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International Connect & Expo on

FOOD SCIENCE AND TECHNOLOGY

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Table of Contents

Pg. No	Index
4	Message from the Conference Chair
5	Organizing Committee
6	Solving Global Food Problems through Sustainable Precision Farming and New Arable Land Creation - Tet Yeap
8	Predictive Microbiology, Risk Analysis, and Artificial Intelligence: Perspectives and Challenges for Food Safety - Antonio Bevilacqua
10	Cadmium Remediation in Alfalfa Using Alginate-Encapsulated PGPB in Contaminated Farmland Soils - Ying Ma
12	Glucosinolates and Their Bioactive Metabolites as Functional Compounds Modulating Inflammation - Diego A. Moreno
14	From Waste to Wellness: Citrus limetta Peel as a Source of Bioactives for Cholesterol Regulation - Raja Chaaba
16	Impact of Cleaning-Induced Surface Modifications on Cheese Yield and Quality in Polypropylene Molds - Tanjona Rabesolonirina
19	Integrating Predictive Microbiology and Statistic Tools to Design a Unified Model to Predict Listeria Monocytogenes Growth - Terlizzi M.
20	Selection and In Vitro Probiotic Characterization of Anticancer Activity Exhibiting Lactic Acid Bacteria from The Microbiome of Fermented Shalgam, a Traditional Turkish Beverage - Mahmut Doğan

Table of Contents

22	Casomorphins and Cancer: A Critical Review of Antiproliferative Mechanisms, Receptor Pharmacology, and Interference Pathways - Menekse Nur Aydinoglu
25	Multilayer Microencapsulation Enhances Lacticaseibacillus casei C24 Viability during Baking and In Vitro Digestion of Probiotic Bread - Tatiana Beldarrain-Iznaga
27	Effect of Physicochemical, Techno-functional, and Microstructural Properties of Different Cocoa Powder Flow Behavior - Mahmut Doğan
29	Physicochemical, Techno-functional, and Morphological Characterization of Industrial Milk-Based Powdered Foods and Determination of Powder Flow Behavior Properties - Mahmut Doğan
31	Effect of Dried Fig Maceration in Olive Oil on Bioactive Compound Extraction - Amel Nakbi
32	Next Series - FOODSCIENCEEXPO2027

Chair Welcome Message

Welcome to the **International Connect and Expo on Food Science and Technology**, a premier international forum where thought leaders, researchers, policymakers, and industry innovators come together to shape the food value chain – from sustainable production and processing to safety, packaging, nutrition and consumer behavior.

It is a pleasure to bring together such a diverse group of experts committed to advancing food science at a time when global food systems face significant challenges—from climate pressures and food safety risks to the growing demand for sustainable and nutritious food.

At the same time, we are seeing rapid innovation across the sector. Advances in technology, data, and sustainable practices are transforming how food is produced, processed, and delivered. The key question is how we translate these innovations into scalable, practical solutions that benefit society.

This conference provides an important platform to exchange knowledge, foster collaboration, and explore integrated approaches—including One-Health perspectives—that connect human, animal, and environmental well-being. Through one of these conferences, I, despite being new to the smart farming domain, successfully established a significant partnership with a government body to advance my startup's work (www.agrismarttech.ca) in smart farming and new farmland development.

I encourage you to engage actively, share insights, and build meaningful partnerships.



Conference Chair

Prof. Tet Yeap

University of Ottawa and AgriSmart Technologies
Ottawa, Canada



Organizing Committee



Dr. Diego A. Moreno Fernández

CSIC - Center for Soil Science and Applied Biology of the Segura (CEBAS), Spain



Mara M. Burr

President and CEO, Nordic Global Strategies, PLLC, USA



Prof. Pongsak Rattanachaikunsopon

Ubon Ratchathani University, Thailand



Dr. Parichat Phumkhachorn

Ubon Ratchathani University, Thailand



Dr. Maria Teresa Sanz Taberner

IATA-CSIC, Spain



Prof. Dr. Fatih Yildiz

Middle East Technical University, Turkey

Plenary Presentation

Solving Global Food Problems through Sustainable Precision Farming and New Arable Land Creation

Tet Yeap

University of Ottawa and AgriSmart Technologies
Ottawa, Canada

As the global population approaches 10 billion by 2050, advancing food security requires solutions that increase productivity while reducing environmental impact. Research at the Area X.O Smart Farm in Ottawa, Canada, demonstrates that seed-placed banding can achieve up to a 30% reduction in fertilizer usage, a 30% increase in yields, and a 90% reduction in nitrous oxide emissions.

