THE 8TH INTERNATIONAL CONFERENCE ON FOOD AND APPLIED BIOSCIENCE

February 5-6, 2026

BOOK of ABSTRACTS

FAB 2026

THE FOOD SINGULARITY: CONVERGING SUSTAINABLE AGRITECH TO FRONTIER FOOD ERA

FAB 2026

AGRO CMU AGRO-INDUSTRY CHIANG MAI UNIVERSITY

CMU CHIANG MAI UNIVERSITY

International Conference on Food and Applied Bioscience

February 5-6, 2026

The Empress Hotel, Chiang Mai, Thailand

BOOK OF ABSTRACTS

Organizer

Faculty of Agro-Industry, Chiang Mai University

Co-Hosts

Preface

It is a great honor and privilege to welcome you to the 8th International Conference on Food and Applied Bioscience (FAB 2026), held under the theme "The Food Singularity: Converging Sustainable AgriTech to the Frontier Food Era." The conference was held from 5 to 6 February 2026 at The Empress Hotel, Chiang Mai, Thailand, and was organized by the Faculty of Agro-Industry, Chiang Mai University, in collaboration with an extensive network of esteemed national and international partner institutions.

The agro-industry is a vital pillar of national development and a key engine of economic growth under the National Economic and Social Development Plan. In today's rapidly evolving global landscape, research and development play a critical role in driving industrial progress. Whether originating from academia, research institutions, or the private sector, the generation of new knowledge is essential for fostering innovation, enhancing competitiveness, and ensuring sustainable development.

Aligned with Chiang Mai University's strategic vision as a research-led institution, FAB 2026 provides an international platform to disseminate academic excellence and facilitate the exchange of research advances and innovative insights among faculty members, scholars, researchers, students, and industry representatives. Through meaningful discussions and knowledge exchange, the conference aims to foster the holistic development of knowledge and innovation within the agro-industrial and food bioscience sectors.

FAB 2026 brought together participants from multiple continents, including Asia, Europe, Africa, the Americas, Oceania, and other parts of the global research community, highlighting the truly international scope of the conference. The scientific program was the main focus of the event and included keynote lectures, invited talks, oral presentations, and poster sessions covering a wide range of topics in food science, applied bioscience, sustainable agritech, and frontier food innovation. The scope, depth, and quality of the contributions showcased both current research frontiers and emerging challenges within agro-industrial and food systems.

In addition to the academic sessions, the conference featured the CNX Food and Applied Science Invention & Exhibition (CNX FINEX), held for the first time alongside FAB 2026. This innovation exhibition offered a lively platform for students, researchers, and emerging entrepreneurs to showcase inventions and solutions related to sustainability, technology convergence, and future food systems. CNX FINEX further strengthened the link between research findings and practical applications while fostering collaboration among academia, industry, and other stakeholders.

The success of FAB 2026 was made possible through the robust collaboration and support of our distinguished co-hosting partners:

- Agro-Industry Academic Council Association (AIAC), Thailand
- College of Food Science and Nutritional Engineering, China Agricultural University, China
- Department of Marine Food Science and Technology, Gangneung-Wonju National University, Korea
- Department of Packaging & Logistics, Yonsei University, Korea
- Faculty of Agricultural Technology, Universitas Brawijaya, Indonesia
- Faculty of Agriculture, Yamagata University, Japan

- Food Science and Technology Association of Thailand (FoSTAT), Thailand
- Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, China
- Institute for Advanced Study, Gifu University, Japan
- Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences, China
- SAFE-Network, Indonesia
- School of Food and Biological Engineering, Hezhou University, China
- School of Food Science and Biotechnology, Kyungpook National University, Korea

We would like to extend our deepest gratitude to all keynote and invited speakers, participants, reviewers, judges, and members of the organizing committee for their dedication and valuable contributions.

We sincerely hope that the 8th International Conference on Food and Applied Bioscience (FAB 2026) will act as a catalyst for new collaborations and inspire sustainable breakthroughs, making a meaningful contribution to the advancement of food and applied bioscience in this frontier food era.

(Associate Professor Yuthana Phimolsiripol, Ph.D.)
Chairman of the Organizing Committee
The 8th International Conference on Food and Applied Bioscience (FAB 2026)

Faculty of Agro-Industry, Chiang Mai University
February 2026

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Conference Committee

Academic Advisory Committee:

Associate Professor Dr. Yuthana Phimolsiripol	Chiang Mai University

Administrative Chairperson:

Associate Professor Dr. Niramon Utama-ang	Chiang Mai University

Scientific Committee

Professor Dr. Alain Le Bail	ONIRIS, Nantes
Professor Dr. Anet Režek Jambrak	University of Zagreb
Professor Dr. Fabiano André Narciso Fernandes	Federal University of Ceará
Professor Dr. Faridah Abas	Universiti Putra Malaysia
Professor Dr. Francisco J. Barba	University of Valencia
Professor Dr. Fuli Li	Chinese Academy of Sciences
Professor Dr. Houda Berrada	University of Valencia
Professor Dr. Hui Hong	China Agricultural University
Professor Dr. Joe M. Regenstein	Cornell University
Professor Dr. Masahiro Ogawa	Kagawa University
Professor Dr. Masanori Watanabe	Gifu University
Professor Dr. Nathdanai Harnkarnsujarit	Kasetsart University
Professor Dr. Noma Seiji	Saga University
Professor Dr. Ozlem Tokusoglu	Celal Bayar University
Professor Dr. Sangguan You	Gangneung-Wonju National University
Professor Dr. Somesh Sharma	Shoolini University
Professor Dr. Sunghwan Kim	Kyungpook National University
Professor Dr. Sunyoung Lim	Korean Maritime & Ocean University
Professor Dr. Tomoaki Hagiwara	Tokyo University of Marine Science and Technology
Professor Dr. Uday S. Annapure	Institute of Chemical Technology (ICT) Nathalal Parekh Marg
Professor Dr. Weon-Sun Shin	Hanyang University
Professor Dr. Wei Qi	Chinese Academy of Sciences
Professor Dr. Witoon Prinyawiwatkul	Louisiana State University Agricultural Center Baton Rouge
Professor Dr. Wouter Saeys	KU Leuven
Associate Professor Dr. Kitipong Assatarakul	Chulalongkorn University
Associate Professor Dr. Massalin Nakphaichit	Kasetsart University
Associate Professor Dr. Mohsen Gavahian	National Pingting University of Science and Technology
Associate Professor Dr. Ravi Jadeja	Oklahoma State University
Associate Professor Dr. Sajid Maqsood Maqsood Ahmed	United Arab Emirates University
Dr. Mahsa Majzoobi	RMIT University STEM College

Organizer

Faculty of Agro-Industry, Chiang Mai University

Co-hosts Organizations

Agro-Industry Academic Council Association (AIAC)	Thailand
College of Food Science and Nutritional Engineering, China Agricultural University	China
Faculty of Agriculture, Yamagata University	Japan
School of Food and Biological Engineering, Hezhou University	China
School of Food Science and Biotechnology, Kyungpook National University	Korea
Institute for Advanced Study, Gifu University	Japan
Department of Marine Food Science and Technology, Gangneung-Wonju National University	Korea
Department of Packaging & Logistics, Yonsei University	Korea
Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences	China
Faculty of Agricultural Technology, Universitas Brawijaya	Indonesia
SAFE-Network	Indonesia
Food Science and Technology, Association of Thailand (FoSTAT)	Thailand
GuangZhou Institute of Energy Conversion, Chinese Academy of Sciences	China

Schedule and Program Sessions

The 8th International Conference on Food and Applied Bioscience 2026

5-6 February, 2026 The Empress Hotel, Chiang Mai, Thailand

Thursday February 5, 2026	
08.30 – 09.00	Registration
Moderator	Asst. Prof. Dr. Thanyaporn Siriwoharn Dr. Pipat Tangjaidee
09.00 – 09.30	Opening Ceremony and Welcome **Introductory Remark** By Assoc. Prof. Dr. Yuthana Phimolsiripol Dean of Faculty of Agro-Industry, Chiang Mai University, Thailand **Opening Remark** By Prof. Pongruk Sribanditmongkol, M.D., Ph.D. President of Chiang Mai University, Thailand
09.30 – 10.00	**Plenary 1:** Prof. Dr. Nenad Naumovski Agri-food science and human nutrition; leading the innovation for the planetary health
10.00 – 10.30	**Plenary 2:** Prof. Dr. Alain Le Bail Upcoming topics for the food industry; PFAS ban project in the EU and non-conventional cold chain
10.30 – 10.45	**Coffee Break**
10.45 – 11.15	**Plenary 3:** Mr. Samitti Chotsriluecha Dietary Pattern Promoting Longevity
11.15 – 12.00	**Poster Presentation**
12.00 – 13.00	**Lunch**
13.00 – 17.15	**Oral Presentation & CNX Finex Exhibition (in separated rooms)**

Oral Presentation Program
Day 1: February 5, 2026

Room	**Division A-1** Food, Nutrition and Health Bioscience **CHIANGMAI 2**	**Division A-2** Food, Nutrition and Health Bioscience **CHIANGMAI 3**	**Division B** Sustainable Bioresource Processing and Engineering **BOARD ROOM 2**	**Division C** Bio-food Innovation and Product Development **BOARD ROOM 3**	**Division F** International Symposium on Sustainable Practices and Sensory Science **CHIANGMAI 1**	**Division G** Sustainable Food Biosystems, Packaging and Regulatory Frameworks **BOARD ROOM 4**
Chairman	Assoc. Prof. Dr. Francisco Juan Marti Quijal	Assoc. Prof. Dongyup Hahn	Assoc. Prof. Dr. Anbarasu Kumar	Asst. Prof. Dr. Rajnibhas Sukeaw-Samakradhamrongthai	Assoc. Prof. Dr. Sujinda Sriwattana	Prof. Dr. Woong-Ryeol Yu
Co-chairman	Asst. Prof. Dr. Suphat Phongthai	Asst. Prof. Ahmar Hashmi, MD, MPH	Dr. Teerasak Charoennapharat	Dr. Phatthawin Setthaya	Dr. Stephen Charles Mansbridge	Assoc. Prof. Dr. Kittisak Jantanasakulwong
13.00 – 13.15	**Invited Speaker** Valorization of Agri-Food By-Products from the Valencian Community through Non-Conventional Extraction Technologies Assoc. Prof. Dr. Francisco Juan Marti Quijal	**O-344** Comparative Impact of Synthetic (polysorbate 80) and Protein-Based (α-lactalbumin) Emulsifiers on Intestinal Barrier Integrity and the Trans-Epithelial Transport of Polychlorinated Biphenyls Mr. Vivek Banjara	**O-187** Green Extraction of Sacha Inchi Oil Using Subcritical Water: Process Optimization and Comparative Characterization Dr. Mohd Zuhair Mohd Nor	**O-384** Innovative AgriTech Approaches for Value-Added Sesame Oil: Enhancing Functional Compounds through Acid-Soaking and Microwave-Assisted Methods Assoc. Prof. Dr. Phumon Sookwong	**Invited Speaker** Informed Green Food Choice: Driver (emotion?), Signal (trust?) or Noise (rationale?) Dr. Wilatsana Porsri	**Invited Speaker** Support-Free 4D Printing of Shape Memory Polymer Composites for Smart Structures Prof. Dr. Woong-Rryeol Yu
13.15 – 13.30	**Invited Speaker** GAPS in understanding safety and health claim regulation: Food Innovation and Regulation Network (FIRN) approach. Prof. (emeritus) Pavinee Chinachoti	**O-364** Effect of Nata de Coco Fiber Addition on Physical, Textural, and Structural Properties of Calcium Alginate Hydrogels Ms. Pradithat Changpuen	**O-270** Machine Learning-Aided Optimization of Longan Byproducts Extraction Mr. Idris Kaida Zubairu	**O-238** Omega-3 Enriched Shrimp Oil: Preparation, and Development of Dysphagia-Friendly Functional Food Via Application of 3D Printing Technology Ms. Akanksha Rajeev Gautam		**O-181** L-Cysteine Modified Carbon Dots from Duea Ching (Ficus Botryocarpa Miq.) Fruit : A Multifunctional Nanomaterial in Active Chitosan/Gelatin Films for Enhancing the Shelf Life of Asian Seabass Slices Ms. Varsha Likhar

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13.30 – 13.45	**O-291** Characterization of γ-Oryzanol Extracted Using Medium-Chain Triglyceride Oil for Enhanced Stability and Bioactive Delivery Ms. Pinthunicha Premkamon	**Invited Speaker** Structural Characterization and Optimized Extraction of Immunomodulatory Polysaccharides from Edible Insects Assoc. Prof. Dongyup Hahn	**O-319** Sustainable Valorization of Corncob Agricultural Residue for Co- Production of Sweeteners and Biofuel Ms. Violet Mbatudde	**O-283** Development of Plant-Based Patty and Fortification with Chia Seed Powder Dr. Kartik Sharma	**Invited Speaker** Informed Green Food Choice: Driver (emotion?), Signal (trust?) or Noise (rationale?) Dr. Wilatsana Porsri	**O-202** pH-responsive Intelligent Indicator Using Fluorescent Nitrogen-doped Carbon dots for Monitoring of Chicken breast and Shrimp freshness Dr. Ajit Kumar Singh
13.45 – 14.00	**O-300** Effect of Fish Soup Formulations on In Vitro α-amylase, α-glucosidase, and Antioxidant Activities, and Characterization of Active Compounds Ms. Jasmin Naher	**O-255** Validation of Capsaicin Binding to Eukaryotic Elongation Factor 2 and Its Antagonistic Interaction with Celastrol in Colorectal Cancer Cells Assoc. Prof. Pei-Fen Liu	**Invited Speaker** Enhancement of Bioactive Properties in Banana (*Musa paradisiaca*) Flower Bract Extract through Fermentation with *Saccharomyces boulardii* and *Bacillus clausii* Assoc. Prof. Dr. Anbarasu Kumar	**O-287** Cassava-Based Mahewu: Physico-Chemical and Nutritional Improvement using Bambara Groundnut Protein Isolates Mr. Paul Ndubuisi Anyiam		**O-173** Enhancement UV-Shielding Properties of PET Films with oPD/PEI-Modified HKUST-1 Ms. Jaeyoung Jang

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14.00 – 14.15	**O-211** Ultrasound-Assisted Extraction of Anthocyanins from Doi Saket Black Rice Husk Ms. Inthira Watthanaworawit	**O-228** Ultrasonic-Assisted Extraction of Selenium-Enriched Polysaccharides Obtained from Germinated Oat via Biotransformation Ms. Napatsawan Singhadechachai	**O-310** Comparative Effects of Drying Techniques on Bioactive Composition and Techno-Functional Properties of Kai (*Cladophora glomerata*) Ms. Yonn Pwint Phyu	**O-302** Sensory and Molecular Insights of Odor-Induced Sweetness Enhancement by Mango Aroma Dr. Fei Lao	**O-350** From Viral Trends to Food Choices: Sustainability Awareness and Its Influence on Students' Healthy and Unhealthy TikTok Purchases Asst. Prof. Dr. Wisuwat Wannamakok	**O-174** Preparation of Novel Nanocomposite Films Based on PVA/ Tea Leaves-Derived Carbon Quantum Dots (CQDs) Mr. Mohammadreza Jozaghkar
14.15 – 14.30	**O-321** Insight into the Impact of Ice-water Interface Dynamics on Myofibrillar Protein Stability in Grass carp (*Ctenopharyngodon idella*) Flesh Assoc. Prof. Juan You	**O-171** Qualities and Antioxidant Activity of Instant Healthy Plant-Based Soup Powder of Gnetum gnemon var. tenerum leaves mixed with Germinated Mung Bean Seeds Ms. Rungnapa Anankarnkit	**O-314** Effect of High-Pressure Processing on Microbial Inactivation and Physicochemical Quality of Green Soybean Milk Ms. Tannaporn Jeenpitak	**O-307** Production of Multi-Bioactive Functional Protein Hydrolysates from Tuna Dark Meat using Mixed-Enzyme Hydrolysis Mr. Chanthearith Ny	**O-224** Physicochemical, Phytochemical, Volatile Compounds, and Taste Profiles of *Apis mellifera* Honey from Longan (*Dimocarpus longan*) Flower Mr. Gerry Renaldi	**O-247** Reactive Blending of Thermoplastic Starch with Chlorhexidine Gluconate and Epoxidized Natural Rubber Ms. Pimlapat Nanjai

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14.30 – 14.45	**O-340** Effect of Heat Treatment on Color, Proximate Composition, and Bioactive Compounds of Three Selected Mushrooms Ms. Pakjira Yawong	**O-326** Development of Gluten-Free Bread from Extracted Barnyard Millet Starch Prepared from Different Drying Techniques Mr. Abhishek Kishor Marathe	**O-349** A Model for Pectin Extraction from Krung Kamoa Leaves (*Cissampelos pareira*) Mr. Seksan Mangkalanan	**O-301** Production of Papain-Hydrolyzed Chitooligosaccharides with Antioxidant and Anti-acetylcholinesterase Activities from Mantis Shrimp (*Oratosquilla nepa*) Chitosan Ms. Supharada Khaisaat	**O-239** Influence of Sweetness, Saltiness, and Sourness on Sensory and Volatile Profiles of an Orange Beverage Fortified with Rice Bran Protein Hydrolysate Dr. Peeraporn Pakakaew	**O-254** Modification of Cassava Starch and Gelatin Blended Films using Cold Plasma Ms. Chonticha Srakam
14.45 – 15.00	**Break 15 min**					

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Co-chairman	Asst. Prof. Dr. Wannaporn Klangpetch Ueno	Asst. Prof. Dr. Akkasit Jongjareonrak	Assoc. Prof. Dr. Thanongsak Chaiyaso	Asst. Prof. Dr. Suthat Surawang	Dr. Kanjana Singh	Asst. Prof. Dr. Sarinthip Thanakkasaranee
15.00 – 15.15	**O-188** Reparative Mechanisms of Collagen Peptides from Chinese Giant Salamander Skin in Counteracting UVB-Induced Skin Photoaging: *In Vitro* and *In Vivo* Insights Dr. Yongjie Zhou	**Invited Speaker** Ginsenoside Rf Ameliorates Alopecia by Promoting Androgen Receptor Degradation Through Directly Inhibiting Deubiquitinating Enzymes Assoc. Prof. Dr. Tae Gyu Lim	**O-362** Effect of Soaking Temperature on Gamma-Aminobutyric Acid (GABA) Content and Germination Rate in Ultrasonic-Assisted Germinated Brown Rice Ms. Wahyu Atmaja Kharisma Jati	**Invited Speaker** Transforming Food Processing by Products into Functional and Health Promoting Ingredients and Foods Using Novel Technologies Prof. Dr. Asgar Farahnaky	**O-240** Impact of Synergistic Encapsulated Green Tea and Black Rice Extracts on Sensory Profile and Consumer Acceptance of High-Pressure Processed Brown Rice Milk Mr. Worrapob Chaisan	**Invited Speaker** Food Waste Utilization Towards Sustainable Food Systems Prof. Dr. Costas Stathopoulos
15.15 – 15.30	**Invited Speaker** Converging Green Technologies for Sustainable Valorization and Frontier Food Innovation Asst. Prof. Dr. Juan Manuel Castagnini	**O-194** Developing Climate-Resilient Rice Varieties with Enhanced Nutritional Profiles and Controlled Heavy Metal Accumulation Dr. Mohd Ikmal Asmuni	**O-182** Enhancing Yield and Quality of Sacha Inchi *(Plukenetia volubilis)* Seed Oil through Ohmic Heating Extraction Dr. Muhammad Hazwan Hamzah	**Invited Speaker** Recent Advances on Food Biosensors and Electrochemical Sensors on Food Bioactives, Nutrients and Toxicants Prof. Dr. Özlem Tokuşoğlu	**O-286** Manufacturing Black Tea Hard Candy by Replacing Industrial Sugar with Honey using Non-Ultra Processed Foods Asst. Prof. Dr. Tunyaluk Bouphun	**Invited Speaker** Deep Eutectic Solvents for Green Extraction of Bioactive Compounds from Agri-Food By-Products Dr. Suwimol Chockchaisawasdee

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15.30 – 15.45	**O-266** Ma-Kiang Kombucha Development: Influence of SCOBY Type on Bioactive Compounds and Antioxidant Properties Mr. Prem Sangpichai	**O-401** Protein Enrichment of Gluten-Free Bread from Brown Rice Flour Using Sacha Inchi Powder Mr. Nirut Tungsatapronkul	**Invited Speaker** Biomanufacturing for Food and agriculture: Alginate Oligosaccharide and Astaxanthin Prof. Dr. Ming Lyu	**O-236** Effect of Maltodextrin Concentration on Stability and Physicochemical Properties of Concentrated Mahachanok Mango Smoothie Mr. Niroth Oomnog	**O-336** Contextual Modulation of Emotional and Hedonic Responses to Functional Peach Tea Beverages Across Real and Immersive Consumption Environments Dr. Kanjana Singh	**O-395** Chitosan and Coffee Skin: Synergy for High-Quality of Sustainable Edible Films for Food Packaging Prof. Dr. Luh Suriati
15.45 – 16.00	**O-351** Exploring the Volatile Aroma Profile of Chrysanthemum Leaf Tea Ms. Charintip Niemphol	**O-429** Determination of the Sensory and Physical Properties of Buckwheat, Einkorn and Quinoa Added Simit (Turkish Bagel) Mr. Mustafa Kaan Doğan	**Invited Speaker** Microbial Oil Production from Defatted Rice Bran Hydrolysate using Oleaginous Yeast and Its Challenges Prof. Dr. Masanori Watanabe	**O-241** Effect of Tamarind Kernel Powder on Texture Formation of High-Moisture Extruded Soy Protein Meat Analogs Ms. Phimchanok Saisuwan	**O-357** Decoding Chiang Mai's Khao Soi Experience: A Google Maps Review Analysis Dr. Ponjan Walter	**O-256** Unpacking Biodegradable Plastic Claims in Indonesia: A Citizen Science Approach to Material Diversity and Policy Gaps Dr. Watumesa Agustina Tan

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16.00 – 16.15	**O-428** Impact of Different Milk Fat Levels on Caffeine, Antioxidant Capacity and Bioactive Profile of Turkish Coffee Mr. Hakan Atakan	**O-346** Leaf Protein Concentrates as Alternative Source of Protein: Processing Method and Properties Asst. Prof. Dr. Kiattisak Duangmal	**Invited Speaker** Construction of DHA and ARA Cell Factories Based on Industrial Applications Assoc. Prof. Dr. Huidan Zhang	**O-251** A Comprehensive Approach to Probiotic Supplement Development: Strain Screening, Functional Characterization, and Stability Testing Ms. Supriya H Yadav	**O-293** Sustainable Product Development and Cradle-to-Gate Water Footprint Assessment of Choco-Natto Synbiotic Dr. Nuttinee Salee	**O-329** Dual-Function Smart Biodegradable Film Integrated with Kradon and Anthocyanin Extract for Quality Monitoring of Chilled Fresh-Cut Pork Dr. Subhash Vishwanath Pawde
16.15 – 16.30	**O-440** Effect of Soybean Cultivars on the Physicochemical, Textural, Rheological, and Microstructural Properties of Soy Yogurt Thi Quyen Nguyen	**O-507** Association Between Maternal Exposure to Fine Particulate Matter (PM2.5) During Pregnancy and Birth length in Offspring: A Retrospective Study in Chiang Mai, Northern Thailand Suwinai Saengyo	**O-272** Functional and Structural Properties of Pomelo Fiber Through Acid-Ultrasound Modification Ms. Kartika Sari Dewi	**O-335** Herbal Mixed Tisanes as Functional Beverages: Antioxidant, Sensory Emotion, Relaxation, and Calmness TM. MD. Preechaya Phrommin	**O-305** Development of a Snack Product from Rice (*Oryza sativa* L.) cv. RD43, Enriched with Plant-Based Protein from Kai-Pum (*Wolffia globosa*) Dr. Threethip Chuensun	**O-343** Preparation and Characterization of TiO_2/ZnO Nanoparticle Coating on Kraft Paper via Sparking Process for Packaging Application Ms. Mutita Witthayapak

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Co-chairman	Asst. Prof. Dr. Wannaporn Klangpetch Ueno	Asst. Prof. Dr. Akkasit Jongjareonrak	Assoc. Prof. Dr. Thanongsak Chaiyaso	Asst. Prof. Dr. Suthat Surawang	Dr. Kanjana Singh	Asst. Prof. Dr. Sarinthip Thanakkasaranee
16.30 – 16.45	**O-260** Ultrasound-Driven Maillard Conjugation for Enhancing Functional Properties of Plant Proteins Ms. Nareekan Chaiwong	-	**O-435** Mapping and Utilization of Sugarcane Bagasse for Sustainable Bioenergy and Bioproduct Pathways in East Java, Indonesia Dr. Nimas Mayang Sabrina Sunyoto	**O-246** When Plants Meet Pleasure: Sensory and Consumer Insights into Probiotic Ice Cream Formulated with Soy and Coconut milk Ms. Korapin Korkijthumrong	**O-306** Sustainable Development of Ready-to-Use Miang Tao-Jiew Sauce from Traditional Fermented Soybean: Sensory and Carbon Footprint Evaluation Mrs. Natwalinkhol Settapramote	**O-177** Gap Analysis for Enhancing Productivity in Cacao Growers in Chiang Mai Province Ms. Thirada Sonthako
16.45 – 17.00	-	-	-	-	**O-309** Application of Hedonic, Just-About-Right, and Discriminative Analyses in Optimizing a Chocolate-Flavored Green Banana–Wolffia Protein Drink Mix Asst. Prof. Wantida Homthawornchoo	**O-233** Biodegradation of Synthetic Aromatic–Aliphatic PET-based Copolyesters Under Composting Conditions: Structure–Properties Relationships Mr. Hojun Shin

Day 1: February 5, 2026 (cont'd)

Room	**Division A-1** Food, Nutrition and Health Bioscience **CHIANGMAI 2**	**Division A-2** Food, Nutrition and Health Bioscience **CHIANGMAI 3**	**Division B** Sustainable Bioresource Processing and Engineering **BOARD ROOM 2**	**Division C** Bio-food Innovation and Product Development **BOARD ROOM 3**	**Division F** International Symposium on Sustainable Practices and Sensory Science **CHIANGMAI 1**	**Division G** Sustainable Food Biosystems, Packaging and Regulatory Frameworks **BOARD ROOM 4**
Chairman	Asst. Prof. Dr. Juan Manuel Castagnini	Assoc. Prof. Dr. Tae Gyu Lim	Prof. Dr. Masanori Watanabe	Prof. Dr. Asgar Farahnaky	Dr. Wilatsana Porsri	Prof. Dr. Pornchai Rachtanapun
Co-chairman	Asst. Prof. Dr. Wannaporn Klangpetch Ueno	Asst. Prof. Dr. Akkasit Jongjareonrak	Assoc. Prof. Dr. Thanongsak Chaiyaso	Asst. Prof. Dr. Suthat Surawang	Dr. Kanjana Singh	Asst. Prof. Dr. Sarinthip Thanakkasaranee
17.00 – 17.15	-	-	-	-	**O-303** Dark Chocolate Hi Enrich Protein from *Wolffia Globosa,* A New Prototype for Future Food Asst. Prof. Dr. Tiparat Tikapunya	-

