human Health

E666: L. Makay, H. Ilyefalvi, V. Breznyán, T. Papp, G. Szurovecz: Protein Consumption in Sports: Enhancing Strength and Endurance

E667: Mac Xuan Hoa, Ha Thi Thanh Nga, Nguyen Le Phuong Lien, Baranyai Laszlo: Enhancing sugar adulteration detection in clear apple juice using laser light backscattering imaging: Comparing transmission and transflection modes

E668: Majd Elayan, Csaba Németh, Munkhnasan Enkhbold, László Friedrich, Adrienn Varga-Tóth: Effect of acid's different parentages on egg white properties

E669: K. L. Majzinger, V. Lehota, H. M. Farr, G. Jónás, L. F. Friedrich: Comparison of the hemoglobin of the content of fattened goose livers affected and non-affected by greening

E670: A. D., Méhes, Gy., Kenesei, I., Dalmadi: Quality parameters of beef patties substituted with oyster mushroom

E671: Chang, M. W., Zhu, G. S., Liu, K. L.: Structural characterization and hypoglycaemic effects on type 2 diabetic mice of Spirulina platensis polysaccharides and Se-modified polysaccharides

E672: Li, M. Y., S., Ma.: Effects of bran dietary fiber-gluten protein interactions on dough structure and properties

E673: Meriem Serine Hamaidia, Lilla Szalóki-Dorkó, Mónika Máté: Impact Of Clarifying Agents on The Bioactive Compounds, Antioxidant Levels and Color properties Of Aronia Juice

E674: Mónika Göb, Zsuzsanna Horváth-Mezőfi, Zoltán Árpád Sasvár, Naji Alwani, Lien Le Phuong Nguyen, Tamás Zsom, Géza Hitka: Improving the food safety of fresh-cut salad products during the production process

E675: Munkhnasan Enkhbold, Attila Lőrincz, Márk Hajnal István, Majd Elayan, László Friedrich, Adrienn Varga-Tóth: Effect of Age on Meat Quality Attributes in Wild Red (Cervus elaphus) and Fallow Deer (Dama dama)

E676: Weizhong Hu, Shuxin Zhou, Amel Ibrahim, Guannan Li, Sameh Awad, José Ramos-Vivas, Jianquan Kan and Muying Du: Whole Genome Analysis of Pediococcus acidilactici XJ-24 and Its Role in Preventing Listeria monocytogenes ATCC® 19115TM Infection in C57BL/6 Mice

E677: My Ban Thi, Géza Hitka, Alwani Naji, Quang D. Nguyen: Discrimination of Hungarian Paprika Growing Regions Using Multi-Element Profiling Combined with Chemometric Techniques

E678: Nguyen Ba Thanh: Factors effect sensory properties of apricot

E679: Duong Hanh Hoa, Nguyen Le Phuong Lien: Egg preservation techniques: A review of conventional and emerging methods

E680: N., Nguyen, T., Nguyen, T., Doan, Q., Hong and T., Do, V., Vu: Synthesis of silver nanoparticles from Syzygium Samagense flower extract

E681: Nóra de Jonge, Katalin Badak-Kerti, Balázs Rimóczi, Tímea Kaszab: Physical and Chemical Properties of Fructo-Oligosaccharide Enriched Walnut Creams

E682: Papp T., Ijefalvi H. K., Breznyán V. V., Szurovecz G., Makay L. M.: Are you getting enough protein? – the truth behind young adult's protein intake - a review

E683: Patrícia Erdei-Tombor, Gabriella Kiskó, Andrea Taczmanné Brückner: Antibiotic resistance analysis of bacteria isolated from drinking water distribution systems

E684: Bodor-Pesti, P. , Váradi Gy. , Hüvely, A., Pető, J., Nyitrainé Sárdy, D., Deák, T., Varga, Zs., Masiero, L., Németh, L.: Spectral response of grapevine (Vitis vinifera L.) cultivar Riesling to foliar applications

E685: Tuan Minh Pham, Tien Nhut Tran, Duy Nhut Nguyen, Lien Le Phuong Nguyen: Optimizing the extraction of bioactive compounds from Gynostemma pentaphyllum using Response Surface Methodology (RSM)

E686: Tuan Minh Pham, Tu Thi Nguyen, Hang Thi Thanh Le, Lien Le Phuong Nguyen: Optimization of microwave-assisted extraction of bioactive compounds from male flowers (Carica papaya L.) using Response Surface Methodology

E687: Felix Y.H. Kutsanedzie: Free-labeled PH-optimized GO-Au@Ag fabricated SERS-nanosensor rapid prediction of Pb and Hg traces

E688: Qian Xu, Caiyun Cheng, Qingyun Li, Guangsu Zhu, Yunshan Wei, Kunlun Liu: Concentration-Regulated Fibrillation of Peanut Protein: formation, structural characteristics, and emulsifying properties

E689: Liebl, R., Nguyen, Q. D., Bujna, E.: Effect of trehalose as substrate and inactivation methods on antimicrobial activity of probiotic-based parabiotics

E690: Revoly A, Tarr, B., Szabó, I., Tőzsér, J.: Data-Driven System for Vertical Farming and Milk Quality Prediction: A Framework for Investigating the Impact of Microgreens in Dairy Nutrition

E691: Mahmuti, B., RM. Gecaj, RM.: Food waste management strategies: A systematic literature review

E692: Z. Jákói, B. Lemmer, Á. Fazekas, T. Baló, S. Beszédes: Characterization of wastewater and sludge based on dielectric parameters and monitoring of organic matter removal

E693: S. Fekete, Zs. Csóka, F. Horváth, J. Felföldi, Z. Kovács, L. Friedrich: Non-measurement estimation of salami water activity based on water content and dry matter-to-fat ratio

E694: Zoltán Sasvár, Zsuzsanna Horváth-Mezőfi, Mónika Göb, Lien Le Phuong Nguyen, Tamás Zsom, Géza Hitka: The Impact of Pre-Harvest 1-MCP Treatment on Apple Quality and Harvest Management

E695: Siniša Bikić, Milivoj Radojčin, Ivan Pavkov, Milan Vraneš, Snežana Papović, Amra Hasečić, Rafat Al Afif: Biomethane and natural gas odor control using gas detection tubes – reduction to reference conditions

E696: Sofia Radja Ziane, Erika Bujna, Quang D. Nguyen: Effect of nitrogen supplementation on the fermentation of commercial apple juice with different Bifidobacterium strains.

E697: S. S. Micevic, E. Bujna, Q. D. Nguyen: Characterization of a commercial fungal L-asparaginase for acrylamide mitigation in thermally processed starchy food

E698: Szabolcs Homolyaa, Tímea Kaszabb, Katalin Badakné Kertia, Eszter Vozáry: Rheological Properties of Oleogels from Sunflower Oil Containing Beeswax and Monoglyceride

E699: Sz., Bánvölgyi, D., Battyányi, M. A., Molnár: Determination of Bioactive Compounds in Rosemary Extracts Obtained by Microwave-Assisted Extraction

E700: Csurka, T.: Review on the utilisation of animal by-products in rearing of Hermetia Illucens: Opportunity for food industry, feed industry or waste management?

E701: Thanh Tung Pham, Lien Le Phuong Nguyen, Adrienn Tóth, Csaba Németh, László Baranyai, László Ferenc Friedrich: Evaluation of Different Edible Coatings for Egg Quality Preservation using Near Infrared Spectroscopy

E702: Tran, D. Thien: Applications of endopeptidases in food industry

E703: Thong Le Ba, László Baranyai, Tímea Kaszab: Laser backscattering as a non-destructive method for monitoring cheese ripening

E704: B.,Tran, V.,Le: Synthesis of Fe3O4/Graphene Oxide nanocomposites on Sugarcane Bagasse-derived Activated Carbon for Cr(VI) removal from aqueous solutions

E705: V., Vu, L., Pham, V., Nguyen: Encapsulation of phenolic-rich Houttuynia cordata extract using Lyotropic Liquid Crystals based on palm oils-based monoacylglycerols

E706: T. Pham, H. Nguyen, V. Vu: Study the effect of agro-waste starch on the physical properties of biodegradable composite films

E707: Vilmos Lehota, Koppány László Majzinger, Gábor Jónás, László Friedrich, Judit Tormási, László Abrankó: Determination of the protein nutritional value of meat products and study of the effect of protein supplementation

E708: Yakubu, Sheriff, , Amoanu,: Innovations in Sustainable Farming and Food Processing: Enhancing Productivity and Reducing Waste

E710: Zita Šereš, Jelena Šurlan, Nikola Maravić, Igor Antić, Jelena Živančev, Nataša Đurišić-Mladenović: Evaluation of nanofiltration membrane material impact on the removal of pesticides from water

E711: Csilla ALBERT, Csaba-Dezső András, László Gyenge, Éva Laslo, Rozália Veronika Salamon: Whey Valorization for Alcoholic Fermentation

E712: András Csaba Dezső, Mátyás László, Salamon Rozália Veronika, Molnos Éva, Szép Alexandru: Distillation process shortcut modeling based on vapour-liquid equilibria (VLE) fitting

E713: Anikó Orosz, Viktória Zsom-Muha and Tamás Zsom: Non-destructive postharvest monitoring of artificial illumination induced potato greening phenomena

E714: Gabriella Szurovecz, Flora Vitalis, Matyas Lukacs, Vanessa Moll, Justyna Grabska, Krzysztof Bec, Christian Huck, Zoltan Gillay, Zoltan Kovacs *: Application of handheld near infrared spectroscopy to assess fruit extract enrichment in sour cherry juice

Oral presentations

E601

A Versatile Journey: From Plastic Prototyping to Food Printing

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3D printing, also known as additive manufacturing, is an innovative technology that has revolutionized various industries. The benefits of 3D food printing include the ability to produce novel textures, customized shapes, and complex geometries, offering new possibilities in culinary arts and confectionery production. This approach enhances aesthetic appeal and allows for personalized and unique edible creations, pushing the boundaries of traditional food manufacturing. This study explores the innovative process of 3D food printing, leveraging the foundational techniques of 3D plastic prototyping. Initially, prototypes were developed using a 3D plastic printer to refine design and structural integrity. Subsequently, these prototypes were adapted for use with a 3D food printer, enabling the creation of specific food designs. We believe that combining 3D printing technology and food matrices with customized composition can satisfy consumer demands, dietary preferences, and potential health restrictions. In addition to its research applications, the concept can be integrated into technology teacher education at universities. Consequently, digital modelling and 3D printing knowledge provide students with essential 21st-century digital skills. Key words: 3D food printing, additive manufacturing, digital learning

E602

Climate Change Patterns and Their Influence on Wheat Quality in Eastern Croatia

Damir Magdić[1]*, Krešimir Dvojković[2], Georg Drezner[2], Dario Novoselović[2], Dragan Živančev[3], Filip Horvat[4] and Daniela Horvat[2]

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This study examines climate change patterns and their impact on wheat quality in eastern Croatia over a 15-year period. A significant increase in cumulative precipitation and a slight rise in air temperature were observed. Analyses focused on two temporal scales: (1) the entire growing season (October–July) and (2) the pre-harvest period (May–June). Extreme precipitation and temperature events frequently co-occurred, with above-average precipitation recurring every 2–3 years in both periods, while above-average warm years were less frequent. These climatic extremes strongly influenced wheat properties. The analyzed cultivars are important because they recognized and utilized as seed stock in several countries.

Standard methods were employed to assess wheat indirect quality parameters, including extensographic, farinographic, and agronomic traits, alongside their correlations. Data from 24 cultivars were analyzed individually and by group. As anticipated, wheat quality declined in cold, dry years. Extensographic properties peaked in normal years, whereas elevated pre-harvest temperatures increased protein content above average. Indirect quality parameters improved in rainy years, while farinographic properties were enhanced in both dry and rainy conditions. The most pronounced effects occurred when cumulative precipitation or temperatures exceeded averages in one or both analyzed periods. The research results assist in planning costs and processing conditions during flour production for various industry needs.

Keywords: weather patterns, wheat quality, temporal analysis, cumulative precipitation, air temperature

E603

The Impact of Drying Technologies on the Polyphenols and Antioxidant Capacity in Chokeberry Pomace Tea Infusion

Efaishe Kavela, Orbán Virág, Mónika Máté, Lilla Szalóki-Dorkó

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Chokeberry pomace is a potential source of healthy tea due to its bioactive compounds, but its processing, especially dehydration, can impact polyphenol concentration. Since chokeberry has an undesirable flavour, combining its pomace with other products can improve quality. This study evaluated the effects of microwave vacuum drying (MV), atmospheric drying (AD), and freeze-drying (FD) on the polyphenols, antioxidant capacities, and colour of chokeberry pomace tea infusions, which were combined with market tea in various ratios: 100-0%, 50-50%, and 60-40%. The tea was made by infusing a 3.5 g sample in 200 mL of boiled water for 5 minutes. It was tested for total phenolic content (TPC), total anthocyanins (TA), antioxidant capacity (FRAP and DPPH), and colour change. Results showed significantly higher ($P < 0.05$) TPC and TA in the 100-0% samples than those with market tea. The FD (100-0%) sample had the highest TPC (98.98±6.05 mg GAE/200 mL), although not significantly different from other 100-0% samples. Microwave radiation (100-0%) samples had the highest TA (47.09±0.51 mg/200 mL). Antioxidant capacities (DPPH and TEAC) did not differ significantly among all 100-0% pomace tea samples. Addition of market tea to chokeberry pomace reduced TPC, TA, and colour, but improved the flavor. The study concludes that all drying technologies effectively preserve high polyphenol content and colour for tea infusion; other fruits can be added to enhance the flavour of the tea.

E604

Sensors, modelling and digital twin applied to fruit packaging and storage

Pramod V. Mahajan

Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Potsdam, Germany

The optimization of fresh produce packaging and storage is key to reducing postharvest losses, maintaining quality, and improving energy efficiency. This talk provides an integrated outlook on recent advances developed by the author's research group, combining sensor technologies, predictive modelling, and control strategies to enhance postharvest management. A suite of sensors that measures gas, airflow, condensation, and heat flux were developed, especially apple storage to collect real-time data on microclimate conditions and physiological responses. These sensors enabled the monitoring of critical variables such as respiration rate, condensation events, and heat exchange under fluctuating temperature scenarios. Building on this data, mathematical models were developed to simulate gas exchange, transpiration, condensation risk, and ethylene accumulation in packaged fruit, supporting the design of equilibrium modified atmosphere packaging. Further developments include an ethylene diffusion model for optimal scavenger placement and an IoT-based predictive system for condensation and mass loss. A model-driven microcontroller system was also implemented to dynamically regulate O_2 and CO_2 levels in storage using simple hardware components. Together, these advances form a foundation for intelligent, data-driven storage systems capable of responding to environmental fluctuations and physiological processes in real time. The integrated approach offers a pathway toward scalable, sensor-assisted digital twin solutions that improve shelf life and reduce waste across the supply chain.

Keywords: MAP, CA storage, gas exchange, mass loss, condensation, cold chain, digital twin

E605

Temperature-Based Classification of Pork Meat During Storage Using Thermal Imaging and Machine Learning

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This study explores the effectiveness of combining infrared thermal imaging and machine learning to classify pork meat stored at two different temperatures, 0 °C (chilling) and -15 °C (supercooling). Over a 28 days period, 100 pork meat slices were analysed using thermal imaging to extract key parameters, including maximum intensity, mean intensity, and region of interest (ROI). Four machine learning models, Quadratic Discriminant Analysis (QDA), Support Vector Machine (SVM), k-Nearest Neighbours (kNN), and Naive Bayes, were used for classification. The SVM model achieved the highest performance, with classification accuracy ranging 57% to 84% across different storage days at 0 °C and 65% to 83% at -15 °C. For validation accuracy, the SVM model achieved was achieved at 83%, followed by Naive Bayes at 78%, kNN at 74%. The study also highlighted the strong correlation (r = 0.999) between the minimum and major axis lengths in the pork thermal images stored at 0 °C, and a correlation of 0.986 at -15 °C. These findings demonstrate that infrared thermal imaging, combined with machine learning, serves as a promising tool for non-invasive pork quality assessment offering precise classification based on storage conditions and significantly contributing to efficient food quality and safety monitoring.

E606

Lichen-symbiont microalgae potential for food and feed applications

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Microalgae are photosynthetic, unicellular eukaryotes of great interest due to their bioactive compounds like sterols, polyunsaturated fatty acids, and antioxidants. The biotechnological potential of aquatic algae like Chlorella, Chlamydomonas, and Dunaliella spp. is being explored, though challenges remain in improving culture, harvesting, and extraction methods. Lichens, symbiotic organisms in extreme environments, consist of a heterotrophic fungus and a photobiont, with adaptations like desiccation tolerance, supported by bioactive molecules including antioxidants. They grow at low temperatures (>20 ◦C) and low light, reducing energy consumption. The vast biodiversity of microalgae is largely unexplored. This study assesses axenic lichen microalgae (Coccomyxa solorina, Asterochloris erici, Trebouxia lynniae) compared to Chlorella vulgaris. We examined relative humidity, desiccation rate, chlorophyll, carotenoids, phenolic compounds, and antioxidant capacity. A. erici is like C. vulgaris in carotenoids, phenolics, and antioxidants. C. solorina and Trebouxia lynniae have higher levels, with C. solorina excelling in antioxidants and phenolics, and Trebouxia lynniae in carotenoids. Water stress improves A. erici's NIRS lipid profile. Lichen microalgae's bioactive profiles and lower cultivation costs suggest a promising new biosource for biotechnology and food industries.

E607

Inhibitory effects of chlorophyll pigments on the bioaccessibility of beta-carotene, but what are the benefits of chlorophyll?