Beyond improving existing farmland, this work explores the sustainable transformation of underutilized savanna ecosystems—particularly in Africa—into productive agricultural systems. By integrating precision planters, roller-crimper technology, and regenerative practices, the approach enables herbicide-free soil management and long-term improvements in soil health.

Pilot operations near Kinshasa in the Democratic Republic of Congo, spanning 10,000–100,000 hectares, show promising early results. Together, these innovations demonstrate a scalable pathway to expand global food production while enhancing ecosystem sustainability.

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Plenary Presentation

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Plenary Presentation

Predictive Microbiology, Risk Analysis, and Artificial Intelligence: Perspectives and Challenges for Food Safety

Antonio Bevilacqua, Barbara Speranza, Angela Racioppo, Milena Sinigaglia, Maria Rosaria Corbo

Department of Agriculture, Food, Natural Resources, and Engineering,
University of Foggia, Foggia, Italy

Abstract.

Food safety represents a fundamental prerequisite, particularly in an era characterized by globalized trade and ongoing climate change. Although a posteriori controls remain among the most effective tools for monitoring and verifying the actions implemented by food producers, there is an increasing need to prevent and to predict potential food safety issues a priori. In this context, Predictive Microbiology, a branch of Food Microbiology that has developed substantially since the early 2000s, has consistently provided valuable decision-support tools.

An aspect that should not be underestimated is the comprehensive estimation of risk along the entire food chain, achieved through the structured framework of Risk Analysis. In this regard, the development of Artificial Intelligence (AI) offers substantial computational power and new analytical opportunities.

In this oral presentation, the potential of Risk Analysis, within the broader framework of Predictive Microbiology, will be discussed, together with the perspectives offered by AI for more accurate risk estimation, the development of predictive models, and the possibility of reliable a priori forecasting of future challenges. These aspects will be illustrated through selected case studies and practical simulations.

Biography.

Antonio Bevilacqua, full professor of Microbiology

Antonio Bevilacqua holds a PhD in Food Product Biotechnology (2006) and a Master's degree in Food Science and Technology from the University of Foggia,

Plenary Presentation

Italy, where he is currently Full Professor of Microbiology at the DAFNE Department and Coordinator of the Master's Degree Programme in Food Science and Technology. His research focuses on food spoilage and pathogenic microorganisms, starter cultures and probiotics, predictive microbiology and mathematical modelling, risk analysis, and sustainable agriculture, including plant growth-promoting bacteria and bioremediation. He has coordinated several national and international research projects and serves as Associate Editor and Editorial Board member of leading journals in food microbiology.

Keynote Presentation

Cadmium Remediation in Alfalfa Using Alginate-Encapsulated PGPB in Contaminated Farmland Soils

Ying Ma

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Abstract.

Plant-beneficial bacteria (PBB) have emerged as a promising approach for assisting phytoremediation of heavy metal (HM)-contaminated soils. However, their colonization efficiency is often challenged by complex soil environments. In this study, we screened one rhizobacterium (*Klebsiella variicola* Y38) and one endophytic bacterium (*Serratia surfactantfaciens* Y15) isolated from HM-contaminated soils and plants for their high resistance to Cd and strong growth-promoting abilities. These strains were encapsulated individually or in combination with alginate and applied with *Medicago sativa* in Cd-contaminated soil pot experiments. The effectiveness of different bacterial formulations in promoting plant growth and enhancing Cd bioconcentration in *M. sativa* was evaluated. Results showed that PBB application enhanced plant growth and antioxidant capacity while reducing oxidative damage. Encapsulated formulations outperformed unencapsulated ones, with combined formulations yielding superior results to individual applications. Quantitative PCR indicated enhanced PBB colonization in Cd-contaminated soils with alginate encapsulation, potentially explaining the higher efficacy of alginate-encapsulated PBB. Additionally, the bacterial agents modified Cd speciation in soils, resulting in increased Cd bioaccumulation in *M. sativa* by 217-337%. The alginate-encapsulated mixed bacterial agent demonstrated optimal effectiveness, increasing the Cd transfer coefficient by 3.2-fold. Structural equation modeling and correlation analysis elucidated that *K. variicola* Y38 promoted Cd bioaccumulation in *M. sativa* roots by reducing oxidative damage and enhancing root growth, while *S. surfactantfaciens* Y15 facilitated Cd translocation to shoots, promoting shoot growth. The combined application of

Keynote Presentation

these bacteria leveraged the benefits of both strains. These findings contribute to diversifying strategies for effectively and sustainably remediating Cd-contaminated soils, while laying a foundation for future investigations into bacteria-assisted phytoremediation.