Friday February 6, 2026	
08.30 – 09.00	Registration
Moderator	Asst. Prof. Dr. Sorraya Khiewnavawongsa Asst. Prof. Dr. Akkasit Jongjareonrak
09.00 – 09.30	**Plenary 4:** Prof. Dr. Dave Stone Advances in Food and Agricultural Sustainability Across the Pacific Northwest, U.S.A.
09.30 – 10.00	**Plenary 5:** Prof. Dr. Jonghwan Suhr From Cork to High-Value Materials: Eco-Friendly Sandwich Composites and Suberin-Enhanced PLA Packaging
10.00 – 10.30	**Plenary 6:** Dr. Stephen Charles Mansbridge Sustainable Livestock Production for New Food Product Development
10.30 – 10.35	**INFORMA Stage Presentation**
10.35 – 10.45	**Coffee Break**
10.45 – 11.45	**Oral Presentation (in separated rooms)**
11.45 – 12.00	**Best Poster Awards, CNX FINEX Awards (Grand Prizes) & Closing Ceremony**
Moderator	Asst. Prof. Dr. Kanyasiri Rakariyatham Dr. Sukan Braspaiboon
12.00	**Lunch**

Oral Presentation Program
Day 2: February 6, 2026

Room	**Division B-1** Sustainable Bioresource Processing and Engineering **CHIANGMAI 1**	**Division B-2** Sustainable Bioresource Processing and Engineering **CHIANGMAI 2**	**Division D-1** Food Microbiology and Sustainable Food Safety Practice **BOARD ROOM 4**	**Division D-2** Food Microbiology and Sustainable Food Safety Practice **+ Division E** Microbial Biosystems and Biomanufacturing **CHIANGMAI 3**
Chairman	Assoc. Prof. Dr. Mohsen Gavahian	Asst. Prof. Dr. Pilairuk Intipunya	Prof. Dr. Hui Hong	Assoc. Prof. Dr. Paul V. Priyesh
Co-chairman	Assoc. Prof. Dr. Rattana Muangrat	Dr. Tabkrich Khumsap	Dr. Phatthanaphong Therdtatha	Assoc. Prof. Dr. Tri Indrarini Wirjantoro
10.45 – 11.00	**Invited Speaker** Food Singularity and Sustainability: Roles of Integrating AI with Emerging Food Processing Technologies Assoc. Prof. Dr. Mohsen Gavahian	**O-394** Enhancing Honey Authentication in Thailand Through Combined Isotope Analysis and Pollen Profiling Assoc. Prof. Dr. Terd Disayathanoowat	**O-285** Effect of Salt Concentration and Fermentation Temperature on the Microbiological and Chemical Properties during Watermelon Rind Fermentation Mr. Shankar Neupane	**Invited Speaker** Bridging Food Bioscience Education and Industry-Accredited Food Safety Training to Address the Global Shortage for Food Safety Professionals in an Evolving Regulatory Landscape to Meet the Sustainable Food Systems Demand Assoc. Prof. Dr. Paul V. Priyesh
11.00 – 11.15	**O-324** Ohmic Heating-Assisted Green Extraction of Polyphenols from Rambutan Peel Using Choline Chloride–Lactic Acid NaDES as an Emerging Solvent Mr. Minh Cao Tran	**Invited Speaker** Towards Industrialization: Advances in Efficient Bioconversion of Black Soldier Fly Protein Assoc. Prof. Longyu Zheng	**O-259** Integrated Pest Management (IPM) in a Fruit Juice Factory: Monitoring, Documentation, and Risk Assessment Mr. Chaiamon Chantarapitak	**Division D: O-387** Mitigating Mineral Oil Hydrocarbon (MOH) Contamination in Palm Oil: An Integrated Farm-to-Mill Strategy for Safe and Sustainable Food Systems Dr. Maznah Zainol

Day 2: February 6, 2026 (cont'd)

Room	**Division B-1** Sustainable Bioresource Processing and Engineering **CHIANGMAI 1**	**Division B-2** Sustainable Bioresource Processing and Engineering **CHIANGMAI 2**	**Division D-1** Food Microbiology and Sustainable Food Safety Practice **BOARD ROOM 4**	**Division D-2** Food Microbiology and Sustainable Food Safety Practice **+ Division E** Microbial Biosystems and Biomanufacturing **CHIANGMAI 3**
Chairman	Assoc. Prof. Dr. Mohsen Gavahian	Asst. Prof. Dr. Pilairuk Intipunya	Prof. Dr. Hui Hong	Assoc. Prof. Dr. Paul V. Priyesh
Co-chairman	Assoc. Prof. Dr. Rattana Muangrat	Dr. Tabkrich Khumsap	Dr. Phatthanaphong Therdtatha	Assoc. Prof. Dr. Tri Indrarini Wirjantoro
11.15 – 11.30	**O-353** Development of Whole Green Banana (*Musa Sapientum* Linn, ABB Group, cv. Kluai Namwa) Flour Using Spray Drying Ms. Trinh Kim Nguyen	**O-311** Optimization of Pectinase-Assisted Hot Water Extraction for Anthocyanin Recovery from Black Goji Berries Mr. Feng Jiao	**Invited Speaker** From Waste to Wellness: Circular Bioprocessing of Animal-Source Proteins for Functional Biopeptides Prof. Dr. Hui Hong	**Division E: O-426** Enhancement of *Spirulina platensis* Biomass and Metabolite Production through Co-Culture with *Lactobacillus plantarum* and *Lactobacillus casei* Dr. Nur Ida Panca Nugrahini
11.00 – 11.15	**O-441** Change in microbiological and biochemical properties of Jincao grass during ensiling by the lactic acid bacterial co-cultures: *Lactiplantibacillus plantarum* KUB-SP1-3 and *Pediococcus acedilactici* KUB-M6 Ms. Pattarapa Pummara	**O-342** Cold Plasma and Plasma-Activated Water as Sustainable Green Technologies for Enhancing the Bioactivity and Antioxidant Potential of Butterfly Pea (*Clitoria ternatea*) Extracts Ms. Beenish Altaf	**Division D: O-397** Salicylic Acid Alleviates Chilling Injury and Enhances Antioxidant Capacity in 'Nam Dok Mai' Mango during Cold Storage Ms. Rungdarunlak Charatsaengphaibun	-

Remark:

(A) Food, Nutrition and Health Bioscience
(B) Sustainable Bioresource Processing and Engineering
(C) Bio-food Innovation and Product Development
(D) Food Microbiology and Sustainable Food Safety Practice
(E) Microbial Biosystems and Biomanufacturing
(F) Biosensory and Consumer Insights
(G) Sustainable Food Biosystems, Packaging and Regulatory Frameworks

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Keynote Speakers

Agri-food science and human nutrition; leading the innovation for the planetary health

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Abstract

Over the past century, there has been a tremendous increase in population, consequently leading to the need for more food and water. Based on reports from the United Nations, it is estimated that the world's population will surpass 9.7 billion people by the year 2050. Furthermore, by the end of this century, the projected number is expected to exceed 11 billion people. The "hot-spot areas" of growth include regions of the African continent and South Asia. The demographic characteristics of this growth include younger populations (aged 15–25) and older populations (aged 65 and over), which are being identified as the most rapidly expanding groups. This may also result in a shift in food consumption patterns, behaviors, requirements, and needs, catering to the majority. This is also accompanied by the current division in the population from a health perspective. On one side, we face populations that are undernourished, hungry, and ravaged by illnesses and diseases as a direct consequence of a lack of nourishment. In contrast, we are also seeing an increase in morbidity and mortality directly related to the overconsumption of high-energy, low-nutritional-value foods. This rather gloomy situation places food and agri-tech science, human nutrition, and population health at a pivotal point for the development of new and innovative technologies. Advancements in all areas related to food can only be seen as part of a unified approach to food singularity. The aim of this keynote presentation is to provide an overview of the challenges and opportunities currently faced by the agri-food sector.

Keynote Speakers

Upcoming Topics for the Food Industry; PFAS Ban Project in the EU and Non-Conventional Cold Chain

Alain Le Bail*

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Abstract

This presentation will propose a focus on two topics of importance for the food industry. The first topic concerns the project of PFAS ban in Europe and the global concern with PFAS pollution. The main domain of application concerns sealing and non stick coating. An overview of the situation and key dates at EU level will be reminded. Results obtained in the case of domestic cookware and baking in industry will be presented with a discussion about alternatives. Coming back to metallic baking surface is doable but address specific risks such as Glycidyl esters and 2-3 MCPD. The second topic concerns the case of emerging non-conventional cold chains such as chilling, superchilling and supercooling. Superchilling has been adopted by the EU commission in 2022 for fish transportation, meanwhile chilling is now adopted by many industries in Europe. Also, a project entitled “the 3°C of change” launched in 2023 by the Univ. of Birmingham (UK) is actually discussed worldwide. It aims at raising the frozen food storage temperature from -18°C to -15°C. The rationale concerns energy saving, meanwhile the possible impact on food quality and food safety is under scrutiny.

References:

An overview of selected “subzero” temperature storage regimes of foods: regulations and perspectives about the expected impact of the "three degrees of change" initiative on the shelf life of frozen foods, Alain Le-Bail & al., https://doi.org/10.1016/j.ijrefrig.2025.04.009

Prof LE-BAIL was Coordinator of the “SATIN-BAKING” project ANR France-2014-2016 on PFAS in the baking industry

Keynote Speakers

Dietary Pattern Promoting Longevity

Samitti Chotsriluecha*

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Abstract

Longevity is shaped by a complex interaction of genetics, lifestyle, environment, and nutrition. Among these factors, dietary pattern is one of the most powerful and modifiable determinants of healthy aging. Growing evidence indicates that long-term adherence to healthy dietary patterns, rather than short-term interventions or isolated nutrients, plays a central role in extending lifespan, preserving functional capacity, and preventing noncommunicable diseases (NCDs) such as cardiovascular disease, diabetes, cancer, and neurodegenerative disorders. The Mediterranean diet is one of the most extensively studied dietary patterns associated with longevity. It emphasizes high intake of vegetables, fruits, whole grains, legumes, nuts, and olive oil as the primary fat source, along with moderate consumption of fish and limited red meat and ultra-processed foods. Large cohort studies and randomized trials have shown that adherence to the Mediterranean diet reduces all-cause mortality, cardiovascular events, and type 2 diabetes risk. These benefits are mediated through improved lipid profiles, enhanced insulin sensitivity, and reduced chronic inflammation. Monounsaturated fats, omega-3 fatty acids, and polyphenols from olive oil, nuts, and fish exert antioxidant and anti-inflammatory effects, which are key mechanisms underlying healthy aging. The Dietary Approaches to Stop Hypertension (DASH) diet also plays a critical role in promoting longevity and preventing NCDs. Originally designed to lower blood pressure, the DASH diet emphasizes fruits, vegetables, whole grains, low-fat dairy products, lean proteins, nuts, and legumes, while limiting sodium, saturated fat, and added sugars. Long-term adherence to the DASH diet has been associated with reduced risk of hypertension, stroke, coronary heart disease, and overall mortality. Mechanistically, the DASH diet improves endothelial function, reduces oxidative stress, and supports blood pressure regulation through high intakes of potassium, magnesium, calcium, and dietary fiber. Across cultures, these healthy dietary patterns share common biological pathways that support longevity. High dietary fiber intake improves gut microbiome diversity and increases production of short-chain fatty acids, enhancing metabolic and immune function. Antioxidants and phytochemicals reduce cellular oxidative damage and chronic inflammation, hallmarks of aging. In addition, balanced energy intake and lower glycemic load influence nutrient-sensing pathways such as insulin/IGF-1 signaling, AMP-activated protein kinase, and mTOR, which are involved in mitochondrial function and biological aging. In conclusion, dietary patterns such as the Mediterranean and DASH diets provide robust, evidence-based strategies for preventing NCDs and promoting longevity. Rooted in whole foods and moderation, these sustainable dietary patterns support not only longer life expectancy but also improved healthspan, enabling individuals to age in better health and functional independence.

Keywords: Healthy Dietary Pattern; Mediterranean Diet; DASH Diet; Longevity

Keynote Speakers

Advances in Food and Agricultural Sustainability Across the Pacific Northwest, U.S.A.

Dave Stone*

Associate Dean of International Programs, College of Agricultural Sciences, Oregon State University, U.S.A.

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Abstract

The Pacific Northwest, U.S.A., has a long history of pioneering sustainable practices in agriculture and food production. Today, it is more critical than ever to integrate advanced technologies into a sustainable framework to optimize economic, health and environmental benefits for both producers and consumers. This presentation highlights initiatives at Oregon State University to harness technologies in robotics, artificial intelligence and digital (smart) agriculture to address complex global issues around the sustainability of agricultural systems and food production. Three specific examples will be shared: 1) training artificial intelligence to better predict the shelf-life of ready-to-eat perishable foods; 2) utilizing agricultural by-products to replace single use plastics and as edible food coatings to reduce food loss; and 3) using robotics, solar farming and machine learning in a collaborative project with engineering for the orchard of the future. Society is at the forefront of major technologica1 advances, which has tremendous opportunity to increase yield, reduce waste and cost and sustain natural landscapes and farming communities. Oregon State University welcomes global partners to help us achieve these outcomes for a better tomorrow.

Keywords: Sustainability; Artificial Intelligence; Robotics; Digital Agriculture

Keynote Speakers

From Cork to High-Value Materials: Eco-Friendly Sandwich Composites and Suberin-Enhanced PLA Packaging

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School of Mechanical Engineering, Sungkyunkwan University, Korea

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Abstract

The packaging industry is rapidly shifting toward advanced functional and eco-friendly solutions due to increasing environmental regulations and the demand for sustainable materials. This study explores the potential of natural cork to develop high-value packaging materials in three key areas: structural composites, PLA plasticizers, and bio-based adhesives. First, cork agglomerates were used as the core material in sandwich composites to improve noise and vibration control. Experimental analysis showed noise reduction rates exceeding 75–95% and a 300% increase in the damping coefficient. These results confirm that cork-based structures are highly suitable for protective packaging in aerospace and automotive applications. Second, suberin extracted from cork and potato peels was applied as a biodegradable plasticizer to reduce the brittleness of polylactic acid (PLA). The suberin-plasticized PLA showed significantly improved flexibility and toughness while achieving over 90% decomposition within 12 weeks. Additionally, a bio-based epoxy adhesive was developed by modifying the terminal groups of suberin. This adhesive reached a lap shear strength of 13.92 MPa which is similar with commercial epoxy adhesives (~15 MPa), while also exhibiting natural degradability through hydrolysis. In conclusion, this research demonstrated that natural cork can be transformed into high-value functional materials through structural and chemical modifications, enabling the development of cork material in next-generation sustainable packaging systems.

Keywords: Cork; Suberin; Sandwich Composites; PLA; Plasticizer; Adhesive; Biodegradation

Keynote Speakers

Sustainable Livestock Production for New Food Product Development

Stephen Charles Mansbridge[1,2]*,Wilatsana Posri[2,3]

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[2]Harper Food Innovation, Harper Adams University, The United Kingdom
[3]ThaiBrit FoodBridge Project (supported by British Council's International Research and Empowerment Programme and NRCT, as part of the International Science Partnerships Fund (ISPF).

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Abstract

The sustainability credentials of new food products incorporating ingredients of animal origin are of growing interest to consumers worldwide. The modern process of new food product development (NFPD) therefore needs to consider societal, environmental and economic concerns across the whole supply chain from the farm to the consumer, and be data driven (evidence based) to substantiate sustainability claims. Food manufacturers must therefore have access to and understand farm level data pertaining to the livestock production systems producing their ingredients. Societal concerns for animal welfare vary by region (geopolitical) and change over time (temporal) so that NFPD must respond dynamically to the markets it intends to serve, since consumer approval of the animal welfare standards applied during production are key to sustained product demand. Labeling and storytelling to raise consumer awareness of the production conditions are mechanisms that can be leveraged in the marketing of new food products. Concurrently, appreciation of minimizing/reversing the environmental harms and realizing the environmental benefits of animal production are equally important. Advances in tools and concepts such as lifecycle assessments, integrated farm management, regenerative agriculture and precision livestock farming are modernizing agriculture so that the best use of resources through careful application and harmonizing with the local ecosystem can be achieved. Careful use of sustainable protein sources including processed animal proteins from livestock and insects can additionally support a circular economy to reduce food and animal by-product waste but need caution to ensure they fit with consumer acceptability and deliver environmental and economic benefits. These environmental credentials relating to new food products must be communicated to society that avoid greenwashing' through the development of labeling, which is robust, standardized and transparent in relation to parameters generated through lifecycle assessment, e.g. carbon audits. Finally, NFPD must ensure economic returns throughout the supply chain to generate long-term profitability for the livestock producer, food manufacturer, retailer and allied industry stakeholders whilst being valued by society. With the generation of 'big data', increased computational resources and evolving use of artificial intelligence, the question is now what, to who, and how much information needs to be communicated to evidence food sustainability?

Keywords: Livestock; Food; Animal Science; Sustainability; Lifecycle Assessment

Invited Speaker

Valorization of Agri-Food By-Products from the Valencian Community through Non-Conventional Extraction Technologies

Francisco Juan Marti Quijal*

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Abstract

The valorization of local agri-food by-products represents a promising strategy to promote circular economy and sustainability within the Valencian Community. In this work, by-products from black truffle (Tuber melanosporum), tiger nut (Cyperus esculentus), and citrus processing were explored as valuable sources of bioactive compounds and essential nutrients. Different non-conventional extraction technologies - pressurized liquid extraction (PLE), pulsed electric fields-assisted extraction (PEF), and supercritical fluid extraction (SFE) - were investigated to optimize the recovery of target compounds. The influence of key operational parameters, such as temperature (PLE and SFE), pressure and extraction time (SFE), and field strength and specific energy (PEF), was systematically evaluated to identify optimal conditions for the extraction of different compounds (e.g.: phenolic compounds, carbohydrates, fatty acids, minerals, and antioxidant molecules). In addition, potential contaminants, particularly heavy metals, were also monitored to ensure extract safety. Selected extracts were further assessed for their cytotoxicity and bioactive potential in vitro. Preliminary findings suggest that the choice of technology and extraction parameters significantly affects the yield and composition of the extracts. These results contribute to establishing sustainable extraction strategies for the efficient recovery of high-value compounds from local by-products, supporting their integration into food, nutraceutical, and cosmetic applications.

Invited Speaker

Green Biorefinery of Crops' Straw via Recycling of Waste Liquor as Fertilizer

Wen Wang[1], Cuiyi Liang[1], Wei Qi[1]*

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Abstract

Bioconversion of crops' straw into biofuels, biochemicals, and other products has faced key bottlenecks such as high energy consumption in pretreatment, large wastewater output, and high production cost. Alkaline pretreatment is a low energy-consuming technology for highly efficient to remove lignin which has been thought as the chief hindrance for enzymatic saccharification of lignocellulose, but it would generate large quantity of wastewater. Through wastewater recycling, this study significantly reduced wastewater output by more than 80% compared with traditional alkaline pretreatment technology. The enzymatic hydrolysis efficiency (EHE) of treated crop straw could achieve 92.02% at 20% solid concentration. After being fermented to produce 37.02 g/L ethanol, the fermented solid residue contained 16.70% protein, which is an ideal animal feed. Meanwhile, a technology was developed to prepare liquid fertilizer from the residual wastewater. It found that the low molecular weight (LMW) organics in BL had concentration effect on the growth of rice seedling. The inoculation of microbial strains into BL could obviously remove inhibitors, and enhance root development, increased soil nutrients, and improved the distribution of beneficial microorganisms around the rhizosphere soil to promote rice yield. It set a green biorefinery process of straw with zero-waste discharging. In summary, the biorefinery technology of crops' straw based on alkaline pretreatment has the significant advantage of environmental friendliness and broad application prospects.

Keywords: Lignocellulose; Pretreatment; Enzymatic hydrolysis; Ethanol; Liquid fertilizer

Invited Speaker

Enhancement of Bioactive Properties in Banana (*Musa paradisiaca*) Flower Bract Extract through Fermentation with *Saccharomyces boulardii* and *Bacillus clausii*

Madhumitha RK[1] and Anbarasu K[1]*

[1]*Department of Biotechnology, Periyar Maniammai Institute of Science & Technology, Thanjavur, 613403, India*

**Corresponding author E-mail: anbarasuk@pmu.edu*

Abstract

Banana is one of the most widely produced and consumed fruits in the world. Although both banana and its flower are utilized globally, the banana flower bracts (BFB) are generally discarded, leading to underutilization of this nutrient-rich biomass. Despite being rich in dietary fiber, flavonoids, and anthocyanins, BFB remain an unexploited biodegradable waste. In the present study, the BFB extract of *Musa paradisiaca* was fermented using two probiotic strains, *Saccharomyces boulardii* and *Bacillus clausii*, and the post-fermentation changes in bioactive properties and probiotic viability were evaluated. A progressive decrease in pH was observed, with S. *boulardii* fermentation showing a reduction from 5.57 ± 0.21 to 3.30 ± 0.10, while titratable acidity increased from 0.12 ± 0.02% to 2.11 ± 0.14% lactic acid equivalents, indicating active fermentation. Probiotic viability increased from 5.42 ± 0.10 to 6.43 ± 0.03 log CFU/mL for S. *boulardii* and from 5.20 ± 0.17 to 6.13 ± 0.13 log CFU/mL for B. *clausii*. Total phenolic content (TPC) increased significantly from 52 ± 1 to 119 ± 3 µg GAE/mL in S. *boulardii* fermentation and from 50 ± 6 to 119 ± 7 µg GAE/mL in B. *clausii.* Similarly, total flavonoid content (TFC) increased from 184 ± 46 to 892 ± 28 µg QAE/mL and from 54 ± 17 to 736 ± 41 µg QAE/mL, respectively. Antioxidant activity improved markedly, with DPPH IC□□ values decreasing from 481 to 356 µg/mL in S. *boulardii* and from 568 to 423 µg/mL in B. clausii fermented extracts. Hydroxyl radical scavenging IC□□ values were also reduced from 820 to 464 µg/mL and from 548 to 417 µg/mL, respectively. Furthermore, the effect of probiotic-fermented banana flower bracts (FBFB) extract on the lifespan of the model organism *Caenorhabditis elegans* was also assessed. These results demonstrate that probiotic fermentation significantly enhances the bioactive composition, antioxidant capacity, and probiotic viability of banana flower bract extract, highlighting its potential as a sustainable functional food ingredient supporting SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production).

Keywords: Banana Flower Bract; Fermentation; Probiotic; Antioxidant; Sustainability

Invited Speaker

Informed Green Food Choice: Driver (emotion?), Signal (trust?) or Noise (rationale?)

Wilatsana Porsri[1,2]*

[1]Harper Food Innovation, Harper Adams University, The United Kingdom
[2]ThaiBrit FoodBridge Project (supported by British Council's International Research and Empowerment Programme and NRCT, as part of the International Science Partnerships Fund (ISPF).

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Abstract

This talk discusses how consumers make choices regarding foods that are claimed to be sustainable. The proposed interventions to encourage sustainable food choice are highlighted through two approaches: reasoned and intuitive. The first approach is grounded in cognitive processing, whereas the second is shaped predominantly by emotional or habitual influences. We examine the indicators of 'sustainable goodness' that reportedly assist consumers in forming judgments which are often referred to as signals. Common signals of sustainability in the food include logos, certifications, and ethical or environmental claims issued by internationally recognised bodies. However, these signals can become noise when consumers feel confused or lose trust in them, which disrupts rational decision- making. Reported causes of such noise include inconsistency in how signals are displayed and unclear or frequently changing contexts of food production and consumption. Individual influencing factors such as subjective norms, attitudes toward health and nutrition, environmental and ethical concerns, as well as bandwagon or peer effects, the choice context, and the widely recognised importance of economic incentives, serve as motivations that prompt and/or nudge consumers' choices, with or without conscious awareness. As there is often a discrepancy between attitudes and behavioural outcomes, more studies in the new product development (NPD) arena have applied implicit measurement techniques, combined with qualitative methods, to gauge the effects of sustainability- related signals in consumers' minds. *We plan to run a showcasing activity based on one of our ThaiBrit FoodBridge NPD projects during this session*. Implicit response tests will be applied to examine the effects of selected eco- claims. We propose that sustainability- related green signals should be tested prior to being embedded into the design of sustainable food concepts. We also encourage sensory scientists and product developers to identify their product's green signals at the early stages of NPD, despite constraints such as limited time and resources during early development phases. To ensure that the green concept functions effectively and aligns with business strategies, consistency is essential for maintaining consumer trust in the brand and its identity.

Keywords: Green Choice; Novel Food; Sustainability; Implicit test

Invited Speaker

Support-Free 4D Printing of Shape Memory Polymer Composites for Smart Structures

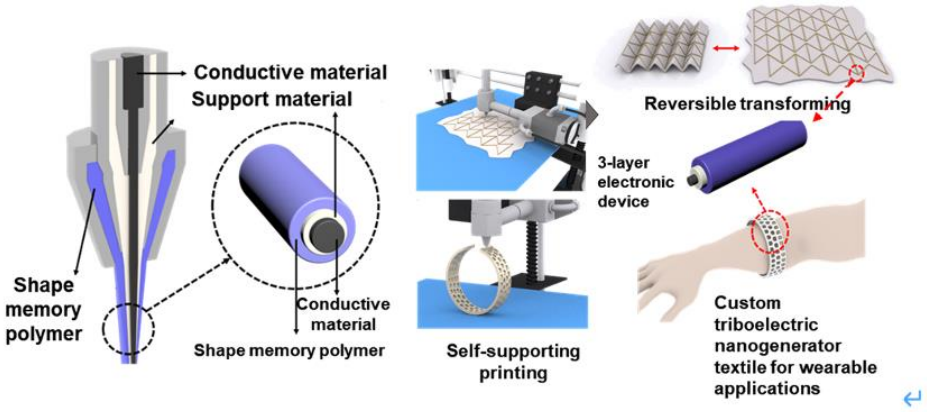
Hyoseop Kang[1], Hyeon-ju Jang[1], Woong-Rryeol Yu[1]*

[1]*Department of Materials Science and Engineering and Research Institute of Advanced Materials (RIAM), Seoul National University, Seoul, 08826, Republic of Korea*

**Corresponding author E-mail: woongryu@snu.ac.kr*

Abstract

Four-dimensional (4D) printing represents a transformative manufacturing paradigm that integrates programmable, time-dependent functionality into additively manufactured structures. A central challenge in this field is achieving support-free fabrication, since conventional methods often require auxiliary frameworks that restrict geometric freedom and limit structural integrity. To address this, recent research has introduced frontally polymerizable shape memory polymers, which undergo rapid, exothermic self-propagating reactions during extrusion. This innovation enables direct printing of complex, free-standing architectures that exhibit excellent shape fixity and recovery, thereby expanding the design space of smart structures. Building upon this foundation, aerial polymerization techniques have been developed to stabilize filaments during mid-air deposition, allowing the fabrication of unsupported 3D forms and their integration into functional devices such as pressure sensors. Mechanical robustness has been further advanced by embedding continuous carbon fibers within the polymer matrix, where optimized impregnation and fiber alignment strategies minimize fiber exposure and ensure reliable performance even under challenging printing orientations. Complementing these approaches, in-situ pin-assisted melt impregnation enables precise control of continuous fiber-reinforced thermoplastics, broadening material versatility while maintaining structural integrity. Together, these advances chart a cohesive pathway toward lightweight, adaptive, and deployable composite systems, establishing 4D printing as a practical route for next-generation aerospace, robotic, and wearable applications.