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Chlorophylls and beta-carotene are fat-soluble phytochemicals in daily diets, which draws our attention about their bioaccessibility interaction. Eight dietary chlorophylls and their derivatives (chlorophyll a, chlorophyll b, pheophytin a, pheophytin b, chlorophyllide a, chlorophyllide b, pheophorbide a, pheophorbide b) were combined with beta-carotene in six different oil matrices (corn oil, coconut oil, medium-chain triglycerides, peanut oil, olive oil and fish oil) and were subjected to in vitro digestion. Generally, chlorophylls significantly decreased beta-carotene bioaccessibility by competitive incorporation into micelles. Dephytylated chlorophylls had a greater inhibitory effect on the micellarization and bioaccessibility of beta-carotene compared to phytylated chlorophylls. In their co-digestion system, olive oil group exhibited the smallest particle size and biggest zeta potential in both digesta and micelles. For chlorophylls, the phytol group and their levels are key factors, which was also buttressed by the mice model where additional supplementation of pheophorbide a significantly hindered the accumulation of beta-carotene and retinoids compounds.It seems that chlorophyll plays a not very good role in the bioavailability of vitamin A precursor beta-carotene. So what are the health effects of chlorophyll in the diet? As people's dietary habits are also changing, what changes will occur in the chlorophyll compounds in the diet?

E608

Development and Consumer Acceptance of Functional Instant Coffee Enriched with Dietary Supplements

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In this study, we developed an instant coffee product enriched with dietary supplements and conducted a sensory preference test to evaluate consumer acceptance. A total of 155 participants tasted the product and completed a questionnaire regarding their sensory experience. Our findings indicate that the majority of respondents had a positive perception of the developed instant coffee. Homogeneity received near-universal approval, while opinions on taste varied. Those who prefer freshly brewed espresso were less satisfied with the flavor, whereas individuals who regularly consume instant coffee and add milk, plant-based alternatives, or sweeteners found the product highly enjoyable. The primary aim of this product is to offer a convenient way to consume dietary supplements—such as magnesium, collagen, prebiotics or medicinal mushrooms—during daily coffee consumption, without compromising the pleasure of drinking coffee. This research highlights the potential for functional instant coffee as an innovative solution for integrating nutritional benefits into everyday habits

E609

Non-destructive evaluation of bruised plum quality changes during storage using Line-based Laser Light Backscattering Imaging

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The study used a line-based laser light backscattering imaging (LLBI) system to evaluate quality changes in bruised 'Topend' plums stored at different temperatures (1°C, 10 °C, and 22 °C) for 21 days. A total of 165 plums were manually dropped from 1 m height to induce bruising. The LLBI images were captured from bruised locations on each plum using a laser module emitting at 635 nm. Quality parameters such as firmness and soluble solid content (SSC) were measured at 7 d intervals. The LLBI profile data were fitted with Cauchy distribution function, from which amplitude, shape, and FWHM parameters were extracted. Quality changes were detected by classifying samples into storage time groups using linear discriminant analysis (LDA). The estimation of firmness and SSC was performed using multivariate regression (MVR), support vector machine (SVM), and multivariate adaptive regression splines (MARS). The analysis of variance (ANOVA) revealed that storage time and temperature significantly influenced firmness, SSC, and LLBI parameters ($p < 0.001$). The LDA model detected 7 d quality changes with 85.6% accuracy in the validation set. The MARS model showed better accuracy than the SVM and MVR models. The MARS model achieved $R^2 = 0.918$, RMSE = 1.77 N, RPD = 3.524 for firmness, and $R^2 = 0.946$, RMSE = 0.551%, RPD = 4.378 for SSC. These results highlight the potential of line-based LLBI combined with multivariate statistical analysis in assessing plum quality during storage.

E610

Frost Prevention in Vineyards Powered by Renewable Energy

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Recent extreme climate events across Europe have highlighted the critical need for innovative frost mitigation strategies in agriculture. This study presents a practical evaluation of a targeted heating wire system, powered by a low-power electrical setup, designed to protect a small vineyard plot during a vulnerable late spring frost. Heating wires were strategically installed along the vine rows to provide direct warmth to the young plants. The effectiveness of this system was rigorously assessed using real-time microclimate monitoring, employing remote and ground-based IoT sensors to track canopy-level air temperature, humidity, and frost occurrence within both the treated area and a control plot. Preliminary results from this case study demonstrate a clear increase in canopy-level temperatures within the heated zone, which significantly correlated with a reduction in frost severity observed on the vines compared to the unheated control. To further explore sustainable energy solutions, we developed and tested a prototype energy harvesting system, integrating a small Darwin wind turbine and a solar panel, coupled with a battery storage unit. Moreover, we designed and evaluated a gravity battery system to showcase an alternative method for storing the harvested renewable energy. This practical investigation offers valuable insights into the immediate impact and future potential of combining localized heating solutions with diverse green energy harvesting and storage technologies to bolster agricultural resilience against increasing climate variability.

E611

Challenges and Solutions in Biogas Production from Food Processing Waste: A Case Study

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This review critically examines the conversion of certain food processing waste into biogas, using a case study to highlight both the challenges and innovative solutions in this field. The inherent heterogeneity of food waste, characterized by variations in composition and moisture content, complicates the optimization of anaerobic digestion processes. Various pre-treatment techniques—mechanical, thermal, and chemical—are assessed for their potential to improve biodegradability and boost biogas yields. Co-digestion approaches, which combine food waste with other organic materials, are explored as effective strategies to enhance carbon-to-nitrogen ratios and stabilize the digestion process. Additionally, advanced reactor configurations are evaluated for their capability to increase methane production and operational efficiency. Furthermore, the article addresses key social challenges and policy issues, emphasizing the importance of hybrid systems and other renewable energy sources in ensuring energy stability and sustainability. Future research directions are proposed, highlighting the need for standardized methodologies and comprehensive life cycle assessments to support the widespread adoption of food waste-to-biogas technologies in industrial applications.

Keywords: Food Processing Waste, Anaerobic Digestion, Challenges, Innovative Solutions

E612

From Subconscious Reactions to Consumer Preferences: A Multimodal Sensory Study Investigating Taste Perception Using Galvanic Skin Response and Facial Expression Analysis

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Advanced sensory instruments and methods can often be used to measure biosensory reactions which can produce quantified results from individual consumer characteristics that operate in a parasympathetic manner, from which we can focus on subconscious needs. The research investigated how consumers facial expressions respond to the taste of vegetable soup and lemonade, using implicit and explicit measurement methods. Different concentrations of salt and Monosodium Glutamate were added to the soup cube solution, while the proportion of added sucrose and lemon juice was varied for the lemonade samples. During this experiment, Galvanic Skin Response (GSR) was used to measure physiological responses while Face Reader measured emotional responses based on facial expressions. The findings showed that physiological arousal differed greatly between people and that higher emotional intensity was associated with stronger GSR responses, implying that physiological changes caused by product rejection are more pronounced than those caused by product acceptance. Our results demonstrate that although flavour enhancement can increase consumer preference for a product, overly strong formulations may result in unfavourable customer experiences. In conclusion, an in depth approach to studying consumer behaviour is provided by the combination of implicit and explicit methodologies, opening the door to better-informed product development strategies for mapping consumer behaviour and preferences.

E613

From Waste to Wealth: Circular Bioeconomy Pathways in Agri-Food Systems for Sustainable Global Development

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In the face of escalating environmental challenges, growing food insecurity, and increasing resource constraints, the transformation of agri-food systems through circular bioeconomy strategies presents an opportunity for sustainable global development. This keynote address explores how integrated, innovative approaches to waste valorization can help redesign our food-energy-waste nexus to enhance resilience, equity, and sustainability. Drawing on field research and policy experience from Europe, Africa, Latin America, and Southeast Asia, the talk examines how agricultural biomass, food waste, and other organic residues can be converted into valuable products—such as biogas, biofertilizers, and bio-based materials—through scalable technologies tailored to local contexts. Special attention will be given to the enabling role of decentralized systems, community-led innovations, and inclusive governance frameworks in ensuring successful implementation. The address will also assess the social and economic dimensions of biowaste transformation, including impacts on rural livelihoods, food security, and environmental health. Finally, it will highlight the importance of international cooperation, education, and policy innovation in fostering bio-circular solutions that align with the Sustainable Development Goals (SDGs), Green Deal objectives, and global climate targets.

E614

Control of the oil content of fried dough sticks through modulating structure change by reconstituted gluten fractions

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Youtiao, a globally popular Chinese breakfast food, faces industrial challenges in quality consistency and oil absorption control. This study systematically investigated the interplay between wheat flour properties, dough rheology, and oil regulation in fried products. Analyses of 20 flours taken from wheat flour production line revealed that gluten composition critically governs oil absorption mechanisms. When gliadin-glutenin ratios exceeded 1:1 (Gli/Glu >1:1), weakened gluten network thermal stability caused structural collapse during frying, increasing pore formation and oil infiltration. Dynamic rheology demonstrated Gli/Glu ratios of 4:6 and 5:5 optimally balance structural integrity and oil barrier efficacy-compact gluten films at these ratios reduced hydrophobic site exposure while maintaining elasticity to withstand frying stresses. Practical validation shows that these formulations achieve a reduction in oils without compromising sensory properties compared to commercial benchmarks. Protein recombination experiments confirmed that controlled Gli/Glu ratios enhance short-chain protein structures, masking lipid-binding sites and improving thermal stability. These findings provide actionable guidelines for selecting flours and optimizing processing to engineer low-oil Youtiao. The mechanistic insights into protein-mediated oil absorption pathways establish fundamental principles for developing healthier fried foods through gluten network engineering.

E615

Recent Approaches for Detecting Complex Food Adulteration with Machine Learning and VIS/NIR Maize, Wine, Melon seed, foam and Calcium carbide

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Food authentication and quality assessment of food products has been the ultimatum for most food industries. Conventional methods for assessing these qualities require sample preparation and long analytical time. Researchers are therefore exploring cheaper, faster but reliable alternatives such as near-infrared spectroscopy (NIRS), which does not destroy the integrity of the food but rather, supports possible on-spot data driven decision making. Calcium carbide (CaC2), a banned chemical has been predominantly utilized in the artificial ripening of climacteric fruits such as bananas. Wine which is regarded as the second most significant source of Ochratoxin A (OTA). One of the most consumed staples in the world, maize, is susceptible to contamination by aflatoxin-producing fungi such as Aspergillus flavus and Aspergillus parasiticus. Honey adulteration, especially with foam, poses significant health risks and economic challenges. Also melon seed powder is suspected to be adulterated with carbohydrate-rich foods including maize, dried-milled cassava (gari) and soy flour to boost its quantity for increased profit. Using and NIRS and chemometrics, absorption peaks and bands were observed in the spectra that relates to food quality. Classification and regression models for authenticating each of these foods yield good accuracies detection while variations were observed in the aquagrams indicating that distinct water matrix is valuable for food authentication.

E616

Primary Screening and Characterization of Disease Causal Agent Affecting Pineapple Plant in Northwestern Region Sarawak

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Pineapple (Ananas comosus) is an important crop in Sarawak, Malaysia's second-largest pineapple-producing state. However, its sustainability is increasingly threatened by a various disease such as heart rot (Phytophthora sp.), fruitlet core rot (Fusarium spp., Penicillium sp.), soft rot (Thielaviopsis paradoxa), and fruit rot (Curvularia eragrostidis) as reported by Eng, L (2009). Despite identification efforts, there remains a knowledge gap regarding new potential causal agents affecting pineapple in Sarawak. Therefore, in this study, we aimed to identify and characterize the potential new pathogens responsible for pineapple diseases through morphological and molecular identification techniques. Samples were collected from several pineapple farms including government-assisted and individual plantations. There are more than 100 fungal and bacterial isolates were morphologically identified. Molecular identification, targeting the Internal Transcribed Spacer (ITS) region and 16S rRNA, confirmed the identity of candidate pathogens. Results shows that heart rot disease caused by Dickeya zeae, previously unreported, has become the most prevalent disease in Northwestern Sarawak. Interestingly, Lasiodiplodia theobromae was also identified for the first time as a potential new causal agent of pineapple disease in Sarawak. This fungal species, previously associated with leaf blight in pineapple and dieback disease in cacao in India. ...

E617

Seeing Green: Comparing Screen-Based Eye Tracking and Virtual Reality Eye Tracking on Sustainable Labels

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Sustainable labels are becoming increasingly important as consumers seek environmentally friendly products, but how effectively do these labels capture attention? This research explores visual attention to six sustainability labels (Euroleaf, Fair Trade, Non-GMO, Rainforest, UTZ, and Leaf) using Eye-Tracking (ET) and Virtual Reality Eye-Tracking (VR ET) to evaluate the influence of environmental complexity on consumer engagement. The GMO-Free label attracted the highest fixation counts (78.91 for ET and 60.41 for VR ET), followed by the Fair Trade (70.19 for ET and 48.79 for VR ET) and Euroleaf (54.69 for ET and 43.69 for VR ET) labels. The UTZ (52.12 for ET and 26.95 for VR ET) and Rainforest (29.36 for ET and 14.67 for VR ET) labels showed moderate attention, while the Leaf label had the lowest engagement (17.91 for ET and 11.38 for VR ET). Mean fixation counts were significantly higher in ET (50.53) than in VR ET (34.31) ($p < 0.001$), reflecting stronger engagement in the simplified ET setting. Despite the lower fixation counts in VR ET, the consistent rank order of attention toward each label suggests that underlying visual preferences were preserved. These findings highlight the influence of environmental complexity on visual attention and suggest that both ET and VR ET offer valuable insights into improving the design and visibility of sustainable labels.

Posters presentations

E622

Recovery of valuable components from carrot peel as vegetable waste using microwave-assisted extraction

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Food waste is a growing problem. In many cases, the wasted part of the food could still be consumed. In this research, we investigated the extraction of the peeled skin of carrots. There is a lot of research on this, but in most cases, it is based on completely dried and pulverized raw material. This process is costly and energetically unfavorable. The aim of this research is to find an easier and more economical extraction process without these preparation steps. For the retrieval of carotenoids and polyphenols from carrot peel microwave-assisted extraction was used, which is more efficient compared to the conventional extraction.

After washing the carrots were peeled as thinly as possible, and the skin was grinded. Ethanol-water mixture was used as extraction solvent for the measurements. The experiments were carried out using central composite design. Three factors were changed: Microwave power (100-450-800 W), extraction time (4-8-12 min), and ethanol concentration (10-35-60 V/V%). The sample volume was determined considering it's moisture content so that the solid- solvent mass ratio was set to 1:40 .

In the extracts the polyphenol content, carotenoid content and antioxidant activity (by FRAP method) were evaluated using spectrophotometric methods.

For the statistical analysis the demo version of Design Expert was used. The optimal parameters were also determined for the different components in the evaluated range.

E623

Microwave-Assisted vs. Traditional Extraction of Polyphenols from Olive Pomace: A Comparative Study

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Olive pomace, a byproduct of olive oil production, is rich in antioxidant polyphenols but poses environmental risks due to its phytotoxicity. Efficient extraction is essential for waste management and industrial applications. This study compares traditional solvent extraction (TSE) and microwave-assisted extraction (MWAE) to identify the most effective method for polyphenol recovery.

The experimental design varied three key variables: for MWAE, extraction time (30–180 s), solid-to-solvent ratio (2–12 g/100 mL), and power (100–800 W); for TSE, extraction temperatures (40–80°C), solid-to-solvent ratio (2–12 g/100 mL), and solvent concentrations (10–90% v/v) were tested. Total polyphenol content (TPC) was measured using the Folin–Ciocalteu method, and antioxidant activity (AA) was assessed via the FRAP assay.

Results show that MWAE achieved a maximum TPC of 15.3 milligrams of Gallic Acid Equivalents per gram of dry weight (mg GAE/gdw), significantly higher than TSE (10.68 mg GAE/gdw). Similarly, MWAE exhibited a peak AA of 10.48 milligrams of Ascorbic Acid Equivalents per gram of dry weight (mg AAE/gdw), compared to 10.00 mg AAE/gdw in TSE. MWAE also demonstrated greater efficiency, achieving higher extractions in shorter times, whereas TSE required prolonged exposure to elevated temperatures. These findings confirm MWAE as a more effective and sustainable extraction method for polyphenol recovery, supporting the valorization of olive pomace as a valuable resource.

E624

Rapid detection of caffeine self-aggregation in aqueous solutions using near infrared spectroscopy and chemometrics

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Caffeine is the most widely consumed psychoactive substance in the world and has been the subject of extensive research. In water solutions caffeine has been shown to self-aggregate, forming long chains of stacked caffeine molecules. By stacking together, caffeine's hydrophobic faces become occluded and the more hydrophilic sides of the molecule are left exposed, effectively increasing hydration of the molecule. Self-aggregated caffeine is more soluble but also less bio-available. Therefore, knowing when caffeine self-aggregates is of great academic and practical value. Since NIRS, as a rapid and non-destructive assessment tool, has been extensively applied in both food and water research recently, the present work is aimed at assessing its feasibility in detecting caffeine self-aggregation in aqueous solutions.

A series of caffeine-MiliQ water samples were prepared in triplicates in the concentration range of 0 – 0.1 mol/kg with 0.02 mol/kg intervals. Two additional sets were also prepared – one with added sodium saccharin as an aggregation promoter, and one with sodium chloride as an aggregation demoter. Transmission spectra were recorded with 3 consecutives in the 400-2500 nm spectral range using the bench top NIRS XDS spectrophotometer with RapidLiquid Analyzer module. The analysis of the spectral data was performed by the inspection of the raw and subtracted spectra and by using chemometric methods, including principal component analysis (PCA) and soft independent modelling by class analogy (SIMCA). PCA and SIMCA results showed a clear separation of measurement points belonging to samples reaching the theoretical self-aggregation point and its shifts due to the presence of additives. Our results confirm, that NIRS combined with chemometrics could indeed be a reliable asset to detect the point of caffeine self-aggregation.