Biography.

Ying Ma is a Full Professor at Southwest University, China. She received her Ph.D. in Biology (Ecology) and has established extensive expertise in environmental microbiology, microbial biotechnology, and plant-microbe-soil interactions. Her research focuses on beneficial microorganisms and their applications in bioremediation and sustainable agriculture, with particular emphasis on the microbial mechanisms underlying plant growth promotion and stress mitigation, including drought, salinity, and heavy metal contamination. She has authored more than 80 peer-reviewed publications, including papers in Nature Food, spanning environmental and agricultural microbiology, soil science, and plant-microbe interactions. Her current research interests include microbial consortia, biofilm-based inoculants, microbial seed coating, and sustainable microbe-based strategies to enhance plant resilience and soil health.

Invited Presentation

Glucosinolates and Their Bioactive Metabolites as Functional Compounds Modulating Inflammation

Cassidy Bo Harris, Vicente Agulló, Verónica Mellado-Romero, Raúl Domínguez-Perles, **Diego A. Moreno**

CSIC - Center for Soil Science and Applied Biology of the Segura (CEBAS), Spain

Abstract.

Cruciferous foods (Brassicaceae) are rich in nutrients (vitamins, minerals), natural antioxidants (carotenoids, flavonoids), and characteristic nitrogen-sulphur compounds, the glucosinolates (GSLs) and the bioactive isothiocyanates (ITCs) and indoles, being responsible of their health-promoting characteristics. The potential benefits of GSL/ITCs has been studied for long time in several cancer models, and more recently in chronic-non communicable and degenerative diseases (obesity, diabetes, neurological disorders, skin problems, etc.) where a central chronic inflammatory condition is always present. The biostimulation of the cruciferous sprouts and microgreens favors a sustainable strategy to enrich plant-based foods in bioactive GSL/ITC for functionality, to evaluate at preclinical and clinical level their potential benefits on human health (e.g. NCT03390855), revealing significant reduction in inflammation markers in adults with overweight and obesity. These results prompted a deeper mechanistic investigation on the influence of the bioaccessible fractions of cruciferous sprouts rich in GSL/ITCs and phenolics in cell models of chronic inflammation, using low-therapeutic dosages and the current developments and research challenges with GSL/ITC-enriched products studying the influence on the multiparametric conditions of obesity. This work was partly supported by the AGROALNEXT Program, granted by Spanish MCIN (Agroalnext_2022_027, "Hortnext"), NextGeneration EU (PRTR-C17.I1), and the Generalitat Valenciana. We also thank Project "SANO" CPP2022-009528, with funds of the MCIU/AEI/10.13039/501100011033 and "NextGenerationEU"/PRTR.

Invited Presentation

Biography.

Dr. Diego A. Moreno, Ph.D.

Research Group “Phytochemistry and Healthy Foods Lab” (LabFAS)
CSIC, CEBAS. Campus Universitario de Espinardo – 25. Murcia, Spain.

Research Scientist (2018 – present), in State Agency CSIC (Spanish National Research Council). Ph.D. in Biological Sciences (U. Granada, Spain, 2000), and previously staff scientist (2008-2017) and postdoctoral associate (‘Ramón y Cajal’ 2006 – 2008; I3P-CSIC 2005-2006) at CEBAS-CSIC.

Agri-food research and innovation using plants as bio-factories of health-promoting bioactives (mainly glucosinolates, and phenolics). Biostimulation (priming, elicitors) of sprouts and microgreens (Brassicas) to enrich their bioactive composition as health-promoters targeting the energy metabolism in chronic non-communicable diseases (obesity, diabetes, metabolic disorders, neurological deterioration, etc.).

URLs:

<http://agrotransfer.csic.es/fitoquimica-y-alimentos-saludables/>

<https://www.scopus.com/authid/detail.uri?authorId=56526352700>

ORCID ID <http://orcid.org/0000-0002-6547-8764>

Invited Presentation

From Waste to Wellness: Citrus limetta Peel as a Source of Bioactives for Cholesterol Regulation

Raja Chaaba, Amel Nakbi, Ilaria Rossi, Hanen Jrah, Nicola Ferri, Sonia Hammami, Stefano Dall'Acqua, Mohamed Hammami

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Department of Medicine, and Department of Pharmaceutical and Pharmacological Sciences University of Padova, Padova, ITALY.

Abstract.