Keywords: Frontal polymerization; 4D printing; Shape memory polymers; Support-free fabrication; Smart Composites

Invited Speaker

GAPS in understanding safety and health claim regulation: Food Innovation and Regulation Network (FIRN) approach.

Pavinee Chinachoti[1,2]*

[1]*Food Innovation Regulation Network, Thailand.*
[2]*Food Science and Technology Association of Thailand*

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Abstract

The world food system has become complex beyond imagination from the eco-system, nutrient delivery as well as economical systainability. Nutraceuticals and Functional foods is an very active market prducts among upper income population and they engage consumers in ways food has never thought possible before. If Thailand continues to make functional foods and nutraceuticals from imported extracts, agricultural values of Thailand will be realized through targettd R&D. Broken and inefficient food supply chain has costed food ingredient trade imbalance as well as major agricultural waste. From regulatory standpoints, in order to assure that such products are safe and truly deliver what they intend, quite regorous criteria and standard of substantiation. This may be one of the most difficult scientific challenges for the Thai industry and researchers. This presentation explains how one developing country builds major efforts to catch-up in science as well as regulatory complexity while eco-system for health claim approval is far from adequate. Food Innovation-Regulation Network (FIRN) by FoSTAT (Food Science and Technology Association of Thailand) takes on a new challenge in trying to bridge the gap by several new programs to support academic researchers, the industry, government and the public. FIRN‘s build new programs and policy engagement has started to make an impact on how to increase values of agriculture products and how to manage research outcome to be more relevant. From nutrition, functional foods to food for clinical patients, Thailand new role maybe in the making!

Invited Speaker

Converging Green Technologies for Sustainable Valorization and Frontier Food Innovation

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Abstract

The convergence of sustainable processing technologies and food innovation is redefining the future of agri-food systems. This presentation will highlight recent advances in green technologies—pulsed electric fields, supercritical fluid extraction, pressurized liquids, and related methods—applied to the valorization of diverse resources, including food side streams, microalgae, edible insects, and underutilised crops. By enhancing the recovery of high-added-value compounds such as antioxidants, peptides, and carotenoids, these approaches contribute to the development of functional and health-promoting ingredients. Complementary studies using in vitro digestion, cell cultures, and microbiota models provide insights into the bioactivity, safety, and potential applications of these extracts in future foods. Beyond technological achievements, the lecture will encourage a critical discussion on the opportunities and challenges of scaling up these non-conventional processes. Issues such as energy demand, economic feasibility, regulatory frameworks, and industrial adoption must be considered to fully realise their potential. Ultimately, these technologies exemplify how scientific innovation can drive sustainability, resilience, and frontier food innovation within the framework of the "Food Singularity," offering pathways towards more equitable and sustainable food futures.

Invited Speaker

Ginsenoside Rf Ameliorates Alopecia by Promoting Androgen Receptor Degradation Through Directly Inhibiting Deubiquitinating Enzymes

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Abstract

Androgenetic alopecia (AGA) is the most prevalent type of hair loss in men and is primarily driven by androgen signaling through the androgen receptor (AR). In this process, testosterone is metabolized to dihydrotestosterone (DHT) by 5α-reductase, and DHT–AR interactions activate transcriptional programs that suppress hair growth, including the induction of dickkopf-1 (DKK-1), bone morphogenetic protein 2 (BMP2), and interleukin-6 (IL-6). Continuous AR activation subsequently promotes hair follicle miniaturization. Accordingly, modulation of AR activity represents a key therapeutic target for AGA. In this study, we investigated the potential anti-AGA properties of ginsenoside Rf (G-Rf). Six-week-old male C57BL/6 mice were assigned to control, DHT-treated, G-Rf–treated (10 or 20 mg/kg), and bicalutamide-treated groups. AGA was induced by daily administration of DHT (1 mg/kg), and G-Rf was orally administered for 17 days. Complementary mechanistic studies were performed using human dermal papilla cells (hDPCs). G-Rf markedly enhanced hair regrowth and hair shaft thickness in DHT-induced AGA mice, accompanied by suppression of AR expression and downstream inhibitory gene transcription. In hDPCs, G-Rf facilitated AR degradation by promoting ubiquitination and subsequent proteasomal turnover. Further analysis revealed that G-Rf directly interacted with and inhibited ubiquitin-specific peptidase 10 (USP10), a deubiquitinase known to stabilize AR. Notably, G-Rf did not alter AR expression in testicular tissue, suggesting a low likelihood of reproductive adverse effects. Together, these findings identify G-Rf as a promising therapeutic agent for AGA, functioning through inhibition of USP10 and enhancement of AR ubiquitin-mediated degradation.

Keywords: Androgenetic alopecia; Ginsenoside Rf (G-Rf); Androgen receptor; Ubiquitin-specific peptidase 10 (USP10); Ubiquitin–proteasome–mediated degradation

Invited Speaker

Microbial Oil Production from Defatted Rice Bran Hydrolysate using Oleaginous Yeast and Its Challenges

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Abstract

In recent years, global demand for vegetable oils and fats has increased due to population growth, with many countries relying on imports for their oil supply. In Japan, a significant challenge is the stable supply and self-sufficiency of oils. This study investigates the potential of using defatted rice bran hydrolysate (DRBH) as a carbon source for lipid production by oleaginous yeasts. The research involved evaluating lipid production by three oleaginous yeast strains, such as *Rhodotorula* sp. (C7), *Rhodosporidium paludigenum* (C10), and *Sporidiobolus pararoseus* (KX709872) using DRBH hydrolysate. The effects of sugar composition in DRBH and EPS (exopolysaccharide) production as by-products on lipid production were analyzed using principal component analysis (PCA) and biplot. First, we conducted oil production tests using oleaginous yeasts with DRBH hydrolysate and its constituent monosaccharides (glucose, xylose, and arabinose) as sole carbon in aerobic batch cultures. Among the oleaginous yeast strains, strain C7 exhibited the highest sugar utilization efficiency on DRBH medium (100%, $p<0.05$) and single-carbon source basic medium (99.2%, $p < 0.05$)). By using PCA and biplot analysis, DRBH medium showed positive correlations for all three strains with DCW, lipid production, EPS production, sugar consumption, and palmitic acid content. Additionally, a positive correlation was observed for linoleic acid content, linolenic acid content, and total unsaturation degree (TUD) with strain C10 on xylose and arabinose medium, and strain KX on xylose and arabinose medium. arabinose medium showed positive correlations, while a negative correlation was observed with cell growth. Strain C7 on glucose/xylose medium and strain C10 on glucose medium showed a high positive correlation with oleic acid content. These results indicate that DRBH medium enables cultivation capable of achieving high levels of DCW, oil production capacity, and EPS production capacity simultaneously. Furthermore, cell growth and sugar consumption are positively correlated with each other, and negatively correlated with linoleic acid content, linolenic acid content, and TUD. These findings demonstrate the potential of utilizing oleaginous yeasts for functional lipid production from DRBH, providing a promising approach to sustainable oil production.

Keywords: Microbial Oil; Defatted Rice Bran; Oleaginous Yeast; PCA & Biplot Analysis

Invited Speaker

Transforming Food Processing by Products into Functional and Health Promoting Ingredients and Foods Using Novel Technologies

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Abstract

The global food industry generates substantial volumes of cereal and plant-based by-products, many of which are under-utilised or diverted to low-value applications, despite being rich sources of dietary fibre, protein, micronutrients, and bioactive compounds. With increasing pressure to improve resource efficiency, reduce food waste, and enhance the sustainability and resilience of food manufacturing systems, innovative and scalable solutions are urgently needed to repurpose food by-products into high-value, health-promoting ingredients and foods. This presentation explores emerging and established processing technologies for the valorisation of food processing wastes and by-products, with a particular focus on cereal-derived streams. Novel physical, thermal, enzymatic, and hybrid processing approaches are discussed, demonstrating how targeted process design can tailor ingredient structure, functionality, nutritional quality, and health outcomes. Key challenges associated with raw-material variability, processing intensity, cost, regulatory constraints, and industrial scalability are critically examined, alongside opportunities for developing robust, flexible, and commercially viable transformation pathways. A central theme of this work is the biorefinery and zero-waste processing concept, which emphasises the integration of complementary processing steps to maximise value recovery from a single raw material. Food by-products contain multiple valuable fractions that must be systematically captured and upgraded to achieve both environmental sustainability and economic feasibility. Integrated processing strategies that enable near-complete utilisation of these streams are therefore essential for next-generation waste-transforming manufacturing systems. Case studies are presented to illustrate successful translation and commercialisation, including the production of soluble and insoluble dietary fibres from plant-protein processing by-products and the development of leaf protein concentrates derived from food and agricultural by-products. Major challenges of upscaling will also be discussed. Collectively, these examples demonstrate how innovative, integrated, and scalable technologies can support a transition from linear, waste-generating processes to circular food manufacturing models that deliver both health and sustainability benefits.

Invited Speaker

Food Waste Utilization Towards Sustainable Food Systems

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Abstract

Global efforts towards ensuring sustainability and Food Security have focused on the reduction and utilization of waste generated across the supply chain. Murdoch University, supported by the Future Food Systems CRC, has taken leadership in Western Australia in exploring potential benefits and impact of food waste utilization. A brief summary of current activities and recently commenced projects and collaborations will highlight the approaches we are adopting and showcase that we anticipate to achieve multifaceted impact, in terms of (i) reduction of the environmental burden generated, (ii) enhanced income streams for primary and secondary producers, and (iii) customer satisfaction, a major social impact driver, focusing on providing the consumers with specific novel products with enhanced properties. Located in a purpose-built Food Innovation Precinct, we are focusing our efforts on addressing industry-led problems as well as carrying out exploratory work in the intersection of food science, nutrition, agriculture and supply chain management. Our international team is exploring the most environmentally friendly ways to recover, stabilize, and utilize bioactive compounds found is waste. Projects recently underway include: utilization of artichoke waste utilizing green extractions, utilization of brewery waste for the sequential recovery of three classes of bioactive compounds, and, exploring the potential of carrot-based functional biodegradable packaging when both the structural components of the packaging and the bioactives added for enhance functionality are sourced from carrot waste. International interactions are a priority, highlighting that a global problem requires global solutions. South-East Asian countries are a natural partner for Australia and we have already established links with Vietnam (Nong Lam, Nha Trang), Thailand (Chiang Mai, Khon Kaen, Kasetsart) and Indonesia (Universitas Pembangunan Nasional "Veteran" Jawa Timur) looking at a range of sources suitable for valorization of waste and by-products.

Keywords: Waste utilization; Sustainable Food Systems, Green Extractions; Functional Packaging

Invited Speaker

Structural Characterization and Optimized Extraction of Immunomodulatory Polysaccharides from Edible Insects

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Abstract

Edible insects represent a promising source of bioactive compounds with diverse health-promoting properties. This study examined the immunomodulatory activity of polysaccharides isolated from *Protaetia brevitarsis seulensis* larvae (PBSL). The polysaccharides were fractionated using molecular weight cutoff membranes, and the high-molecular-weight fraction (H-PBSL, 666.84 kDa) exhibited pronounced immunomodulatory effects. Structural characterization by methylation and NMR analyses revealed that H-PBSL is an acidic heteropolysaccharide composed mainly of glucose and galactose residues. It possesses a complex structure with a backbone of repeating (1→4)-linked α-glucan units that are highly branched at O-6 positions with terminal α-Glcp, α-GlcpA, and β-Galp residues. The immunostimulatory effects of H-PBSL were evaluated using RAW264.7 macrophage cells. Treatment with H-PBSL (100 μg/mL) significantly increased phagocytic activity by 1.8-fold ($p < 0.01$) and upregulated the expression of immune mediators such as *iNOS*, *TNF-α*, and *IL-6* by 2.3- to 3.1-fold compared with the control ($p < 0.001$). Furthermore, H-PBSL activated the NF-κB signaling pathway, as evidenced by a 2.5-fold increase in IκB and NF-κB phosphorylation, along with NF-κB translocation from the cytosol to the nucleus. Inhibition of Toll-like receptor 4 (TLR4) reduced H-PBSL-induced nitric oxide production by approximately 45% ($p < 0.01$), demonstrating the pivotal role of TLR4 in H-PBSL-mediated macrophage activation. These results suggest that H-PBSL is a novel immunomodulatory heteropolysaccharide derived from an edible insect, with promising potential for application in functional foods and nutraceuticals.

Keywords: Polysaccharide; Edible insects; Immunomodulation; Heteroglycan

Invited Speaker

Biomanufacturing for Food and agriculture: Alginate Oligosaccharide and Astaxanthin

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Abstract

Biomanufacturing has emerged as a pivotal driver for sustainable food and agriculture, with alginate oligosaccharides (AOS) and astaxanthin standing out as promising bioactive compounds. Derived from the degradation of alginate via enzymatic, fermentation, physical, or chemical methods—among which enzymatic hydrolysis is favored for preserving bioactivity—AOS exhibit versatile functions in agricultural applications. As efficient biostimulants, they promote plant root development, enhance stress tolerance against drought, salinity, and extreme temperatures, and improve crop quality and yield by boosting photosynthetic efficiency and nutrient accumulation. Notably, AOS mitigate fertilizer loss by forming synergistic systems with chemical fertilizers: for instance, they can increase the utilization rates of nitrogen, phosphorus, and potassium fertilizers in maize by 16.57%, 25.05%, and 12.06% respectively, while enriching soil bacterial diversity to enhance soil health. Astaxanthin, a potent antioxidant, complements AOS by reinforcing plant stress resistance through scavenging reactive oxygen species, protecting cell membranes, and regulating key metabolic pathways for carotenoid and anthocyanin synthesis. It promotes robust root growth, improves fruit coloration and sugar content, extends post-harvest shelf life, and optimizes fertilizer efficiency—astaxanthin-enriched fertilizers have been shown to reduce ammonia volatilization by at least 15%. Advanced biomanufacturing technologies, such as synthetic biology-based construction of high-temperature alginate lyase yeast cell factories and green production systems for astaxanthin, have enabled scalable and eco-friendly production of these compounds. This report summarizes the biomanufacturing processes of AOS and astaxanthin, highlights their mechanisms in promoting plant growth, enhancing stress resilience, improving crop quality, and optimizing fertilizer efficiency, and discusses their synergistic potential in advancing sustainable and high-performance agriculture.

Keywords: Biomanufacturing; Alginate Oligosaccharide; Astaxanthin

Invited Speaker

Recent Advances on Food Biosensors and Electrochemical Sensors on Food Bioactives, Nutrients and Toxicants

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Abstract

The importance of food nutrients, bioactive compounds and toxicants to human health has driven the development of various assay methods for determining the above-mentioned compounds in a wide range of matrices. Food matrices are complex and diverse, ranging from water-rich fruits and vegetables to dairy products and meats with varying compositions, and lipophilic matrices such as oils, thus requiring a variety of analytical methods. Furthermore, sometimes it is necessary to simultaneously quantify multiple compounds. Some promising biosensors have been proposed for analyzing individual polyphenolic compounds or related cumulative parameters even in complex food matrices like edible oil. The proposed material is a conductive composite made of polymers and nanoparticles. Given the complexity and challenges of food matrix analysis, current presentation focuses only on methods that have been widely validated in most consumed foods and food by-products. The technical characteristics and analytical performance of the sensors introduced are discussed, along with breakthroughs and future trends. Food nanosensors are a promising technology that can be used to improve food safety, environmental monitoring and public health. While high-quality materials such as gold nanoparticles and carbon nanotubes are critical for performance, they increase production costs and limit their availability in resource-scarce environments. The electronic nose described herein employs multiple quartz microbalances (QMBs) coated with modified metalloporphyrins and related compounds. For effective utilization as a component of an electronic nose, the sensor must exhibit broad selectivity for substances relevant to the application. Furthermore, ideally, these selectivity characteristics should not overlap. Metalloporphyrins and related macrocyclic compounds (e.g., corrins) significantly alter the sensor properties of the molecules by changing the type of central coordinating metal and side groups, thereby also altering the properties of the coated QMBs. To address these challenges, research into low-cost alternatives and additive manufacturing processes can reduce material consumption and simplify the manufacturing process. Besides, sensitivity to environmental factors is a double-edged sword: while it enables high accuracy, it also exposes sensors to the risk of performance degradation under varying conditions such as humidity or temperature. Future strategies should focus on developing more robust coating and encapsulation solutions to ensure that sensors remain stable in various environments without affecting their performance.

Keywords: Food Biosensors; Nanosensors; Phenolics; Bioactives; Toxicants

Invited Speaker

Deep Eutectic Solvents for Green Extraction of Bioactive Compounds from Agri-Food By-Products

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Abstract

The agri-food sector is generating large quantities of by-products which still contain many bioactive compounds of high value. One upcycling approach is to extract those valuable compounds from the biomass. Deep eutectic solvents (DESs) are new media introduced as green extraction solvents. A DES is characterized as a binary or ternary mixture with a melting point lower than those of the individual compounds. The formation of hydrogen bonds between the precursors, at a given molar ratio, causes a large depression in melting point, allowing the mixture to remain a homogenous liquid at room temperature. Since the first introduction in the early 2000s, novel types of DESs have been proposed and numerous combinations of precursors to synthesize DESs have been studied. As a solvent, DESs exhibit many desirable properties, such as, high biodegradability, low-cost production, tailorable design, and low toxicity. DESs are considered a strong candidate in replacing the use of organic solvents of bioactive compounds from agri-food biomass, offering high extraction efficacy and low environmental burden. Although they possess many advantages, some shortcomings exist. This talk will cover the fundamental of DESs, and their applications, opportunities, and challenges in the extraction of bioactive compounds in some selected agri-food by-products.

Keywords: Deep Eutectic Solvents; Waste valorization; Agri-food by-products; Sustainability

Invited Speaker

Construction of DHA and ARA Cell Factories Based on Industrial Applications

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Abstract

Polyunsaturated fatty acids (PUFAs), including docosahexaenoic acid (DHA) and eicosapentaenoic acid (ARA), are indispensable nutrients that the human body is unable to synthesize de novo. *Aurantiochytrium* sp. becomes one of the best marine microorganisms for the research and production of DHA. Here, the fatty acid synthesis pathway of *Aurantiochytrium* sp. was reconstructed to improve the production of DHA. First, homologous recombination was employed to knock out one copy of the fatty acid synthase (FAS) gene, followed by the expression of a second copy of the *fas* gene that further weakens its function. Subsequently, overexpression of acetyl-CoA carboxylase (ACCase), diacylglycerol acyltransferase (DGAT), and glucose-6-phosphate dehydrogenase (G6PD) was achieved, resulting in the DHA content reaching 70% of total lipids, which represented a 63% increase compared to the parental strain. Additionally, PUFAs accounted for 85% of total lipids, approaching the theoretical limit of PUFAs synthesis in *Aurantiochytrium* sp.The second part of the work concentrated on enhancing ARA yield in *Mortierella alpina* through heavy ion mutagenesis and genetic modification. The mutant strain F-23 was selected through heavy ion mutagenesis combined with triclosan-directed screening.In comparison with the parental strain, the ARA content in F-23 increased from 27.04% to 49.08%. Secondly, an multigene expression system was constructed based on the 2A sequence. Through this approach, the ARA synthesis gene cluster was overexpressed, resulting in a 4.5-fold increase in ARA production.This study provides a theoretical foundation and guidance for clarifying the regulatory mechanisms of polyunsaturated fatty acid synthesis in lipid-producing microorganisms and increasing lipid yield.

Keywords: *Aurantiochytrium*; *Mortierella alpina;* ARA; DHA; PUFA

Invited Speaker

Food Singularity and Sustainability: Roles of Integrating AI with Emerging Food Processing Technologies

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Abstract

Due to the global food system facing increasing pressure to meet growing demand while reducing environmental impact, the need for efficient and sustainable food processing solutions has never been more urgent. In this sense, integrating artificial intelligence (AI) with emerging food processing technologies has been proposed as an approach to enhance food safety while maintaining nutritional quality and reducing energy consumption. In this context, this work elaborates on the progress in integrating AI with emerging food processing technologies, using non-thermal food processing as a case study. Real-time process control, predictive analytics, and waste reduction are made possible by AI-driven optimization, which can make the food processing more sustainable, economical, and efficient. Despite the progress in academic research, challenges are involved for practical applications that must be considered. This helps define the future research direction and practical applications in the industry.

Invited Speaker

From Waste to Wellness: Circular Bioprocessing of Animal-Source Proteins for Functional Biopeptides

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Abstract

Industrial production of bioactive peptides still faces major bottlenecks such as low yield, unstable activity, and limited consumer acceptance. To address these challenges, this study developed an integrated circular bioprocessing approach to transform animal by-products into functional biopeptides, promoting sustainability and high-value utilization of protein resources. A systematic preparation framework was established to optimize enzymatic hydrolysis, purification, and separation conditions for diverse animal protein sources, including fish skin, fish meat, fish roe, fish maw, edible bird's nest, donkey-hide gelatin, insect proteins, yak bone, animal blood, and whey protein. Through cell and animal studies, the obtained peptides exhibited multiple functional activities, such as antioxidant, immune-enhancing, and gut-modulating effects. By integrating precise enzymatic control and protein modification technologies, biopeptides with targeted bioactivities and improved physicochemical and sensory properties were obtained. This circular bioprocessing strategy not only enhances the comprehensive utilization of animal-derived proteins but also provides a sustainable technological foundation for developing innovative nutritional products and functional food ingredients. The study highlights how animal-source biopeptides can bridge the gap between waste valorization and health innovation, exemplifying a forward-looking model for the future of sustainable agrifood biotechnology.

Invited Speaker

Bridging Food Bioscience Education and Industry-Accredited Food Safety Training to Address the Global Shortage for Food Safety Professionals in an Evolving Regulatory Landscape to Meet the Sustainable Food Systems Demand

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Abstract

With the global population projected to approach 10 billion by 2050 (World Resources Institute, 2019), food systems must expand production while simultaneously ensuring safety, regulatory compliance, and resilience across increasingly complex supply chains. This challenge is intensified by a well□documented global shortage of food□safety professionals, driven by high turnover, extended training timelines, and an aging workforce. Regulatory agencies in the U.S. and abroad have reported reduced inspection capacity and widening oversight gaps, while the COVID□19 pandemic further exposed system vulnerabilities and underscored the urgent need for a technically skilled, adaptable food□safety workforce capable of maintaining continuity during public□health disruptions. This paper proposes an educational model that integrates university□level food□bioscience instruction with accredited food□safety certifications, strengthened through the applied, community□embedded mission of Cooperative Extension. Stronger, more intentional collaboration among academia, regulatory agencies, industry partners, and the food sector is essential to ensure that workforce□development efforts remain aligned with practical, real□world needs. Program outcomes from University of Kentucky's Martin-Gatton College of Agriculture Food and Environment's food safety Extension initiatives demonstrate the success of current three□way partnerships (academia, industry, and regulatory agencies) and the value and scalability of this approach. Through state□level partnerships for the produce best practices program, more than 400 Extension personnel were trained to deliver produce best□practices certification to 2,931 growers who accessed farmers□market opportunities through improved compliance and market readiness. Through national-level partnerships, two Extension lead trainers and ten active trainers delivered training to 1,105 growers to support compliance with federal produce□safety rule requirements. Other University of Kentucky Extension programs provide complementary evidence of workforce□development impact. Among adults, 1,406 reported improved professional skills, 583 acquired new workforce□relevant competencies, and 174 enhanced interview readiness. Youth programming further strengthened the long□term workforce pipeline, with 6,169 participants gaining new career□relevant skills, 2,234 completing résumés or interviews, and 11,663 engaging in college□ and career□readiness activities. Taken together, this proposed model supported by demonstrated outcomes from Extension□based workforce programs and reinforced through active collaboration among academia, industry, and regulatory agencies offers a scalable, evidence□driven strategy for preparing the next generation of food□safety professionals essential for resilient global food systems.

Keywords: Food Safety; Workforce; Extension; Industry; Academia

Invited Speaker

Towards Industrialization: Advances in Efficient Bioconversion of Black Soldier Fly Protein

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Abstract

The heightened dependency on imported feed proteins presents a significant challenge to China's food security strategy, necessitating the development of novel protein alternatives. The black soldier fly (BSF) represents as a sustainable solution by efficiently converting organic wastes into high-value insect protein, lipids, and fertilizers. This report systematically reviews the pioneering contributions of our research team in advancing the scientific research and industrialization of the BSF in China, encompassing key breakthroughs in strain domestication, genomic characterization, and automated rearing technologies. Our latest research advances include: Construction of a genome-scale metabolic model (iHil3966) with nutrient algorithms to optimize biomass and lipid yield; Development of a CRISPR/Cas9 platform for precision breeding of key traits; Multi-omics insights into metabolic regulators driving nutrient conversion; Probiotic-based biocontrol of "Soft Rot" disease caused by Paenibacillus thiaminolyticus. Future endeavors should focus on a strategic paradigm shift towards integrated breeding platforms, leveraging advances in molecular design, precise microbial manipulation, and synthetic biology to develop next-generation BSF varieties. This translational pipeline, driven by synergistic policy-institution-industry collaboration, is poised to establish BSF industrialization as a cornerstone of the circular bio-economy and a key enabler for achieving sustainable development goals.

Abstracts of Oral Presentation

O - 171 Qualities and Antioxidant Activity of Instant Healthy Plant-Based Soup Powder of *Gnetum gnemon* var. *tenerum* Leaves Mixed with Germinated Mung Bean Seeds

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Abstract

High fat-sugar food is a crucial factor to generate hyperglycemia and hyperlipidemia leading to type-2 diabetic and followed by cardiovascular diseases. Less fat and low digestible carbohydrate products are interesting and more marketable. *Gnetum gnemon* var. *tenerum* leaves an indigenous Thai plant named as Liang leaves was taken to dry with the proper condition of vacuum microwave dryer before brought to grind to powder called as Liang powder, LP. The powder was used to produce the instant plant-based soup powder by mixing with the germinated mung bean powder (MBP) and other ingredients. Phytochemical profiles, antioxidant activities, nutrition, sensory evaluation and microbial qualities, and in vitro glycemic index (eGI) of the product were investigated. Results showed that LP contained twenty-one flavonoids, one phenolic acid, one stilbene, fourteen terpenoids and one quinone. Total phenolic content of LP, MBP, formula 1 (F1) and formula (F2) were 19.41 ± 0.45, 5.18 ± 0.07, 7.15 ± 0.26 and 6.74 ± 0.18 mg GAE/g dry basis, respectively. Total flavonoid content of LP, MBP, F1 and F2 were 8.66 ± 0.14, 2.79 ± 0.06, 3.12 ±0.04 and 2.23 ± 0.04 mg QE/g dry basis, respectively. LP provided the highest ORAC activities followed by F1, F2 and MBP as 1336.09 ± 68.51, 528.87 ± 4.64, 433.50 ± 6.22and 357 ± 8.82mM TE/g dry basis ($p<0.05$). The instant soup products in this experiment were sensory evaluated and compared with 3 heathy commercial soup products. The result found that both F1 and F2 were close to 3 commercial brands. F2 showed a good sensory result with more than 6 scores in 6 of 7 attributes. F2 contained 21.06±0.25 g protein, 68.17±0.23 g carbohydrates, 2.40±0.005 g fat, 10.96±0.004 g total dietary fiber, 4,604.17±45.84 µg vitamin A, 36.02±0.04 mg vitamin C, 414.54±12.10 mg phosphorus and 168.64±3.71 g magnesium per 100 g sample. In addition, F2 exhibited medium glycemic index with 65.28±0.05 classified as moderate GI. The instant plant-based soup powder of LP mixed with MBP can be used as an optional healthy soup. However, yeasts and molds, and *Bacillus cereus* counts indicated that microbial quality is still doubtful and needs to standardize process further.