E625

Effect of carrier materials on the properties of vacuum-dried fruit powder mixtures

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A widely used method for producing fruit powders is vacuum drying, which helps preserve the bioactive components of raw materials, resulting in products with functional properties that can be integrat into a healthy lifestyle. The technological process requires drying aids that help foam formation and stabilize the structure. The most commonly used foaming agent in industrial conditions is maltodextrin, which also has several unfavourable properties which limit the broader use of powders. Therefore, recent research has turned more towards studying carrier materials with functional properties.

In this study, the foaming properties of resistant maltodextrin, glycine, inulin, bovine collagen, whey protein and chickpea flour and their effect on the nutritional components of the fruit concentrate mixture compared to the maltodextrin currently used in the industry were examined in 10, 20 and 30% ratios of fruit juice concentrate mixtures that contain some biologically active components. The moisture content, water activity, colour parameters, total polyphenol content, total anthocyanin content and antioxidant capacity were investigated.

We concluded that all functional carrying materials are suitable for foaming, although their properties differ. They have a significant impact on the colour and content of the powders. It has been established that in the future, it is worth dealing with mixtures of carrier materials, taking advantage of the beneficial properties of each material.

E626

Enrichment of the Antioxidant Capacity of Stirred Type Yoghurt with Beetroot Juice

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Yoghurt is considered a functional food which is a complex system containing different biological components. The objective of this research was to prepare yoghurt rich with antioxidant properties and reduced allergenicity. The prepared yoghurt was supplemented with Beetroot juice (Beta vulgaris) extract prepared from beetroot peel by microwave-assisted extraction (MAE). In this study, the application of enzymatic hydrolysis and fermentation-based yoghurt production is detailed. Different enzyme concentrations were used during the hydrolysis. The milk was treated with different concentrations of papain at a temperature of 50°C for 10 minutes and, subsequently, deactivation of enzymatic activity was performed at a temperature of 70°C for 30 minutes. After the deactivation of the catalytic activity of papain, milk was fermented with yoghurt starter culture at a temperature of 45°C for 6 hours. By analyzing the effect of the different enzyme concentrations and different extraction parameters, the antioxidant capacity and the allergenicity were investigated. It was found that the application of papain enzyme and beetroot juice increased the antioxidant capacity of yoghurt. The SDS-PAGE results revealed that the hydrolysis of milk proteins with lower molecular weight increased gradually at higher enzymatic concentration which resulted in the reduced allergenicity of the samples.

E627

Screening of ceramic membranes for MBR based production of separated whey and casein derived peptides

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Cow's milk protein allergy (CMPA) is a well-known condition, triggered by cow's milk proteins, with casein (αS1-2–casein, β-casein, κ-casein) and whey proteins (α-lactalbumin, β-lactoglobulin, bovine serum albumin, and immunoglobulins) being the main allergens. Enzymatic hydrolysis is considered a promising strategy, as specific proteases can target allergenic epitopes. Membrane filtration is widely used for milk protein separation, but tubular ceramic membranes have been less studied. Microfiltration (MF) can be employed as a pre-treatment to reduce protein content, facilitating enzymatic hydrolysis. Membralox tubular ceramic membranes (Pall, New York, NY) with an active layer of α-alumina (α-Al2O3) were used for filtration in a laboratory-developed cross-flow membrane module. The pore sizes of the tubular membranes were 5 µm, 1.4 µm, and 0.8 µm. The 5 µm membrane exhibited no significant effect on protein fractionation, while the 1.4 µm membrane showed slight protein retention. In contrast, effective milk protein fractionation was achieved using the 0.8 µm membrane. The feed, permeate, and retentate of the MF membrane were treated with different concentrations of papain and trypsin. Therefore, the aim of this experiment were to screen ceramic membranes and to investigate the enzymatic hydrolysis of permeate and retentate fractions obtained through microfiltration.

E628

Sustainable Packaging: Application of Response Surface Methodology in the Optimization of Chitosan-Based Edible Coatings with Soy Protein and Rice Bran Oil

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The development of biodegradable edible coatings is a promising strategy for enhancing food preservation while reducing reliance on synthetic packaging. This study optimized an edible coating formulation based on chitosan, isolated soy protein (ISP), and rice bran oil (RBO) using Response Surface Methodology (RSM). A Box-Behnken design with 17 treatments and 3 replications was employed to evaluate the effects of component variations within the ranges of chitosan (1–3 g), ISP (1.5–4 g), and RBO (0.5–2 g) on key coating properties, including moisture barrier function, structural stability, and color retention as responses. The optimized formulation—1.78 g chitosan, 1.99 g ISP, and 1.78 g RBO—exhibited superior performance, achieving a water activity (aw) of 0.87 (R^2 = 0.98), stability of 39.15% (R^2 = 0.95), L* value of 41.315 (R^2 = 0.62), b* value of -0.258 (R^2 = 0.90), and a* value of -0.973 (R^2 = 0.79). These findings highlight the synergistic effects of chitosan, ISP, and RBO, which significantly improved moisture resistance, mechanical integrity (stability), and visual quality (color attributes) of the edible coating. The formulation can provide not only an effective and eco-friendly alternative for prolonging the shelf life of perishable food products by cooperating with natural antioxidants like Fruit by-product extracts and decreasing water activity by combining other hydrophobic components, but also contribute to the advancement of sustainable food packaging solutions.

E629

Monitoring the quality characteristics of canned vegetables stabilized with rosemary extracts during storage

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Consumers today are becoming more and more conscious buyers, and as a result there is a growing demand for products containing natural ingredients. The production of these products requires examining the possibility of replacing additives that are currently used in industry with ingredients of natural origin.

The aim of this study was to investigate the application of rosemary extract as an antioxidant in canned sweetcorn and red kidney bean mixes during 6 months storage compared to ascorbic acid currently used in industry. A further goal was to investigate the effect of rosemary extract in combination with other antioxidant substances, e.g. rosemary+acerola and rosemary+green tea extracts.

In the experiment, 9 different samples were tested, and the colour, total polyphenol (TPC) content, total flavonoid (TFC) content, antioxidant status of the samples were determinded and evaluated by two methods: free radical scavenging capacity (DPPH) and ferric reducing antioxidant power (FRAP), and the texture (firmness) of the samples. In colour preservation, a mixture of rosemary and acerola was found to be the most effective, while it was demonstrated that a mixture of rosemary and green tea extracts is not suitable for preserving the yellow colour of corn kernels. Acerola extract was found to be suitable for the preservation of antioxidant compounds. Furthermore, combinations of rosemary and acerola should be examindes as colour preserving natural antioxidants in canned vegetables.

E630

Electronic nose detects off-odor of pork caused by lucerne protein concentrate feeding

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Meat and fat samples of fattening pigs feeding (i) control diet or (ii) experimental feed containing Lucerne protein concentrate (LPC) were investigated with instrumental aroma analysis. Before aroma measurement, samples were heat treated at 70°C for 20 minutes to generate headspace containing odors of cooked meat and fat. The aroma profiles were recorded with an AlphaMOS Heracles Neo electronic nose. The aroma of the samples changed slightly but detectably because of the feeding. Of the samples of animals fed LPC or control diet, the meat samples showed the smallest difference between the two groups. This was followed by back fat, then connective tissue fat. Classification models were not suitable for reliable identification of independent samples, but adequately showed the aroma-changing effect of LPC treatment that consistently appeared in different tissue types.

E631

The examination of the digestibility and sensory properties of high protein cream

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The aim of this study is to investigate the digestibility and sensory parameters of protein- egg white enriched products. Parameters such as pH, colour, dry matter content, texture, rheological properties and protein digestibility were determined for four types of egg-white products such as cream, extra cream, crumble and drink milk replacement. Protein digestibility was analysed using the Kjeldahl method, whereas for texture analyses was used the SMS Texture Analyzer. Significant changes in the techno-functional parameters were observed in the samples. The cream sample showed the most significant colour changes, the crumble and drink sample remained within the same ranges, the extra cream showed colour uniformity. The pH analysis showed that the cream sample showed slight shifts between the repetitions, while the extra cream and crumble sample remained relatively stable. The dry matter content showed constant values for cream and extra cream samples, while the drink sample showed lower values for dry matter content. Rheological parameters were analysed using Anton Paar MCR 92 Rheometer to determine viscosity, shear thinning behaviours, yield stress and viscoelastic properties. While drink milk replacement is classified as a non-Newtonian liquid, preliminary results suggest that under the tested conditions, it shows Newtonian behaviours. This study finds provide valuable insight into the functional and sensory properties of high-protein cream products and their application.

E632

Assessing chicken breast fillet quality: a sensory-instrumental approach

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Storage temperature is considered a key factor in maintaining fresh meat quality, as it directly affects microbial growth, biochemical changes, and overall shelf life. While constant refrigeration is commonly applied to slow down spoilage, temperature fluctuations may occur during transportation, storage, or retail display, potentially accelerating quality deterioration. Therefore, understanding how different storage conditions influence meat properties is crucial for ensuring food safety and extending shelf life.

In this study, chicken breast fillet was stored under constant and fluctuating temperature conditions and sensory evaluation was compared with instrumental measurements. The sensory assessment was performed to evaluate colour, odour, and texture, while instrumental methods included colourimetry and texture analysis.

Preliminary findings suggest that odour changes may be detected earlier than colour changes in sensory evaluation. Additionally, there are indications that both the ΔE (colour difference) value and texture measurement results could align with sensory evaluation outcomes, highlighting their potential relevance in meat quality assessment.

E633

Exploring the Role of Protein in Student Nutrition: A Workshop Overview

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A workshop was conducted by a group from the Future Leaders Programme's academic career path as part of the E3UDRES2 Hackathon project in December 2024. The primary objectives of the workshop were to assess the participants' understanding of protein composition and to enhance their knowledge through a series of presentations delivered by the group. First the students got to listen to a 10 minute general lecture about the structure and role of the proteins, afterward they were asked to form 5 small groups. The groups were assigned separate rooms to discuss one of the following diets with the help of moderators: vegan, omnivorous, vegetarian, paleo, ketogenic. Although the groups were locked from each other and had students from various countries with diverse eating habits, the conclusion was the same in every of them, omnivorous diet was found to be the best for the human body.

E634

Dietary Habits and Use of Nutritional Supplements Among Amateur Athletes in Southern Italy

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Nutrition plays a fundamental role in supporting both health and performance in athletes. This observational study examines dietary habits and use of nutritional supplements in a representative sample of 600 amateur and recreational athletes from Apulia (Italy), selected with stratified random sampling (by gender and Cage group) and interviewed via mixed-technique questionnaires (CATI/CAMI, CAWI, CAPI), aiming to collect data on meal frequency, dietary variety, use of supplements and sources of nutritional advice. Results indicate a general awareness of healthy dietary practices; however, imbalances in macronutrient intake and insufficient dietary diversity were observed. In particular, a portion of the interviewees reported using supplements, often without professional guidance. These findings highlight the need for targeted educational initiatives aimed at promoting evidence-based nutritional choices and responsible use of supplements in the sports community. The study offers insights that can support the development of integrated food system strategies tailored to athlete populations.

E635

Lactic Acid Bacteria from Animal Microbiota as Natural Inhibitors of Mycotoxin-Producing Fungi

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Abstract: Mycotoxins are harmful compounds produced by moulds that contaminate animal feed and food threatening the cunsumers’ health. Some lactic acid bacteria (LAB) can prevent mould growth and bind mycotoxins, making them useful for biological feed and food detoxification. In this study, LAB were isolated from the faeces of domestic animals using classical and molecular microbiological methods. The goal was to identify strains capable of inhibiting the growth of aflatoxin B1-producing Aspergillus flavus, patulin-producing Aspergillus clavatus, and Penicillium digitatum. Among the isolates, Streptococcus alactolyticus isolated from pig and Enterococcus gallinarum from American bison showed the strongest antifungal activity. These results suggest that LAB from domestic animals can be used as natural biocontrol agents to improve feed and food safety. This approach could reduce the need for chemical treatments and support more sustainable livestock farming.

Keywords: lactic acid bacteria, mycotoxins, animal feed, food, mould inhibition

E636

Taste perception in VR and microgravity

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Taste perception is known to be altered in microgravity, which can significantly impact astronauts' food acceptance and overall dietary experience. This study examines the effects of microgravity and virtual reality (VR) on the sensory perception and overall liking of products, specifically lemonade and vegetable soup, under controlled experimental conditions. The results indicate that overall liking for both products decreased significantly in microgravity, consistent with prior research on sensory suppression in space environments. However, VR demonstrated a compensatory effect, as overall liking scores in VR-enhanced microgravity stabilized and closely resembled those observed under normal gravity. This suggests that VR has the potential to mitigate the adverse effects of microgravity on taste perception, thereby improving food acceptability for astronauts. These findings underscore the necessity for further research into sensory modulation in altered gravity environments, particularly for long-duration space missions. Future studies should explore VR-based interventions, adaptive food formulations, and multisensory integration strategies to optimize food palatability and acceptance in space.

E637

Oviposition Behavior of Plodia interpunctella (Hübner) on Nuts and Dried Fruits and the Identification of Key Volatile Compounds

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Understanding the oviposition preference of insects on different stored products and identifying attractive or repellent volatiles may contribute to ecological manage-ment strategies for product storage. The oviposition preference of Plodia interpunc-tella was measured on goji berry, fig, walnut, hazelnut, normal-oleic and high-oleic peanut. The differential VOCs（VIP>1） were analyzed by the partial least square-discrimination analysis (PLS-DA), gas chromatography-electroantennographic de-tection (GC-EAD), and confirmed by electrophysiological, Y-tube, and oviposition preference bioassays. More eggs were laid on goji berry, fig, walnut, hazelnut, and normal-oleic peanut than on high-oleic peanut. Nonanal was abundant in goji berry, fig, walnut, hazelnut, and normal-oleic peanut, and 2-ethyl-1-hexanol was more abundant in high-oleic peanut. Nonanal, ethyl caproate, octane, and undecane exhib-ited strong EAG responses and attracted females, while 2-ethyl-1-hexanol exhibited a strong EAG response and repelled females. The characteristic VOCs are involved in the oviposition selection of P. interpunctella and provide a basis for developing attractants and repellents.

E638

Unveiling the potential of the electronic nose in the determination of E. coli indicator compounds

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Microbial volatile organic compounds (MVOCs) can be used as indicators to find bacteria in the food industry, hospitality, and other industrial systems.

In this study, we investigated the volatile organic compound emissions of Escherichia coli (E. coli). The bacteria were cultured on a different culture media in order to find indicator compounds, and the emitted volatiles were analyzed using a Heracles electronic nose (e-nose) device. The concentration of the microbial suspension was 10^6, measured by an automatic coliform detector.

According to our findings, we could distinguish the volatile profile of E. coli on the different culture media, and we identified commonly appearing compounds, which may be potential indicators of E. coli presence. Furthermore, we determined the aroma profiles of E. coli on different culture media. The results show that the e-nose is an excellent device for detecting the coliform bacteria. The method can be further developed to detect other bacteria and even fungi, like molds, and yeasts.

Our research could give a helping hand not only in food safety but also in medical diagnostics and environmental monitoring, including sustainable indoor air quality analysis (IAQ). By the analytical monitoring of the IAQ in closed spaces, harmful microorganisms can be detected in a short time so that the microbiological risks could be properly decreased and handled, improving public health and safety.

E639

Effect of raw material quality on the properties of sous-vide cooked chicken breasts

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Meat, as a raw material of animal origin, reaches the consumer's table after various degrees of preparation, processing and storage. It is the most commonly used sous-vide raw material, and it is therefore important to assess its quality in order to improve the efficiency of the technology.

Is there a difference between the main quality properties of each sous-vide treated product, such as weight loss rate, texture, dry matter content, pH, CIELab colour parameters, oxidative state (TBARS) or sensory properties, when using raw materials stored in different ways and for different lengths of time?

Chicken breasts in wholesale packaging were used for the study. After purchase, the chicken breasts were divided into four groups. The chilled (+3°C) samples were treated with sous vide on the second and tenth day after slaughter, while the frozen (-25°C) samples were treated with sous vide on the tenth day and after six months (65°C, 45 min).

For sous-vide treated meats, significant differences can be measured (colour, stock, weight loss, TBARS, organoleptic scores) as a consequence of the use of raw materials stored in different ways and for different lengths of time. In the case of raw materials stored refrigerated, the difference between the stored for shorter and longer periods are more distinct, whereas in the case of those stored frozen, despite the longer duration, the samples are less distinct in terms of the properties measured, so that even a difference of six month showed .

E640

Utilization of wine industries' spent grain in wheat bread enrichment

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Based on the quality parameters (product weight, volume, specific volume, crumb moisture, water activity, color parameters), as well as biochemical analyses of the wheat bread antioxidant capacity, with and without the addition of defatted (DF) or conventional (CF) grape seed flour (Vitis vinifera) incorporated into the dough at various concentrations, it was established: 1) with an increase in the amount of water used the dough formation, an increase in the mass and a decrease in the specific volume of the enriched samples (15% DF) was observed; 2) however, the specific volume significantly increases ($p < 0.05$) at 5%, and partially at 7.5% and 10% (DF and CF), compared to the control; 3) due to the high fiber content, a substantial increase (from 5% to 10%) in crumb moisture was observed (DF); 4) the water activity range was from 0.887 to 0.875, with the lowest values observed at 5% CF, and the highest at 10% DF, $p \leq 0.05$; 5) the inclusion of additives in the dough resulted in a significant change ($p \leq 0.05$) in crumb color intensity, leading to a darkening (L*) ($p \leq 0.05$). The total polyphenol content significantly increases with higher concentrations of the additives, and the analysis of total antioxidant activity confirmed markedly elevated values in the enriched samples by both methods, DPPH and FRAP. Based on the crumb's deformation characteristics it was established the new bread retains its freshness for an average of five to six days.