The increasing demand for health-promoting ingredients has intensified interest in agro-industrial by-products as valuable bioresources. Objective: To evaluate the potential of phenolic-rich Citrus limetta extract as a natural modulator of lipid metabolism, and to investigate its antioxidant properties. Materials and Methods: Free radical scavenging assay and reducing power were used to evaluate the antioxidant activity. The phytoconstituents were identified by LC-DAD-MSⁿ. The effect of the phenolic extract on PCSK9 and LDLR expressions in human hepatocarcinoma cells Huh7 were determined using Real-Time PCR. Simvastatin was used as positive control. Results: The hydroethanolic extract of Citrus limetta peel exhibited high phenolic content and strong antioxidant activity. LC-DAD-MSⁿ analysis identified key bioactive constituents, including poncirin and ellagic acid derivative. Beyond its antioxidant properties, the extract modulated key regulators of lipid metabolism, notably PCSK9 and the LDL receptor (LDLR), in cultured cells. This effect, showing similarities to statin activity, supports its potential role in cholesterol regulation. Conclusion: These findings highlight the dual value of Citrus limetta peel as a sustainable resource and a functional ingredient. Its integration into food or nutraceutical formulations could contribute to cardiovascular health while supporting waste valorization strategies.

Invited Presentation

Biography.

Raja Chaaba is an Assistant Professor of Biochemistry at the Higher School of Health Sciences and Technology, University of Sousse, Tunisia. She has been a member of the Research Laboratory “Functional Food and Health” at the University of Monastir since 1999. Dr. Chaaba has authored and co-authored numerous scientific publications, including research articles, review papers, and book chapters. Her research interests focus on food chemistry, lipid metabolism, and their implications in cardiovascular diseases and diabetes. She is also an active member of the organizing committee of the annual event “Micronutrients, Health, and Well-being,” held at the Higher Institute of Applied Sciences and Technology of Mahdia, Tunisia.

Invited Presentation**Impact of Cleaning-Induced Surface Modifications on Cheese Yield and Quality in Polypropylene Molds**

Tanjona Rabesolonirina^{1,2,3}, Élodie Perry³, Benoît Paysant⁴, Vincent Humblot², Cécile Le Floch-Fouéré¹

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³ SERVI DORYL, R&D Department, Langeais, France

⁴ ACTALIA - Analytical Expertise Division, Poligny, France

Abstract.

Cheese sticking to mold surfaces is a major issue in dairy processing, leading to product losses, quality defects, and reduced production efficiency. This study investigates how cleaning procedures and fouling affect the surface properties of polypropylene cheese molds and their role in adhesion phenomena at the mold-curd interface.

Polypropylene mold surfaces exhibiting different surface energy states, representative of different degrees of use, were subjected to controlled cleaning cycles using acidic or alkaline solutions, with or without model fouling. Fouling was reproduced using a controlled matrix composed of proteins, lipids, and minerals of dairy origin, representative of a product undergoing draining, under controlled environmental conditions. Surface properties were characterized using contact angle measurements to determine surface energy and its polar and dispersive components, complemented by infrared spectroscopy and scanning electron microscopy coupled with energy-dispersive X-ray analysis.

Results show that cleaning and fouling modify surface energy, particularly its polar component, due to the accumulation of organic and mineral residues. Variations in adhesion behavior were observed depending on the number of cleaning cycles, indicating a non-linear evolution of surface properties.

Invited Presentation

From an industrial perspective, these phenomena may lead to increased yield losses and demolding defects. These findings provide new insights into the mechanisms governing cheese sticking and highlight the importance of controlling surface modifications induced by cleaning in order to limit adhesion phenomena. This work contributes to improving sustainability in dairy processing by reducing product losses and optimizing cleaning strategies.

Biography.

Tanjona Rabesolonirina, PhD candidate, is currently in the second year of his doctoral research in dairy science. He holds a Master's degree in Dairy Industry and Quality from ENSAIA (France). His research focuses on adhesion mechanisms between cheese and polymer molds during manufacturing, investigating the influence of dairy constituents and processing parameters, cleaning conditions, and mold material properties. His work combines physico-chemical characterization techniques to study the evolution of surface properties during cheese production. This work is carried out in collaboration with partners from the dairy and equipment manufacturing sectors, with the aim of improving process efficiency and reducing product losses.

Invited Presentation

Integrating Predictive Microbiology and Statistic Tools to Design a Unified Model to Predict *Listeria Monocytogenes* Growth

Terlizzi M., Speranza B., Corbo M.R., Racioppo A., Sinigaglia M., Bevilacqua A.
Department of Agriculture, Food, Natural Resources and Engineering (DAFNE),
University of Foggia, Foggia, Italy

Abstract.