Keywords: Heathy soup; *Gnetum gnemon* var. *tenerum* leaves; Antioxidant; Glycemic index

O - 173 Enhancement UV-shielding Properties of PET Films with oPD/PEI-Modified HKUST-1

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Abstract

Polyethylene terephthalate (PET) is a widely used semi-crystalline polymer in fibers, films, and bottles. However, its poor ultraviolet (UV) shielding ability limits its application in UV-blocking packaging materials. In this study, the metal–organic framework (MOF) HKUST-1 was synthesized via a hydrothermal method using o-phenylenediamine (oPD) and polyethyleneimine (PEI) as framework crosslinkers. The introduction of oPD and PEI effectively expanded the HKUST-1 framework, creating a denser coordination environment and enhancing the UV-absorbing capability of the MOF. The synthesized HKUST-1 was then incorporated into PET by heat pressing to enhance its UV-shielding performance. Comprehensive characterizations were performed using Fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), X-ray diffraction (XRD), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), a universal testing machine (UTM), and UV–visible (UV–vis) spectrophotometry. The FTIR spectrum exhibited the characteristic peaks of HKUST-1 at 487, 600, 730, 1110, 1447, 1615, and 3427 cm□¹. In the PET/3wt% HKUST-1 film, the peaks corresponding to C–O and Cu–O bonding became broader at 1372 and 487 cm□¹, respectively. Furthermore, the characteristic peaks of PET and HKUST-1 overlapped in the PET/HKUST-1 composite films, indicating successful incorporation. SEM images revealed a smoother surface for oPD/PEI-modified HKUST-1, accompanied by a broader and more open framework structure. Similarly, the crystallinity of HKUST-1 decreased with increasing oPD/PEI concentration. UV–vis spectroscopy showed that the transmittance of the PET/HKUST-1 film containing 3wt% HKUST-1 dramatically decreased from 100% to 20% in the UV-A region, demonstrating excellent UV-shielding ability. These findings suggest that oPD/PEI promoted the formation of a larger HKUST-1 framework, which effectively enhanced the UV-shielding performance of PET. The thermal stability of HKUST-1 at the PET processing temperature (250 °C) was confirmed through DSC and TGA analyses. Overall, the incorporation of HKUST-1 significantly improved the UV-shielding properties of PET/HKUST-1 films, highlighting its potential as a promising and versatile strategy for developing high-performance UV-shielding PET materials.

Keywords: Polyethylene terephthalate; Metal-organic framework; UV-shielding; HKUST-1

O - 174 Preparation of Novel Nanocomposite Films Based on PVA/ Tea Leaves-derived Carbon Quantum Dots (CQDs)

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Abstract

This study investigates the effect of tea leaves–derived carbon quantum dots (CQDs) on improving multifunctional properties of polyvinyl alcohol (PVA) films. For this purpose, hydrothermal carbonization was used to prepare CQDs from tea leaves and then added to PVA with different concentrations (1, 2, 3, and 4 wt.%) during solution polymerization. The effects on structural, optical, mechanical, antimicrobial, and barrier properties were systematically examined. Photoluminescence analysis revealed a strong blue emission peak at 450 nm under 360 nm excitation, attributed to quantum confinement and surface functional groups of CQDs. FTIR spectra confirmed enhanced hydrogen bonding and good interfacial compatibility between PVA and CQDs, evidenced by broadened O–H stretching bands. Incorporation of CQDs significantly improved UV shielding, achieving complete UV-B blocking at 2.0 and 3.0 wt.% and over 85% UV-A blocking at 4.0 wt.%, while maintaining high visible transparency due to nanoscale scattering. XRD results indicated that the semi-crystalline structure of PVA was preserved, with crystallinity increasing at higher CQDs loadings, suggesting uniform dispersion without phase separation. Mechanical testing showed remarkable reinforcement, as tensile strength rose from 23.01 MPa for pure PVA to 91.28 MPa at 4.0 wt.% CQDs, and Young's modulus increased from 23.09 MPa to 123.84 MPa, accompanied by reduced elongation at break. The oxygen transmission rate dropped sharply from 6.78 to 0.21 cc/m²·day, confirming improved barrier performance. Antibacterial assays demonstrated concentration-dependent inhibition, with maximum activity at 4.0 wt.% CQDs, attributed to reactive oxygen species generation and electrostatic interactions with bacterial membranes.

Keywords: Antibacterial performance; UV blocking; Oxygen barrier properties; Carbon quantum dots; Food packaging

O - 177 Gap Analysis for Enhancing Productivity in Cacao Growers in Chiang Mai Province

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Abstract

The increasing demand for cocoa in Thailand has led to its regulation as a key crop under the Ministry of Agriculture and Cooperatives. Despite this, cocoa productivity among local farmers remains limited, resulting in a persistent supply deficit. This study addresses this challenge by analyzing the factors contributing to yield gaps within community-based cocoa enterprises in Chiang Mai Province and proposing strategies to close them. This research uses a foresight framework, blending an assessment of the current state of cocoa production with a vision for a future where these enterprises achieve stable, year-round yields and enhanced value through processing and marketing. Primary data were collected through in-depth interviews with 30 respondents who agreed to participate following our invitations, including approximately 10 growers, 10 processors, and 10 distributors. A thematic analysis identified five key dimensions contributing to the productivity gap: (1) Productivity: significant yield variations were directly linked to differences in farm management, including tree care, irrigation, and fertilizer application. Notably, tree age did not significantly affect yield, suggesting that effective management practices are more critical than maturity alone. (2) Knowledge and Skills: farmers often use conventional orchard techniques instead of specific, high-yield cocoa cultivation methods. (3) Economic and Marketing: farmers sell raw cocoa beans at low prices and lack the knowledge and capital needed for value-added processing, despite their interest. (4) Environmental Sustainability: while many farmers practice organic methods, they lack formal certification, which limits market access and pricing power. (5) Social and Institutional Support: there is a notable lack of external support and institutional guidance for cocoa farmers. The study confirms that a shortage of fresh beans is a major bottleneck for both processors and distributors. The findings underscore that reducing the yield gap requires improvements in farm management practices, complemented by targeted knowledge transfer and robust institutional support. The core contribution of this research is its use of a foresight approach to integrate current challenges with a future-oriented vision, providing practical, actionable pathways for enhancing the productivity and competitiveness of community-based cocoa enterprises. These insights are crucial for guiding sustainable development and ensuring long-term benefits for farmers.

Keywords: Sustainable Food Biosystems; Cacao; Foresight; Gap Analysis; Productivity

O - 181 L-Cysteine Modified Carbon Dots from Duea Ching (*Ficus Botryocarpa* Miq.) Fruit : A Multifunctional Nanomaterial in Active Chitosan/Gelatin Films for Enhancing the Shelf Life of Asian Seabass Slices

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Abstract

This study aimed to develop biocompatible, natural active packaging materials by synthesizing L-cysteine-modified carbon dots (CDs) from Duea ching (*Ficus botryocarpa* Miq.) fruit extract and incorporating them into chitosan/gelatin (CS/GE) films for seafood preservation. CDs were produced via a hydrothermal process, and the modified particles exhibited nanoscale dimensions with enhanced colloidal stability. Among the formulations, $CD_{DC/0.4LC}$ showed superior functional performance, demonstrating the highest antioxidant capacity and strong antimicrobial activity against *Listeria monocytogenes* and *Staphylococcus aureus*. It also displayed good biocompatibility, maintaining over 80% human dermal cell viability. CS/GE films containing $CD_{DC/0.4LC}$ exhibited markedly improved antioxidant and antimicrobial properties, together with exceptional UV-B blocking capability (97.07%). When applied to Asian seabass slices and packaged in polypropylene pouches, films containing 5% $CD_{DC/0.4LC}$ effectively inhibited microbial growth and slowed chemical deterioration. Total viable counts remained below 6 log CFU/g, a commonly accepted spoilage threshold for chilled seafood, throughout 15 days of refrigerated storage. Preservation performance increased progressively with higher concentrations (1-5%) of $CD_{DC/0.4LC}$ incorporated into the films. Overall, the multifunctional attributes of L-cysteine-modified CDs combining strong antioxidant and antimicrobial activities with excellent UV-barrier properties and biocompatibility demonstrate their potential as promising natural active fillers for enhancing the performance of CS/GE-based packaging films and extending the shelf life of seafood products.

Keywords: L-cysteine; Carbonization; Active-film; Asian seabass; Storage-stability

O - 182 Enhancing Yield and Quality of Sacha Inchi *(Plukenetia volubilis)* Seed Oil through Ohmic Heating Extraction

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Abstract

Sacha inchi (*Plukenetia volubilis*) fruit is a nutrient-rich oilseed crop prized for its high content of polyunsaturated fatty acids, particularly omega-3 and linoleic acid. However, traditional oil extraction techniques such as steam distillation (SD) and hydro-distillation (HD) are hindered by low yields and high energy consumption, limiting their efficiency and environmental sustainability. This study investigates the application of Ohmic Heating Extraction (OHE), a green, electrically driven technology as an alternative method for oil recovery from sacha inchi seeds. The optimal parameters for OHE, namely reaction time, voltage, and solvent-to-solid ratio, were optimized using Response Surface Methodology (RSM) with a Central Composite Design to maximize sacha inchi oil yield. Experiments were conducted within the ranges of 70 to 105 V, 15 to 30 minutes, and 5:1 to 10:1 solvent-to-solid ratios. The performance of OHE was compared with conventional methods, including HD and SD, in terms of oil yield, energy efficiency, and physical, chemical, antimicrobial, and morphological properties. Process optimization using RSM identified optimal conditions at 70 V, 30 minutes, and a solvent-to-solid ratio of 7.06:1. Under these conditions, OHE achieved a significantly higher oil yield of 102.16 mL/kWh, with a reduced energy consumption of 0.14 kWh representing up to 91.21% energy savings compared to SD and HD. The oil extracted via OHE exhibited a light-yellow color and a refractive index of 1.48, comparable to those of oils obtained through conventional methods. However, its specific gravity was lower than that of oils extracted using conventional techniques. Gas chromatography-mass spectrometry analysis confirmed the presence of linoleic acid esters and other bioactive compounds, while scanning electron microscope imaging revealed notable structural disruption of seed tissues, indicating enhanced cell wall breakdown and oil release. These results demonstrate that OHE is a highly efficient, energy-saving method for producing high-quality sacha inchi oil, with promising applications in the food and cosmetic industries. Further research is recommended to evaluate its economic feasibility, long-term oil stability, and scalability for commercial production.

Keywords: Sacha inchi; Essential oil; Ohmic heating; Optimization; Characterization

O - 187 Green Extraction of Sacha Inchi Oil Using Subcritical Water: Process Optimization and Comparative Characterization

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Abstract

This study investigates the application of subcritical water extraction (SWE) for oil recovery from sacha inchi (*Plukenetia volubilis*) and evaluates the physicochemical properties of the extracted oil in comparison with commercially available sacha inchi oils produced by screw pressing. Key extraction parameters namely solid-to-water ratio (0.167–0.367 g/mL), temperature (110–170°C), and time (10–40 min) were optimized using a one-variable-at-a-time (OVAT) approach, with oil yield and extraction efficiency as response variables. Following extraction, residual moisture in the oil was removed by drying at 60°C for 24 h.The extracted oil was characterized in terms of density, color, total phenolic content (TPC), antioxidant activity (DPPH assay), fatty acid profile via gas chromatography–mass spectrometry (GC–MS), and antimicrobial properties. Additionally, the defatted sacha inchi cake remaining after SWE was analyzed using Fourier-transform infrared spectroscopy (FTIR) and field emission scanning electron microscopy (FE-SEM). Under optimal conditions (0.300 g/mL, 150°C, 20 min), SWE yielded 18.4% oil with an extraction efficiency of 37.27%. Although this efficiency is moderate compared to non-aqueous methods, SWE was selected as a green, solvent-free alternative that avoids toxic organic solvents and aligns with sustainable processing principles. The SWE-extracted oil exhibited lower total phenolic content (0.237 mg GAE/g oil) and DPPH radical scavenging activity (90.84%) compared to commercial oils (TPC: 0.209–0.348 mg GAE/g; DPPH: 91.7–95.2%), likely due to thermal degradation at elevated temperatures. GC–MS analysis identified only two fatty acids in the SWE oil i.e. linoleic acid (8.55%) and α-linolenic acid (9.13%) whereas commercial oils contained a full profile of saturated, monounsaturated, and polyunsaturated fatty acids. No antimicrobial activity was observed in any of the oil samples. FE-SEM revealed significant structural disruption in the seed matrix after SWE, confirming effective cellular breakdown. FTIR analysis of the residual cake confirmed the presence of amide I (1634 cm□¹) and amide II (1530 cm□¹) bands, indicating retained protein with potential for valorization. This study demonstrates that while SWE may compromise heat-sensitive bioactives, it offers an eco-friendly route for oil extraction and enables the utilization of the protein-rich byproduct.

Keywords: Green extraction method; Essential oil; Sacha inchi oil; Subcritical water extraction; Oil yield optimization.

O - 188 Reparative Mechanisms of Collagen Peptides from Chinese Giant Salamander Skin in Counteracting UVB-Induced Skin Photoaging: *In Vitro* and *In Vivo* Insights

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Abstract

Chronic UVB exposure accelerates skin aging by disrupting extracellular matrix homeostasis and activating pro-inflammatory and nutrient-sensing pathways. Bioactive peptides, particularly those with multi-target effects, are of interest as potential modulators of photoaging biology. In this study, we evaluated collagen peptides derived from Chinese giant salamander skin (CPs) for efficacy and mechanism in UVB-induced photoaging models *in vitro* and *in vivo*. In human skin fibroblasts exposed to UVB (200 mJ/cm^2) and incubated for 24 h in complete medium supplemented with CPs (40 μg/mL), CPs significantly ($p < 0.05$) restored the expression of type I collagen (41% increase) and elastin (69% increase), reduced senescence-associated β-galactosidase (SA-β-gal) staining, and significantly ($p<0.05$) lowered the senescence markers p21 and p16 compared to UVB-exposed controls. Western blot analysis indicated coordinated pathway modulation: suppression of NF-κB signaling and mTOR activity accompanied by activation of autophagy, consistent with a shift toward a pro-repair, anti-inflammatory state. In a parallel nude-mouse photoaging model, these pathway signatures and matrix-restorative effects were recapitulated in skin tissue. Collectively, the results support CPs as multifunctional anti-photoaging agents that mitigate UVB-induced damage by convergently dampening NF-κB and mTOR while promoting autophagy to preserve dermal matrix integrity.

Keywords: Collagen peptides; Skin photoaging; Chinese giant salamander skin; Autophagy; Bioactive peptides

O - 194 Developing Climate-Resilient Rice Varieties with Enhanced Nutritional Profiles and Controlled Heavy Metal Accumulation

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Abstract

Climate change necessitates the development of stress-tolerant rice varieties, yet concerns remain whether breeding for climate resilience inadvertently affects micronutrient profiles and food safety parameters. This study tested the hypothesis that climate-resilient varieties maintain acceptable nutritional quality while minimizing heavy metal accumulation compared to biofortified reference varieties. The research objectives were to: (1) evaluate mineral content and heavy metal levels in climate-resilient genotypes, (2) quantify the impact of post-harvest polishing on nutritional retention and contaminant reduction, and (3) identify superior genotypes combining climate resilience with enhanced nutrition for functional food development. Five rice genotypes were evaluated: submergence-tolerant varieties (UKM54, UKM37, UKM112), drought-tolerant variety (UKM5), and high-zinc red rice check variety (RC9) as reference control. Grain samples were harvested at physiological maturity (30-35 days after flowering), manually threshed, and processed into both polished (using standardized 60-second milling to achieve 10% degree of milling) and non-polished grain for comparative analysis. Mineral content (Zn, Fe, Mg) and heavy metals (As, Pb, Cd) were quantified using standard analytical methods. Results demonstrated significant nutritional losses during polishing, with zinc retention at 76.5%, iron at 58.4%, and magnesium at only 32.8%. However, polishing showed variable effects on heavy metal removal, reducing arsenic by 26.7% while paradoxically concentrating lead and cadmium. Among genotypes, the drought-tolerant UKM5 exhibited superior zinc content (22.0 mg/kg) in non-polished grain, while submergence-tolerant varieties maintained competitive nutritional profiles (18.8 mg/kg zinc average) with the lowest cadmium accumulation (0.015 mg/kg). All stress-tolerant varieties demonstrated acceptable heavy metal levels well within food safety standards, indicating successful genetic selection for both climate resilience and food safety. The findings reveal critical trade-offs between post-harvest processing decisions and nutritional outcomes, supporting the development of processing protocols that optimize both nutrition retention and contaminant reduction. This research contributes to food nutrition and health bioscience by quantifying essential mineral retention in climate-resilient varieties, sustainable food safety practices through heavy metal risk assessment, and bio-food innovation by identifying superior genotypes for functional food development. The integration of climate resilience with nutritional enhancement and safety considerations provides a foundation for developing next-generation rice varieties that address both environmental challenges and global nutrition security, particularly relevant for Southeast Asian food systems facing increasing climate variability.

Keywords: Biofortification; Food; Rice; Nutrients; Heavy Metals

O - 202 pH-responsive Intelligent Indicator Using Fluorescent Nitrogen-doped Carbon dots for Monitoring of Chicken breast and Shrimp freshness

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Abstract

Striving for sustainable practices, the food sector is placing more emphasis on enhancing safety and quality standards across the supply chain, with the goal of reducing food waste through improved control and monitoring systems. In this study, nitrogen-doped carbon quantum dots (N-CQDs) were synthesized via a one-step hydrothermal process and applied to filter paper substrates through a simple drop-coating method to develop a pH-responsive fluorescent indicator. The as-prepared N-CQDs demonstrated significant photoluminescence, adequate photostability, and a high sensitivity to pH and ammonia vapor, both of which are important indications of food spoilage. The manufactured indicator demonstrated a broad and consistent colorimetric response across the pH range of 2.0-12.0, ranging from pale yellow under acidic conditions to dark brown under alkaline conditions. Notably, the colorimetric response remained stable during storage, indicating the stability of the indicator and its effectiveness over the long term. The N-CQD-impregnated paper indicator was subsequently evaluated as a smart packaging application to monitor the freshness of chicken breast and shellfish samples stored at 25 °C for 48 h. The color change of the indicator correlated well with the increase in pH and total volatile basic nitrogen (TVB-N) levels of the samples during storage, confirming its effectiveness for real-time spoilage monitoring. The N-CQDs-based intelligent indicator proved efficient as a facile and economical solution, providing a valuable method for the real-time assessment of chicken breast and shrimp spoilage via visual response and quantitative analysis.

Keywords: Carbon quantum dots; Nitrogen doping; pH indicator; Spoilage detection; Intelligent Packaging; Sustainability

O - 211 Ultrasound-Assisted Extraction of Anthocyanins from Doi Saket Black Rice Husk

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Abstract

Doi Saket Black Rice, a northern Thai landrace rich in anthocyanins, has an underused husk that can be valorized. This study aimed to optimize anthocyanin extraction from black rice husk. Ultrasound-assisted extraction with a Box–Behnken design evaluated ethanol concentration (60–80% v/v), ultrasound time (20–40 min), and amplitude (20–60%), performed at a liquid-to-sample ratio of 20:1 (v/w) and temperature below 30°C using an ice–water bath to minimize thermal degradation of anthocyanins. The responses included total anthocyanin content (TAC), HPLC profiles of cyanidin-3-glucoside (C3G) and peonidin-3-glucoside (P3G), including % area and C3G/P3G ratio, antioxidant indices (DPPH, ABTS, FRAP), and inhibition of α-amylase and α-glucosidase. The quadratic model showed no significant lack of fit ($p = 0.716$), showing a good fit to the data. The analysis results indicated that ethanol is a determinant of the composition: as ethanol levels decreased, C3G became more outstanding, which was consistent with the correlation of the C3G region with DPPH/ABTS/FRAP ($r = 0.549$/ 0.509/ 0.617; $p < 0.001$) and TAC with FRAP ($r = 0.725$; $p < 0.001$). With the Response Optimizer targeting high C3G and maintaining TAC at an acceptable level, the resulting conditions were: 60.81% ethanol, 28.89 min, and 36.98% amplitude, predicting % area C3G of 79.57, C3G/P3G ratio of 3.736, and TAC of 15.651 mg C3G equivalents/100 g DW (composite desirability 0.705). At 11.77 mg/mL (DW-equiv.), α-glucosidase inhibition correlated with DPPH ($r = 0.480$; $p = 0.001$), FRAP ($r = 0.443$; $p = 0.002$), and TAC ($r = 0.300$; $p = 0.046$), proposing a potential reduction in carbohydrate absorption and postprandial glucose levels. Overall, an ethanol level of ~61%, ~29 minutes, and an amplitude of ~37% significantly increased C3G while maintaining TAC and exhibiting interesting inhibitory activity against starch-digesting enzymes, supporting the development of black rice husk extracts for health products.

Keywords: Black rice husk; Ultrasound-assisted extraction; Total anthocyanin content (TAC); Cyanidin-3-glucoside (C3G)

O - 224 Physicochemical, Phytochemical, Volatile Compounds, and Taste Profiles of *Apis mellifera* Honey from Longan (*Dimocarpus longan*) Flower

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Abstract

Honey is a sweet, viscous substance produced by *Apis mellifera* L. from floral nectar, with monofloral varieties characterized by a predominance of pollen from a single plant species. In northern Thailand, longan (*Dimocarpus longan*) blossoms represent the main natural nectar source for honeybees. This study was conducted to analyze the physicochemical and phytochemical properties of longan honey (LH) collected from Chiang Mai, Thailand in February–March 2025. In addition, the aroma-active volatile organic compounds (VOC) and taste profiles were investigated using electronic nose (E-nose) and electronic tongue (E-tongue) respectively. The analysis showed the properties of the LH samples significantly ($p < 0.05$) varied with each other: moisture content (19.16–19.68%), color (2.02–50.98 mm, water white to light amber), pH (4.06–4.50), acidity (5.96–18.16 meq/kg), total phenolic content (22.56–46.99 mg GAE/100 g sample), total flavonoid content (0.66–24.01 mg CE/100 g sample), IC_{50} DPPH (81.57–496.53 mg/mL), IC_{50} ABTS (213.58–523.18 mg/mL), and FRAP (9.53–28.69 mg TE/100 g sample). VOC investigation identified esters, alcohols, aldehydes, and ketones as the major VOC group, with all samples contained 3-Nonanone (24.24–337.77 µg/kg) that provides floral aroma, followed by acetic acid (3.41–45.31 µg/kg), ethyl 3-(methylthio)propanoate (9.24–127.06 µg/kg), methyl cinnamate (0.66–3.07 µg/kg), and propan-2-one (205.75–355.44 µg/kg) in the majority of the samples. Based on taste profiling, honey samples exhibit distinct taste profiles, ranging from those dominated by high sweetness and low bitterness to those exhibiting elevated bitterness or complex savory notes. The principal component analysis (PCA) of the LH based on physicochemical properties, volatile compounds, and taste profile explained 99.4%, 95.4%, and 99.0%, of the total variance, respectively, indicating a strong and reliable representation of the data structure within two principal components. Based on the results, within the same floral origin, honey possessed differences in its composition. These findings highlight the unique characteristics and chemical diversity of longan honey produced in northern Thailand. The results also emphasize the potential of longan honey as a valuable natural product with distinct sensory qualities and significant antioxidant properties, making it promising for applications in functional foods formulations.

Keywords: Longan honey; Physicochemical properties; Volatile compound; Taste profile; Instrumental sensory analysis

O - 228 Ultrasonic-assisted Extraction of Selenium-enriched Polysaccharides obtained from Germinated oat via Biotransformation

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Abstract

Oat polysaccharides, primarily β-glucan, are complex carbohydrates offering significant health benefits such as antioxidant activity, lowering cholesterol and blood glucose. Selenium (Se), an essential trace element, can be incorporated into polysaccharides through biotransformation to form selenopolysaccharides with improved bioactivity, bioavailability, and lower toxicity. This study aimed to investigate the effects of selenium biotransformation on polysaccharide and selenium contents in germinated oats and optimized ultrasonic-assisted extraction (UAE) conditions using a Box–Behnken design. Oat was germinated in sodium selenite solutions (0–300 ppm) until the root reach 1 cm, then the polysaccharide and selenium content in germinated oats were analyzed. The extraction condition of UAE was optimized on the effective parameters, including ultrasonic power (225–525 W), extraction time (10–30 min), and solid-to-liquid ratio (5–10% w/v). The results showed that the highest selenium (2.91 mg Se /g), polysaccharide (951.04 mg/g), and yield (9.61%) were obtained from germinated oat in 150 ppm sodium selenite. The optimal UAE conditions was the extraction power at 520 W, extraction time at 29 min, and solid-liquid ratio at 7.35% w/v. This UAE condition produced the selenopolysaccharide with selenium, polysaccharide, and yield of 2.07 mg/g, 954.04 mg/g, and 9.96%, respectively. In conclusion, UAE can be applied as a pretreatment method to improve extraction efficiency and promote better recovery of selenium-enriched polysaccharides from germinated oats.