E641

The difference between imagination and reality - Testing Nutri-Score label using emotion recognition software

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The examination of front-of-pack nutrition labels is essential as there are several options for manufacturers to choose from, so understanding which ones best support consumer decision-making needs further investigation. In our study, 20 food products and Nutri-Score labels were used as visual stimuli. A total of 71 people participated in the study, whose eye movements were examined using an eye-tracker and their emotion changes were examined using facial expression analyser software to determine the relationship between the products and emotions. Based on our results, we found that there were significant differences in the six basic emotions of happy and surprised, and that there were products that could elicit both emotions. Thus, we found that participants do not always react with surprise in the case of an incorrect response, and we also confirmed that the label is difficult for consumers to interpret, as clearly indicated by the surprised expression.

E642

Development of sprouted soybean powder combined with brown rice powder and black sesame powder

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The study presents a process for producing a powder from sprouted soybean seeds combined with brown rice and black sesame, with the aim of creating a product of high value and potential applications in the field of functional foods. In this research, sprouted soybean seeds were selected as the primary raw material. The sprouting process facilitates the conversion of oligosaccharides into simple sugars and enhances the content of vitamins and bioactive compounds. The investigation focused on examining factors such as the soaking duration of soybean seeds prior to sprouting, incubation time, as well as drying duration and temperature, in addition to the mixing ratio. Enzyme activity (α-amylase), reducing sugar content, polyphenol content, moisture, and viscosity of the final product were measured. The results indicated that a soaking time of 9 hours, incubation time for 24 hours, drying for 11 hours at 50°C, and a mixing ratio of 70:15:15 for sprouted soybean powder, brown rice powder, and black sesame powder, respectively, produced the most favorable outcome.

Keywords: sprouted soybean seeds, powder, polyphenol, α-amylase, reducing sugar

E643

DEVELOPMENT OF THE MATCHA CEREAL MILK PRODUCT

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This study focuses on developing a Matcha cereal milk product by combining various nutritious ingredients - including oats, lotus seeds, mung beans, brown rice, and white beans – with matcha powder to create a valuable beverage. The processing procedure involves raw material preparation (cleaning, soaking, and wet milling) followed by steps such as starch hydrolysis, filtration, heating, homogenization, filling, and sterilization. The investigations examined the effects of enzyme concentrations (α-amylase and glucoamylase), hydrolysis time, and the amounts of additives such as lecithin, guar gum, and sucrose on key parameters including viscosity, reducing sugar content, and Brix value of the final product, along with an evaluation of consumer preferences. The results indicate that the critical variables have been optimized to achieve a product with a smooth texture and the distinctive flavor of matcha, while meeting both sensory and nutritional quality requirements. The study confirms the potential of Matcha cereal milk in fulfilling the demand for healthy food products.

Keywords: matcha, cereal milk, milk, lecithin, guar gum

E644

The Impact of Drying Technologies and Market Tea Integration on the Polyphenols and Antioxidant Capacity of Chokeberry Pomace Tea Infusion

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Chokeberry pomace is a potential source of healthy tea due to its bioactive compounds, but its processing, especially dehydration, can impact polyphenol concentration. Since chokeberry has an undesirable flavor, combining its pomace with other products can improve quality. This study evaluated the effects of microwave radiation (MV), atmospheric drying (SZ), and freeze-drying (LIO) on the polyphenols, antioxidant capacities, and color of chokeberry pomace tea infusions, which were mixed with market tea in various ratios: 100-0%, 50-50%, and 60-40%. The tea was made by infusing a 3.5 g sample in 200 mL of boiled water for at least 5 minutes. It was tested for total phenolic content (TPC), total anthocyanins (TA), antioxidant capacity (FRAP and DPPH), and color change. Results showed significantly higher ($P < 0.05$) TPC and TA in the 100-0% samples compared to those with market tea. The LIO (100-0%) sample had the highest TPC (98.98±6.05 mg GAE/200 mL), although it was similar to other 100-0% samples. Microwave radiation (100-0%) samples had the highest TA (47.09±0.51 mg/200 mL). Antioxidant capacities (DPPH and TEAC) did not differ significantly among all 100-0% pomace tea samples. Mixing market tea with chokeberry pomace reduced TPC, TA, and color. The study concludes that all drying technologies effectively preserve high polyphenol content and color for tea infusion, though other factors should be considered when choosing a technology.

E645

From Hive to Policy: The Sustainable Beekeeping Practices Index (SBPI) as a Decision-Making Tool

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Sustainable beekeeping promotes sustainable food systems by ensuring crop pollination services and enhancing food availability and nutritional diversity. This study introduces the Sustainable Beekeeping Practices Index (SBPI), a composite index developed using Principal Component Analysis (PCA) to quantify the sustainability of beekeeping practices. The SBPI integrates key sustainability factors, including colony health, genetic diversity, environmental stressors, beekeeper management, and migratory beekeeping. The highest impact on sustainability comes from colony health and disease management (38.4%), reinforcing the importance of disease control as a primary factor for sustainable beekeeping. Genetic diversity and hive resilience (15.8%) play a significant role in ensuring the long-term adaptability of bee populations. Environmental stressors (7.7%), beekeeper management (5.8%), and migratory beekeeping (5.4%) contribute to a lesser extent but remain relevant to sustainability outcomes. The factor distribution highlights the need for targeted interventions on disease control and genetic diversity to improve beekeeping sustainability. The study offers valuable recommendations to enhance disease monitoring, genetic conservation, and environmental adaptation strategies to enhance the sustainability of beekeeping practices. The index can also be adapted to explore SBPI in other contexts and is a valuable analytical tool for training, certification, and policymaking processes.

E646

Modelling Food Waste: A Recursive Partitioning Approach to Food Behaviour Segmentation

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Food waste is a critical challenge for sustainable food systems, undermining food security and contributing to environmental harm. When individual behaviour interacts with a convenience-driven, industrialised food environment, it may reinforce unsustainable outcomes. This study draws data from the Waste Watcher International Observatory on Food and Sustainability (WWIOFS), which explores food waste through self-perceptions and lifestyle dynamics.
Using WWIOFS data from Albania, we applied a decision tree model to classify individuals by food waste frequency. A recursive partitioning algorithm identified the waste of ready meals as the most significant predictor ($p < 0.001$). Those who rarely waste ready meals formed a homogeneous low-waste group. In contrast, frequent wastes were segmented by diet and place of residence. Results show that undefined diets correlate with higher, more unpredictable waste, while structured diets and rural residence are linked to more sustainable behaviour. A modest rural–urban divide emerged, with rural participants displaying slightly more cautious waste patterns. One limitation is the absence of socioeconomic variables such as income or education, which may affect food waste behaviour. Future studies will include these factors to improve the model's explanatory power. By identifying distinct waste profiles, this research supports more targeted, behaviour-based strategies for food waste prevention.

E647

VARIETAL DISCRIMINATION OF COCONUT USING DEEP LEARNING ALGORITHMS: A UV-VIS SPECTROPHOTOMETRY APPROACH

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The study investigates the varietal discrimination of coconut using deep learning algorithms, focusing on conventional physicochemical analysis and UV-Vis spectroscopy. Given the limitations of traditional methods, which are time-consuming and require sophisticated equipment, this research aims to provide a rapid and reliable alternative. The study involves five dried coconut cultivars—Tacuna, Catigan, VTT, MYD, and SGX—obtained from the Oil Palm and Coconut Research Institute in Ghana. The coconuts were prepared and analyzed using UV-Vis spectroscopy. Physicochemical properties of the coconut water, including total soluble solids (TSS), pH, and titratable acidity, were also conducted. The pH values ranged from 4.27 to 5.13, with VTT having the highest pH and SGD the lowest. TSS values ranged from 3.57 to 5.7 °Brix, with SGD showing the highest value. The spectral data were processed using multivariate models and principal component analysis (PCA) to identify specific wavelengths capable of distinguishing the coconut varieties. UV-Vis spectroscopy, combined with Partial Least Squares Regression (PLSR), demonstrated high predictive capabilities for physicochemical parameters, achieving coefficients of determination (R^2) above 0.99 and root mean square errors (RMSE) below 1% w/w for total soluble solids, titratable acidity, and pH during both training and validation phases. Cross-validation further confirmed the robustness of these models, with R^2CV values above 0.86

E648

Saffron Adulteration: Innovative Detection Techniques

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Saffron (Crocus sativus L.) is a highly valued spice in the global market, primarily due to its distinctive organoleptic properties and its therapeutic potential, attributed to bioactive compounds such as crocin, picrocrocin, and safranal. These compounds contribute not only to saffron's characteristic color and flavor but also confer notable antioxidant, anti-inflammatory, and neuroprotective effects.

The chemical composition of saffron varies based on environmental factors, including climate, soil characteristics, and agricultural practices. These variations significantly influence the final product's quality and potency. Owing to its high economic value, saffron is often subjected to adulteration through synthetic dyes or substitution with cheaper plant materials. Consequently, ensuring its authenticity, safety, and efficacy requires robust, reliable quality control measures to counteract fraud.

Recent advancements in analytical technology have facilitated saffron authentication through non-destructive techniques such as near-infrared spectroscopy (NIR), often combined with chemometric modeling. These methods enable precise characterization of saffron's chemical profile, offering a powerful toolset for quality assessment and traceability.

This presentation explores current challenges in saffron authentication, reviews spectroscopic techniques for quality assurance, and discusses future directions to enhance saffron's sustainability and integrity in the global market.

E649

Prevalence, Antibiotic Resistance, and Virulence Traits of Escherichia coli in Fermented Dairy Products During Ramadan in Dakahliya, Egypt: A Public Health Concern

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In Egypt, fermented dairy products are essential for Sehoor due to their nutritional benefits. They sustain well-being throughout fasting in the holy month (Ramadan). Increase production rate to meet consumer needs may compromise safety standards, and quality control threatening public health. Data on the prevalence of Escherichia coli (E. coli) in fermented dairy products during Ramadan in the highly populated districts of ten Dakahliya governorate cities, Egypt, remain limited. This study aimed to identify and characterize E. coli isolates using biochemical, serological, antibiotic susceptibility, and multiplex PCR analyses of virulence genes. A total of 26 (22.6%) E. coli isolates, representing twelve distinct serotypes, were recovered from randomly collected fermented milk samples, including yoghurt (n=55) and laban rayeb (n=60). The most prevalent serotypes were O26:H11, O127:H6, and O91:H21. The virulence genes stx1 and stx2 were detected in most isolates, while eaeA and hylA were found in O26:H11 and O111:H2. The highest antibiotic resistance was observed against vancomycin and clindamycin, followed by trimethoprim and oxacillin, whereas ciprofloxacin and ampicillin showed the greatest effectiveness. This finding highlights inadequate food safety measures and the risk of food poisoning with virulent and antimicrobial resistant E. Coli in the surveyed areas underscoring the urgent need for stricter food control measures to ensure the safety of fermented dairy products.

E650

Fitting and evaluating diffusion models for dry salting, wet curing and ultrasonic curing

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The process of meat preservation through pickling plays a crucial role in shaping product characteristics; however, it presents a bottleneck in production efficiency due to the extended processing time it necessitates. This duration is primarily governed by how swiftly salt and water permeate the meat tissue—factors influenced by the chosen curing technique. In our study, we quantified the diffusion rates of both salt and moisture across three approaches: traditional dry salting, conventional wet brining, and an advanced method that incorporates ultrasonic assistance into wet curing.

Our research aimed to address two core inquiries: (1) In what ways do these processing methods alter the diffusion behavior of salt and water relative to baseline dry curing? (2) How accurately can established mathematical models simulate the diffusion phenomena occurring during meat curing?

For a cylindrical pork loin sample measuring 80 mm in length and 15 mm in diameter, dry curing yielded a salt diffusion constant of 4.22×10^{-10} m²/s when analyzed using the best fitting model. This rate rose by approximately 33% under wet curing conditions and doubled when ultrasonic treatment was applied at 14.1474 W/cm² intensity and 19 kHz frequency.

E651

Enhancement of Antioxidant Activity in Milk Protein Concentrate Hydrolysates via Enzymatic Hydrolysis Using Streptomyces griseus Protease

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Peptides play an important role in the alive cell activity. Additionally, some of them have antioxidant capacity, and they can be produced from milk proteins. This study investigates the enzymatic hydrolysis of milk protein concentrate (MPC) using protease from Streptomyces griseus (PSG) type XIV to enhance its antioxidant properties. A 5% MPC solution in Tris-HCl buffer was incubated for 24 hours at pH 8.5 and 60 °C with varying enzyme-to-substrate ratios. Gel electrophoresis was employed to monitor peptide release, while the antioxidant capacity of the resulting hydrolysates was evaluated using the DPPH radical scavenging assay. Results indicated that increasing both the enzyme concentration and the incubation time progressively improved hydrolysis, leading to a greater breakdown of protein into smaller peptides with enhanced antioxidant activity. These findings underscore the potential of enzymatic hydrolysis as a strategy to develop bioactive peptides from MPC, which could be beneficial for functional food applications and nutraceutical development.

The research was supported by GINOP_PLUSZ-2.1.1-21-2022-00048, EFOP-3.6.3-VEKOP-16-2017-00005, and TKP2021 projects as well as Doctoral School of Food Sciences, MATE.

Milk Protein Concentrate (MPC), Bioactive Peptides, Enzymatic Hydrolysis, Protease, Streptomyces griseus, Antioxidant Activity, DPPH Assay, Functional Foods, Protein Modification

E652

Dielectric parameters of vegetable oils during storage

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Vegetable oils play an important role in a healthy diet. But, during storage, beside their composition, many environmental factors (light, oxygen, temperature) accelerate lipid oxidation, resulting in rancidity, off-flavours, and a reduction of shelf life. When vegetable oils are used for cooking, oils undergo oxidative and thermal degradation, leading to the formation of harmful compounds such as trans fatty acids or aldehydes, which decrease the nutritional quality. Therefore, development of rapid, non-destructive but reliable measurement methods for testing quality of vegetable oils is an important area of R&D activities. These requirements are met by the specific characteristics of dielectric measurements.
Dielectric behavior of sunflower-, olive- palm-, rapeseed and pumpkin seed oil was analysed in the frequencies of 200-2400 MHz (Speag DAK 3.5), investigating the effect of heating and storage on the dielectric constant and loss factor. It was found, that dielectric constant and loss factor increased characteristically in the frequency range 300-1200 MHz during storage. The dielectric parameters showed linear correlation with the variation of the peroxide number. The chemical changes occurring in oils during storage—characterised by peroxide value and iodine value—and the variations in the trend of the relationship between the dielectric constant and loss factor at a given frequency (transition to linearity) show good agreement.

E653

QUICK FRAUD DETECTION IN SHELL EGG FRESHNESS DECLARATION USING A HANDHELD NIR SPECTROMETER COMBINED WITH RANDOM FOREST ALGORITHM

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The applicability of a handheld NIR spectrometer for detecting false egg freshness declaration was studied. Various spectral pre-processing techniques were investigated. Random Forest (RF) models were compared with partial least squares (PLS) models for classification (C) and regression (R). Multiplicative scatter correction (MSC) was the most effective pre-processing method. RF models outperformed PLS models in all cases. For discrimination based on egg freshness, MSC-RF-C using full spectra obtained the highest performance (F1-scores of 98.75 – 99.31%). For estimating Haugh unit (HU) as freshness indicator, using selected wavelengths slightly decreased the predictive ability of MSC-RF-R model but reduced the computational time by 8 times, compared to using full spectra. Balancing prediction accuracy and efficiency, the MSC-RF-R model with selected wavelengths (R2 = 0.964, RMSE = 2.224, RPD = 4.80) was suggested for predicting HU. This finding indicates that NIR spectroscopy coupled with RF was a useful tool for disclosing egg freshness mislabelling.

E654

COMPARISON OF RAW AND FRIED AFRICAN CATFISH MEAT SUPPLEMENTED WITH BLACK SOLDIER FLY MEAL

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The growing demand for sustainable and alternative protein sources has led to increased interest in black soldier fly (BSF) meals as a supplement in aquaculture. Understanding the impact of BSF is crucial for evaluating its suitability as a functional food. Aim of this study was to compare the texture of meat of African catfish which were fed by BSF supplemented forage.

Fish were maintained in a Recirculating Aquaculture System. There were three test groups: control, 33% black soldier fly meal supplementation, 50% black soldier fly meal supplementation. At the end of the raising period, ten fish were randomly selected from each group. After slaughtering fillets were made from each fish and rectangular shape (5x10 cm) samples were formed. 50% of the samples were baked in an air circulation oven at 180°C for 10 minutes. The other half of the samples were measured in raw form. Texture analysis (hardness) was carried out at room temperature (23°C) using TA.XTplus texture analyzer (probe diameter: 5 mm).

The texture of fried and raw samples varied according to BSF concentration. Significant difference ($P<0.05$) was observed between the control and 33% BSF samples. An even more pronounced textural difference was found in case of 50% BSF samples, exhibiting over 30% higher penetration forces than the control ones.

It can be concluded that the texture of African catfish meat was influenced by elevated BSF content. Higher BSF concentrations resulted in greater hardness of the meat.