This research evaluates the application of predictive microbiology as a strategic tool for food safety assurance, focusing on a unified third-level predictive model designed to estimate *Listeria monocytogenes* behaviour across multiple environmental and technological variables.

Two international third-level models/databases (FSSP, Food Spoilage and Safety Predictor; PMF, Pathogen Modeling Program) were used to simulate the growth of *L. monocytogenes* under a variety of conditions. Data were then modelled through a re-parameterized Gompertz equation to evaluate t_{100} , representing the timeframe required for a 2-fold increase in the microbial population.

Multivariate statistical analysis, performed using Pareto diagrams and response surface methodology, revealed that temperature and pH serve as the main drivers of growth. In the last phase, data integration via computational algorithms and generative artificial intelligence enabled the comparison of diverse regression models, including Random Forest, non-linear logistic model, and liner-mixed effects.

The non-linear logistic model was selected as the most effective framework due to its robustness and biological consistency, surpassing purely mathematical techniques like Random Forest by preventing unrealistic extrapolations. These outcomes confirm that combining predictive software with advanced analytics provides essential support for formulating HACCP systems and proactively governing food safety within Industry 4.0.

Invited Presentation

Biography.

Mario Terlizzi, Ph.D. Student.

Mario Terlizzi obtained his Bachelor degree in Gastronomic Sciences and his Master Science degree in Food Science and Technology at the Department of Agriculture, Food, Natural Resources and Engineering (DAFNE), University of Foggia, Foggia, Italy.

Then, he worked as a research fellow in microbiology, investigating the effect of unconventional prebiotics within the "SAVEMAR" project. He is currently a Ph.D. student working on a research project DAMASCO. His research focuses on food safety through the application of predictive microbiology software.

Invited Presentation

Selection and In Vitro Probiotic Characterization of Anticancer Activity Exhibiting Lactic Acid Bacteria from The Microbiome of Fermented Shalgam, a Traditional Turkish Beverage

Ahmet Yetiman, Mehmet Horzum and **Mahmut Doğan**

Department of Food Engineering, Faculty of Engineering, Erciyes University, Kayseri, Türkiye

Abstract

Shalgam is a widely consumed traditional Turkish lactic acid-fermented black carrot beverage, yet its microbiome remains poorly characterized at the molecular level. This study aimed to isolate, identify, and characterize the probiotic potential of lactic acid bacteria (LAB) from shalgam. LAB were isolated from six locally and industrially produced shalgam samples using conventional culture techniques without starter cultures. Isolates were typed by (GTG)₅-rep-PCR and identified by 16S rRNA Sanger sequencing. Probiotic properties were assessed in vitro via acid and bile salt tolerance, autoaggregation, cell surface hydrophobicity, antibacterial activity, antibiotic susceptibility, β -hemolysis, and DPPH/ABTS⁺ radical scavenging. Selected strains underwent whole-genome sequencing (Illumina) with bioinformatic analysis (RAST, KEGG, BAGEL, OrthoANI). *Lactiplantibacillus plantarum*, *Lactiplantibacillus pentosus*, *Limosilactobacillus fermentum*, *Levilactobacillus brevis*, *Lentilactobacillus buchneri*, and *Liquorilactobacillus nagelii* - the latter reported for the first time in shalgam. Autoaggregation ranged from 15.6% to 96.0%, and DPPH and ABTS⁺ inhibition reached 94.5% and 85.3%, respectively. No β -hemolytic activity was detected. In addition, cell-free supernatants of the shalgam-derived strains exhibited concentration-dependent cytotoxic activity against human colorectal adenocarcinoma cell lines, with *Lentilactobacillus buchneri* AGA55 showing IC₅₀ values of 8.55 mg/mL (HT-29) and 3.44 mg/mL (DLD-1), and *Levilactobacillus brevis* DY55bre showing IC₅₀ values of 7.71 mg/mL (HT-29) and 3.19 mg/mL (DLD-1), indicating greater sensitivity of DLD-1 cells. This anticancer potential was corroborated by GC-MS identification of bioactive cyclic dipeptides, including

Invited Presentation

cyclo(D-Phe-L-Pro) and cyclo(L-Leu-L-Pro), in the cell-free supernatant of DY55bre. Shalgam harbors diverse LAB with promising probiotic and anticancer potential, providing a valuable culture infrastructure for future functional food and industrial applications.