Keywords: Selenium biotransformation; Ultrasonic-assisted extraction; Selenopolysaccharides; Germinated oats

O - 233 Biodegradation of Synthetic Aromatic–Aliphatic PET-based Copolyesters Under Composting Conditions: Structure–Properties Relationships

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Abstract

impede a circular, low-carbon economy. Mechanical recycling alone cannot remedy quality loss and contamination in post-consumer streams, and many bioplastics still lack the combined performance, processability, and end-of-life options required for high-value flexible packaging. Polyethylene terephthalate (PET) is ubiquitous in packaging owing to its strength, clarity, and low weight. Among PET recycling strategies, chemical routes enable depolymerization to high-quality intermediates; in particular, glycolysis has emerged as the most commercially mature option because of its relatively mild conditions and low toxicity. The resulting monomer, bis(2-hydroxyethyl) terephthalate (BHET), can be repolymerized to PET, yet cost competitiveness versus virgin PET remains challenging, and the non-degradability of PET continues to burden the environment post-disposal. To couple recycling with controllable end-of-life behavior, a series of BHET–aliphatic acid copolyesters was synthesized by melt polycondensation using aliphatic dicarboxylic acids of varying chain lengths. Thermal, mechanical, optical, and barrier properties were comprehensively characterized, and biodegradation behavior was evaluated under composting conditions. Degradation kinetics were tracked through chemical and surface structural analyses to elucidate structure–property–degradation relationships. The systematic variation of aliphatic chain length revealed a clear trend: increasing methylene sequence length disrupted PET-like packing and reduced crystallinity while simultaneously enhancing chain mobility. These structural modifications decreased oxygen and moisture permeability but increased enzymatic accessibility in soil microcosms by promoting localized amorphous regions. Overall, the copolyesters exhibited a balanced trend in which variations in aliphatic chain length moderated mechanical performance while progressively enhancing biodegradation under composting environments. The findings provide mechanistic insight into how aliphatic chain length and crystalline fraction co-govern environmental stability, offering design guidelines for PET-based copolyesters that combine recycled feedstocks with tunable, soil-relevant end-of-life performance.

Keywords: Bis(2-hydroxyethyl) terephthalate; Chemically recycled copolyester; Structure-property-biodegradation relationship; Sustainable packaging materials; Circular polymer design

O - 236 Effect of Maltodextrin Concentration on Stability and Physicochemical Properties of Concentrated Mahachanok Mango Smoothie

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Abstract

This study aimed to develop a concentrated mango smoothie using Mahachanok mango as a main material and investigate the effect of maltodextrin addition on its stability and physicochemical properties. Smoothie formulations were prepared with maltodextrin concentrations of 0, 2, 4, 6, 8, and 10%, with 0% as the control. Samples were evaluated for rheology, total phenolic content (TPC), antioxidant activity (DPPH assay), color (L*, a*, b*), pH, total soluble solids (TSS), and other physicochemical properties. Among the formulations, the smoothie containing 4% maltodextrin demonstrated the most favorable overall characteristics. The concentrated mango smoothie behaved as a non-Newtonian fluid with a solid-like behavior (G′>G″). Rheological analysis revealed a damping factor (tan δ) of 0.28, indicating a balanced viscoelastic behavior suitable for a concentrated beverage. This formulation also exhibited the highest TPC (534.19 mg GAE per liter of sample) and the strongest antioxidant activity, as indicated by a DPPH value of 1.87%, highlighting its enhanced functional potential. Color evaluation showed an acceptable brightness and slightly yellow-red hue, while pH (4.01) and TSS (24.10°Brix) were within desirable ranges for taste and stability. These results suggest that 4% maltodextrin effectively optimizes both the functional and textural quality of concentrated mango smoothies, enhancing antioxidant potential and phenolic content while providing a smooth, stable texture. Incorporation of maltodextrin at this concentration offers a promising approach for producing nutritionally enriched, high-quality fruit beverages that balance sensory appeal and health benefits.

Keywords: Mahachanok; Maltodextrin; Mango; Smoothie; Stability

O - 238 Omega-3 Enriched Shrimp Oil: Preparation, and Development of Dysphagia-Friendly Functional Food Via Application of 3D Printing Technology

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Abstract

Shrimp hepatopancreas oil is a rich yet underutilized source of long-chain omega-3 fatty acids, and its enrichment and incorporation into soft-textured foods offers potential benefits for populations with dysphagia. The present study investigated the enrichment of shrimp (*Litopenaeus vannamei*) oil (SO) extracted from hepatopancreas with DHA/EPA and unsaturated fatty acids (USFAs) through lipase-mediated hydrolysis and explored its application in developing a dysphagia-friendly surimi gel via 3D food printing. The original fatty acid composition of SO measured prior to hydrolysis was DHA/EPA 1.85/0.84 mg/g lipids and USFAs/ SFAs were 11.10/13.69 mg/g of lipids. The effect of various hydrolytic conditions on fatty acid composition was evaluated, and optimized parameters were established as 20 U lipase, hexane as solvent (0.2:0.5), hexane to water for substrate mixture (SM), and water to SM (0.4:1) at 50 °C for 2 h. Under these conditions, DHA/EPA and USFA levels increased to 40.96/22.61 and 27.83%, respectively. The omega-3 enriched shrimp oil (n3SO) was then incorporated into surimi inks (5–20%) optimized for moisture content (80–95%) to achieve desirable printability and structural stability. A 90% moisture level was identified as optimal, providing excellent shape retention (87%) and stability (100%). Increasing n3SO levels decreased G′ and G″ values, indicating a weakened protein network; however, 10% n3SO provided the best balance between softness and acceptability. Three-dimensional printing parameters, including medium (MLR), coarse (CLR), and extra-coarse (ECLR) layer resolutions and nozzle diameters (1.5–3.5 mm), were systematically evaluated. MLR with a 3.5 mm nozzle produced gels with the lowest hardness and expressible moisture, while correlation analysis indicated 2.5 mm as a practical balance between printability and integrity. Confocal microscopy revealed uniform lipid–protein distribution. Among cooking methods, steaming yielded the softest gels followed by microwave, classified as IDDSI Level 5 (Minced and Moist), suitable for dysphagic individuals. Whereas air-fried gels were firm, dense and solid structured (IDDSI Level 6). Each 100 g serving provided 9/27 mg EPA/DHA, respectively. Overall, DHA/EPA-enriched shrimp oil demonstrated potential as a functional ingredient for developing nutrient-rich, 3D-printed, dysphagia-friendly foods with favorable texture and structural properties.

Keywords: Shrimp oil; EPA/DHA; 3D-Food printing; Soft gel; Dysphagia

O - 239 Influence of Sweetness, Saltiness, and Sourness on Sensory and Volatile Profiles of an Orange Beverage Fortified with Rice Bran Protein Hydrolysate

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Abstract

Rice bran protein hydrolysate (RBPH) can enhance the nutritional value of beverages but may introduce off-flavors. This study investigated the effects of sucrose, salt, and citric acid on sensory perception and volatile compounds in an orange beverage fortified with RBPH, using a D-optimal mixture design with sucrose (70–85%), salt (5–15%), and citric acid (5–20%) formulated within 2 g of total solids in 200 mL of orange beverage. Sensory evaluation was conducted with 156 panelists. The mixture model was significant ($p < 0.05$) with R^2 values above 0.75 and showed that higher sucrose and citric acid levels were positively associated with color, aroma, taste, flavor, and overall liking, whereas increased salt content reduced all sensory scores. Headspace solid-phase microextraction (HS-SPME) identified 26 volatile compounds, among which 3-methylbutanal (malty, dark chocolate), 2-acetylfuran (sweet, chocolate-like), palmitoleic acid (fatty note), and furfural (sweet, almond-like) contributed to a warm and nutty–caramel aroma profile that correlated with higher liking. Regression analysis confirmed that the proportions of sucrose, salt, and citric acid significantly influenced both volatile composition and sensory responses, highlighting compounds that contributed positively or negatively to flavor perception. The optimized beverage, containing 2% total solids of sucrose, salt, and citric acid (82.91%, 12.09%, and 5.00%, respectively) in 200 mL and fortified with 570 mg RBPH, achieved high sensory ratings, 90% consumer acceptance, and 82.5% purchase intent. These results suggest that achieving an appropriate balance of sweetness, saltiness, and acidity can enhance flavor perception and support the potential use of RBPH in functional beverage development.

Keywords: Rice bran protein hydrolysate; Orange beverage; Sensory evaluation; Volatile compounds; Flavor modulation

O - 240 Impact of Synergistic Encapsulated Green Tea and Black Rice Extracts on Sensory Profile and Consumer Acceptance of High-Pressure Processed Brown Rice Milk

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Abstract

This study investigated the effects of synergistic encapsulated extracts of green tea and black rice powder (SEP) on the physicochemical characteristics, sensory properties and consumer acceptance of brown rice milk (BRM) processed by high pressure. The incorporation of SEP at varying concentrations (3–15% w/v) significantly affected the physicochemical properties, decreasing pH from 6.01 ± 0.07 to 4.31 ± 0.04, while increasing viscosity from 40.51 ± 0.28 to 62.69 ± 0.15 mPa·s and total soluble solids (TSS) from 9.70 ± 0.17 to 14.73 ± 0.46 °Brix and reducing lightness (L*) from 57.20 ± 0.02 to 32.75 ± 0.18, indicating darker pigmentation of BRM. Moreover, the total phenolic content markedly increased from 88.90 ± 5.31 to 430.52 ± 6.08 mg GAE/100 mL. Increasing SEP concentrations influenced the sensory profile, with higher levels producing greater turbidity, darker pigmentation, reduced sweetness, and intensified undesirable attributes such as bitterness and astringency. Principal component analysis revealed that a 5% SEP concentration provided the most desirable sensory profile, characterized by enhanced sweetness (7.02 ± 0.85) and overall liking (8.04 ± 0.91). Consumer testing confirmed high acceptance (86.5%) and purchase intention (72.0%) for BRM with 5% SEP. These findings suggest that high-pressure processing combined with optimal SEP incorporation offers a promising strategy to enhance both the nutritional quality and sensory appeal of functional brown rice milk. This approach underscores its potential as a sustainable functional beverage that supports healthy aging, nutrition security, and positive consumer acceptance.

Keywords: Functional beverages; Synergistic extracts; High-pressure processing; Antioxidant activity; Descriptive sensory analysis

O - 241 Effect of Tamarind Kernel Powder on Texture Formation of High-Moisture Extruded Soy Protein Meat Analogs

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Abstract

This study investigated the effect of tamarind kernel powder (TKP) addition on the structural and textural properties of soy protein isolate (SPI) extrudates produced by twin-screw high-moisture extrusion. Formulations were prepared by incorporating TKP at different levels (0%, 2.5%, 5%, and 7.5%) with varying moisture contents (50%, 60%, and 70%) and screw speeds (150, 200, and 250 rpm). The mechanical and morphological characteristics of the extrudates were evaluated to determine the influence of TKP on the fibrous texture formation. Results indicated that increasing TKP content up to 5% significantly enhanced the tensile strength of the extrudates, reaching 118,551 Pa at 50% moisture and 150 rpm. However, excessive TKP (7.5%) slightly reduced texture uniformity. Increasing the moisture content from 50% to 70% decreased tensile strength but improved elongation, suggesting a more flexible structure. Screw speed at 200 rpm provided the most balanced texture, exhibiting both strength and elasticity. Overall, the addition of 5% TKP under 50–60% moisture and 200 rpm screw speed produced extrudates with structural integrity and fibrous characteristics closely resembling meat. These findings highlight the potential of TKP as a natural hydrocolloid modifier for improving the mechanical and sensory attributes of soy protein-based meat analogs.

Keywords: High-moisture extrusion; Soy protein isolate; Tamarind kernel powder; Fibrous structure; Meat analogs

O - 246 When Plants Meet Pleasure: Sensory and Consumer Insights into Probiotic Ice Cream Formulated with Soy and Coconut milk

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Abstract

The modern shift toward vegan diets has accelerated demand for plant-based foods, particularly non-dairy milk alternatives such as soy and coconut milk—key ingredients now prevalent in ice cream production. Beyond serving as a dessert, plant-based ice cream holds potential as an innovative vehicle for probiotic delivery, contributing to both health promotion and environmental sustainability. This study aimed to develop a plant-based ice cream using soy milk and coconut milk fortified with the probiotic *Bifidobacterium bifidum* Bbi32 and evaluated its sensory properties and consumer acceptance. A D-optimal mixture design was used to find the optimal ratio of 0-45% soy milk, 0-45% coconut milk, and 0-50% water based on sensory characteristics. Results indicated that the optimal ratio—comprising 18% water, 17% soy milk, and 45% coconut milk—achieved an overall liking score of 7.40±1.03. Subsequently, a completely randomized design (CRD) experiment determined the optimal concentration of probiotic. Sensory evaluation across probiotic concentrations (7–9 log CFU/g) revealed no significant differences in all sensory attributes. The sensory acceptance of prototype formulations was evaluated, followed by product acceptance and consumer purchase decision analysis using Logistic Regression of the final product. The optimized product attained a texture score of 7.20±1.49, an overall taste score of 7.01±1.36, a 100% consumer acceptance rate, and an 85% purchase decision rate. In conclusion, plant-based ice cream from soy and coconut milk, fortified with probiotics, offers strong sensory appeal and high consumer acceptance, highlighting the importance of biosensory evaluation and consumer insights in creating sustainable, health-focused foods.

Keywords: Ice cream; Plant-based milk; Probiotic; Sensory evaluation

O - 247 Reactive Blending of Thermoplastic Starch with Chlorhexidine Gluconate and Epoxidized Natural Rubber

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Abstract

The development of biodegradable materials with enhanced mechanical and antimicrobial properties, is the great significance for sustainable packaging applications. Thermoplastic starch (TPS) is a promising bio-based polymer. However, its practical application is limited by poor mechanical strength and high moisture sensitivity. To address these limitations, this study introduces a reactive blending approach combining TPS with chlorhexidine gluconate (CHG) and epoxidized natural rubber (ENR). CHG was incorporated to impart antibacterial and antifungal functionalities, while ENR was added to improve flexibility and interfacial compatibility through reactive blending. TPS was prepared from gelatinized cassava starch and glycerol (70/30 wt/wt%) at 70 °C. CHG was incorporated into TPS at concentrations of 0.5%, 1%, 2%, 5%, and 10% (wt/wt%). The TPS/CHG (0.5–10%) samples were melt-blended with ENR (90/10 wt/wt%) at 135 °C. In the TPS/CHG/ENR blends, at 5 wt% CHG (TPS/CHG5/ENR) improved the tensile strength to 13.8 MPa. The water contact angle increased from 30° (TPS) to 76° (TPS/CHG10/ENR) at 10 min, indicating enhanced hydrophobicity. FTIR showed hydrogen-bonding at the TPS/CHG/ENR interface with partial epoxide ring opening to form C–O–C reaction with NH_2 groups. The TPS/CHG2/ENR sample exhibited inhibition zones against both *Staphylococcus aureus* and *Escherichia coli*. TPS/CHG10/ENR also showed antifungal activity against *Rhizopus oligosporus*.

Keywords: Starch; Chlorhexidine gluconate; Epoxidized natural rubber; Polymer blends

O - 251 A Comprehensive Approach to Probiotic Supplement Development: Strain Screening, Functional Characterization, and Stability Testing

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Abstract

Probiotic-based health supplements are increasingly recognized for their potential to improve gut health, immune function, and dermatological well-being. This study aimed to develop a multifunctional probiotic formulation with enhanced skin health benefits. Total 30 isolates were isolated out of which 13 isolates were Lactic acid bacteria (LAB) from local dairy and household sources and evaluated for probiotic attributes through biochemical and molecular characterization. Their functional potential was assessed by testing tolerance to acidic pH (2.0, 3.0, and 3.5), bile salts (0.5%–2.5%), NaCl concentrations (1%–6%), and cholesterol (0.3%) assimilation capacity. Growth at low pH increased progressively from pH 2.0 to 3.5, with the highest absorbance values recorded at pH 3.5, indicating improved survival in moderately acidic conditions. Bile tolerance assays showed that most isolates exhibited increasing absorbance with rising bile concentrations, with Isolate 12 demonstrating strong resistance even at 2.5% bile salt. Salt tolerance testing revealed that many isolates grew well at 4% NaCl, while only a few—especially Isolate 12—maintained substantial growth at 6% NaCl, indicating robust stress resistance. Cholesterol assimilation analysis revealed notable variability among isolates, with Isolate 12 showing the highest assimilation (absorbance 0.49), followed by Isolates 10 and 13. Based on these performance parameters, a probiotic blend containing selected *Lactobacillus* and *Enterococcus* strains which was identified by 16s rRNA and was formulated alongside hyaluronic acid, grape seed extract, inulin, and essential vitamins to promote skin health. Stability studies conducted under controlled temperature and humidity confirmed the viability and physicochemical integrity of the final product. Overall, the findings demonstrate the successful development of a stable, multifunctional probiotic supplement with strong gastrointestinal tolerance, cholesterol-lowering potential, and targeted dermatological benefits.

Keywords: Probiotic formulation; Lactic acid bacteria (LAB); Skin health; Microbial viability; Stability testing; Nutraceutical development.

O - 254 Modification of Cassava Starch and Gelatin Blended Films using Cold Plasma

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Abstract

Modification of biopolymers using cold plasma treatment has been developed to overcome inherent limitations such as high hydrophilicity, poor thermo-mechanical strength, and weak barrier properties. In this study, cassava starch (CS) and gelatin (G) blended films were treated with cold plasma to enhance their compatibility and performance. The plasma process promoted polymer chain scission and cross-linking reactions between CS and G leading to improved film characteristics while maintaining biodegradability and environmental friendliness. Cassava starch and gelatin were blended at an 80:20 ratio (CSG) and treated with a cold plasma jet at 7 W for 5, 10, 15, 30, and 45 minutes. The plasma treatment was applied to the film-forming solution before casting. The resulting CSG films exhibited significant improvements in both physical and mechanical properties. The tensile strength increased from 30 MPa (untreated) to 42 MPa (15-minute treatment), whereas the elongation at break decreased from 7.62% to 5.42%, indicating enhanced stiffness. Film solubility decreased from 42% to 13% which improved water resistance. Thermogravimetric analysis (TGA) revealed higher thermal stability at shorter plasma exposure (5 minutes) while long-time treatment led to partial degradation of the polymer chains. The ^{1}H NMR results confirm that cold plasma treatment effectively modified the molecular structure of the starch–gelatin blend, enhancing intermolecular bonding through oxidative and crosslinking mechanisms. At 7 W 15 min and 7 W 30 min showed noticeable peak shifts and intensity changes due to molecular interaction and compatibility between the biopolymers. At 10–13 W with 15 min treatment showed less pronounced peaks and broader signals, which may result from excessive degradation or chain scission due to strong plasma energy. Overall, cold plasma treatment significantly improved the properties of cassava starch–gelatin films, highlighting their potential as sustainable and high-performance biopolymer materials.

Keywords: Starch; Gelatin; Blended films; Cold plasma; Modification

O - 255 Validation of Capsaicin Binding to Eukaryotic Elongation Factor 2 and Its Antagonistic Interaction with Celastrol in Colorectal Cancer Cells

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Abstract

Capsaicin, a major compound of *Capsicum* spp, has been reported to suppress the proliferation of colorectal cancer cells. In our previous work, eukaryotic elongation factor 2 (eEF2) was identified as a potential binding target of a high-purity commercial capsaicin standard (≥95%) at 100 μ M. Interestingly, screening for natural compounds revealed that capsaicin and celastrol exert opposing effects on eEF2 stability, prompting further investigation into their molecular relationship. Using HCT116 colorectal cancer cells, we employed cellular thermal shift assay (CETSA), CETSA combined with pulse proteolysis (CETSA-pulse), and dose-dependent protein stability analyses. CETSA-pulse demonstrated a significant reduction in eEF2 thermal stability upon capsaicin treatment (T_m: control 54.6 ± 0.1°C vs. capsaicin 52.7 ± 0.1°C; $p < 0.05$), supporting direct binding. Moreover, eEF2 stability decreased in a concentration-dependent manner in response to capsaicin. CETSA further showed distinct stabilization patterns with celastrol (57.7 ± 0.9°C), capsaicin (55.6 ± 0.3°C), and their combination (53.1 ± 0.3°C). The combination index (CI = 1.81) indicated an antagonistic interaction between the two compounds. In conclusion, this study validates the direct binding of capsaicin to eEF2 and highlights its antagonistic interplay with celastrol, providing new insights into eEF2-targeted therapeutic strategies and food-derived bioactive interactions.

Keywords: Capsaicin; Eukaryotic elongation factor 2 (eEF2); Colorectal cancer; Cellular thermal shift assay (CETSA); Celastrol

O - 256 Unpacking Biodegradable Plastic Claims in Indonesia: A Citizen Science Approach to Material Diversity and Policy Gaps

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Abstract

As biodegradable plastics gain popularity as sustainable alternatives to conventional packaging, concerns persist about the accuracy of environmental claims, especially in countries where regulations remain limited. This study investigates the diversity of biodegradable plastic products in Indonesia and examines the transparency of the claims and standards attached to them. Using a citizen science approach, 328 product entries were collected by university students from urban areas, primarily Jakarta and South Tangerang. The recorded items included carrier bags, drinking straws, food and non-food packaging, disposable eating utensils, polymailer bags, trash bags, and cup covers. Carrier bags made up the majority of entries (57%), followed by drinking straws (19%). These products were typically received as packaging or accompanying items that came with other purchased goods, such as food, beverages, or retail products, instead of being deliberately chosen or bought on their own. This suggests that businesses, rather than consumers, largely drive the use of biodegradable plastics. Oxo-plastics made up 57 percent of the sample, despite ongoing concerns about their biodegradability. Many products displayed vague or unsupported claims such as "biodegradable" or "eco-friendly," while 59 percent did not disclose any verifiable environmental standard. These findings point to a regulatory gap in Indonesia, where biodegradable plastic products often lack accountability. By involving the public in data collection, this study provides a foundation for policy development focused on clearer labeling, stronger standard enforcement, and improved oversight of producer claims. Such reforms are essential to increase public trust, support appropriate waste management systems, and reduce plastic pollution in sectors like food and retail.

Keywords: Biodegradable Plastics; Citizen Science; Environmental Claims; Product Regulation; Policy Gap

O - 259 Integrated Pest Management (IPM) in a Fruit Juice Factory: Monitoring, Documentation, and Risk Assessment

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Abstract

Food safety in food manufacturing facilities necessitates rigorous pest management aligned with HACCP, GMP, and ISO standards. This study evaluated the implementation of an Integrated Pest Management (IPM) program in a fruit juice factory in Pathum Thani, Thailand, from January 2023 to June 2025. Weekly monitoring with 28 insect light traps and supplementary sticky boards revealed Diptera (primarily fruit flies) as the dominant insect group, constituting 85.7% of captures. Other groups included Hemiptera/Homoptera (7.9%), Hymenoptera (1.7%), and Coleoptera (1.3%). Other insects occurred sporadically. Temporal analysis indicated half-year changes of −19.1% (H1, 2023 to 2024), −28.0% (H2, 2023 to 2024), and −12.6% (H1, 2024 to 2025), with a distinct peak in November 2023 suppressed by corrective measures such as fogging, light management, and door control. Spatial analysis showed higher captures in Building 2 and the staff canteen than in Building 1. Risk classification further demonstrated that most traps remained within acceptable thresholds, whereas persistent Level 3 classifications were confined to Trap No.10, No.18, and No.19 in Building 2 production zones. These findings provide robust evidence that IPM, supported by systematic monitoring, documentation, and spatial–temporal risk analysis, can effectively suppress insect populations in food manufacturing environments, thereby reinforcing compliance with international food safety standards and offering a practical framework for sustainable pest management in the food industry. In this context, initial monitoring data were used to establish baseline insect levels and define measurable performance criteria, including temporal reduction trends and risk-based thresholds. This approach enables periodic review and continuous improvement of IPM implementation in alignment with HACCP, GMP, and ISO food safety standards.

Keywords: Food Industry Pests; Urban Pests; Food Safety Standard; Food Quality Standard; Insect Monitoring Program

O - 260 Ultrasound-Driven Maillard Conjugation for Enhancing Functional Properties of Plant Proteins

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Abstract

Ultrasound-driven Maillard conjugation has emerged as an innovative and sustainable strategy to enhance the functional properties of plant-based proteins. By integrating ultrasound treatment into the Maillard reaction, this approach accelerates glycation under milder conditions, thereby reducing energy consumption and minimizing protein denaturation compared with conventional heating, which typically requires prolonged treatment (12–24 h). Plant proteins such as hemp, soy, pea, oat, mung bean, and rice are nutritionally valuable but often exhibit poor solubility, weak emulsifying holding properties. Recent studies demonstrate that US-MR markedly improves these properties. For instance, ultrasound-assisted pea protein conjugates increased solubility from 35% to 71%, while soy protein conjugates showed improvements from 28% to 85% and foaming capacity from 10% to 50%. Oat protein conjugates exhibited solubility enhancement from 40% to 75% and antioxidant activity from 25% to 50%. Similarly, rice protein treated by US-MR (82 °C, 22 min, 600 W) achieved approximately 90.6% solubility compared with 12–13% for the untreated sample and displayed enhanced foaming and emulsifying capacities, while ultrasound–protein-glutaminase treatment improved solubility by 102.6% and boosted oil-holding capacity. Hemp protein conjugates with oligosaccharides (e.g., chitooligosaccharides or carboxymethyl chitosan) also demonstrated superior performance. US-MR of hemp protein–chitooligosaccharide conjugates at 90 °C for 1 h increased solubility from 36% to 82% and improved emulsifying activity 18-fold compared with untreated protein. Likewise, hemp protein–carboxymethyl chitosan conjugates treated at 70 °C for 2 h showed enhanced foaming capacity (70%) and excellent water and oil holding capacities (85 g/g and 61 g/g, respectively). Structural analyses revealed conformational changes from α-helix to β-sheet, which improved interfacial and emulsifying behavior. Overall, US-MR represents a practical, energy-efficient, and effective approach to transform plant proteins into multifunctional, health-promoting ingredients for next-generation sustainable food innovation.

Keywords: Ultrasound; Maillard reaction; Plant proteins; Functional properties; Protein conjugation

O - 266 Ma-Kiang Kombucha Development: Influence of SCOBY Type on Bioactive Compounds and Antioxidant Properties

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Abstract

This study investigated the development and comparative fermentation dynamics of a novel fermented fruit beverage based on Ma-Kiang (*Syzygium nervosum DC. var. paniala*), an underutilized indigenous Thai fruit, using two distinct starter cultures: traditional Kombucha (black tea/sucrose-derived SCOBY) and Juncha (green tea/honey-derived SCOBY). The research aimed to determine the optimal fermentation duration over 21 days and compare the final product quality. Fermentation with both starter cultures significantly reduced pH and soluble solids, reflecting active microbial metabolism. The Kombucha starter promoted faster acidification, resulting in a higher final acetic acid concentration (1.19 ± 0.02 g L□¹), consistent with its dominance of acetic acid bacteria (AAB). This starter achieved the highest final AAB viable count at 7.91 ± 0.03 log CFU mL□¹. In contrast, the Juncha starter, leveraging honey-derived substrates and catechins from green tea, yielded significantly higher ethanol content (12.95 ± 0.33 g L□¹) and supported a more balanced microbial proliferation, peaking on day 21. Functionally, the Juncha fermentation consistently outperformed the Kombucha group, maximizing the Total Phenolic Content (3,325.69 ± 17.70 µg GAE mL^{-1}) and achieving the highest antioxidant activity, including a maximum DPPH scavenging capacity of 2,764.18 ± 5.01 µg TE mL□¹. Sensory evaluation further confirmed the superiority of the Juncha formulation, with Juncha receiving the highest overall acceptability (4.47 ± 0.67 out of 5) due to its balanced aroma and flavor profile. Overall, Juncha fermentation represents a promising and sustainable approach for developing antioxidant-enriched fermented fruit beverages from Ma-Kiang, providing a viable model for community-based value addition.