E655

Isolation, Partial Purification, and Characterisation of β-Galactosidase from Limosilactobacillus fermentum LF08

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β-Galactosidase is an important enzyme with applications in biological and industrial processes. Probiotic lactic acid bacteria, such as Limosilactobacillus fermentum LF08, are promising sources for biotechnological use. This study aimed to achieve partial purification and characterisation of β-galactosidase from L. fermentum LF08. Bacterial cells were produced through 16-hour fermentation in MRS medium with a modified carbon source (ratio of galactose:glucose, was 3:1) and then collected by centrifugation. Mechanical method using French Press was applied to disrupt cells. Purification protocol involving ammonium sulphate precipitation, dialysis, and ion-exchange chromatography was developed. The β-galactosidase enzyme exhibited optimal activity at 50°C and pH 7.5–8.5. Meanwhile Ca^{2+}, K^{+}, Mn^{2+}, Mg^{2+}, Zn^{2+}, Fe^{2+}, and Co^{2+} caused increase in enzyme activity , whereas Cu^{2+} slightly inhibit the enzyme. The molecular weight of enzyme protein was estimated to be 50–75 kDa based on the SDS-PAGE. The enzyme remained stable at 30°C for 72 hours but lost activity at 50°C after 8 hours. These findings contribute significantly to understanding L. fermentum LF08 β-galactosidase and highlight its potential for biotechnological applications.

The research was supported by the Flagship Research Groups Programme of the Hungarian University of Agriculture and Life Sciences, GINOP_PLUSZ-2.1.1-21-2022-00048 and TKP2021-NVA-22 projects, as well as by Doctoral School of Food Science.

E656

Possible uses of coffee by-products

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Cascara is the outer, dried skin of the coffee cherry. A by-product of coffee production, it ends up in very large quantities in African waters or in compost. However, its natural active ingredients and caffeine content make it a suitable substitute for coffee, as less and less coffee is grown nowadays. Therefore, we tested the solubility of our samples in two ways: traditional soaking and ultrasonic testing. 2 g of Cascara samples were put in 60 ml of preheated to 40 °C and 60 °C distilled water, and then were tested them for 15 min at the respective temperatures. PH, Brix, refractive index, colour (CIE Lab) and density were measured. It was observed that the density and water soluble solids content of our samples increased with soaking time and temperature. Ultrasonically treated samples showed higher values compared to control samples. These results suggest that much more components can be extracted by cell disruption at lower temperatures using ultrasound, even in a shorter time.

E657

Does your education have an impact on your protein-mindfulness? – a case study among E3UDRES2 students

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In December 2024, a workshop was carried out within the E3UDRES2 Hackathon project by a group of the Future Leaders Program's academic career path. The main goals of the workshop were to get a vision of how much students from different European universities know about proteins, and to educate them further through presentations and non-formal learning methods.
At the beginning of the workshop participants had filled out a questionnaire with 12 questions regarding consumer mindfulness of proteins. Results show that participants who pursue food-related studies tend to have a higher average consciousness about their protein sources and intake when examining it on a scale from one to te

E658

Next-Generation Water Spectroscopy: Mapping Water Absorbance Bands for Biosystems and Food Engineering

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Near-infrared (NIR) spectroscopy has long been a cornerstone of biosystems and food engineering, providing a powerful tool for probing the molecular dynamics of water—the lifeblood and the essential driver of these systems. Recent advancements in the NIR spectroscopy of water and aqueous systems have recognized the significance of specific absorbance bands in the first overtone region of water (1300–1600 nm), offering critical insights into system properties and functionality. For instance, absorbance bands around 1395–1403 nm, associated with confined water, serve as indicators of cellular stress or dehydration, while bands near 1518 nm correspond to strongly bound water, governing structural integrity, texture and preservation. The 1364–1382 nm range, linked to water vapor, provides key information on porosity and water activity—vital parameters for food quality and stability. Absorbance bands in the region 1428–1440 nm, are related to non-ionic-water interactions and biomolecular hydration, while those near 1503 nm provide early warnings of material defects and structural integrity. Translating these spectral markers into actionable insights enables precise control over protein stability, biomaterial resilience, and processing efficiency. By harnessing water's spectral signals, this next-generation approach elevates NIR spectroscopy from a diagnostic tool to a precision-engineering asset in biosystems and food technology.

E659

Investigation of space soil simulants

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This study presents a plant cultivation experiment carried out by researchers at the University of Agriculture and Life Sciences (MATE) in Gödöllő in artificial soils of Mars and the Moon. A test chamber has been built in which the experiments were carried out, equipped with various sensors based on the principle of testing and measuring plant-soil variables. The study describes the approach of selecting indicator plants, and the applied artificial Mars and Moon soil simulants. As an extension of this experiment, the results can be interpreted to traditional Earth environments and applied as guidelines to develop methods of growing crops in poor quality or polluted soils. Four soil simulants were selected, the lunar low-titanium basaltic regolith LMS-1, lunar-type LHS-1, which is a high-fidelity mineral soil sample representative of general highland soils on the Moon. Of the Mars simulants, MGS-1 is a high mineralogical accuracy basaltic regolith, and the JEZ-1, purchased from the Exolith lab. Of the tested plants, two of them have presented the most prominent results, ivy (Hedera helix) and mustard (Synapsis alba), cuttings were added to the soil mixtures rather than seeds in the case of ivy. The plants were growing better in LHS-1 than in MGS-1, with the best growth in the Moon soil simulant. For the experiment with mustard, they have sprouted in all soil types, with discoloration and deformities on the leaves, indicating nutrient deficiencies.

E660

Detection of bissap calyces and bissap juices adulteration with sorghum leaves using NIR spectroscopy and VIS/NIR spectroscopy

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This study investigated the detection of bissap calyces and juices adulteration with sorghum leaves using near-infrared (NIR) and ultraviolet-visible (VIS/NIR) spectroscopy. Eight samples of bissap calyces-sorghum leaf formulations were prepared using eight concentrations (0, 5, 10, 20, 30, 40, 50 and 100%) w/w. Each sample was prepared in cut, whole and powder forms, respectively. The bissap calyces-sorghum leaf formulations were analyzed with NIRS, while bissap juices were analyzed with VIS/NIR spectroscopy. Results from the physicochemical analysis showed that the unadulterated samples had lower pH and higher (brix, titratable acidity, and total phenolic content), with no intense color change for all forms when compared to adulterated samples. PCA showed no difference between adulterated and unadulterated samples based on forms and concentrations. LDA showed a 100% classification for all cut samples and some misclassifications for whole and powder samples for both NIR and VIS/NIR spectroscopy. Also, there were observable differences between adulterated and unadulterated juices produced from cut forms. PLSR models predicted different concentrations of adulterants presented in forms. NIR and VIS/NIR spectroscopy, combined with chemometric techniques such as PCA, LDA, and PLSR, as a rapid detection technique, showed good potential for sobolo authentication.

Keywords: Bissap calyces, Sorghum leaves, bissap juice, Near-infrared spectroscopy, VIS/NIR spectroscopy, Chemometrics

E661

Predicting Aflatoxin contamination in white and yellow maize using Vis/NIR spectroscopy combined with PCA-LDA and PLSR Models through Aquaphotomics Approaches

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Conventional methods of for the detection of aflatoxin require sample preparation and long analytical time.. This study aimed to develop models, optimized with pre-processing techniques and wavelength ranges to classify and predict 0, 3, 5, 10, 20, 30 and 50 ng/g aflatoxin in three major datasets (naturally contaminated white, spiked white maize and spiked yellow maize). Absorption peaks and bands (500, 950,1000, 1300, 1500, 1900, 2100, and 2300nm) were observed in the spectra, that could be related to aflatoxin contamination. Using all three datasets, the highest classification accuracies of 92.52% and 92.54% were obtained when models were developed at the wavelength range of 450-1050nm and1150-2400nm with Savitsky Golay smoothing (first derivative with filter 17). Sensitivity, precision, specificity and F1 score close to 1. Classification accuracies were 100% at all the distinct wavelength ranges when models were developed separately for each dataset. Partial least squares regression yielded an R2CV of 0.99, RMSECV of 1.70 ng/g, RPD of 9.90, LOD of 0.60 ng/g, LOQ of 1.81 ng/g at the wavelength range of 450-1050nm, indicative of model robustness and high-performance. Aquagrams revealed water matrix coordinates that could be related to aflatoxin presence in maize. The findings suggest that NIRS can be explored as a potential alternative approach for aflatoxin detection and quantification in maize.

Keywords: Aquaphotomics, mycotoxin, machine-learning, modelling, chemometrics

E662

DETECTION OF FOAM ADULTERATION IN HONEY USING ULTRAVIOLET-VISIBLE SPECTROSCOPY (UV-VIS)

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Honey adulteration, especially with foam, although a suspicion, poses significant health risks and economic challenges. Models were developed using UV-VIS spectroscopy to detect and quantify foam adulteration in honey. Adulterated samples were prepared in the laboratory with foam concentrations of 0% (pure), 1%, 1.5%, 3%, and 5%. pH and color were analyzed, and UV-VIS spectra were processed using chemometric techniques: Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), and Partial Least Squares Regression (PLSR).

pH of adulterated honey samples ranged from 4.52 (pure) to 5.94 (5% adulteration), indicating that foam adulteration increases the pH of honey. Lightness (L*) of adulterated samples decreased from 32.28 (pure) to 22.75 (5% adulterated honey), indicating darker coloration with higher foam concentrations. a* (red/green) and b* (yellow/blue) values also decreased, with the 5% adulterated sample recording the lowest values.

PCA revealed distinct separation patterns among the samples. LDA showed an overall correct classification rate of 92.5% for market samples and 89.3% for adulterated samples. LDA model successfully classified pure honey with 100% accuracy. PLSR demonstrated good predictive performance for foam concentration, with values of 0.99 for calibration (R^2C) and 0.96 for cross-validation (R^2CV). Root mean squared error (RMSE) values were 0.12 w/w% for calibration and 0.18 w/w% for cross-validation, indicating high precision

E663

Effects of Staphylococcus cohnii 129 on lipid hydrolysis and oxidation of fermented sausage

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Six strains of coagulase negative staphylococci, isolated from fermented meat products and identified as Staphylococcus hominis 9, Staphylococcus saprophyticus 18, Staphylococcus saprophyticus 27, Staphylococcus xylosus 37, Staphylococcus saprophyticus 120, Staphylococcus cohnii 129, were used to evaluate their lipid hydrolase and antioxidant enzyme activity, subsequently effects of the selected strain on lipid hydrolysis and oxidation of fermented sausage were investigated. Firstly, in the fermentation of meat stimulation medium, S. cohnii 129 showed the highest lipase and superoxide dismutase activities among all tested strains. Then, S. cohnii 129 was selected as the excellent one to ferment sausage individually (S129) and simultaneously with Lactiplantibacillus plantarum 77 (S129+L77), with blank as Control. Lipase activities and the contents of lipid hydrolyzed products including monoglyceride, free glycerol and free fatty acids in S129 and S129+L77 were higher and more than that in Control. The suppression of lipoxygenase activity, TBARS, hexanal and saturated aldehydes production in S129 and S129+L77 were higher than the effect in Control. Moreover, the highest scores of overall flavor and acceptability and lowest score of rancid note were reported for S129. The results obtained indicated that S. cohnii 129 has great potential for improving the flavor of sausage and preventing the formation of off-flavors.

E664

Investigation of the extraction of peppermint (Menthae piperitae folium) active ingredients using microwave-assisted extraction

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Nowadays, herbals are enjoying a renaissance. Peppermint (Menthae piperitae folium) is one of the most popular and widely consumed herbs in Hungary. At present, the production of filter tea generates a large amount of by-products and waste, which can account for up to 10-40% of the starting material. For all of the above reasons, it is therefore worthwhile to ensure that the peppermint is processed in the most efficient manner possible.
The aim of the research was to extract as much as possible of the active ingredients from peppermint raw material by microwave extraction. The solvent used in the experiment was a mixture of ethanol and water, and the solvent-to-mint ratio was set at 30 ml/g. Three parameters were varied: treatment time (2 - 7 - 12 min), microwave power (100 - 450 - 800 W) and solvent concentration (10 - 35 - 60 V/V%). The extractions were performed using the central composite RSM design with 6 measurements in the center point.
Colour and analytical assays such as total polyphenol (TPC) and flavonoid content (TFC), antioxidant capacity (AC) by FRAP and DPPH methods were performed on the prepared extracts. Statistical software Design Expert (demo version) was used to evaluate the results. The aim was to set up a mathematical model to estimate the concentrations of TPC, AC, TFC in the range of the applied measurements. This can be used to optimize the extraction of peppermint for maximum yield.

E665

Toxicological Profiles of Polyethylene Terephthalate (PET) and Its Additives: A Systematic Review Across Ecosystems and Human Health

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Since the 1950s, the production and use of plastics have increased exponentially. This review focuses on one of the most widely used polymers, polyethylene terephthalate (PET) and its additives.
Emphasis is given to the potential toxic effects on terrestrial and aquatic ecosystems, as well as on potential harmful effects on human health. PET micro- and nanoplastics have been detected in various human and animal biological samples such as blood, heart, placenta, breast milk, sputum, semen. In addition to PET itself, many additives which are added during the plastics manufacturing process can be potentially toxic and hazardous as well. Therefore, this review aims to examine potential harmful effects of PET together with their additives.
Out of the collected 152 articles, 105 focused on PET, yet only half of them examined the combined effects of PET and its additives. Most of the articles conducted human health-relevant studies, followed by aquatic then terrestrial aspects. However, a systematic comparison of PET additives at different exposure concentrations and research regarding the long-term and mixed exposure scenarios remain scarce. Hence, it is of utmost importance to develop comprehensive toxicological assessments and protocols which will help understand the hazards of these substances and their uptake kinetics

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E666

Protein Consumption in Sports: Enhancing Strength and Endurance

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There have been numerous studies on what the diet of an athlete should consist of, however there are controversial opinions in this regard, raising further questions, whether it is proteins or rather carbohydrates that really enhances the performance of physically active individuals. Athletes are usually associated with significant protein intake, and it is generally believed, that proteins should be the main components of their diets and the carbohydrate and fat intake should be reduced as much as possible.
According to some studies, the highest source of energy lies in carbohydrates and fats, suggesting that athletes are in great need of these nutrients, as their body uses up a significant amount of energy during exercise. They not only place a big emphasis on carbohydrate and fat consumption, but it has also been proven in certain experiments, that the body cannot utilize proteins, no matter the amount, unless it is consumed together with carbohydrates and fats. Other studies have elaborated on the fact, that the necessary protein intake cannot be generally stated, since it is highly dependent on different aspects, such as the gender of the athlete, or weather the individual is an endurance or strength athlete. It has been investigated as well, that although some plants have a high protein content, the proteins that can be utilized by the body to the highest extent are of animal origin, such as meat and dairy products.

E667

ENHANCING SUGAR ADULTERATION DETECTION IN CLEAR APPLE JUICE USING LASER LIGHT BACKSCATTERING IMAGING: COMPARING TRANSMISSION AND TRANSFLECTION MODES

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This research investigated the feasibility of laser light backscattering imaging (LLBI) for identifying added sugar in 100% clear apple juice, comparing two measurement configurations: transmission (M1) and transflection (M2). Samples with six adulteration rates were illuminated using seven laser wavelengths (532–1064 nm). Backscattering signals were modelled using Gaussian distribution functions to extract three features per wavelength. Multivariate models - Random Forest (RF), Linear Discriminant Analysis (LDA), and Partial Least Squares Regression (PLSR) - were developed for classification and regression tasks. All features showed significant sensitivity to sugar addition, particularly at shorter wavelengths. M2 enhanced scattering intensity and improved model performance compared to M1. The RF model using M2 data achieved the highest classification accuracy (98.2%) and excellent regression results (= 0.950, RMSEP = 0.795%). These findings demonstrate that combining M2 with RF modeling provides a fast, non-destructive, and accurate approach for detecting sugar adulteration in clear apple juice.

E668

Effect of acid's different parentages on egg white properties

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This experiment was made to evaluate the impact of different acids on the properties of liquid egg white on 2 weeks period of storage. Ascorbic acid, phosphoric acid and citric acid are known for their acidic nature and widely used in food systems as a preservation method. By examining its effects on key properties such as, viscosity, rheological behavior, and foaming ability and stability this study aims to provide valuable insights into how acids influence the functional and processing characteristics of liquid egg white product.
homogenized and pasteurized liquid egg white samples were mixed with different acids. Liquid egg white pH was reduced from 7.4 ± 0.2 to 5.9 ± 0.1, 5.9 ± 0.3 and 5.9 ± 0.1 with phosphoric acid, citric acid, and ascorbic acid samples respectively, by adding 40 ml of phosphoric acid, 20 ml of citric acid and 32 ml of ascorbic acid solutions to the liquid egg white, then homogenized measurement was made on week 1 and week 2 after storing at 4 °C.
The rheological properties of liquid egg whites were affected by acid treatments. Phosphoric acid slightly increased structural integrity, citric acid weakened the gel network and ascorbic acid significantly increased viscosity. Over two weeks of storage, protein degradation led to changes in flow behavior, with ascorbic acid enhancing viscosity while other acids generally reduced it.

E669

COMPARISON OF THE HEMOGLOBIN CONTENT OF FATTENED GOOSE LIVERS AFFECTED AND NON-AFFECTED BY GREENING

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Fattened goose livers are vacuum-packed and stored frozen. It is a common problem that green spots appear on the surface of the products. It is assumed that the hemoglobin of residual blood in the livers can be associated with the discoloration.
The aim of the study was to investigate the hemoglobin content of fattened goose livers affected and non-affected by greening.
Hemoglobin content of the livers was determined by using Sigma-Aldrich's Drabkin's Reagent. Livers were individually homogenized and 4 g samples were taken from each of them. The samples were homogenized with 40 ml of water at 10.000 rpm for 1 minute. Mixtures were centrifuged at 5.000 rpm, 4 °C for 10 minutes then filtered. After filtration 20 µl of filtrate and 5 ml of Drabkin's Solution were mixed and stored at room temperature for 15 minutes. The filtrates were submitted to spectrophotometric readings at wavelength 540 nm in a 10 mm pathway cuvets versus blank which was pure Drabkin's Solution. The absorbance values were recorded and the total hemoglobin concentration (mg Hgb / g liver) was calculated.
Significant difference ($P=0.176$) was not detected between fattened goose livers affected and non-affected by greening in term of hemoglobin content.
It is still hypothesized that hemoglobin is one of the main factors that contributes to the appearance of the green spots however the phenomenon is highly complex this is why a holistic approach has to be applied to reveal the mechanism of discoloration.