Keywords: Shalgam, probiotic, whole-genome sequencing, lactic acid bacteria, in vitro

Acknowledgment: This study was supported by the Erciyes University Scientific Research Projects Coordination Unit (BAP) under project code FKB-2020-10551.

Biography

Mahmut DOĞAN, Prof. Dr. Erciyes University, Faculty of Engineering, Department of Food Engineering. He is interested in Food Chemistry and Food Rheology. He has about 106 published papers in SCI and 150 presentations in international congresses. He has completed 60 research projects and five big industrial projects. Also, he has completed 30 MSc and 10 PhD projects; he is now an advisor to 5 master's students. He has a firm in the Erciyes Teknopark area, Biomixera Food Co.

Video Presentation

Casomorphins and Cancer: A Critical Review of Antiproliferative Mechanisms, Receptor Pharmacology, and Interference Pathways

Menekse Nur Aydinoglu

Yuksekt Ihtisas Universitesi, Turkey

Abstract

Background: Casomorphins are opioid-like peptides derived from the enzymatic digestion of milk caseins. While traditionally studied for their analgesic and gastrointestinal effects, a substantial body of evidence from the late 1990s and early 2000s revealed unexpected antiproliferative properties against human cancer cells. This review synthesizes the mechanistic complexity underlying casomorphin-mediated growth inhibition and evaluates the pharmacological evidence for parallel signaling pathways.

Objective: To critically examine the multifunctional mechanisms by which casomorphins exert anticancer effects, including opioid receptor engagement, non-opioid receptor cross-talk, and direct enzyme inhibition, with emphasis on pharmacological interference patterns that illuminate pathway contributions.

Methods: Comprehensive analysis of seminal in vitro studies examining casomorphin effects on human breast (T47D) and prostate (LNCaP, PC3, DU145) cancer cell lines. Evaluated evidence includes radioligand binding assays, proliferation studies with opioid antagonists (diprenorphine), nitric oxide synthase (NOS) activity measurements, and kinetic analyses of enzyme inhibition.

Results: Casomorphins demonstrate dose-dependent antiproliferative effects across multiple cancer cell lines with IC₅₀ values in the picomolar to low nanomolar range. Three parallel mechanisms have been identified: (1) Classical opioid receptor engagement— δ , κ , and μ receptor binding partially reversed by diprenorphine (40-60% blockade), indicating additional non-opioid

Video Presentation

contributions; (2) Non-opioid receptor cross-talk—interaction with somatostatin receptors in breast cancer cells and α_1 -adrenergic receptors in androgen-sensitive prostate cancer (LNCaP) cells, the latter modulating androgen-induced PSA secretion through cytoskeletal interference; (3) Direct NOS inhibition— κ -selective casomorphins (particularly human α S1-casomorphin) non-competitively inhibit NOS by binding to the reductase domain, stabilizing the inactive monomeric conformation. This mechanism is diprenorphine-insensitive and operates independently of membrane receptors, as demonstrated by cell-free enzymatic assays. Pharmacological interference studies reveal that diprenorphine exhibits paradoxical effects—partial antagonism in receptor-positive cells, no reversal in receptor-negative cells, and agonist-like NOS inhibition—underscoring the necessity of multi-pathway mechanistic models.

Conclusions: Casomorphins represent uniquely multifunctional bioactive peptides that simultaneously engage opioid receptors, heterologous receptor systems, and direct enzymatic targets to inhibit cancer cell proliferation. The mechanistic redundancy and high potency warrant contemporary reinvestigation using modern structural biology, in vivo models, and translational approaches. These findings have implications for dietary bioactive compounds, opioid receptor biology in cancer, and the development of novel NOS-targeted therapeutics.

Learning Objectives:

Understand the three parallel mechanisms by which casomorphins inhibit cancer cell proliferation

Appreciate the limitations of using opioid antagonists to infer receptor-mediated effects

Recognize the potential and current limitations of casomorphins as anticancer lead compounds

Video Presentation

Highlights for Conference Program:

First comprehensive synthesis of casomorphin anticancer mechanisms in 20+ years

Integration of opioid receptor pharmacology with direct NOS inhibition

Critical analysis of pharmacological interference patterns revealing parallel pathways

Identification of research gaps and future directions for translational investigation.