Keywords: *Syzygium nervosum DC. var. paniala*; Kombucha; Juncha; Phenolic compound; Antioxidant activity

O - 270 Machine Learning-Aided Optimization of Longan Byproducts Extraction

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Abstract

The extensive processing of longan produces nearly 1 million tons of byproducts each year, leading to waste management challenges and potentially hindering the achievement of SDGs 9, 12, and 13. These byproducts are recognized as valuable in traditional medicine due to their bioactive content, with potential applications in functional foods, pharmaceuticals, and cosmeceuticals. Among the bioactive compounds, polyphenolics are of particular interest; however, the most suitable extraction conditions for these compounds using machine learning (ML) models for effective utilization have not been previously studied. This study applied ML approaches to optimize extraction conditions for higher recovery and bioactivity. A dataset (> 50) of experimental observations from published studies was analyzed, including variables such as time, temperature, solvent type, and solvent ratio, to evaluate their predictive accuracy and performance. The RFR shows a higher coefficient of > 0.9 R^2 value than other models. Furthermore, based on the predictions, temperature, aqueous ethanol concentration, and amplitude were used to extract longan byproducts. The proximate composition of the residues was also examined. The optimized UAE conditions, 62.88 °C, 40.61 % ethanol, and 70.48 % amplitude, significantly improved polyphenol recovery and functional properties compared to conventional methods. The proximate analysis revealed 81.5 % w/w carbohydrates; 49.4 % dietary fiber; 6.21 % protein; and moderate water activity (0.459). These findings highlight the value of ML-driven models in enhancing bioactive compound extraction, paving the way for sustainable industrial-scale applications.

Keywords: Longan byproducts; Machine learning; Smart extraction; AI optimization; Sustainability

O - 272 Functional and Structural Properties of Pomelo Fiber Through Acid-Ultrasound Modification

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Abstract

Pomelo albedo, a citrus by-product rich in dietary fiber, has limited uses due to its natural functional properties. This study aimed to improve the functional characteristics of pomelo fiber (PF) through phosphoric acid treatment combined with ultrasound at different durations (5 or 10 min) and reaction times (1, 3, or 24 h). Color analysis revealed that acid treatment increased L* values, whereas prolonged ultrasound exposure caused red-brown and yellow shifts. Fourier Transform Infrared (FTIR) confirmed changes in O–H, C–H, C=O, and C–O–C peaks, indicating depolymerization and oxidative modification. Scanning Electron Microscopy (SEM) observations showed the progressive surface fragmentation, fibrillation, and increased porosity of the cell wall, particularly under prolonged acid-ultrasound treatment. Viscosity improved significantly after acid-ultrasound modification, which was supported by Insoluble Dietary Fiber (IDF) reduction of up to 0.09 and soluble dietary fiber (SDF) increase of up to 0.30, which enhanced solubility and fiber interactions. Water Holding Capacity (WHC) decreased by up to 9.92 % due to degradation of hydrophilic groups, whereas Oil Holding Capacity (OHC) increased by up to 8.13 %, supporting oil-binding potential. Higher OHC contributed to improved emulsion stability index (ESI) up to 38.25 min, although emulsion activity index (EAI) declined up to 15.8 m^2/g. The results highlight S10/3 as the optimal condition for pomelo fiber modification, providing balanced improvements, strong potential for food applications, and valorization of citrus waste. Future work will focus on applying regenerated pomelo fiber as a natural stabilizer in emulsion systems to explore its functional performance further.

Keywords: Pomelo; Acid-ultrasound treatment; Food waste valorization; Sustainable processing; Dietary fiber

O - 283 Development of Plant-Based Patty and Fortification with Chia Seed Powder

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Abstract

The growing consumer shift toward sustainable, nutrient-dense plant-based foods has driven interest in functional ingredients that enhance both nutritional and sensory quality. This study developed and evaluated plant-based patties formulated with varying levels of chia seed powder (CSP; *Salvia hispanica L.*) as a partial replacer for texturized pea protein. Six formulations (F1–F6) containing 0–25 % CSP were analyzed for sensory, physicochemical, lipid oxidation, and nutritional values during 20 days of refrigerated storage (4 °C) under nitrogen-flushed packaging. Sensory evaluation revealed significant ($p < 0.05$) improvement in all quality attributes with increasing CSP content, with the 20 % formulation showing the highest scores for appearance (6.87 ± 1.03), odor (7.03 ± 0.96), texture (7.23 ± 0.87), flavor (6.95 ± 0.72), taste (7.00 ± 0.95), and overall acceptability (7.02 ± 0.49). Proximate analysis indicated a significant rise in protein (18 to 21%), fat (9 to 12%), and ash contents (2 to 3%) with increasing CSP, accompanied by slight reduction in moisture levels, reflecting the nutrient-dense composition of chia seeds. All patties maintained pH stability (6.07–6.23) throughout storage. TBARS values increased gradually from 0.10-0.17 mg MDA/kg patty on day 0 to 0.89-1.10 mg MDA/kg patty by day 20, remaining within the acceptable oxidative stability range for refrigerated products. The rise was more pronounced in CSP-fortified samples due to their higher unsaturated lipid content, though this was partially counterbalanced by chia's inherent antioxidant capacity. DPPH scavenging activity increased significantly with CSP addition, rising from 59.55% (F2) to 87–89% in formulations containing ≥15% CSP (F3–F6), supporting the improved oxidative stability. Fatty acid profiling showed a marked increase in polyunsaturated fatty acids (PUFAs), particularly α-linolenic (C18:3 n-3) and linoleic (C18:2 n-6) acids, improving the PUFA/SFA ratio and lowering the n-6/n-3 ratio. Amino acid analysis confirmed elevated levels of glutamic acid, aspartic acid, arginine, leucine, and lysine—amino acids characteristic of chia proteins with high biological value. Overall, the 20 % CSP formulation demonstrated optimal sensory acceptance, enhanced nutritional quality, and acceptable oxidative stability under cold storage, positioning chia seed powder as a promising functional ingredient for next-generation plant-based meat alternatives.

Keywords: Chia seed powder; Plant-based patty; Lipid oxidation; Polyunsaturated fatty acids; Amino acid profile

O - 285 Effect of Salt Concentration and Fermentation Temperature on the Microbiological and Chemical Properties during Watermelon Rind Fermentation

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Abstract

Watermelon rind, a significant by-product of fruit processing, represents a high-volume underutilized resource yet has the potential of valorization through natural lactic acid fermentation. As a part of the effort to valorize, this study investigated the effects of salt concentration (2%, 4%, 6%) and fermentation temperature (25, 30, 35, 40°C) on the microbiological and chemical properties of naturally fermented watermelon rind over 10 days. Lactic acid bacteria (LAB) growth, yeast and mold, Enterobacteriaceae counts, pH, and titratable acidity were monitored. Results indicated that both temperature and salt concentration significantly influenced microbial dynamics and acidification. The highest LAB growth (8.80 ± 0.01 log CFU/g) was observed at 40°C with 6% salt on day 2, although LAB populations declined rapidly thereafter, causing lower acidification. At lower temperatures (25–35°C), LAB growth was more stable, with 6% salt consistently supporting robust LAB growth. Maximum counts at 25°C (8.40 ± 0.03 log CFU/g) and 30°C (8.35 ± 0.05 log CFU/g) were not significantly different, highlighting sustained LAB activity at moderate temperatures. Yeast and mold were eliminated most rapidly at higher salt concentrations and temperatures, disappearing within 2 days in 6% salt samples at 30-40°C. Enterobacteriaceae, initially present at high levels (7.72-7.35 log CFU/g), were undetectable in all samples by day 5. The pH drop was most rapid and pronounced at 30°C with 6% salt, achieving the lowest final pH of 3.23±0.01. Acidity increased correspondingly with LAB activity, with lower salt concentrations (2%) generally yielding higher final acidity at most temperatures, except at 40°C where acid production was suboptimal. The study concludes that fermenting watermelon rind at 30°C with 6% salt provides optimal conditions for stable LAB growth, complete acidification, and efficient elimination of undesirable microorganisms.

Keywords: Watermelon rind; fermentation; Lactic acid bacteria; salt; temperature

O - 286 Manufacturing Black Tea Hard Candy by Replacing Industrial Sugar with Honey Using Non-Ultra Processed Foods

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Abstract

This study developed a black tea hard candy using a non-ultra-processed approach, replacing industrial sugar with honey. The experimental design involved two types of honey (aged and fresh) and four concentrations of low-grade black tea (0%, 2.5%, 3.3%, and 5.0%) that were adjusted and formulated using Just About Right sensory techniques and examined for physiochemical properties and consumer testing. The results indicated that the optimal formulation comprised 17% black tea water (3.3% concentration) and 83% honey. The production process required a hard crack stage of 166°C with a slightly caramel flavor. The product had an L* value of 35.38, a* value of 3.06, b* value of 10.37, and a hardness of 21.42 kg/F. The total phenolic content was 0.04 µg GAE/mg, the reducing sugar content was 1975.80 µg GE/mg, and the tannin content was 1.10 µg TAE/mg. The antioxidant capacity, as determined by DPPH (IC50), was 246.17 mg/ml, whereas the capacity measured by ABTS (IC50) was 91.94 mg/ml. The acceptance test (9-point hedonic scale) revealed an average overall liking score of 7 out of 9, indicating a moderate liking level. A black tea hard candy was formulated as a healthier alternative to confections. This product added value by using natural ingredients such as low-grade black tea, which preserves phytochemical health benefits, and honey instead of sugar syrup and artificial additives.

Keywords: Black tea; Candy; Sensory evaluation; Non-ultra-processed foods; Antioxidants

O - 287 Cassava-Based Mahewu: Physico-chemical and Nutritional Improvement using Bambara Groundnut Protein Isolates

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Abstract

Despite the progress in child nutrition, protein-deficiency malnutrition remains a concern, highlighting the need for accessible nutrient-dense foods. This study aimed to develop a protein-enriched cassava-based mahewu (PE-CBM) using bambara groundnut protein isolate (BGPI) obtained via enzyme-assisted extraction (EAE), and to evaluate its potential contribution to recommended daily allowance (RDA) for protein in school children (4-13 yr.). Cassava flour was substituted with BGPI at 15% (T1), 25% (T2), 35% (T3), and 0% (control), and fermented at 30 °C for 24 h until pH ~4.5, using starter culture containing lactic acid bacteria (*L. lactis* and *L. bulgaricus*) to develop PE-CBM. Fermentation decreased pH (6.32–4.49) and increased titratable acidity (0.23–0.72%) across treatments. Protein content (1.06–10.20% w.w.b), ash (0.21–0.51%), IVPD (67.37–92.37%), ºBrix (12.33–15.40%), and syneresis after 24 h storage (7.99–20.22%) increased with increasing BGPI inclusion. However, viscosity decreased (251.6–143.5 cP), with minimal color changes (8.14–8.74) compared to control. Tannin (0.18–0.24 g TAE/100 g) was within acceptable limits for foods intended for children. Protein RDA contribution per 240 mL serving significantly increased for girls (5.03–66.55%) and boys (4.28–56.54%). SEM analysis showed progressive microstructural changes consistent with protein–starch interactions. Overall, enzyme-assisted BGPI improved PE-CBM, with 25% inclusion (T2) giving the best overall quality in terms of physicochemical and balanced nutritional properties. This highlights BGPI as a promising, sustainable ingredient for food processing. Future studies may investigate sensory acceptability and shelf-life optimization to support product adoption and scaling.

Keywords: Bambara groundnut; Protein isolate; Cassava mahewu; Recommended daily allowance; Nutrient-dense foods

O - 291 Characterization of γ-Oryzanol Extracted Using Medium-Chain Triglyceride Oil for Enhanced Stability and Bioactive Delivery

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Abstract

This study aimed to investigate the extraction of γ-oryzanol from rice bran (KDML 105) using medium-chain triglyceride (MCT) oil, an edible and environmentally friendly solvent, and to develop the extract into an oleogel as a potential functional ingredient, as existing solvents can leave toxic residues. Thus, a research gap is identified regarding the use of MCT oil as a green solvent. In addition, employing technologies that can encapsulate and control the release of active compounds can further enhance their practical applications. Extraction of γ-oryzanol from rice bran was performed under various conditions (30-50 °C for 1-9 min), revealing that extraction at 40 °C for 1 min yielded the highest γ-oryzanol content of 4,333.54 μg/g ($p < 0.05$), demonstrating the suitability of MCT oil as a green solvent for rapid and efficient bioactive compound recovery. The peroxide value (PV) of the extracted samples differed between the liquid oil phase and the oleogel phase. The oleogel exhibited a lower PV than the liquid oil, indicating that the three-dimensional gel network improved oxidative stability. Rheological analysis showed that the structural strength of the oleogels increased proportionally with policosanol concentrations from 1% to 9% w/w, confirming the formation of a more reinforced and stable gel network. The oleogels exhibited semi-solid behavior with notable elasticity, supporting their potential as delivery matrices for bioactive compounds. Antioxidant activity measured by the DPPH radical scavenging assay was 90.34 ± 1.14% for the liquid MCT oil and 77.94 ± 1.17% for the oleogel, demonstrating substantial free radical-scavenging potential in both systems. Thus, the oleogel provides promising options for practical applications, either as a cooking oil or as a fat-replacement spread with antioxidant properties. These experimental results demonstrated encouraging potential for extracting bioactive compounds using medium-chain triglyceride (MCT) oil and subsequently structuring the extracts into oleogel that can function effectively as a delivery matrix. In the future research stage, data will be collected using an in vitro digestion model to assess bioaccessibility.

Keywords: γ-Oryzanol; Medium-Chain Triglyceride; Oleogel; Partial extraction; Delivery matrix

O - 293 Sustainable Product Development and Cradle-to-Gate Water Footprint Assessment of Choco-Natto Synbiotic

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Abstract

The development of functional foods incorporating prebiotics, probiotics, and postbiotics has increased in response to consumer interest in gut health. This study aimed to develop a choco-natto synbiotic product using locally sourced Thai raw materials and to evaluate its sensory acceptance and environmental sustainability through a cradle-to-gate water-footprint assessment. Three formulations containing 40%, 25%, and 5% natto were evaluated by 30 consumers using a 9-point hedonic scale. Results showed that 25% and 5% natto had significantly higher acceptability than the 40% natto formulation ($p < 0.05$). The 5% natto formulation received the highest overall liking score (6.23), with ratings for appearance (6.57), sweetness (6.60), and overall taste (6.40). Just-About-Right (JAR) analysis confirmed the 5% natto was the optimal formulation, with 61% of panelists rating key attributes - including fermented aroma, perilla seeds aroma, sweetness, and hardness - as "just right," whereas the 40% natto formulation exhibited excessively strong fermented aroma (70% "too strong"). Based on these findings, the 5% natto formulation was selected as the final prototype for sustainability assessment. A cradle-to-gate water footprint analysis was conducted following the life cycle assessment (LCA) principles. The product's total water footprint was 1.14 m^3 per 100 g, with cocoa mass (62%) and cocoa butter (21%) identified as the primary contributors due to high upstream water requirements (~27 m^3/kg). Water use within factory operations accounted for less than 0.01% of the total footprint. The analysis indicated that agricultural practices, particularly cocoa cultivation, represent the major hotspots. Sustainable agroforestry systems practiced in regions such as Doi Saket, Chiang Mai—where cocoa is intercropped with plants and perennial fruit trees—were identified as a promising strategy to reduce water consumption by improving soil moisture retention and ecosystem balance. Overall, this study demonstrates the successful integration of local raw-material utilization, consumer-driven product development, and environmental sustainability assessment in creating a choco-natto synbiotic product. The findings highlight both the feasibility of producing an acceptable synbiotic product and the potential for reducing environmental impacts through improved agricultural practices.

Keywords: Choco-Natto Synbiotic; Sustainable Development; Water Footprint; Cradle-to-Gate

O - 300 Effect of Fish Soup Formulations on I*n Vitro* □-amylase, □-glucosidase, and Antioxidant Activities, and Characterization of Active Compounds

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Abstract

Diabetes mellitus (DM) is a significant global health concern. Effective management relies heavily on medical treatment and dietetic therapy. Many spices and herbs are recognized for their antioxidant and anti-diabetic effects. Southern Thai cuisine, which is rich in phytochemicals, has been shown to possess these beneficial properties. This study was designed to develop a Southern Thai fish soup (FS) containing Thai red curry paste (TRCP) incorporated with coconut milk and fish (*Nemipterus japonicus)* as a functional food against T2DM. The aim is to evaluate the effects of TRCP incorporated with coconut milk and fish on α-amylase, α-glucosidase, and antioxidant activities (DPPH, ABTS, FRAP, and MCA), total phenolic content (TPC), and total flavonoid content (TFC). FS characterization included amino acids, fatty acids, and active compounds (LC-QTOF-MS/MS). The IC□□ values for α-amylase inhibition were 13.21 mg/mL (CCM-F4) and 21.92 mg/mL (CCM-R), compared with 0.39 mg/mL for acarbose. For α-glucosidase inhibition, the IC□□ values were 1.85 mg/mL and 11.64 mg/mL, versus 0.04 mg/mL for acarbose. The TPC and TFC values in CCM-F4 (CCM denotes commercial coconut milk and TRCP formula 4 incorporated fish soup) and CCM-R (CCM incorporated with reference Thai red curry paste) were higher (60.25±0.12, 35.30±0.34 µM of GAE/g extract and 13.70±0.21, 10.92±0.06 µM of QE/g extract). The DPPH and ABTS results for CCM-F4 and CCM-R samples had higher values, 68.25±0.13, 40.65±0.16 µM of TE/g extract and 120.12±0.05, 109.35±0.09 µM of TE/g extract, respectively. A similar trend for FRAP and MCA was also observed for the same samples. The LC-QTOF-MS/MS data identified major phenolic compounds curcumin, apigenin, and kaempferol in CCM-F4 samples, and phenolic acids in CCM-R samples. The amino acid profile shows isoleucine (302.72mg/100g sample) being the predominant one. Fatty acid profile in CCM-F4 lauric acid (1.85 mg/100g) and mysteric acid (0.81mg/100g) were more than other fatty acids. Based on the assessed parameters, it can be predicted that CCM-F4 has potential as a functional food with antioxidant and anti-diabetic properties. However, further studies on CCM-F4 and CCM-R samples will be conducted to investigate their anti-inflammatory activity and their efficacy against anti-diabetic effects through cytokine inhibition and clinical trials.

Keywords: Thai red curry paste (TRCP); Fish soup; Antioxidant activity; Compound identification; Amino acid profile; Fatty acid profile

O - 301 Production of Papain-Hydrolyzed Chitooligosaccharides with Antioxidant and Anti-acetylcholinesterase Activities from Mantis Shrimp (*Oratosquilla nepa*) Chitosan

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Abstract

Chitooligosaccharides (COS) are low-molecular-weight derivatives of chitosan, which exhibit diverse biological activities. In this study, the COS of mantis shrimp (*Oratosquilla nepa*) chitosan with acetylcholinesterase (AChE) inhibitory and antioxidant activities was prepared using enzymatic hydrolysis. The effects of papain concentration (1.0–5.0%, w/w) and hydrolysis time (8–16 h) on yield and bioactivity were investigated using response surface methodology (RSM) with a face-centered central composite design. The results showed that all RSM experiments exhibited normally distributed data. A quadratic equation was appropriate for all models with high R^2 values of 0.970-0.996. By multi-response optimization, the optimal hydrolysis conditions were 5% w/w papain and 14 h of hydrolysis time. The predicted responses were 45.82% yield (reducing-sugar yield) and 55.52% DPPH, 50.73% ABTS, and 79.47% hydroxyl radical scavenging activities, and 15.79 mg/mL IC□□ value with AChE inhibitory activity. The optimal conditions were validated. The resulting COS showed high solubility (98±0.02%). The obtained COS was fractionated and analyzed for physicochemical and biological properties.

Keywords: Chitooligosaccharides (COS); Acetylcholinesterase (AChE); Mantis Shrimp; Enzymatic Hydrolysis; Antioxidants

O - 302 Sensory and Molecular Insights of Odor-Induced Sweetness Enhancement by Mango Aroma

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Abstract

Excessive intake of sugar has become a public concern. However, it is challenging for food industries to decrease sugar level without sacrificing safety and sensory profile. Odor-induced sweetness enhancement (OISE) is believed to be a novel and promising strategy for sugar reduction. In order to investigate the OISE effect of mango aroma and evaluate its degree of sugar reduction in low-sugar beverages, a mathematical model was constructed through sensory evaluation in this study constructed a mathematic model. The strongest OISE effect was at the concentration level of 2.24% sucrose + 0.25% mango flavor, which was equivalent to 2.96% pure sucrose solution. With 32.14% sugar reduction, the mango aroma was suggested to generate the OISE effect. To investigate the potential molecular mechanism of OISE, gas chromatography/olfactometry-associated taste was applied and identified ethyl butyrate, D-limonene, γ-undecanolactone, γ-octanoic lactone, γ-decalactone, and ethyl maltol were the sweet-related odorants in mango aroma. Molecular docking showed the 6 odorants could interact with sweetness receptors in T1R2-sucrose and T1R3-sucrose by hydrogen bonding or hydrophobic interactions at TMD region and/or the VFD region. D-limonene had the lowest docking binding energy of -6.6 kcal/mol with T1R2-sucrose, and γ-octanoic lactone had the lowest binding energy of -6.6 kcal/mol with T1R3-sucrose. In summary, this study demonstrated that the cross-modal interaction of mango aroma on sweetness enhancement in low-sugar model beverages, and provided additional learnings to the molecular mechanism of OISE, which could provide practical guidance for developing sugar-reduced beverages without applying sweeteners.

Keywords: Odor induced sweetness enhancement; Sugar reduction; Sweetness perception; GC; Molecular docking.

O - 303 Dark Chocolate Hi Enrich Protein from *Wolffia Globosa*, A New Prototype for Future Food

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Abstract

Food sustainability and food security are critical global issues due to ongoing challenges from climate change and population growth. *Wolffia globosa* is a superfood in term of containing all essential amino acids with non-allergic high protein content and it produces CO_2 emission less than animal protein around 30%. However, it still needs product development for consumer acceptance. This study aimed to develop and evaluate a high-protein dark chocolate product enriched with *Wolffia globosa* protein. 3 different percentages of *Wolffia globosa* powder have been formulated in 60% dark chocolate with inulin, monk fruit sugar, coconut oil, sesame, and coconut powder. Texture profile analysis was applied to compare with sensory test using hedonic 9-point scales and just about right method (JAR). Nutritional data of the highest acceptance formula was also evaluated. Acceptance rate from 30 target consumers of 3 formulas were 76.67%, 50.00%, 33.33%, respectively. The highest acceptance formula exhibited the lowest hardness (872.63 ± 507.22) and chewiness (215.30 ± 323.74). Meanwhile, other two lower acceptance formulas exhibited the high hardness with 31,194.94 ± 8,768.79 and 15317.32 ± 4,723.90 compared to a commercial one (27,202.46 ± 6801.32). The JAR test results revealed that the highest acceptance formula required to increase its sweetness and hardness. Therefore, reducing percentage of coconut oil and increasing percentage of monk fruit sugar have been adjusted. Nutritional data in 100 g of this prototype was a total fat 44% (saturated fat 19g), total carbohydrate 15% with dietary fiber 6 g, protein 14%, iron (4.5mg) 25%, potassium (360 mg) 8%, 530 calories in total. This study confirms the feasibility of developing a high-protein dark chocolate enriched with *Wolffia globosa* protein that aligns with nutritional enhancement with consumer acceptability. This work highlights the potential of *Wolffia globosa* as a functional ingredient for value-added food innovation and supports its application in developing climate-smart, nutrient-dense foods contributing to sustainable food systems and future protein security.

Keywords: Dark Chocolate; Functional Chocolate; *Wolffia globosa*; Food Sustainability; Future Food

O - 305 Development of a Snack Product from Rice (*Oryza sativa* L.) cv. RD43, Enriched with Plant-Based Protein from Kai-Pum (*Wolffia globosa*)

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Abstract

Rice flour derived from cultivar RD43 is recognised for its low glycaemic index, resulting in slower starch digestion compared with conventional rice varieties and making it suitable for individuals who require blood glucose control or weight management. Wolffia globosa, a nutrient-dense microaquatic plant, contains high levels of protein, dietary fibre, and diverse bioactive compounds, underscoring its potential as a functional food ingredient. This study aimed to develop a gluten-free, nutritionally enhanced extruded snack from RD43 rice flour fortified with dried W. globosa powder, and to evaluate the effects of different inclusion levels on the product's physical, chemical, and sensory attributes. Extruded snack samples were produced using a single-screw extruder at a fixed moisture content of 12%, with W. globosa incorporated at five concentrations (3%, 5%, 7%, 9%, and 11% w/w) based on a total batch weight of 300 g. The products were analysed for proximate composition, colour parameters, water activity, antioxidant activity (DPPH and ABTS assays), and consumer acceptance. Increasing the proportion of W. globosa significantly elevated the protein content and antioxidant capacity of the snacks ($p < 0.05$). Simultaneously, moisture content and water activity decreased, contributing to improved crispness and enhanced storage stability. The colour of the products became progressively darker with higher levels of W. globosa, attributable to the chlorophyll and phenolic compounds present in the ingredient. Sensory evaluation by 50 untrained panellists revealed that the formulation containing 5% W. globosa achieved the highest overall acceptability, particularly with respect to colour, aroma, flavour, and texture. In conclusion, fortification of RD43 rice-based extruded snacks with W. globosa powder effectively improves their nutritional value and functional properties without diminishing consumer preference. These findings support the potential of W. globosa as a sustainable, plant-based ingredient for the development of innovative, health-promoting food products.

Keywords: Snack; Product Rice (*Oryza sativa* L.) cv. RD43; Plant-Based Protein; Kai-Pum (*Wolffia globosa*)

O - 306 Sustainable Development of Ready-to-Use Miang Tao-Jiew Sauce from Traditional Fermented Soybean: Sensory and Carbon Footprint Evaluation

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Abstract

This study aimed to develop and upscale *Sour Tao-Jiew*, a traditional fermented soybean from Tak Province, Thailand, into a ready-to-use *Miang Tao-Jiew* sauce with enhanced sensory properties and market potential. The product concept emphasized the authentic three-flavor balance—sweet, salty, and sour—while improving convenience and commercial viability. Four formulations were prepared using different sugar types: no sugar (control), refined sugar, palm sugar, and a mixed sugar. The physicochemical analysis revealed that all sugar additions significantly reduced lightness (L) values ($p<0.05$), with the palm sugar formulation showing the darkest color (L= 16.52). All samples exhibited mild acidity (pH = 2.98–3.84), which is suitable for flavor stability and microbial safety. Sensory evaluation by 30 trained panelists, using a 9-point hedonic scale, indicated that the refined sugar formulation achieved the highest overall liking score (7.60), corresponding to the category like very much. Consumer testing with 100 participants, also conducted using the 9-point hedonic scale, confirmed high acceptance (7.14), with 92% expressing purchase intention. Furthermore, the carbon footprint of the final 240 g product, estimated using Life Cycle Assessment (LCA) principles and Thailand-specific emission factors, was 0.657 kg CO□-eq per bottle. The main contributors were raw material production (51.75%) and glass packaging (36.55%). The findings demonstrate that *Miang Tao-Jiew* sauce not only enhances the market value of local fermented soybeans but also embodies a sustainable, low-carbon approach to product innovation aligned with Thailand's bio-circular-green (BCG) economy framework.