E670

Quality parameters of beef patties substituted with oyster mushroom

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Regular consumption of meat and fat is a risk factor for degenerative and inflammatory diseases, obesity, cardiovascular diseases and diabetes. The use of oyster mushrooms offers an opportunity to reduce fat and calorie content while enriching the product with valuable nutrients such as proteins, fibers, vitamins, and minerals. Due to its meaty texture and natural umami taste, oyster mushrooms can enhance the sensory properties of meat patties, making them closer in taste and texture to traditional meat products.

Meat patties were prepared using 2n –type experimental design, with mushroom and fat content as the two factors. The low levels were set at 20% mushroom and 10% fat content, while the high levels were 50% mushroom and 20% fat. The control sample was beef with 20% fat. Meat patties were analyzed after cooking. Measurements included cooking loss, CIELab* color measurement, texture analysis, and sensory evaluation to assess the impact of formulation changes.

Collected data were statistically analyzed using The Unscrambler software. The results indicate that increasing the mushroom content enhances water retention and juiciness. Hardness supports the sensory findings, showing that higher mushroom content softens the texture and makes it more crumbly. The Lab* color values were influenced by the mushroom content, with ΔE* showing noticeable differences between samples. Sensory evaluation showed that overall likeness correlated with taste. In these cases, fat content had n

E671

Structural characterization and hypoglycaemic effects on type 2 diabetic mice of Spirulina platensis polysaccharides and Se-modified polysaccharides

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Type 2 diabetes mellitus (T2DM) is a metabolic disorder characterized by hyperglycemia and insulin resistance, often associated with imbalances in gut microbiota and dysregulated metabolic pathways. Natural compounds exhibit considerable potential in the prevention and adjunctive treatment of T2DM due to their diverse sources, various mechanisms of action, and fewer side effects. In this study, we prepared Spirulina platensis polysaccharides (SPP) and selenium-enriched SPP (SeSPP), and assessed their structural properties and hypoglycaemic functions both in vitro and in vivo. The results of the structural characterization indicated that SPP was successfully selenized. The interaction between SPP and selenium primarily occurred in the forms of Se-O-C and O-Se-O through covalent interactions. In vitro and vivo assays demonstrated that SeSPP exhibited significantly enhanced hypoglycaemic and antioxidant properties compared to SPP. Additionally, both SPP and SeSPP significantly improved the gut microecological balance by increasing beneficial bacteria and reducing conditionally pathogenic bacteria. Multi-omics analysis revealed that their hypoglycemic effects were mediated through the regulation of lipid and carbohydrate metabolism, as well as cellular signaling pathways. In conclusion, SPP demonstrated strong potential as a dietary supplement or adjunctive therapy for T2DM, leveraging multi-target and multi-pathway mechanisms to alleviate metabolic disorders.

E672

Effects of bran dietary fiber-gluten protein interactions on dough structure and properties

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The addition of exogenous WBDF usually interacts with the major components of the food system, which may be an important factor in determining the edible properties of food. Among them, gluten protein is one of the major components of wheat flour that provides unique rheological properties for flour products, and it is also the natural carrier of WBDF. Recent research has shown that WBDF and gluten protein may form complexes through noncovalent interaction, which affect the structural and functional properties of gluten protein. Therefore, the effects of wheat bran dietary fiber (WBDF) on the formation mechanism and multiscale structures of the WBDF-gluten protein complex were investigated. In the process of dough formation, the interaction between glutenin and gliadin facilitates their aggregation, which plays a crucial role in the formation of the gluten network structure. Therefore, the effects mechanisms of WBDF-gluten protein interaction on gluten protein aggregation behavior were investigated. Wheat flour primarily consists of gluten proteins and starch. The interaction between the two promotes the formation of a continuous gluten-starch network, giving the dough unique rheological properties. Therefore, WBDF-gluten protein interaction on macro-rheology and microstructure of dough were investigated. The aim is to provide valuable theoretical and practical guidance for optimizing the application of WBDF in dough products industry.

E673

Impact Of Clarifying Agents on The Bioactive Compounds, Antioxidant Levels and Color properties Of Aronia Juice

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The global demand for fruit juices is rising, driving interest in natural clarification methods to enhance visual appeal (Shirvani, Mirzaaghaei, and Goli 2023). Black chokeberry (Aronia melanocarpa (Michx.) Elliott) is rich in phenolics, anthocyanins, and antioxidants, making it valuable for juices and natural food colorants. However, its astringency limits direct consumption (Oziembłowski et al. 2022; Kapci et al. 2013). This study evaluated the impact of three different positively charged clarifying agents: gelatin-based (Erbigel), and plant-based (Litto Fresh and Flora Claire) on Aronia juice, it was evaluated based on total anthocyanin content (TAC), total phenolic content (TPC), ferric reducing ability of plasma (FRAP), and color properties. Total anthocyanins (TAC) were highest in samples treated with Klar Super + Flora Claire and Klar Sol30 + Erbigel compared to the control, (50.64 ± 0.42 mg/L and 50.64 ± 1.08 mg/L, respectively). The highest total phenolic content (TPC) was observed with Klar Super + Erbigel (7838.36 ± 238.02 GAE mg/L), while Klar Sol30 + Litto Fresh yielded the highest antioxidant activity (8895.65 ± 654.94 mg/L) compared to the control samples. Color differences varied, with Klar Super + Litto Fresh causing the most noticeable change (ΔE > 9), the remaining samples showed well visibility of the color difference (3>ΔE>7). This study highlights the potential of selected clarifying agents to enhance juice clarity while preserving bioactive compounds

E674

Improving the food safety of fresh-cut salad products during the production process

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My research includes the examination of the production and processing parameters of fresh-cut salad products, as well as the determination of development directions that help increase the food safety of the products.
The food safety and shelf life of freshly cut salad products are greatly influenced by the conditions of raw material storage, preparation, cleaning, cutting, washing, drying, semi-finished product storage, and packaging.
With the experiment, I analyzed how the physical, chemical, and microbiological hazards arising during the processing process of the tested Iceberg Lettuce (Lactuca sativa var. capitata, "Iceberg") can be reduced with the parameters determined by good manufacturing and hygiene practices, as well as how the individual parameters (temperature, time, hygiene) affect the quality of the finished product.
The main conclusions of the study were based on the microbiological tests of the finished products (Microbial count, Listeria Monocytogenes, Staphylococcus aureus, Salmonella spp., Escherichia coli O157:H7).
Based on the test results obtained, it can be said that compliance with the previously determined temperature and storage parameters, as well as appropriate hygiene conditions, preserves the good quality of the finished product and increases its food safety
Acknowledgements:
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E675

Effect of Age on Meat Quality Attributes in Wild Red (Cervus elaphus) and Fallow Deer (Dama dama)

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This study evaluated the influence of age on selected meat quality characteristics in wild red deer (Cervus elaphus) and wild fallow deer (Dama dama) from Western Hungary. Semimembranosus muscle samples were collected from nine deer aged 7–48 months. Additionally, one wild red deer meat sample of unknown age was included. The aim was to assess age-related quality trends and estimate the age of the unknown sample.
Measured parameters included pH, water-holding capacity (WHC), instrumental color, and instrumental texture attributes. Results showed clear age-related trends: older samples generally had higher WHC, shear force, chewiness, and lower L* values. Younger samples exhibited higher lightness and redness, and lower pH and WHC, reflecting more tender, lighter meat. The unknown sample displayed intermediate pH (5.87), low WHC (0.00042), moderate L* (37.0), high a* (13.4), and elevated shear force (103.75 N) and chewiness (3.46 J). These traits suggest an estimated age of approximately 32–37 months.
Overall, the study confirms that age significantly influences meat quality in wild deer species and highlights the importance of considering age in meat quality assessment. Future research should explore larger sample sizes and additional quality parameters to strengthen these findings.

E676

Whole Genome Analysis of Pediococcus acidilactici XJ-24 and Its Role in Preventing Listeria monocytogenes ATCC® 19115TM Infection in C57BL/6 Mice

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Abstract: Background/Objectives:As probiotics gain prominence in the prevention and treatment of intestinal diseases, their protective effects against pathogens and in-fluence on host health have drawn significant attention. This study investigates the genomic characteristics and functional potential of Pediococcus acidilactici XJ-24 (XJ-24) in the prevention of Listeria monocytogenes (LM) infection in mice. Methods/Results: Whole-genome analysis confirmed the safety and probiotic properties of XJ-24, including acid and bile salt tolerance, antimicrobial activity, and safety. In vivo, C57BL/6 mice challenges indicated that XJ-24 significantly reduced LM colonization, sup-pressed pro-inflammatory cytokines (IL-1β, IL-6, TNF-α, IFN-γ), alleviated colon and spleen tissue damage, and maintained intestinal barrier integrity by upregulating tight junction proteins (Occludin, Claudin-1, ZO-1). Moreover, XJ-24 modulated gut microbiota composition by increasing beneficial taxa while reducing harmful bacteria. Correlation analysis highlighted a positive association between Lachnospiraceae and tight junction proteins. Conclusions: These findings demonstrate the potential of XJ-24 as a functional probiotic for preventing LM infection and provide a basis for further clini-cal exploration.

Keywords: probiotic; whole-genome analysis; intestinal barrier; intestinal microbiome

E677

Discrimination of Hungarian Paprika Growing Regions Using Multi-Element Profiling Combined with Chemometric Techniques

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Paprika is one of popular spices used around the world. The quality of paprika is strongly influenced by cultivation area. This study investigates the mineral composition of paprika fruits from four major growing regions of Hungary. The concentrations of many macro-, micro-, and toxic trace elements in three main parts of paprika fruits (peel, pith and seeds) were determined by ICP-MS and ICP-OES techniques. The results indicated that the pith contained the highest levels of the element, followed by the peel, and lowest in the seeds. Although certain toxic elements were detected in some areas, their concentrations remained below the licit. The PCA and LDA techniques were used to classify samples by geographical origin based on their elemental profiles. The results demonstrated that PCA effectively distinguished growing regions of paprika, accounting for 69.1%, 65.2%, and 59.2% of the total variance for the peel, pith and seeds, respectively. LDA exhibited strong classification performance for growing regions, with the first two discriminant functions explaining between 90.4% and 98.5% of the total variance. Notably, combining element profiles from peel, pith, and seeds enhanced the discriminatory capability. The results demonstrated that this analytical approach was effective for the geographic classification of paprika from different regions of Hungary and could be a valuable tool for supporting fair trade in the market.

E678

Factors effect sensory properties of apricot

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Apricot is a highly economical fruit because of its nutrition, attractive appearance, and typical flavor. This fruit has its short season and postharvest shelf-life, thus the marketability are limited. The ripening process of apricot is very rapid, therefore the fruit qualities decrease significantly including wrinked skin, flavor, and nutrition losses. Color, appearance, texture and flavor being sensory attributes of fruit affecting the acceptability of consumer. Among them, color and appearance are characteristics which consumers are consider to chose, whereas flavor and texture are important factors driving the consumer satisfactory. The ratio of sugars and acids and the concentration of voltatile compounds are main effects of flavors. The major factors affect the organoleptic of apricot are cultivar, harvesting time, conditions during transportation and storage. However, the scientific information about the chemical and volatile compositions and sensory attributes of apricot is limit. This work reviewed the sensory quality of apricot at different maturity stages, cultivars and storage conditions after harvest. Thus, proper maturity stage, and postharvest technologies are recommended for each cultivar to obtain the consumer preference.
Keywords: fruit, postharvest, organoleptic, quality, consumer

E679

Egg preservation techniques: A review of conventional and emerging methods

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Egg has been an important food source for long. It enriches human diet and is also popular raw material in the food industry. Chicken egg demand continuously has a stable level across countries, demonstrating strong consumer preference for this livestock product. Due to their perishable nature, the global egg industry encounter great challenges in extending egg shelf life with minimizing the quality loss. In parallel, maintaining a sustainable, cost-effective, and environmentally friendly approach is essential when attempting to extend shelf life. Numerous studies explored thermal and non-thermal technologies. Thermal methods, such as pasteurization, has seen restriction due to the egg's heat-sensitive characteristic. On the other hand, non-thermal technologies such as coatings, ozone gas, UV light have been introduced as promising solutions. Application of edible coatings is increasing, offering a safe and effective technique by establishing a protective layer that seals the pores of the eggshell. There are green technologies for decontaminating eggshell surface, including ozone, and electrolyzed water. This paper provides an overview of the egg's characteristics and a review of current novel emerging methods in egg preservation. Additionally, the study will highlight the prospects and limitations of these techniques and suggest potential areas for future research about extending shelf life and preserving egg quality.
Keywords: coating, ozone, Haugh unit, eggshell, yolk

E680

Synthesis of silver nanoparticles from Syzygium Samagense flower extract

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This study explored the utilization of agricultural by-products as raw materials for synthesizing silver nanoparticles (AgNPs) with potential applications in pesticide formulations. The synthesis of silver nanoparticles was achieved through a chemical reduction method, utilizing polyphenol molecules extracted from Syzygium samagense flower buds as the reducing agent. The effects of various reaction conditions such as silver nitrate concentration, extract to AgNO3 solution ratio, reaction time, and temperature were investigated. The silver nanoparticles were characterized by spectroscopic techniques, X-ray diffraction analysis and scanning electron microscopy (FE-SEM). The results demonstrated that silver nanoparticles with an average size ranged from 5 nm to 35 nm were successfully synthesized with high efficiency under optimal conditions, including ratio of flower bud extract and 5 mM $AgNO_3$ solution as 4:30, temperature reaction of 70 °C and reaction duration of 45 minutes. These findings highlight the potential of Syzygium samagense flower bud extract as a sustainable and eco-friendly reducing agent for the synthesis of silver nanoparticles, which could be further applied in pesticide development.

E681

Physical and Chemical Properties of Fructo-Oligosaccharide Enriched Walnut Creams

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Consumption of dietary fiber is essential to maintain a healthy digestive system. Walnuts are popular both raw and processed form for their positive physiological effects. The aim of our research was to compare the physical and chemical properties of walnut creams made from high nutrient walnut pellets, a by-product of walnut oil production, enriched with four different prebiotic fibers. In the experiment, the moisture content, CIE Lab colour components and particle size of the nut creams were determined. The oil content of the samples was also measured. The rheological measurements were performed by amplitude sweep to determine the LVE and flow point, and rotational measurements were performed to determine the viscosity at constant shear rate. In the chemical measurements, water activity and total polyphenol content were determined, and finally antioxidant capacity was tested.
The results showed that the fibre-enriched walnut creams have low water activity and moisture content, making them long-lasting products. Among the samples tested, the apple fibre enriched nut cream had one of the smallest particle sizes and the highest average dynamic viscosity at constant shear rate. Its oil spreading was one of the lowest and it is considered as a stable nut cream. Its colour was darker, browner and richer than the other samples. The apple fibre enriched walnut cream had a high antioxidant and polyphenol content.

E682

Are you getting enough protein? – the truth behind young adult's protein intake - a review

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This review was carried out by one of the Future Leaders Program's groups from the academic career path within the project "Nutritional Myths and Science - Proteins in Black and White." The main goal of the research was to get an understanding of teens and young adult's protein consumption, and the diet trends that they are following. More than 20 scientific articles were processed and compared on the topic. There was an agreement within the articles that the most consumed protein source is eggs. Also, more and more teens and young adults are consuming some protein supplements, to gain muscle or to drop weight. A tendency was shown among the articles, that male and female participants of various types of research showed different eating habits, with distinct goals.
This review explains the different diets and habits, reflected on protein consumption. As a vision of the new eating habits, it is visible that academic stress and lifestyles heavily affect the food choices of teens and young adults

E683

Antibiotic resistance analysis of bacteria isolated from drinking water distribution systems

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Access to safe drinking water remains inadequate in many regions, posing significant public health risks due to waterborne bacterial infections. These risks are heightened by the increasing presence of antibiotic-resistant bacteria (ARB) in treated drinking water, creating challenges for water quality management and disease prevention. This study focused on identifying bacteria in drinking water sytems from various Hungarian households and analyzing their antibiotic resistance, with an emphasis on opportunistic pathogens. Water samples were collected from five cities and eight districts of Budapest, processed using membrane filtration, and analyzed via MALDI-TOF MS. Antibiotic resistance was assessed using the Kirby-Bauer disk diffusion method in 3 different media. A total of 26 bacterial strains, including opportunistic pathogens (e.g. Bacillus cereus, Pseudomonas aeruginosa) were identified. The selection of nine antibiotics for susceptibility testing was guided by literature and prior expertise. The results revealed that a notable proportion of the bacterial strains exhibited resistance to aztreonam and oxacillin, whereas ciprofloxacin and gentamicin demonstrated the highest efficacy. These findings highlight the critical need for intensified monitoring and improved control measures to ensure the safety of drinking water and to address the growing challenge of antibiotic resistance transmission.

E684

Spectral response of grapevine (Vitis vinifera L.) cultivar Riesling to foliar applications

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This study investigates the effects of different foliar applications on the spectral characteristics of grapevine (Vitis vinifera L.) cv. Riesling leaves. In addition to untreated control plants, experimental plots were treated with natural bioactivator extracts and microelements. Leaf samples were collected at the beginning of July and September 2024, referring to E-L33-34 and E-L38 Eichhorn-Lorenz phenological stages. Reflectance measurements were performed on leaf discs of uniform size (r = 10 mm; A = 314.2 mm²) using a CI-710 Leaf Spectrometer. Spectral data were analyzed using principal component analysis (PCA), and selected wavebands were utilized to compute vegetation indices, including NDVI, EVI, CIgr, MCARI, NDRE, TVI, VARI, and PRI. PCA revealed that the first principal component (PC1) accounted for 54.3% of the total variance, while PC2 and PC3 explained 35.5% and 5.5%, respectively. The highest loading for PC1 was observed at 725 nm, whereas for PC2, it was at 505 nm. Analysis of variance (ANOVA) indicated that the applied treatments had a statistically significant effect on the vegetation indices. These findings highlight the impact of foliar applications and corroborate previous results demonstrating that leaf chlorophyll content and morphology are influenced by different treatments.