Poster Presentation

Multilayer Microencapsulation Enhances *Lactocaseibacillus casei* C24 Viability during Baking and In Vitro Digestion of Probiotic Bread

Tatiana Beldarrain-Iznaga¹ and Ricardo Villalobos-Carvajal²

1Department of Animal Science, Faculty of Veterinary Sciences, Universidad de Concepción, Av. Vicente Méndez 595, Chillán, Chile

2Department of Food Engineering, Faculty of Health and Food Sciences, Universidad del Bío-Bío, Av. Andrés Bello 720, Chillán, Chile

Abstract.

Purpose/Objectives: The demand for non-dairy probiotic foods has increased interest in baked products. However, high baking temperatures represent a major challenge for maintaining probiotic viability. This study evaluated multilayer microencapsulation as a strategy to protect *Lactocaseibacillus* (Lc.) *casei* C24 during bread baking and simulated gastrointestinal digestion.

Materials/Methods: Lc. *casei* was encapsulated in W1/O/W2 double emulsions containing casein and subsequently coated with alginate and chitosan by layer-by-layer electrostatic deposition. Three interfacial structures (casein, casein–alginate, and casein–alginate–chitosan) and two incorporation strategies (dough and surface coating) were evaluated. Breads were baked at 150, 180, or 200 °C for 10 min. Probiotic viability after baking and simulated gastrointestinal digestion was determined.

Results: Viability was strongly influenced by interfacial structure and incorporation strategy. At 200 °C, casein–alginate–chitosan multilayer microcapsules maintained 9.40 ± 0.38 and 9.47 ± 0.32 log CFU/g in dough and surface applications, respectively, compared with only 2.26 ± 0.10 and 1.93 ± 0.57 log CFU/g for free cells. High probiotic viability was also maintained during simulated gastrointestinal digestion.

Conclusions: Combining double-emulsion encapsulation with alginate–chitosan multilayer coating effectively protected Lc. *casei* C24 against severe baking conditions and gastrointestinal stress, demonstrating strong potential for developing stable probiotic baked foods.

Poster Presentation

Biography

Tatiana Beldarrain-Iznaga is an Assistant Professor in the Department of Animal Science, Faculty of Veterinary Sciences, Universidad de Concepción, Chile. She holds a Ph.D. in Food Engineering and a Master's degree in Food Science and Technology. Her research focuses on food microbiology, probiotics, functional foods, and emerging food-processing technologies. Her work explores strategies to improve probiotic robustness and functionality through sublethal physical treatments and microencapsulation, as well as their incorporation into food matrices. She has experience in double-emulsion and multilayer encapsulation systems designed to enhance probiotic survival during food processing and gastrointestinal digestion. Her current research interests include the development of functional and probiotic foods with improved technological stability and biological functionality.

Poster Presentation

Effect of Physicochemical, Techno-functional, and Microstructural Properties of Different Cocoa Powder Flow Behavior

Sena Şahin , **Mahmut Doğan** and Mehmet Horzum

Department of Food Engineering, Faculty of Engineering, Erciyes University, Kayseri, Türkiye

Abstract

This study classified ten commercial cocoa powders—alkalized (ACP1–ACP6), bitter (BCP), and natural (NCP1–NCP3)—by evaluating physicochemical, optical, reconstitution, and powder-flow properties. Significant compositional differences were observed: fat ranged from 7.49% (NCP3) to 13.56% (ACP1), moisture from 1.49% (NCP2) to 4.86% (ACP4), and pH from 5.10 (NCP3) to 8.63 (ACP1). Bitter cocoa powder (BCP) recorded the highest ash (14.75%), solubility (33.77%), bulk density (0.47 g/cm³), tapped density (0.64 g/cm³), and bridging factor (1541.60), accompanied by the lowest color coordinates a* (1.80) and b* (1.61) (p<0.05). Flow behavior varied markedly across classes: alkalized powder ACP3 displayed the highest cohesion index (19.70). Among natural powders, NCP1 showed passable flow (Carr index 25.69%, Hausner ratio 1.35), whereas NCP3 demonstrated very poor, cohesive flow with the highest Carr index (49.64%), Hausner ratio (1.98), flow stability (1.09), and cake strength (16803.90); NCP2 yielded the highest mean cake strength (314.33). Statistically significant correlations revealed strong inverse relationships between the color coordinate a* and the bridging factor ($r = -0.867$, $p < 0.01$), between b* and tapped density ($r = -0.853$, $p < 0.01$), and between protein content and the Hausner ratio ($r = -0.842$, $p < 0.01$). Conversely, pH correlated positively with bulk density ($r = 0.802$, $p < 0.01$). The limited sample size ($n = 10$) restricts broader batch generalization across manufacturing lots. Establishing quantitative relationships between optical attributes, proximate composition, and consolidation dynamics offers essential benchmarks for industrial raw-material screening, silo hopper design, pneumatic conveying, and anti-caking strategies in cocoa processing lines.