Keywords: Fermented soybean; Sugar type; Sensory evaluation; Carbon footprint; Sustainable food innovation

O - 307 Production of Multi-Bioactive Functional Protein Hydrolysates from Tuna Dark Meat using Mixed-Enzyme Hydrolysis

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Abstract

The growth of the tuna processing industry has led to an increase in processing by-products, including skin, bone, viscera, head, dark meat, etc. This study aimed to valorize tuna dark meat to produce bioactive protein hydrolysates with antioxidants, angiotensin-converting enzyme (ACE) inhibitory, antidiabetic, anti-inflammatory, and anticancer properties. Mixed enzyme hydrolysis was performed using a combination of commercial enzymes (Alcalase, Papain, and Flavourzyme) at a 3% (w/w) total enzyme concentration, with hydrolysis times of 3 and 6 h. Eight experimental units were developed. Yield, degree of hydrolysis (DH), solubility, and the effect of pH on solubility were evaluated to determine the functional characteristics of tuna dark meat protein hydrolysates. Thermal and structural properties were examined through DSC, FTIR, and total amino acid composition analyses. Furthermore, antioxidant, ACE-inhibitory, DPP-IV-inhibitory, anti-inflammatory, and anticancer activities were also determined. Among all treatments, tuna dark meat protein hydrolysate prepared with a mixture of 3 enzymes and 6 h of hydrolysis demonstrated the highest functional and bioactive properties. The results showed a 12.77% yield, 59.59% DH, and 98.75% solubility. Bioactivity assessment revealed that this hydrolysate exhibited the strongest activities, with IC_{50} values of 0.84 mg/mL (ABTS), 0.36 mg/mL (DPPH), 22.53 mg/mL (OH), and 5.93 mg/mL (H_2O_2), along with a FRAP value of 0.14 mmol $FeSO_4$/g, ACE inhibitory activity of 0.20 mg/mL, and DPP-IV inhibitory activity of 4.64 mg/mL. In addition, anti-inflammatory activity was observed in RAW 264.7 macrophage cells, where the hydrolysate reduced nitric oxide production to 66.74% compared to the LPS-stimulated control (100%) at a concentration of 2 mg/mL. Meanwhile, the HepG2 cell evaluation showed a reduction in cell viability to 80.38% compared with the DMEM control (100%) at the same concentration, suggesting potential anticancer activity. These findings demonstrate that extended mixed-enzyme hydrolysis, particularly with three enzymes, significantly improves the functional and bioactive properties of tuna dark meat hydrolysates, highlighting their potential for use in functional foods.

Keywords: Tuna dark meat; Protein hydrolysate; Antioxidant; ACE inhibitory activity; DPP-IV inhibitory activity

O - 309 Application of Hedonic, Just-About-Right, and Discriminative Analyses in Optimizing a Chocolate-Flavored Green Banana–Wolffia Protein Drink Mix

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Abstract

This study demonstrates a sensory-methodology-driven approach to optimizing a functional chocolate-flavored beverage powdered mix, formulated from green banana flour and Wolffia powder. Green banana flour (22.6%) was used as a base ingredient in all formulations, providing dietary fiber, resistant starch, and functional properties related to beverage viscosity, while Wolffia served as the primary variable protein source. The development emphasized the application of hedonic testing, Just-About-Right (JAR) diagnostics, and discriminative sensory evaluation to guide formulation decisions. Consumer insights were first gathered through a survey (n=70), identifying high interest in products offering increased fiber (79.4%), high protein (60.3%), and low sugar (30.2%). These expectations informed the design of three formulations varying in Wolffia levels (11.5%, 15%, 20%). Consumer acceptance testing (n=31) using a 9-point hedonic scale showed no significant differences among samples ($p>0.05$). However, detailed sensory insights from JAR diagnostics indicated that sweetness and bitterness were generally "just right," while green flavor notes and viscosity were perceived as too strong in certain formulations. The formulation containing 15% Wolffia achieved the highest acceptance rate (87.1%), confirming its suitability as the lead prototype. To maintain nutritional claim thresholds (≥10 g protein and ≥10% DV fiber per serving) while improving sensory characteristics, optimization was achieved by adjusting dilution instructions rather than altering ingredient composition. Further sensory investigation using a Same–Different discriminative test conducted with general consumers (n = 45) revealed that 94% of participants perceived differences between sugar-sweetened and non-nutritive-sweetener versions, with a preference for the sugar-sweetened formulation (68%). These insights were critical for determining the final sweetener choice. The optimized beverage powdered mix delivers approximately 10 g protein and 4.4 g dietary fiber per 45-g serving, aligning with health-driven consumer expectations while leveraging underutilized agricultural raw materials. This work highlights how structured sensory methodologies-hedonic scoring, JAR diagnostics, and discriminative testing can meaningfully direct product development and enhance consumer-driven innovation in functional drink mix.

Keywords: Hedonic testing; JAR diagnostics; Discriminative analysis; Consumer insight; Functional beverage optimization

O - 310 Comparative Effects of Drying Techniques on Bioactive Composition and Techno-Functional Properties of Kai (*Cladophora glomerata*)

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Abstract

The freshwater macroalga Kai (*Cladophora glomerata*) is a nutrient-rich, sustainable source of bioactive compounds with potential as a functional food ingredient. This study systematically evaluated the effects of freeze drying (FD), tray drying (TD), and sun drying (SD) on the bioactive composition, microstructure, and functional properties of Kai powder for future food applications. Drying method significantly ($p < 0.05$) influenced powder characteristics. TD yielded the highest chlorophyll (4.41 mg·g^{-1}) and total flavonoids (6.60 mg QE·g^{-1}) content, as well as antioxidant activity (FRAP: 20.86 µmol Fe^{2+} ·g^{-1}), whereas SD had the highest total phenolic content (1.13 mg GAE·g^{-1}). Mineral analysis demonstrated that all powders were rich in essential elements, with heavy metal concentrations below safety limits. Techno-functional properties varied with drying method: SD exhibited the highest water-holding capacity (14.95 g water·g^{-1} powder), whereas TD had the greatest swelling capacity (25.50 mL·g^{-1}); nonetheless, all powders displayed poor flowability (Carr's index >30%). The highest initial foaming capacity (44.6%) was observed in TD samples, but the foam collapsed rapidly, whereas FD (42.9%) and SD powders (27.4%) maintained foam more effectively over time. FD showed structural integrity, as evidenced by SEM and FTIR analyses, resulting in superior emulsifying capacity (63.33%) and emulsion stability (86.61%). Overall, it can be concluded that drying method can strategically modulate Kai algae functionality: FD is optimal for structure-sensitive and emulsification applications, TD enhances color and flavonoid-based antioxidant content, and SD maximizes phenolic-related functionality. This study provides a clear framework for developing Kai algae powders as natural, nutrient- and bioactive-rich ingredients for functional foods and nutraceuticals, supporting the sustainable utilization of freshwater macroalgae in the food industry.

Keywords: Kai Algae; Drying Methods; Bioactive Compounds; Techno-functional Properties

O - 311 Optimization of Pectinase-Assisted Hot Water Extraction for Anthocyanin Recovery from Black Goji Berries

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Abstract

This study aimed to optimize a pectinase-assisted hot-water extraction process to enhance anthocyanin recovery from black goji berries (*Lycium ruthenicum*), in which pigment release is often limited by the pectin-rich cell wall matrix. Briefly, dried black goji berries were milled into powder and subjected to enzymatic hydrolysis using pectinase during hot-water extraction, followed by filtration and anthocyanin quantification. A three-factor, three-level response surface methodology (RSM) based on a Box–Behnken design was employed to systematically evaluate the effects of extraction temperature, enzyme dosage, and enzymatic hydrolysis time on anthocyanin yield. The optimal extraction conditions were determined to be 49.1 °C, 280 U/g, and 49.9 min, resulting in an anthocyanin concentration of 2003.70 ± 35 mg/L. Pectinase treatment effectively disrupted the pectin-dominated cell wall structure, significantly improving anthocyanin release compared with conventional hot-water extraction. Overall, this study demonstrates the critical role of pectinase in facilitating anthocyanin extraction and provides a simplified, food-grade, and scalable strategy for the utilization of black goji berry pigments in functional foods, anti-aging products, and smart packaging applications.

Keywords: Black goji berry; Anthocyanins; Enzyme-assisted extraction; Response surface methodology

O - 314 Effect of High-Pressure Processing on Microbial Inactivation and Physicochemical Quality of Green Soybean Milk

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Abstract

Green soybean milk is a nutritious plant-based beverage rich in proteins, essential amino acids, and various bioactive compounds. However, its high moisture and nutrient contents make it highly susceptible to microbial contamination and spoilage. Therefore, thermal pasteurization is commonly applied to ensure microbiological safety. Nevertheless, it often causes undesirable changes in physical and sensory quality. This study aimed to investigate the potential of high-pressure processing (HPP) as a non-thermal pasteurization technique for green soybean milk and to compare its efficacy with conventional heat pasteurization. The experimental design was based on a Box–Behnken model, evaluating the effects of pressure ranging from 400 - 600 MPa, holding time between 1 - 3 min, and initial temperature from 20 - 30 °C. The optimal HPP condition was determined to be 600 MPa for 1.1 min at 27 °C, resulting in 7.26 and 7.07 log reductions of *Escherichia coli* K12 and *Listeria innocua*, respectively, and complete inhibition of *Saccharomyces cerevisiae*. The model validation showed a percentage error of 10.16%. Additionally, HPP effectively eliminated all detected pathogenic indicators in uninoculated samples, including *Salmonella* spp., *Staphylococcus aureus*, *Listeria monocytogenes*, and *Bacillus cereus*, complying with the microbiological standards of the Thai FDA. Physicochemical analyses revealed that HPP-treated samples maintained pH, total soluble solids, viscosity, and color parameters (L*, a*, b*) similar to those of unprocessed samples. While thermal pasteurization significantly increased viscosity and caused obvious color degradation. Moreover, HPP significantly ($p < 0.05$) preserved higher total phenolic content (0.79 µg GAE/mL) than both unprocessed and thermal pasteurized sample, and also higher antioxidant capacity (2.09 µmol FeSO□/mL) than the unprocessed sample. In conclusion, HPP demonstrated enhanced microbial inactivation while improved the nutritional and physicochemical quality of green soybean milk rather than thermal pasteurization. These findings highlight HPP as a promising non-thermal preservation technology for extending the shelf life of green soybean milk without compromising its quality.

Keywords: Green soybean milk; High-pressure processing; *Listeria innocua*; *Eschericia coli* K12

O - 319 Sustainable Valorization of Corn Cob Agricultural Residues for Co-Production of Sweeteners and Biofuel

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Abstract

Effective utilization of agricultural wastes to produce high-value bioproducts is essential in developing countries to sustain the environment, particularly by controlling air pollution from open-field burning, such as in Thailand. Co-production of potential sweeteners and biofuel from waste can decrease production costs as well as improve the overall process efficiency. However, there is a lack of reports on the spontaneous co-production of xylitol, erythritol, and bioethanol from corn cob by using only one microbial strain. The research aims to valorize corn cob agricultural residues to produce xylitol, erythritol, and ethanol using *Candida magnoliae* TISTR 5664. Corn cob was primarily pretreated using 3.77% (v/v) dilute sulfuric acid for the preparation of xylose-rich hemicellulosic hydroxylase for xylitol production. It was followed by enzymatic hydrolysis using commercial cellulase enzymes with an enzyme loading of 45 FPU/g dried solid for the glucose-rich cellulosic part, which was used for ethanol and erythritol production, with fructose supplementation (50-200g/L) required for erythritol synthesis. Product concentration, product and biomass yield of xylitol, erythritol, and ethanol, as well as their productivity, were examined. The results indicated that xylitol and ethanol yields were within 0.45-0.65 g/g and 0.35-0.45 g/g, respectively, while erythritol production was observed. The integrated approach presented a sustainable production of biochemicals by reducing environmental waste, which is in line with Thailand's Bio-circular Green Economic Model.

Keywords: Ethanol; Erythritol; Xylitol; Hemicellulosic hydrolysate; Cellulosic hydrolysate.

O - 321 Insight into the Impact of Ice-water Interface Dynamics on Myofibrillar Protein Stability in Grass carp (*Ctenopharyngodon idella*) Flesh

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Abstract

To elucidate the mechanisms by which ice-water interface formation and migration affect the stability of myofibrillar proteins (MP) in salted fish muscle during freezing process. This study employed freezing treatments at −35 °C and −110 °C on grass carp flesh with varying salting levels to modulate ice-water interface migration rates and examine the effects of ice crystallization and interfacial dynamics on the physicochemical properties of MP. Chemical analyses showed that slow ice-water interface migration induced myofibrillar network formation via hydrophobic interactions, whereas rapid migration trapped partial salt ions and MP within ice crystals. The MP in unbrined flesh frozen at −110 °C exhibited the lowest particle size (1144 nm) and surface hydrophobicity (35.37 μg). Rapid migration of ice-water interface maintained native protein conformation and inhibited protein degradation and aggregation. Molecular dynamics simulations revealed that freezing significantly affected the structural stability of the myosin head region (residues 343-449). Freezing at −110 °C immobilized both salt ions and MP within ice crystal matrices. Compared with the unbrined sample, the optimal salt concentration (0.18 M) disrupted the hydration shells around proteins, thereby weakening electrostatic interactions between ice crystals and proteins during freezing by 15.49 % to 31.89 %. Rapid ice-water interface migration induced compaction protein structure, counteracting salt-induced thermal instability from protein unfolding. This finding provides a theoretical basis for the development of high quality frozen aquatic products.

Keywords: Ice-water interface; Myofibrillar proteins; Freezing; Molecular dynamics

O - 322 High Efficient Protein Recovery from Surimi Rinsing Wastewater by Coupling isoelectric and Electrophoretic effects in an Electric Field

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Abstract

Surimi rinsing wastewater (SRW) contains high levels of water-soluble proteins and chemical oxygen demand (COD), causing environmental pollution and the waste of protein resources if discharged directly. However, existing recovery methods for treating SRW still suffer from low protein recovery rate, complex process and high cost. Herein, this study systematically evaluated six methods: heating flocculation (H), pH-shifting flocculation (pH), chitosan flocculation (C), pH-shifting flocculation coupled with chitosan flocculation (pHC), low-voltage direct current electric field (DC), and low-voltage direct current electric field at constant temperature (DC-CT). The DC group showed optimal performance, with a protein recovery rate and a COD removal rate as high as 90.42% and 56.36%, respectively. Compared to other groups, the DC group leveraged electrophoretic migration, oxidative cross-linking, local pH shifts and Joule heating to form recovered protein films without chemical additives. It was beneficial for efficient solid-liquid separation, yielding reusable supernatant. FTIR and SDS-PAGE revealed that the electric field treatment promoted the formation of high-molecular-weight, stable protein aggregates based on β-sheet structures and disulfide bond cross-linking, which facilitated protein recovery and separation. These aggregates could be further modified through strategies such as mild enzymatic hydrolysis or high-pressure homogenization to enhance their application in food systems. The energy cost of electric field treatment was only 107-126 kWh/ton, merely 25-30% of that of the thermal treatment. This approach provides an eco-friendly, cost-effective solution for SRW treatment, also providing a reference for treating other protein-rich wastewater streams (e.g., dairy, slaughterhouse effluents).

Keywords: Surimi rinsing wastewater; Low-voltage direct current electric field; Recovered protein; Sustainable technology; Protein aggregation

O - 324 Ohmic Heating-Assisted Green Extraction of Polyphenols from Rambutan Peel Using Choline Chloride–Lactic Acid NaDES as an Emerging Solvent

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Abstract

Rambutan (*Nephelium lappaceum* L.) fruit peel, a waste material of the canning industry, is a rich source of polyphenols and other bioactive compounds that have the potential to be used as natural antioxidants. Extracting these compounds presents a promising approach for value addition and for reducing the environmental impact of this agrifood waste. In this study, a natural deep eutectic solvent (NaDES) composed of choline chloride and lactic acid (ChCl-LAC) at a 1:2 molar ratio was synthesized using a heating-stirring method. Its effectiveness as an emerging extraction medium for polyphenols was further investigated under ohmic heating assistance. Fourier transform infrared (FTIR) spectroscopy confirmed hydrogen-bond interactions between choline chloride and lactic acid, validating the successful formation of the ChCl–LAC NaDES. Electrical conductivity measurements of aqueous ChCl-LAC NaDES solutions showed that the values varied with concentration and temperature. The maximum electrical conductivity was observed at concentrations of 40% and 50% (w/w) when the temperature was maintained at 25°C and 60°C, respectively. Both the electric field strength and solvent-to-solid ratio significantly affected the efficiency of ohmic heating-assisted extraction. The highest total phenolic content (~303 mg gallic acid equivalent/g sample) and antioxidant activities (~654 and ~397 mg Trolox equivalent/g sample for $DPPH^{l}$ and $ABTS^{l+}$ scavenging assays, respectively) were obtained at 5 V/cm and a solvent ratio of 40 mL/g, outperforming conventional heating (0 V/cm). These results demonstrate a synergistic effect between NaDES and ohmic heating, highlighting the potential of ChCl–LAC NaDES as a green, efficient, and sustainable solvent system for the valorizing agricultural and food waste, thereby supporting the advancement of a circular bioeconomy.

Keywords: Antioxidant activity; Natural deep eutectic solvent; Ohmic heating; Polyphenols extraction; Rambutan fruit peel

O - 326 Development of Gluten-Free Bread from Extracted Barnyard Millet Starch Prepared from Different Drying Techniques

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Abstract

Millets are nutrient-rich grain that offer a sustainable alternative to common cereals. This study aimed to examine effect of hot air and freeze drying on the characteristics of starch extracted from barnyard millet (*Echinochloa frumentacea*), and to develop gluten-free bread and evaluate its quality. The grains were soaked in NaOH solution (0.2% w/v) for 8 hours at a 1:2 w/v ratio, then ground, filtered, and the residue was dried at 40°C, 50°C, 60°C, and freeze-drying. The dried samples were evaluated for amylose content, techno-functional properties and morphology. Amylose content ranged from 20.14% DM at 60°C to 25.69% DM at 40°C, while freeze-dried sample has 27.45% DM. Higher drying temperatures increased water hydration capacity (5.50%) and swelling power (5.26%) but reduced final viscosity (5584.67 cP). SEM analysis revealed that drying had an influence on the surface integrity, aggregation, granule shape of starch. Freeze dry had a smooth, well-preserved structure while the surface deformed at 60°C. Aggregation ranged from moderate at freeze dry to extensive at 60°C. Freeze dry starch had a sharp polygonal shape while there was loss of definition at 60°C. Gluten-free bread was then produced using the freeze-dried starch. Formulations included millet starch (S), whole wheat flour (W), and pearl millet flour (M), with six variations consisting of 100%W, 100%M, 100%S, 25%S, 50%S, and 75%S in gluten free flour portion. Breads were analyzed for proximate compositions, amylose content, specific volume, color value, textural property, aw, and storage test. The highest in protein content was observed in 100M bread (13.48% DM) and the lowest in 100S (8.49% DM). Fat content ranged from 2.36% DM (100W) to 6.73% DM (100M). The amylose levels varied from 14.24% DM (100S) to 7.66% DM (100W). Specific volume varied from 1.17 to 1.62 mL/g, while aw ranged from 0.94-0.95 (-). Seven days of storage, increased hardness (138.34-250.74%) and adhesiveness (55.56-99.52%), while decreasing springiness (22.73-85.71%), cohesiveness (50-94.44%), and resilience (50-63.16%). Overall, drying techniques affected quality of starch. Addition of starch in gluten free formulations had effect on finished products.

Keywords: Millet; Starch; Drying; Gluten-Free-Bread

O - 329 Dual-Function Smart Biodegradable Film Integrated with Kradon and Anthocyanin Extract for Quality Monitoring of Chilled Fresh-Cut Pork

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Abstract

Quality monitoring of fresh-cut packaged pork is challenging due to its highly perishable nature and short shelf life. Currently, pork is packaged in synthetic polypropylene trays wrapped with polyvinyl chloride (PVC) stretch film; however, consumers cannot identify quality during purchase. This study developed an integrated biodegradable intelligent film with dual active and indicator functions using food industrial by-products: gelatin from pork skin, chitosan, and *Careya sphaerica* (Kradon) leaf extract (3-15% w/v) as an antimicrobial matrix. Anthocyanins from Brassica oleracea var. capitata (red cabbage) (2% w/v) served as natural pH-sensitive colorimetric indicators. Film characterization revealed slightly reduced mechanical properties, with elongation decreasing from 29.47% to 5.89%, tensile strength from 39.34 to 20.83 MPa, and transparency from 79.67% to 57.38% compared to control films. Conversely, water vapor transmission rate decreased from 83.68 to 75.12 g/day·m² and antimicrobial activity, especially against Staphylococcus aureus and Pseudomonas aeruginosa, improved with increasing Kradon extract concentration. FTIR and SEM analyses confirmed strong phenolic–polymer interactions that generated a compact matrix at 9% Kradon. UV-Vis spectral analysis demonstrated pH-dependent absorbance shifts and distinct color transitions (purple to sky blue) between pH 5-7, corresponding to pork spoilage ranges. Real-time application on fresh-cut pork at 4 ± 1 °C showed shelf-life extension from 3 to 5 days compared to controls, monitored through pH, total plate count (TPC), total volatile basic nitrogen (TVBN 10 to 28.44 mg N/100 g), and textural properties, with simultaneous quality monitoring via visible color changes. Microbiological load increased from an initial 4.05 to 5.29 log CFU/g on day 5, indicating spoilage of packed pork according to regulatory standards. These findings demonstrate that chitosan-gelatin films incorporating Kradon extract and anthocyanins provide effective intelligent packaging for the pork industry, enabling concurrent shelf-life extension and quality monitoring.

Keywords: Intelligent packaging; Anthocyanin indicator; Antimicrobial activity; Pork freshness/spoilage

O - 335 Herbal Mixed Tisanes as Functional Beverages: Antioxidant, Sensory Emotion, Relaxation, and Calmness

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Abstract

Traditional herbal tisanes contain a diverse array of phytochemicals that contribute not only to their antioxidant capacity but also to sensory-driven emotional responses. This study aimed to develop a mixed-herb tisane with enhanced antioxidant activity, consumer acceptance, and stress-relieving potential using a mixture design of *Lavandula angustifolia* Mill., *Mimosa pudica* L., *Stevia rebaudiana* Bertoni, with *Chamaemelum nobile* (L.) All, and *Rosa damascena* fixed at these proportions. The effects of herbal ratios on sensory acceptance and emotion-related responses, particularly calmness ($p < 0.05$), were analyzed, leading to an optimized mixture (23% lavender, 10% mimosa, 17% stevia) that achieved the optimal balance between flavor acceptance and perceived calming and relaxation. This herbal tea formula has amino acid profiles, including phenylalanine (86.13±0.08 µg/ml), tyrosine (7.67±0.04 µg/ml), serine (13.47±0.02 µg/ml), and glutamic acid (8.36±0.21 µg/ml), that may contribute to mood regulation and calmness. The phenolic compounds were identified as follows: chlorogenic acid, catechin, and ferulic acid, 2967.66±46.19; 2089.45±0.68, 1025.35±1.87 (µg/g), respectively, which may support calmness, relaxation and mental well-being. Tisanes demonstrated low acute toxicity in animals, with an LD50 greater than 5 g/kg, classified in category 5. The tea blend showed low acute oral toxicity, as indicated by tests conducted according to animal testing. In the consumer test (n = 250), participants with scores above 5 in the Stress Test Scale (ST-5, DMH), indicating a moderate level of stress, reported greater relaxation and steadier emotional settling, a great aroma/ smell feeling, whereas those using psychiatric medications or sleep aids experienced delayed sleep and should avoid this tisane due to potential interactions. These findings position this formulation as a promising functional beverage that integrates antioxidant efficacy with high sensory acceptance and measurable mood-supportive benefits, and point to its application in health, wellness, and mental well-being innovations.

Keywords: Herbal Tisanes; Antioxidant; Sensory evaluation; Emotional response; Functional beverage; Stress Test

O - 336 Contextual Modulation of Emotional and Hedonic Responses to Functional Peach Tea Beverages Across Real and Immersive Consumption Environments

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Abstract

Understanding how consumption context shapes emotional and hedonic responses to functional beverages is essential for ensuring that health-oriented products perform consistently across real and immersive environments. This study investigated how three ready-to-drink peach tea products enriched with a functional green tea–turmeric co-extract a developed instant peach drink, commercial A (an international brand marketed in Australia and Thailand), and commercial B (a Japanese tea) were perceived across three ecologically distinct consumption contexts including a sensory booth, a real food court, and an immersive food-court environment. Sixty consumers evaluated 21 emotion terms (CATA and 5-point intensity) and 19 liking attributes (9-point hedonic scale). ANOVA revealed strong contextual effects on multiple emotional and sensory responses ($p < 0.001$), particularly those reflecting heightened stimulation in richer environmental settings. For example, *active* increased substantially from booth to immersive context ($F = 16.49$, $p < 0.001$), indicating enhanced engagement in high-immersion environments. Significant product effects ($p < 0.001$) were also observed for attributes associated with flavour quality, bitterness, and aftertaste, reflecting intrinsic formulation differences among the three teas. Several key attributes, including *adventurous*, *bored*, *refreshing*, Overall aroma, and Overall taste, showed significant product × context interactions ($p < 0.05$), demonstrating that contextual immersion not only intensified emotions but also shifted the relative sensory positioning of the products. Notably, *bored* was strongly associated with booth evaluations, especially for commercial B, highlighting reduced consumer engagement in low-ecology sensory settings. External preference mapping (67.4% total variance explained) identified three distinct perceptual clusters: (1) the instant peach drink in real and immersive contexts, associated with *active*, *excited*, *surprise*, *pleasant*, *refreshing*, and higher liking; (2) Commercial A, centrally positioned with moderate liking and mild emotional responses across contexts; and (3) Commercial B in the booth context, associated with bitterness, astringency, *nervous*, *worried*, *bored*, and lower hedonic ratings, although its acceptance improved modestly in food-court environments. Overall, the findings demonstrate that contextual immersion substantially enhances emotional engagement and modulates hedonic perception, with the most pronounced benefits observed for the functional instant peach drink formulated. These results underscore the importance of ecologically valid testing environments for evaluating consumer responses to functional beverages.