This study was supported by the Agri-Digital Growth Central Europe Interreg Project (CE0200761)

E685

Optimizing the extraction of bioactive compounds from Gynostemma pentaphyllum using Response Surface Methodology (RSM)

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Gynostemma pentaphyllum, a medicinal herb of the Cucurbitaceae family with historical significance in Asian traditional medicine, was investigated for the optimization of bioactive compound extraction. This study employed Response Surface Methodology (RSM) utilizing a Central Composite Circumscribed (CCC) design, comprising 17 experimental runs with triplicate replication at the central point, to assess the effects of ethanol concentration (50-80%), extraction temperature (60-80°C), and extraction time (90-150 min) on the extraction efficiency of bioactive compounds. The optimal parameters were determined to be an ethanol concentration of 80%, an extraction temperature of 80°C, and an extraction time of 115 min. Under these conditions, the obtained contents of polyphenol, saponin, saponin, chlorophyll, antioxidant activity, and the obtained extraction yeild reached 0.51 ± 0.01 mg/g GAE, 8.26 ± 0.001 mg OA/g, 0.11 ± 0.0001 mg/ml, 1.54 ± 0.08 mg Vitamin C/g, and 21.53%, respectively. Model validation through three replicate experiments at the optimized conditions demonstrated no statistically significant difference ($p > 0.05$) between experimental and predicted values, confirming the model's reliability.

Keywords: extraction, Gynostemma pentaphyllum, optimization, polyphenol, saponin, chlorophyll, antioxidant activity

E686

Optimization of microwave-assisted extraction of bioactive compounds from male flowers (Carica papaya L.) using Response Surface Methodology

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The study was conducted with the aim of optimizing the extraction conditions for alkaloids and bioactive compounds from male papaya flowers (Carica papaya L.) using microwave-assisted extraction, to produce male papaya flower honey extract. The microwave power (119W – 700W) and time (60 – 120 seconds) were examined by using the experimental design employed the Response Surface Methodology (RSM) with a Central Composite Face-centered (CCF) model. The results demonstrated that the optimal extraction conditions were achieved at a microwave power of 385W and a microwave time of 80 seconds. In these conditions, alkaloid content, polyphenol content, flavonoid content, and antioxidant activity reached 0.033 ± 0.001 mg BER-H/g, 9.15 ± 0.14 mg GAE/g, 3.39 ± 0.13 mg rutin/g, and 12.93 ± 0.17 mg vitamin C/g, respectively.

Keywords: optimization, RSM, papaya, male flower, bioactive compound

687

Free-labeled PH-optimized GO-Au@Ag fabricated SERS-nanosensor rapid prediction of Pb and Hg traces

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Heavy metals accumulations in humans pose debilitating health threats. Conventional methods are deficient in the rapid prediction of heavy metals traces in water, food and biological materials at low limits of detection (LOD). This paper attempted the synthesis and fabrication of free-labeled pH-optimized SERS GO-Au@Ag-nanosensor coupled to competitive-adaptive-reweighted-sampling-partial least square (CARS-PLS) algorithm for the rapid prediction of Pb and Hg traces in serial aqueous standard solutions (SS); and spiked cocoa beans samples (SCBS) used as food and biomaterial. A dynamic linear range concentrations of 103 – 10-4 µg/mL with linearity coefficients (96-99.9%), and LOD (3.13 x 10-5 and 4.08x10-5µg/mL) respectively were realized for Pb and Hg in the SCBS, indicative of the sensor's ability to detect below the European Commission's set maximum permissible limits of Pb (0.001mg/g) and Hg (0.005 mg/g) for cocoa beans. Computed recovery rates (RC) and coefficient of variations (CV) for both Pb and Hg in SS and SCBS ranged between (94.27 - 109.96%) and (0.45 – 5.85%) respectively; and were not significantly different (p-values = 0.12 - 0.77, α = 5%), implying the sensor's capability to predict the traces of heavy metals in the SS and SCBS similarly. CARS-PLS built-models recorded high residual-predictive-deviations (RPD) of 3.02 – 7.40, indicative of models' robustness and stability in the prediction of both analytes. All results were predicted within 4.07s, indicating

E688

Concentration-Regulated Fibrillation of Peanut Protein: formation, structural characteristics, and emulsifying properties

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This article investigates the structure and emulsification properties of peanut protein amyloid fibrils (PAFs) formed at pH 2.0 and different protein concentrations (PC). The findings demonstrated that with an escalation in the PC concentration (10−80 mg/mL), the conversion rate and β-sheet ratio of the fibrils significantly rose, suggesting that the increase in protein concentration promoted the formation of the fibrils. When the concentration was 10 mg/mL, large aggregates and a few short fibrils were formed; when the concentration was 40 mg/mL, more curved fibrils were formed; when the concentration is 60 mg/mL, long curved fibrils were formed; at higher concentrations (80 mg/mL), short and thick fibrils and rigid straight fibrils were formed. This indicates that the morphology of the fibrils formed under different PCs varies. Additionally, increasing the concentration of PC (10−60 mg/mL) rendered the PAF structure more stable, enhanced the thermal stability, and resulted in a higher emulsification activity index (EAI). When the protein concentration was higher (80 mg/mL), the EAI of the fibrils decreased. This study will intensify the exploration of the concentration-regulated protein fibrillation

E689

Effect of trehalose as substrate and inactivation methods on antimicrobial activity of probiotic-based parabiotics

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No doubt that probiotics have many beneficial advantages, however these effects in most cases are due to the cellular substances and/or fragments that can be synthetised separately by fermentation and generally do not need the presence of alive cells. This study investigated the effect of trehalose and inactivation methods on antimicrobial properties of probiotic-based parabiotics. Four probiotic LAB strains were grown on MRS medium and different physical and chemical cell inactivation methods were used. Antimicrobial activity was checked by agar diffusion method using 5 different test microorganisms. Our results showed that substitution of glucose in MRS culture medium by trehalose increased the antimicrobial activity of parabiotics while slightly reducing growth rates of bacterial cells. Meanwhile, heat treatment at 100°C for 15 minutes was the most effective physical method, CTAB was the best chemical method for inactivating probiotic LAB cells for the antimicrobial activity of parabiotics. Sonication showed low antimicrobial activity of some investigated LAB strains, while freeze-thaw cycle, triton-x, and SDS did not provide detectable results. All probiotic-based parabiotics showed antimicrobial activity against Gram-negative and Gram-positive foodborne pathogenic bacteria. This result is new and very promising making parabiotics excellent candidates in food preservation application.
This work was supported by the Flagship Programme of MATE and TKP2021-NVA-22 projects

E690

Data-Driven System for Vertical Farming and Milk Quality Prediction: A Framework for Investigating the Impact of Microgreens in Dairy Nutrition

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Sustainable agriculture and precision farming are becoming increasingly important in optimizing food production. This study presents a novel data-driven system that integrates a sensor-equipped vertical farming chamber with a machine learning-based milk quality prediction model. The vertical farming chamber is designed to maintain constant water levels, nutrient content, and temperature, while allowing controlled adjustments to the light program, enabling precise microgreens cultivation. The milk quality prediction model accurately estimates protein content based on dairy feed composition. This integrated system lays the foundation for a large-scale experiment to investigate the effects of microgreens supplementation in dairy cattle feed on milk composition and nutritional value. The proposed approach bridges precision crop cultivation and livestock nutrition, offering potential advancements in sustainable and high-quality dairy production.

E691

FOOD WASTE MANAGEMENT STRATEGIES: A SYSTEMATIC LITERATURE REVIEW

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Our research aims to identify and evaluate effective strategies to improve sustainability by reducing food waste. We explore the use of organic matter and microbial inoculants to enhance composting and biodegradation processes. Using systematic review methodology, we identified and evaluated the most effective strategies for food waste management. PubMed and Google Scholar were searched using keywords like “food waste OR agricultural waste” and “composts OR digests,” resulting in 585 relevant papers from an initial 26,806. Rayyan AI was used to filter and narrow these down to 44, excluding irrelevant publications.
The most common technique was composting, including windrow, bin, vermicomposting, and anaerobic digestion. These methods were found to be effective in minimizing food waste. The study also assessed the role of microbial inoculants in accelerating biodegradation. Key factors influencing the effectiveness of these methods include biodegradation rate, microbial activity, CO_2 emissions, and compost quality. Aerobic conditions and microbial inoculants significantly improved biodegradation, especially in composting banana peels.
Based on our findings, we recommend implementing food waste management policies, improving waste treatment technology, fostering collaboration, recovering energy from food waste, standardizing product labeling, and educating the public to encourage waste reduction.

E692

Characterization of wastewater and sludge based on dielectric parameters and monitoring of organic matter removal

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Dielectric measurements are considered as rapid and non-destructive method and do not require special sample preparation and specific reagents. If the material under test (MUT) or its components react differently to the electromagnetic field, differences in composition or certain biological, chemical or physical changes can be detected and monitored by dielectric measurements.

In our research work, the dielectric constant and loss factor of different types and origins, and from different stages of wastewater treatment processes, were investigated using an open-ended coaxial dielectric sensor (DAK 3.5, Speag) in the frequency range of 200-2400 MHz (ZVL-3 VNA, Rohde&Schwarz). Changes in conventional analytical parameters (COD, BOD, TOC/TC, TN, TP) were also determined using biological and physico-chemical wastewater and sludge treatment processes.

It was found that based on the dielectric loss factor and the dielectric constant to loss factor ratio there can be detected difference between the sewage and sludge types. Furthermore, our results are also verified that the change of organic pollutant concentrations correlated well with dielectric parameters in the 400-700 MHz frequency range.

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E693

Non-measurement estimation of salami water activity based on water content and dry matter-to-fat ratio

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Salami production is a typical example of preservation by complex treatment, in which the principles of the barrier theory are widely applied. The shelf life of the product is served by the appropriate water activity, the sufficiently low pH, the presence of a starter culture that displaces competing bacteria, the salt content, etc. Accordingly, the Hungarian Food Code sets strict limits for the chemical and physical characteristics of salami. In industrial practice, these parameters are measured mainly by destructive methods, and the determination of water activity is also a time-consuming activity.

An important goal for the meat industry is to determine as precisely as possible the end of the salami ripening process, i.e. the moment when the product meets the prescribed limits. During our research, the water content, fat content and water activity of the dried paprika salami were examined. The answer to the question was sought: if the water content of the tested product reaches the 34% limit, can it be assumed that its water activity also meets the 0.95 limit?

Water activity can be estimated by the chemical composition of the paste before filling and the current water content during maturation. According to our results, all the three examined regression models confirm that if the water content limit value is met, the water activity is also adequate. Therefore, monitoring the development of the water content during maturation is sufficient to determine the end of maturation.

E694

The Impact of Pre-Harvest 1-MCP Treatment on Apple Quality and Harvest Management

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Recent years have presented significant challenges to farmers, including those engaged in apple cultivation. Climate change, the reduction in the number of applicable pesticides, and the recruitment and organisation of the harvest workforce have become increasingly difficult for producers. The application of innovative solutions has become essential to maintain productivity efficiency. The judicious application of the ripening inhibitor molecule 1-MCP, when administered to fruit still on the tree, has been shown to influence the colour, firmness and refraction of the fruit, thereby aligning with market expectations. This technology facilitates the achievement and scheduling of optimal harvest maturity, enhancing fruit market value and ensuring more efficient harvesting operations. However, this approach necessitates an increased demand for labour within agricultural settings. The present experiment involved the treatment of fruit on the tree with the molecule 1-MCP, encompassing various varieties and at different times, with the aim of examining the effect on the fruits. The results obtained indicate that the treatment had a positive effect on ethylene release and against fruit drop.

Keywords: Preharvest, Postharvest, 1-MCP, Apple, anti-ripening, HarvistaTM, SmartFreshTM

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E695

BIOMETHANE AND NATURAL GAS ODOR CONTROL USING GAS DETECTION TUBES - REDUCTION TO REFERENCE CONDITIONS

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The odorization of biomethane and natural gas is essential for public safety, as both gases are colorless and odorless. The aim of this study was to assess whether it is always necessary to correct the measured odorant concentrations (tetrahydrothiophene, THT) in gas distribution systems to reference conditions, which typically account for temperature, atmospheric pressure, and gas pressure. To achieve this, the research employed detection tubes to measure THT concentration under various operational conditions. The study's key finding indicated that when gas temperatures are below 10°C and the elevation is under 100 meters, corrections to the measured concentration are not required. This result suggests that under these specific conditions, the THT concentration measurements can be considered accurate without further adjustments, potentially simplifying the odorization monitoring process. Based on these findings, additional studies are recommended to verify the applicability of these conditions in different geographical locations and gas distribution systems. Such investigations could lead to more efficient monitoring protocols, reduce operational complexity, and ensure regulatory compliance.

Key words: odorization, biomethane, natural gas, tetrahydrothiophene, gas monitoring,

E696

Effect of nitrogen supplementation on the fermentation of commercial apple juice with different Bifidobacterium strains.

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Fruit juice offers an alternative carrier for probiotics for those with milk allergies or lactose intolerance. However, generally, fruit juices lack short peptides and free amino acids needed for probiotic metabolism. This study examined the effect of two nitrogen sources (soy peptone and yeast extract) on fermentation efficiency and the quality of the beverage. Commercial unfiltered apple juice was fermented by six Bifidobacterium monocultures at 37 °C for 24h. Two nitrogen sources were then added at 1% and 2% using two selected Bifidobacterium strains. Samples were taken at 0, 8, 16, 24, and 32 hours of fermentation, and analysed. Apple juice supported Bifidobacterium growth, with cell counts exceeding 10^8 CFU/mL after 24h. Addition of exogenous nitrogen supported bacterial growth and metabolism by increasing sugar consumption and production of organic acids. However, both antioxidant and total phenolic content of the fermented apple juice supplemented with exogenous nitrogen were lower than ones without. The highest total phenolic content and antioxidant capacity (945 mgGAE/mL, 10.29 mM$FeSO_4$/mL) were observed when the beverage was fermented with in B. longum DSM 16603 without nitrogen addition. These results are valuable for development of probiotic apple juice.

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E697

Characterization of a commercial fungal L-asparaginase for acrylamide mitigation in thermally processed starchy food

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During the thermal processing of starchy foods, reducing sugars react with the amino acid asparagine, leading to the formation of acrylamide, a probable human carcinogen (group 2A). L-asparaginase catalyzes the conversion of asparagine to aspartic acid and ammonia, with this reducing the precursor relevant in acrylamide creation. This study characterized a commercial L-asparaginase enzyme (Novozymes), made by Aspergillus oryzae, to determine its optimal activity conditions and catalytic efficiency for acrylamide mitigation. Enzyme activity was quantified via the Nesslerization method, measuring the ammonia released from L-asparagine hydrolysis. The enzyme exhibited maximal activity (10.43 U/ml) at pH 7.2 (Gomori buffer) within the tested pH range of 5–9 (using Tris-HCl, Sorensen, and Gomori buffers). Temperature profiling from 30 °C to 70 °C portrayed a peak activity of 12.29 U/ml at 45 °C, followed by a sharp decline beyond 60 °C. A Bradford protein assay indicated a protein concentration of 0.141 mg/ml, corresponding to a specific activity of 86.94 U/mg. These results demonstrate the enzyme's high catalytic efficiency under conditions used in food processing and can serve as good bases for development of technology for mitigation of acrylamide in food.

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E698

Rheological Properties of Oleogels from Sunflower Oil Containing Beeswax and Monoglyceride

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Due to their physical and physiological properties, oleogels can be used to replace palm fat in foods. Sunflower oil with high oleic acid content was gelled using beeswax and monoglyceride. The concentration of the gelling agent was 5, 7 and 9 (weight) %. The beeswax:monoglyceride ratio was 1:0, 1:3, 1:1, 3:1 and 0:1. The oil was heated to 90 °C and the appropriate mass of gelling agents was dissolved in it and then cooled. The flow curve, amplitude and frequency scan curves of the samples were measured at 20 °C with an Anton-Paar MCR302 rheometer. The Herschel-Bulkley and Windhab models were fitted to the flow curves using the Excel Solver program. The Windhab model gaves better approaching the measured curves. Based on the obtained parameters, it can be said that the shear stress characteristic of the yield point increases with the concentration of the gelling agent in the case of both models. The highest shear stress was obtained for the sample containing only monoglyceride. The viscosity parameter also increases with the concentration of the gelling agent and this parameter also reaches its highest value in the oleogel containing only monoglyceride. However, for the samples containing both gelling agents, this parameter is highest when the sample contains beeswax in a 3:1 ratio. This observation may indicate that at this ratio the two gelling agents do not crystallize separately, but form common crystals.

E699

Determination of Bioactive Compounds in Rosemary Extracts Obtained by Microwave-Assisted Extraction

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In recent years, the use of rosemary (Rosmarinus officinalis) has become widespread and popular, partly due to its medicinal and antibacterial properties. The growing interest in rosemary is due to social media trends, educational content shared by food industry companies and the public's health-conscious lifestyle changes.

The aim of this work was to study isopropanol extracts of dried rosemary leaves. Following solvent removal, the obtained extracts may enhance the sensory properties of foods and enable the production of functional food products.