Poster Presentation

Keywords: Food powders, Cacao, Powder Rheology, Physicochemical properties

Acknowledgment: This study was supported by the Erciyes University Scientific Research Projects Coordination Unit (BAP) under project code FYL-2026-15835.

Biography

Mahmut DOĞAN, Prof. Dr. Erciyes University, Faculty of Engineering, Department of Food Engineering. He is interested in Food Chemistry and Food Rheology. He has about 106 published papers in SCI and 150 presentations in international congresses. He has completed 60 research projects and five big industrial projects. Also, he has completed 30 MSc and 10 PhD projects; he is now an advisor to 5 master's students. He has a firm in the Erciyes Teknopark area, Biomixera Food Co.

Poster Presentation

Physicochemical, Techno-functional, and Morphological Characterization of Industrial Milk- Based Powdered Foods and Determination of Powder Flow Behavior Properties

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Abstract

This study evaluated ten commercial dairy powders—whole milk powder (WMP), skim milk powders (SMP1–SMP3), demineralized whey powders (DWP1–DWP3), whey powder (WP), cheese powder (CP), and yogurt powder (YP)—for physicochemical, reconstitution, and powder-flow properties. Substantial variations occurred across composition and reconstitution: fat content ranged from 0.50% (SMP3) to 34.63% (CP), moisture from 1.21% (WP) to 4.29% (SMP2), solubility from 61.74% (CP) to 96.66% (DWP1), and wettability time from 15.33 s (DWP2) to 1751.67 s (CP). Flowability classifications revealed distinct handling behaviors: low-fat skim milk and whey powders (SMP1–SMP3, WP, DWP1) exhibited fair, relatively free-flowing tendencies with the lowest Carr index (20.00, SMP1) and Hausner ratio (1.25, SMP1), whereas high-fat powders (CP and WMP) demonstrated poor, highly cohesive flow (Carr index 34.00, Hausner ratio 1.51 in WMP). Dynamic powder-flow analysis showed cohesion index ranging from 9.59 (DWP1) to 34.67 (CP), flow stability from 0.92 (DWP1) to 1.09 (SMP3), bridging factor from 1072.16 (DWP1) to 2296.87 (DWP3), and cake strength from 5651.07 (DWP1) to 30199.77 (WP). Statistically significant correlations demonstrated that higher fat content strongly increased powder cohesiveness ($r = 0.983$, $p < 0.001$), whereas tapped density correlated negatively with cohesion index ($r = -0.851$, $p < 0.01$), confirming that fat impairs flow by promoting interparticle cohesion. Bulk and tapped density were positively correlated ($r = 0.983$, $p < 0.001$). The limited sample size ($n = 10$) restricts broader generalization across manufacturing batches. These findings offer practical benchmarks for optimizing hopper discharge, pneumatic conveying, and anti-caking strategies in dairy processing.

Poster Presentation

Keywords: Food powders, Dairy Powder, Rheology, Physicochemical properties

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Biography.

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Poster Presentation

Effect of Dried Fig Maceration in Olive Oil on Bioactive Compound Extraction

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Abstract

Objective : This study investigates the effect of macerating dried figs in olive oil on the physicochemical, biochemical, and antioxidant properties of both matrices during storage. **Materials and Methods:** The evolution of key parameters—including polyphenols, flavonoids, tannins, anthocyanins, fatty acid profile, antioxidant activity (DPPH), and reducing power—was monitored over six months. The results show that maceration leads to a transient enrichment of olive oil with bioactive phenolic compounds, particularly during the first two to four months, corresponding to improved oxidative stability and a temporary reduction in acidity and peroxide value. Dried figs initially exhibited high levels of phenolic compounds, which progressively decreased due to oxidative degradation, while the oil maintained a stable fatty acid composition dominated by oleic acid. **Conclusion:** Overall, maceration emerges as a natural and effective method for enhancing olive oil with bioactive molecules from dried figs, offering promising potential for the development of high-value functional products.

Biography.

Dr. Nakbi Amel is an Assistant Professor of Biochemistry at the University of Monastir and a researcher at the Functional Foods and Health Laboratory at the University of Monastir. Her research focuses on nutritional biochemistry, and their implications in metabolic disorders. Dr. Nakbi has published extensively in the field and contributes to the scientific community through her involvement in the annual conference on Micronutrients, Health, and Well-being.



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