The rosemary branches were thoroughly cleaned and dried at room temperature under constant ventilation. The extractions were carried out based on a Central Composite Design, varying three operation factors: concentration of isopropanol in the solvent (10 - 50 - 90 V/V%), microwave power (100 - 450 - 800 W) and extraction time (2 - 6 - 10 min). All experiments were performed at a leaf:solvent ratio of 0.06 g/mL. The polyphenol content (TPC) and antioxidant capacity (TAC) in the extracts were determined by spectrophotometric methods.

The highest TPC value (386.56 mg GSE/L) was obtained at 800 W, 10 min and 90 V/V% isopropanol. The highest TAC value (220.48 mg ASE/L) was also obtained at the maximum parameters. The TPC and TAC values were significantly affected by all three chosen factors, and a significant increase in TPC and TAC values can be expected when they are increased together.

E700

Review on the utilisation of animal by-products in rearing of Hermetia Illucens: Opportunity for food industry, feed industry or waste management?

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The number of scientific publications on the rearing and processing of insects for human consumption has increased exponentially in the last 10 years. In addition, sustainability and the utilisation of by-products is a hot topic in scientific and public literature as well. The study presents the animal by-products and their proportions in different types of slaughter animals, such as blood, endocrine glands, intestine. One of the aims of this review is to collect studies in which animal by-products (for instance blood) were used to rear black soldier flies (BSF). The other main aim is to discuss whether the products of the BSF raised in this way, such as protein and fat, can be used in the food and feed industry in the current European and non-European legislative environment, or whether they can "only" help in the management of the carcass.

E701

Evaluation of Different Edible Coatings for Egg Quality Preservation using Near Infrared Spectroscopy

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This research aimed to investigate the performance of different types of edible coatings, including starch-based, protein-based, and lipid-based coatings, in maintaining egg quality across varying surface areas. A total of 480 fresh eggs (M and XL size) was monitored during 4 weeks of storage (25 ± 1 °C, 60–65%). The results showed that coated eggs maintained better quality parameters (weight loss, Haugh unit, yolk index) compared to uncoated eggs for up to three weeks. Starch-based coatings were more effective in preserving egg quality than protein-based coatings. However, the effectiveness of both starch- and protein-based coatings decreased with increasing egg size. Notably, lipid-based coatings exhibited the best performance across all egg sizes, resulting in only 0.33% weight loss, 87.07% Haugh unit retention and 77.23% yolk index retention by the end of storage. Additionally, NIR spectra were used to develop models for prediction of quality parameters. Among these, the PLSR model combined with SNV preprocessing showed the highest accuracy for predicting weight loss (R^2 = 0.73, RMSE = 1.73%), Haugh unit (R^2 = 0.76, RMSE = 5.77), and yolk index (R^2 = 0.77, RMSE = 2.72). The findings suggest that lipid-based coatings offer a promising solution for preserving eggs at room temperature. Furthermore, the developed models demonstrated reliable performance in predicting key indicators of egg quality.

E702

APPLICATIONS OF ENDOPEPTIDASES IN FOOD INDUSTRY

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Abstract: Endopeptidases, a subclass of protease enzymes, plays a crucial role in protein degradation by cleaving peptide bonds within polypeptide chains. In the food industry, endopeptidases serve essential functions across multiple sectors. They accelerate cheese ripening and enhance flavor development. In meat products, they improve palatability and tenderness by breaking down myofibrillar proteins. Additionally, endopeptidases enhance flavor, improve product appearance, and facilitate the production of gluten-free beer. Another notable application of these enzymes is their involvement in the formation of bioactive peptides. The bioactive peptides offer health benefits, such as antioxidant, antimicrobial, and immunomodulatory activities. With the increasing demand for natural enzyme applications in food processing, peptidases produced by microbes have become the dominant choice due to their adaptability and high efficiency. Commonly used microorganisms for enzyme production include Aspergillus niger, Bacillus subtilis, and Aspergillus oryzae. There is particular interest in reduced gluten content of wheat-based products, especially based on the combination of endopeptidases derived from Flavobacterium meningosepticum or Pyrococcus furiosus, with the expression of gluten-degrading genes. The continuous development and optimization of the application of endopeptidases yield significant advancements including industrial scale solutions.
Keywords: Cheese, meat, beer, protease

E703

Laser backscattering as a non-destructive method for monitoring cheese ripening

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Cheese ripening is a complex biochemical and physical process that significantly affects the texture, flavor, and overall quality of the final product. Monitoring the ripening stages is essential for quality control and process optimization. This study explores the application of laser backscatter imaging (LBI) as a non-destructive, real-time method to assess cheese ripening and correlate it with textural changes. By analyzing the scattering properties of laser light at wavelengths of 532, 635, 780, 808 and 1064 nm, changes in optical properties related to cheese ripening were monitored. Experimental tests were conducted on Trappist cheese samples at different ripening times. Ripening was controlled in a refrigerator at 7.0±1.0 °C and measurements performed once per week. Laser backscatter profiles were compared with cutting tests and texture profile analysis, assessing parameters such as maximum cutting force, total work, hardness, cohesion, adhesiveness, springiness, gumminess and chewiness. The results highlight the potential of LBI as an effective tool for monitoring cheese ripening, with data processed using multivariate statistical models to predict ripeness levels.

E704

Synthesis of Fe3O4/Graphene Oxide nanocomposites on Sugarcane Bagasse-derived Activated Carbon for Cr(VI) removal from aqueous solutions

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In this report, a new nanocomposite material, magnetic graphene oxide on activated carbon from sugarcane bagasse (AC/GO/Fe3O4) was synthesized using the co-precipitation method. This synthesized nanocomposite was employed for the removal of Cr(VI) from an aqueous solution. The AC/GO/Fe3O4 adsorbent was subjected to characterization using FE-SEM, XRD, EDX, FTIR spectra. These techniques determined the morphological structure and properties of nanocomposite materials. The adsorption process of AC/GO/Fe3O4 is described by a pseudo-second-order model. At the equilibrium state, near room temperature, the AC/GO/Fe3O4 material adsorbs Cr (VI) with an equilibrium adsorption capacity of 14.27 mg/g. The maximum adsorption efficiency of Cr (VI) was about 97% after 90 min. Results also show the adsorption capacity of Cr (VI) by the composite was higher than that of activated carbon and magnetic graphene oxide material. The reusability of AC/GO/Fe3O4 material has been demonstrated up to 5 adsorption-desorption cycles with a stable Cr (VI) adsorption efficiency of over 80%. These findings underscore the robustness and potential of the nanocomposite for practical applications. In conclusion, the AC/GO/Fe3O4 adsorbent exhibits exceptional performance in the removal of heavy metal ions, particularly Cr(VI), from aqueous solutions. Its high adsorption capacity, efficiency, and reusability make it a promising and innovative material for advanced water treatment technologies

E705

Encapsulation of phenolic-rich Houttuynia cordata extract using Lyotropic Liquid Crystals based on palm oils-based monoacylglycerols

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Fish mint (Houttuynia cordata) is a well-known herb for its high phenolic content, contributing to its potential antioxidant activity. However, the application of Houttuynia cordata in the food and pharmaceutical industries is still limited due to its poor stability. This study focused on encapsulating phenolic-rich Houttuynia cordata extract using Lyotropic Liquid Crystals (LLCs) based on palm oils-based monoacylglycerols (MAGs). The wall materials were prepared by ultrasonic homogenizing MAGs/water mixtures (40%, 60% MAGs, w/w) into a Pluronic solution (2%, w/w) to formulate LLC dispersions, which then freeze-dried to encapsulate Houttuynia cordata extracts. The physicochemical properties of the dispersions and encapsulated powders such as rheology, refractive properties, and morphology were evaluated using a rheometer, polarized light microscopy, and scanning electron microscopy. The effect of wall compositions on encapsulation efficiency was evaluated over a two-week storage period. The results demonstrated the uniform dispersion of lyotropic liquid crystals in the gel phase. The crystalline structures observed in LLC dispersion with 60% MAG (w/w) which obtained encapsulation efficiency exceeded 75%. Polyphenol degradation after 2 weeks ranged from 10 to 20% depending on the ratios between the leave extract and LLCs. These findings highlight the potential of LLCs to provide better protection for active compounds from herbs during storage, thereby improving the stability.

E706

STUDY THE EFFECT OF AGRO-WASTE STARCH ON THE PHYSICAL PROPERTIES OF BIODEGRADABLE COMPOSITE FILMS

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The widespread use of petroleum-derived plastics has become a major environmental and public health concern due to their persistence and ecological toxicity. Natural-based polymers have emerged as promising sustainable alternatives, offering advantages such as biodegradability, low cost, abundance, and functional properties such as antimicrobial and antioxidant capacity. However, their practical application is often limited due to inherent drawbacks of poor water resistance, brittleness, or weak mechanical strength. Recent studies found that chitosan-starch composite films can address these limitations while enhancing better performance. This study developed biodegradable composite film using starch extracted from avocado seeds (AS) combined with chitosan (C) and glycerol as a plasticizer. The effects of varying AS: C ratios and plasticizer content on the physical properties of composite films were investigated and compared with other commercial starches. Results showed that composite film with an AS: C ratio of 8:2 exhibited the highest Young's modulus value (14Mpa), whereas biofilm with an AS: C ratio of 1:9 obtained the greatest elongation at break (27%). Besides, the water absorption capacity of composite film increased with the increasing amount of chitosan but reduced with glycerol incorporation. These results demonstrate that chitosan-starch composite films can be tailored for specific applications, offering a viable eco-friendly alternative to conventional plastics.

707

Determination of the protein nutritional value of meat products and study of the effect of protein supplementation

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Food adulteration is considered one of the major food safety concerns today and meat products are particularly susceptible to adulteration. The aim of this study was to determine the protein nutritional value of manipulated meat products and to examine the effects of various protein supplements.

Four different types of products were analysed: a control, a mechanically separated meat (MSM)-based product, a collagen- and a soy powder-fortified product. Digestion processes were simulated through in vitro digestion with Infogest method. After digestion amino acid profiles were assessed using chromatographic techniques to determine protein quality and bioavailability. The determined attributes were evaluated using the protein digestibility corrected amino acid score (PDCAAS) and the digestible indispensable amino acid score (DIAAS) indicators.

The highest protein content was found in the control sample while the MSM-based product had the lowest. The protein supplements significantly influenced protein quality: soy enrichment improved nutritional value. The protein digestibility of the MSM product was found to be lower than expected. Based on DIAAS and PDCAAS values it was demonstrated that adulteration directly affects the nutritional quality of foods.

The findings indicate that protein supplementation does not always enhance the nutritional value. The protein quality indicators of fortified and MSM-based products were shown to differ from consumer expectations.

E708

Innovations in Sustainable Farming and Food Processing: Enhancing Productivity and Reducing Waste

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Sustainable agriculture and food processing have become crucial in addressing global food security challenges while minimizing environmental impact. This study explores innovative methods in precision farming, organic waste recycling, and advanced food preservation techniques to enhance productivity and reduce post-harvest losses. Through a combination of field trials and laboratory analysis, the research highlights the benefits of integrating smart farming technologies, biopreservation, and value-added food processing. Findings indicate that adopting these practices can significantly improve food supply chain efficiency, increase smallholder farmer profitability, and promote environmental sustainability. The study further emphasizes the role of policy frameworks and technological advancements in shaping the future of food production. These insights contribute to the ongoing discourse on achieving a resilient and sustainable agricultural ecosystem, particularly in developing economies.

E710

EVALUATION OF NANOFILTRATION MEMBRANE MATERIAL IMPACT ON THE REMOVAL OF PESTICIDES FROM WATER

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Pesticides are excessively used in order to maintain food production and raw material supply. Persistence and excessive use of pesticides has raised an issue of the potential harmful effects on the environment. Often detection of potentially harmful pesticides in various water sources led to requirement for their efficient removal from water. The aim of this study was to determine efficiency of three nanofiltration membranes in the removal of carbofuran, acetamiprid, malathion and propiconazole from water. Different material nanofiltration membranes (polyamide, polypiperazine and cellulose acetate) with molecular weight cut off 200 Da were selected for the removal of four pesticides. Experiments were conducted in a METCell dead-end stirred cell unit from Evonik Industries AG (Germany). The highest rejection values of acetamiprid, malathion and propiconazole were achieved when polyamide membrane was used (above 84.49% rejection). However, the lowest rejection value, 48.28%, was observed for carbofuran with polyamide membrane. Rejection values ranged from 69.26% to 79.10% for selected pesticides when polypiperazine membrane was used. Cellulose acetate membrane performance was greatly dependent on the pesticide, with the rejection values of 57.88% and 62.43% for acetamiprid and carbofuran, respectively, and 74.63% and 100% for propiconazole and malathion, respectively. Acetamiprid and carbofuran had lower rejection by all three membranes compared to propiconazole and malathion, due to lower molecular mass values, suggesting size exclusion as an important removal mechanism.

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E711

Whey Valorization for Alcoholic Fermentation

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During dairy processing, a considerable volume of by-product – whey – is generated, characterized by high organic content. Due to its elevated chemical and biological oxygen demand content (COD: 0.8 - 102 g/L; BOD: 0.6 - 60 g/L), whey poses notable environmental risks. However, its lactose-rich composition renders it a potential substrate for bioethanol production through appropriate biotechnological approaches.

In this study, the applicability of reverse osmosis (RO), concentrated whey (14 - 16% lactose) for ethanol fermentation was assessed using two yeast strains: Saccharomyces cerevisiae (commercial strain - CHR-Hansen Viniflora Merit) and Pichia fermentans (isolated from Gordon Prod. Ltd. - a dairy facility in Bisericani, Romania). The latter was identified via MALDI-TOF mass spectrometry and 16S rRNA sequencing.

Fermentation metabolites, including glucose, galactose, lactic acid, acetic acid, and ethanol were quantified using high-performance liquid chromatography (Agilent 1260 Infinity). Maximum ethanol yields were observed on day 12: 6.84% V/V for S. cerevisiae and 3.45% V/V for P. fermentans. By day 12, P. fermentans had consumed 46.5% of the available galactose, with only 17.75% remaining by day 24.

E712

Distillation process shortcut modeling based on vapour-liquid equilibria (VLE) fitting

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The distillation is one of most important concentration method of multicomponent liquid mixtures. In food industry for obtaining alcoholic beverages with high alcoholic concentrations different variants are chosen, as follows: Repeated simple batch distillation for traditional spirits (kisüsti pálinka, whisk(e)y, cognac, rum), continuous multiple column rectification for vodka, and batch rectification are used to produce modern fruit spirits. Vapor-liquid equilibrium (VLE) data are essential of for design and optimal operation of distillation equipment. Ethanol-water is a non-ideal mixture exhibiting an azeotropic phenomenon with inflection, characterized by a large change in relative volatility. The most common shortcut method for estimating the separation unit number is the McCabe-Thiele (McCT) graphical method, but one of their disadvantages is the difficulty of steps drawing at low reflux ratios, due by closeness of the equilibrium curve and the operation lines. The computer-based McCT method based on discrete equilibrium data could be complicated and quite inaccurate due to the interpolation constraint. In our work we developed continuous VLE functions that extend the applicability and improve the accuracy of the McCT method using exclusively Excel spreadsheets. The main advantage is, that make possible the concomitant determination of the number of stages N and the corresponding reflux ratio R, that is it extremely useful for simplifying the column design, furthermore, would be useful for both pedagogical and modeling purposes.

E713

Non-destructive postharvest monitoring of artificial illumination induced potato greening phenomena

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The quality of potatoes is significantly affected by the storage conditions applied. Direct exposure to natural or artificial light has an effect on the formation of chlorophyll in potatoes, which becomes visible as green surface coloration of the crop. The process of chlorophyll formation is accompanied by the natural synthesis of alpha-chaconine and alpha-solanine, which are toxic glycoalkaloids with natural origin.

The objective of this study was to examine the effect of varying degrees of illumination on the process of greening in relation to the synthesis of potato solanine. For the purpose of this study, table potatoes were stored under three different conditions: in the dark, under artificial illumination by LED lamps and high light intensity providing photolamps. Separate measurements were made on the samples' illuminated and shaded sides. The experiment was performed using non-destructive quality measuring methods, namely surface color measurement and DA-index® measurement. The experiment was carried out over a period of 21 days, during which the samples were stored at ambient temperature. Results indicate that postharvest induced greening can be monitored using the applied non-destructive measuring methods. Significant differences were found in the greening caused by high-intensity photoluminescence and LED lighting compared to control samples kept in dark taking into consideration the surface colour and Vis/NIR DA-meter® measurement results.

E714

Application of handheld near infrared spectroscopy to assess fruit extract enrichment in sour cherry juice

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The consumption of healthy foods has gained undoubted popularity, leading to increasing demand for fortified products containing health-promoting compounds (i.e., vitamins, antioxidants, minerals). It is essential to analyse the composition of these products to ensure consistent and high quality. Near infrared spectroscopy (NIRS), a non-destructive and increasingly applied technique in food analysis, was applied in our study as a rapid method to assess fruit juice fortification. Our aim was to detect and quantify the addition of various fruit extracts in sour cherry juices using NIRS. Cranberry, grapeseed, pomegranate extracts were added in 0-2.5 g/100 mL concentration range in simple, binary or ternary combinations to sour cherry juices. Their transflectance spectra were collected with a handheld NIR spectrometer, and evaluated in the 1350–1850 nm spectral range. Principal component analysis combined with linear discriminant analysis was employed to detect the effect of the added extracts and their concertation. Partial least squares regression was used to predict the fortification degree in the juices. The classification results showed clear separation trends, especially based on extract concentration. The predictive modelling resulted in coefficients of determination higher than 0.9, and root mean square errors below 0.5 g/100 mL during model calibration and validation. The results highlight the potential of NIRS to contribute to healthier and safer beverage options, and aligning with conscious consumer preferences.

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