Keywords: Contextual consumption; Emotional response; Hedonic perception; Functional beverage; Immersive environments

O - 340 Effect of Heat Treatment on Color, Proximate Composition, and Bioactive Compounds of Three Selected Mushrooms

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Abstract

Heat treatments are widely used as post-harvest processes and can strongly influence the nutritional and functional properties of mushrooms. This study aimed to evaluate the effects of three heat treatments including boiling, steaming, and grilling on color, protein content, and bioactive compounds in three edible mushroom species: King Oyster mushroom (*Pleurotus eryngii*), Shimeji mushroom (*Hypsizygus commune*), and Split Gill mushroom (*Schizophyllum commune*). For the boiling process, samples were treated in reverse osmosis water at 100°C for 20 minutes with a 1:10 mushroom-to-water ratio, while steaming was conducted at 100°C for 20 minutes. Grilling was carried out at 180°C for 3 minutes. The analytical assessments covered color measurement, proximate composition analysis, evaluation of total phenolic content, and quantification of beta-glucan. The results demonstrated that all heat treatments induced significant alterations in mushroom nutritional composition compared with fresh samples. Steaming provided the greatest color preservation in *Shimeji* and *Split Gill* mushrooms, whereas in *King Oyster*, steaming produced the lowest lightness (L^*) value. Among the heat treatments, steaming was the most effective overall, as it best preserved color quality and maintained high protein levels, yielding 13.61, 15.52, and 18.79 g/100 g dry weight in King Oyster, Shimeji, and Split Gill mushrooms, respectively. In contrast, boiling better retained carbohydrate content, while grilling resulted in the lowest moisture levels among the treatments ($P < 0.05$). Steaming also produced significantly higher levels of total phenolics and beta glucans content compared with boiling and grilling ($P < 0.05$). Overall, the findings highlight the suitability of steaming as a post-harvest treatment for retaining key nutritional components and valuable bioactive compounds in the examined mushroom species, providing meaningful insights into quality preservation and health-related benefits.

Keywords: Bioactive compounds; Edible mushroom; Heat treatment; Beta glucan content; Nutritional composition

O - 342 Cold Plasma and Plasma-Activated Water as Sustainable Green Technologies for Enhancing the Bioactivity and Antioxidant Potential of Butterfly Pea (*Clitoria ternatea*) Extracts

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Abstract

The valorization of botanical pigments through eco-efficient processing aligns with global efforts to promote sustainable food innovation. Butterfly pea (*Clitoria ternatea*) flowers are rich in antioxidants; however, their poor thermal stability limits industrial utilization. Fresh flowers harvested in June 2025 were homogenized, stored at −20 °C, and prepared by blending 10g petals with 100mL DI water for 60sec at room temperature. The extract was filtered, and treated within one hour. This study investigated cold plasma (CP) and plasma-activated water (PAW) as emerging green technologies aimed at enhancing the bioactivity, and quality of *C. ternatea* aqueous extracts, while reducing energy consumption and chemical dependence. Extracts were treated with CP using air, nitrogen, or argon gases (4-8 min) and with PAW generated from the same gases (10-15 min) at 220 V input, 1.5 L/min flow rate, and 1 cm treatment gap. The untreated samples served as the control. Both gas composition and treatment duration significantly affected ($p < 0.05$) the total anthocyanin, phenolic, and flavonoid contents, as well as antioxidant activity and color attributes. Relative to the control (TAC = 19.43 mg/L; DPPH = 14.14%; TPC = 2.01 mg GAE/g), CP-argon (6 min) achieved the highest pigment retention (TAC = 22.43 mg/L) and radical scavenging activity (24.14%). CP–nitrogen maximized phenolic enrichment (TPC = 2.33 mg GAE/g) and maintained minimal color variation ($\Delta E \approx 2.0$). Among the PAW treatments, nitrogen derived PAW (15 min) produced the greatest antioxidant potential (FRAP ≈ 8700 μmol Fe^{2}□ g□^{1}) and phenolic content (TPC = 2.64 mg GAE/g), with sustained PPO inhibition and color stability ($\Delta E < 3$). All plasma treatments preserved the natural acidic profile (pH ≈ 4.95–5.24) and total solids consistency (0.39-0.57%), confirming limited matrix degradation. All results were statistically validated using one-way ANOVA followed by Tukey's post hoc test (n = 3) at $p < 0.05$, ensuring rigorous comparison across treatments. Overall, CP-argon promoted effective enzymatic inactivation and pigment retention, whereas PAW-nitrogen enhanced bioactive compound recovery through mild redox reactions. These results establish CP and PAW as sustainable, residue free green technologies capable of stabilizing natural colorants for application in future clean-label food systems.

Keywords: Cold plasma; Plasma-activated water; Butterfly pea; Antioxidant activity; Sustainable food

O - 343

Preparation and Characterization of TiO_2/ZnO Nanoparticle Coating on Kraft Paper via Sparking Process for Packaging Application

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Abstract

This study aims to investigate the surface modification of Kraft paper (KP) using TiO_2 and ZnO nanoparticles generated via the sparking method to enhance hydrophobicity and ethylene-elimination performance for active packaging applications. Nanoparticles of TiO_2 and ZnO were deposited using a sparking machine operating at 100 mm/min with 0–20 sparking cycles, while a magnetic field was applied beneath the substrate to improve nanoparticle adhesion and dispersion. The coated papers were subsequently annealed at temperatures of 100-140°C for 1-3 h. Hydrophobicity was evaluated through water contact angle (WCA) measurements, with the highest WCA of 123° obtained after 20 sparking cycles followed by annealing at 140°C for 3 h. shown increased surface coverage and improved surface fine roughness on the KP that was treated. Ethylene adsorption tests showed a substantial decrease in ethylene concentration, with coated samples containing approximately 410 ppm compared with 920 ppm in untreated paper, indicating enhanced ethylene-removal efficiency. Surface morphology and chemical composition were analyzed using scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR), confirming successful nanoparticle deposition and structural modification of the paper surface. Overall, the findings demonstrate that TiO_2 - and ZnO-coated KP produced via the sparking process provides improved functional properties and represents a promising material for sustainable active packaging.

Keywords: Kraft paper; Nanoparticle; Sparking process; Ethylene adsorption; Active packaging

O - 344 Comparative Impact of Synthetic (polysorbate 80) and Protein-Based (α-lactalbumin) Emulsifiers on Intestinal Barrier Integrity and the Trans-Epithelial Transport of Polychlorinated Biphenyls

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Abstract

Food emulsifiers are ubiquitous additives in processed foods that stabilize formulations and may modulate the intestinal barrier function and influence xenobiotic absorption. With growing consumer preference for natural alternatives, evaluating the comparative effects of protein-based emulsifiers like α-lactalbumin (α-LA) on intestinal function is critical. The intestinal barrier serves as a vital dual role in facilitating nutrient absorption and preventing the entry of toxins and xenobiotics. This study investigates the effects of P80 and α-lactalbumin (α-LA) on intestinal barrier function and the absorption of polychlorinated biphenyl (PCB) congeners 138 and 153 using Caco-2 cells, in a validated in-vitro model. Differentiated Caco-2 monolayers were exposed to non-cytotoxic concentrations of P80 or α-LA (0.1%, 0.05%), with and without 1µM PCB (138 and 153) mix for 4 hours. Barrier function was assessed by transepithelial electrical resistance (TEER), Lucifer Yellow (LY, 100µM) flux and PCB transport by GCMS/MS. RT-qPCR analysis of tight junction proteins (TJP1, OCLN, CLDN) and pro-inflammatory cytokines (IL-6, IL-1β, TNF-α) were performed, normalizing to GAPDH. P80 (0.1%) induced a 43.7% TEER (630.5 to 354.9 Ω·cm²) reduction, 3.7-fold increase in LY permeability (0.829µM vs. 0.257µM control), 4.2-fold enhancement of basolateral PCB transport. RT-qPCR revealed significant downregulation of occludin (5-fold) and upregulation of TNF-α, indicating tight junction disruption and inflammatory activation. In contrast, α-LA (0.1%) maintained barrier integrity (TEER 467 Ω·cm²), showed non-significant LY flux elevation and notably reduced PCB transport below control levels. Co-administration of P80 with PCB demonstrated dose dependent effects, with 0.05% P80 producing intermediate barrier compromise and 2.6 fold PCB transport elevation. These findings demonstrate that P80 compromises intestinal barrier function through tight junction degradation, facilitating xenobiotic absorption whereas α-LA maintains epithelial integrity with anti-inflammatory properties. These findings have important implications for food safety, food formulation strategies and consumer health.

Keywords: Emulsifiers; Polysorbate-80; α-Lactalbumin, Intestinal Barrier; Polychlorinated Biphenyls

O - 346 Leaf Protein Concentrates as Alternative Source of Protein: Processing Method and Properties

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Abstract

Leaf protein concentrates (LPCs), also known as leaf protein extracts, are a promising source of sustainable, high-nutrition protein for human foods and animal feeds. Potential plant sources include alfalfa, quinoa leaves, sugar beet leaves, potato leaves, spinach, moringa leaves, cassava leaves. In this study, moringa leaves and cassava leaves will be discussed. The protein content in the extract may vary depending on plant species, harvesting period, the LPCs processing, and the scale of production. The major proteins found in LPCs are composed of Ribulose-1,5-biphosphate carboxylase/oxygenase (RuBisCo) and photosynthetic proteins. The process for LPCs preparation involves a few key steps, including: (1) Tissue grinding to disrupt cell walls, (2) Solubilization of the protein in alkali solution at pH around 9.0, (3) Protein coagulation and precipitation near its isoelectric point at pH around 4.5, (4) Protein separation via centrifugation or membrane filtration, and (5) Drying. Protein precipitation can be achieved through thermal coagulation or adjusting pH of suspension close to its isoelectric point. Different protein precipitation techniques result in different protein structure and functional properties. In our study, applying further heating after the protein precipitation step through adjusting pH of suspension close to the pI of proteins caused changes in protein structure and functionality. The results from FTRI spectra confirmed the changes in protein structure. This phenomenon can be assumed that protein hydrolysis occurred under mild acid condition during heating after the protein precipitation step. Balancing protein quality and the protein yield should be investigated for applications of LPCs for human foods and animal feeds. In food application, the use of 5-15% moringa leaf protein concentrates were tested to replace pancake mix. The substitution showed nutritional enhancement of protein content increasing (18.7$\pm$1.2%) compared to the control. Texture profile analysis of the pancakes showed that springiness and cohesiveness of pancakes were maintained even with substitution of moringa LPC at 15%.

Keywords: Leaf protein concentrates; Leaf protein extract; Moringa leaf; Cassava leaf; Acid hydrolysis

O - 349 A Model for Pectin Extraction from Krung Kamoa Leaves (*Cissampelos pareira*)

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Abstract

In Northeastern Thailand, *Cissampelos pareira* (commonly known as the Krung Kamoa) is traditionally utilized in local cuisine as a gelling agent, attributed to its exceptionally high low-methoxyl pectin content. This study investigated the extraction of pectin from *C. pareira* leaves to optimize both yield and polymer quality. We employed a Central Composite Design (CCD) to analyze the effects of three independent variables: extraction time (9.77 - 60.23 min), temperature (26.36 - 93.64°C), and citric acid concentration (16.36 - 83.64 mM).The influence of these factors on gravimetric yield and galacturonic acid content was modeled using quadratic equations. The predictive model for pectin yield (Y_{yield}) demonstrated statistical significance ($R^2 = 0.7631$): $Y_{yield} = 3.45X_1 + 2.29X_2 + 3.21X_3 + 2.48X_1X_2 + 2.48X_1^2 - 1.76X_3^2$. The model for galacturonic acid content (Y_{gal}) showed positive factor effects ($R^2 = 0.5463$): $Y_{gal} = - 5.87X_2 - 7.00X_1X_2 + 13.22X_1^2 + 9.32X_3^2$. Both fitted models presented residuals below 2%. The optimal experimental condition (Run F7) was identified at 80 °C, 70 mM citric acid concentration, and 20 minutes. This configuration produced a yield of 16.86 $g.100^{-1}$ with a galacturonic acid content of 73.50%, indicating high purity. While pectin extracts from all experimental runs exhibited gelation in water at a 1:15 ratio at room temperature, the extract from condition F7 demonstrated superior gel strength.

Keywords: Pectin; Krung Kamoa; *Cissampelos pareira*; Central Composite Design

O - 350 From Viral Trends to Food Choices: Sustainability Awareness and Its Influence on Students' Healthy and Unhealthy TikTok Purchases

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Abstract

This study investigates the impact of TikTok on food consumption behaviors among university students, with a particular focus on the moderating role of perceived sustainability. As a visual, algorithm-driven platform, TikTok has become a prominent source of food-related content that influences students' dietary choices through viral trends, cooking tutorials, and influencer endorsements. Prior research indicates that exposure to sustainable food content on social media can enhance awareness and engagement with sustainable consumption, yet concerns remain regarding the credibility and health implications of viral food trends. This study proposes a conceptual framework in which exposure to healthy and unhealthy TikTok content influences students' attitudes toward online food purchasing, which subsequently affects their intentions to buy healthy or unhealthy food. Perceived sustainability is theorized to moderate these relationships by strengthening intentions to purchase healthy food and weakening intentions to purchase unhealthy food. A structured questionnaire was administered to 300 users to measure TikTok usage, exposure to food content, attitudes, purchase intentions, and sustainability perceptions. Using SmartPLS to validate the hypotheses, the study found that individuals' exposure to TikTok significantly shapes their food choices. The findings are expected to contribute to understanding the dual role of TikTok in influencing food consumption and highlight the importance of sustainability awareness in promoting healthier and more responsible eating behaviors among university students.

Keywords: Healthy food; Unhealthy food; TikTok; University student

O - 351 Exploring the Volatile Aroma Profile of Chrysanthemum Leaf Tea

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Abstract

Flavor is a key determinant of the quality and consumer preference of food and beverage. The chrysanthemum leaf is an agricultural waste that has the potential to produce tea. This study aimed to establish a robust and practical analytical approach for volatile aroma profiling of chrysanthemum leaf tea using headspace solid-phase microextraction (HS-SPME) coupled with gas chromatography-mass spectrometry (GC-MS). The optimal sample incubation and extraction temperature for volatile in tea prepared via filtration (filtered tea) was identified as 60 °C. This moderate temperature produced a balanced volatile aroma profile and more closely resembled the beverage as it is commonly consumed, while incubation and extraction at 80 °C resulted in a higher-yield but woody-dominated profile especially from 5,6,7,7a-tetrahydro-4,4-7a-trimethyl-2(4*H*)-benzofuranone, β-caryophyllene, and germacrene D. However, the aroma concentrations in the 60 °C treatment were relatively low compared to those in the tea leaf itself, and the tea leaf aroma did not reflect the typical sensory characteristics of the beverage. Therefore, a tea sample prepared by direct leaf steeping (loose-steeped tea) was used to enhance the analytical signal intensities. This sample preparation effectively represented the volatile aroma composition of the tea and importantly, yielded exactly the same order of top six aromas with the highest odor activity values (OAVs). It was also crucial for quantifying low-abundance aroma compounds. These findings emphasize the significant influence of both incubation and extraction temperature as well as the sample matrix on aroma composition, and they provide a practical framework for quality evaluation of chrysanthemum leaf tea.

Keywords: Chrysanthemum; Tea; Flavor; Volatile aroma compound; Headspace solid-phase microextraction (HS-SPME)

O - 353 Development of Whole Green Banana (*Musa Sapientum* Linn, ABB Group, cv. Kluai Namwa) Flour Using Spray Drying

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Abstract

Whole green banana flour (WGBF) is recognized as a promising functional food ingredient, primarily due to its substantial content of resistant starch (RS). The conventional preparation method, involving oven drying (OD) at low temperatures (50-60 °C) successfully preserves the RS content. However, the resulting flour exhibits poor solubility, which significantly restricts its versatile incorporation into a variety of food matrices. This study rigorously investigated spray drying (SD) as an innovative alternative processing technique aimed at producing WGBF with maximized RS retention and enhanced hydration characteristics. WGBF was prepared from stage-1 ripening whole green bananas (° Brix at 2–5). The optimal SD feed suspension was formulated at a banana-to-water ratio of 1:2. The SD process was executed under controlled conditions: inlet temperature 130 ± 5 °C outlet temperature 70 ± 5 °C and a fixed feed rate of 0.6 L/h, while maintaining constant atomizer disc speed, air flow rate, and pressure. The results demonstrated that SD significantly outperformed the conventional OD method, yielding WGBF with a statistically higher mean RS content (62.87 g/100 g, dry basis) compared to OD (53.56 g/100 g; $P < 0.05$). Paradoxically, un-modified SD samples exhibited lower solubility compared to the OD counterparts. The subsequent inclusion of gum arabic (10% w/w) as a carrier agent during SD markedly improved the solubility profile; however, this enhancement was accompanied by a significant reduction in RS content to 17.17 g/100 g ($P < 0.05$). These critical findings underscore the necessity for optimization of SD parameters (e.g., inlet temperature, feed rate, and carrier selection) to meticulously achieve a desirable balance between the indispensable RS retention and the requisite functional properties. Ultimately, SD presents a highly scalable and promising method for the production of WGBF for functional food applications, contingent upon further systematic refinement of the process parameters.

Keywords: Green banana flour; Resistant starch; Spray drying optimization; Hydration properties; Functional food ingredient

O - 357 Decoding Chiang Mai's Khao Soi Experience: A Google Maps Review Analysis

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Abstract

This study explored consumer insights in culinary tourism by systematically analyzing Google Map reviews of Khao Soi restaurants in Chiang Mai. The main objectives are to 1) uncover dominant discussion topics and their temporal trends and 2) generate a sentiment and emotional-keyword map reflecting how real consumers describe their dining experiences. Google Map reviews from 11 most-recommended Khao Soi restaurants in Chiang Mai based on Michelin Guide were collected (22,664 reviews in total) and preprocessed before applying unsupervised topic modeling and trend analysis to uncover recurring themes, including menu varieties, dining atmosphere, service quality, value, authenticity, and food innovation. Sentiment classification (positive, neutral, negative) and emotional-keyword mapping were further employed to link commonly used emotion words with sentiment categories and restaurant types. The identified emotional patterns in consumer experiences revealed that the reviews are predominantly positive, frequently describing the broth as rich or aromatic, noodles as tender or springy, and toppings as crispy, reflecting joy and satisfaction. Positive comments also highlight welcoming atmosphere, attentive service, reasonable value, authentic flavors, and creative variations, indicating comfort, appreciation, and delight. Neutral remarks often focus on portion size, wait time, or consistency without strong affective tone. Negative sentiments, less frequent, are associated with bland or overcooked food, slow service, or crowded seating, signaling frustration or disappointment. These findings outline the emotional landscape surrounding Khao Soi consumption and demonstrate the usefulness of review-based text analysis for understanding consumer perception within culinary tourism. Key themes and sentiment patterns surrounding Chiang Mai's Khao Soi experience based on Google Maps reviews offer practical insights for local restaurants and demonstrate the value of online reviews as a tool for understanding consumers for culinary tourism.

Keywords: Consumer Insights; Culinary Tourism; Topic Modeling; Social Media Study; Sentiment Analysis; Emotional-keyword Mapping

O - 362 Effect of Soaking Temperature on Gamma-Aminobutyric Acid (GABA) Content and Germination Rate in Ultrasonic-Assisted Germinated Brown Rice

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Abstract

Ultrasound treatment is a non-thermal and environmentally friendly technology used to assist germination. This study investigated the effect of initial soaking temperature on the gamma-aminobutyric acid (GABA) content and germination rate in two Thai brown rice cultivars (KDML 105 and Riceberry) under ultrasonic-assisted germination. Brown rice grains were soaked at different temperatures (30, 35, and 40°C) for 6 h, followed by ultrasonic pretreatment using a probe system (20 kHz, 50 W, 35°C, 5 min) and then incubated at 30°C for 36 h (88 ± 1% RH). A control treatment employed conventional soaking at room temperature (28°C) without ultrasound. The highest GABA contents were obtained at a soaking temperature of 30°C for both KDML 105 (48.62 ± 3.62 mg/100 g DW) and Riceberry (52.56 ± 2.06 mg/100 g DW) compared to their respective controls (37.11 ± 3.81 mg/100 g DW and 31.83 ± 9.02 mg/100 g DW). However, while the control groups exhibited high germination rates (68.09% for KDML 105 and 36.27% for Riceberry), the ultrasonic treatment did not significantly alter these rates (67.38% and 32.01%, respectively). These findings suggest that ultrasonic pretreatment is an effective strategy for enriching GABA in germinated brown rice without adversely affecting the germination rate, with the optimal response for both cultivars observed at a 30°C soaking temperature.

Keywords: GABA; Germination; Soaking; Ultrasound; Germinated Brown Rice

O - 364 Effect of Nata de Coco Fiber Addition on Physical, Textural, and Structural Properties of Calcium Alginate Hydrogels

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Abstract

Bacterial Cellulose (BC), commonly known as nata de coco and produced by *Acetobacter xylinum*, is a high-purity biomaterial with a unique nanofibrillar structure that makes it suitable for reinforcing composite matrices. This study investigated the effects of nata de coco fiber addition on the physical, textural, and structural properties of calcium alginate hydrogels. Hydrogels were prepared using 0.5% (w/w) sodium alginate with nata de coco fiber at 0 (control), 0.5, 1.0, 1.5, and 2.0% (w/w), and the mixtures were molded into rectangular samples (10 mm × 10 mm × 5 mm) and crosslinked with 5% (w/w) calcium lactate. Transparency (%T at 600 nm), appearance, and texture were evaluated, while scanning electron microscopy (SEM) and X-ray diffraction (XRD) were used to assess microstructure and crystallinity. Increasing fiber content progressively reduced transparency, with %T decreasing from 5.9 to 0.3%. Texture analysis revealed that the hydrogel containing 0.5% fiber exhibited the greatest penetration force (1.60 N) and toughness (5.39 N·mm). In contrast, higher fiber loadings (≥1.0%) led to reduced strength due to fiber agglomeration, consistent with SEM observations. The control hydrogel showed a brittle, collapsed network, while the composite hydrogel exhibited a denser architecture reinforced by BC nanofibers. XRD showed that the control sample was fully amorphous, whereas the composite samples presented characteristic Cellulose I diffraction peaks. Interestingly, the strongest hydrogel (0.5% fiber) displayed the lowest crystallinity (%CrI = 69.55%), whereas the weaker, fiber-overloaded formulations, exhibited higher %CrI values (up to 82%). Overall, nata de coco fiber is an effective natural filler for improving the physical stability of alginate hydrogels; however, reinforcement does not scale linearly with crystalline content. Optimal mechanical performance depends more on proper fiber dispersion than on the total amount of crystalline cellulose.

Keywords: Nata de Coco fiber; Natural filler; Calcium alginate hydrogel; Texture properties; Microstructure

O - 384 Innovative AgriTech Approaches for Value-Added Sesame Oil: Enhancing Functional Compounds through Acid-Soaking and Microwave-Assisted Methods

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Abstract

This study introduces an innovative pre-treatment approach combining acid soaking and microwave heating—applied for the first time—to enhance the value and functional quality of sesame (*Sesamum indicum* L.) oil. In pursuit of sustainable AgriTech solutions, sesame seeds were soaked in hydrochloric or citric acid solutions followed by microwave heating prior to oil extraction. This combined pre-treatment aimed to maximize the enrichment of key functional bioactive compounds. The results demonstrated significant improvements in the concentration of valuable constituents: sesamin ranged from 1365 to 6927 µg g□¹, sesamolin from 605 to 3493 µg g□¹, tocopherol from 69.31 to 282.76 µg g□¹, asarinin up to 383.52 µg g□¹, sesamol up to 49.59 µg g□¹, phytosterols from 3690 to 6201 µg g□¹, and squalene from 532 to 1628 µg g□¹ after treatment. Notably, the combination method enhanced lignan content by up to 371% and tocopherol content by up to 454%, compared to the control sesame oil. The process maintained the nutritional integrity of the oil as reflected in stable fatty acid profiles, as well as high antioxidant activity (92.94–95.08% DPPH scavenging) and preserved oxidative stability (2.13–2.90 mg malondialdehyde kg□¹ oil). The absence of adverse effects on safety and nutritional characteristics suggests its suitability for practical use. This pioneering method not only reflects a significant step forward in sustainable agricultural processing but also adds substantial value to sesame oil as a functional ingredient, supporting high-value applications in the cosmetic, pharmaceutical, and health food industries. The findings highlight the potential of converging innovative AgriTech solutions toward advancing the frontier of functional food era.

Keywords: Sesame oil; Pre-treatment; Microwave heating; Functional compounds; Value-added products

O - 387 Mitigating Mineral Oil Hydrocarbon (MOH) Contamination in Palm Oil: An Integrated Farm-to-Mill Strategy for Safe and Sustainable Food Systems

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Abstract

Mineral oil hydrocarbons (MOH), comprising mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH), have emerged as priority chemical contaminants of concern within the global edible oil industry. In crude palm oil (CPO), MOH contamination typically arises from incidental contact with technical fluids used during harvesting, transportation, and milling operations. These petrogenic compounds present potential health risks, particularly MOAH, which may contain genotoxic and carcinogenic fractions. In response, the European Union is set to implement legally binding maximum levels of 2 mg/kg for MOAH in fats and oils by 2027, under Regulation (EU) 2023/915. This regulatory development places significant pressure on the Malaysian palm oil industry, a leading global exporter to demonstrate effective control measures and safeguard access to key markets. This study presents a comprehensive farm-to-mill assessment of MOSH and MOAH contamination pathways throughout the CPO production chain in Malaysia. Samples were collected across multiple stages of the palm oil milling process and analysed in accordance with ISO 12022 (2024) using an on-line LC–GC–FID workstation. The findings identified the sterilisation and digestion stages as critical high-risk zones for MOH ingress, largely due to direct contact between CPO and machinery lubricants and hydraulic fluids. The implementation of targeted preventive measures including the transition to food-grade lubricants, strengthened equipment maintenance programmes, and engineering modifications to eliminate leakage pathways resulted in substantial reductions in contamination, with decreases of 33% for MOSH and 9% for MOAH. Integrating these interventions within established food safety management systems, such as HACCP and the MPOB Code of Good Milling Practice for Palm Oil Mills (CoPM), provides a systematic and proactive framework for MOH prevention. Overall, the results underscore the importance of upstream control and early-stage intervention over reliance on end-product testing alone, supporting the industry's capacity to consistently achieve low MOSH/MOAH levels in CPO while enhancing regulatory compliance and sustaining global competitiveness.

Keywords: Palm oil; Mineral oil hydrocarbon; Contaminant; Food safety; Milling.

O - 394 Enhancing Honey Authentication in Thailand Through Combined Isotope Analysis and Pollen Profiling

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Abstract

Honey adulteration—particularly through the addition of sugar syrups and misrepresentation of floral origin—continues to impede quality assurance in both domestic and international markets. This study assessed the effectiveness of integrating stable carbon isotope ratio analysis (SCIRA) with melissopalynology to achieve a more reliable evaluation of honey authenticity. Principal component analysis of $\delta^{13}C$ data and sugar composition further enhanced discrimination between genuine and adulterated samples. Thirty-four honey samples from beekeepers across seven provinces in Thailand, with emphasis on longan honey, were analyzed. Of these, twenty-four met the $\delta^{13}C$ criteria for authenticity, with bulk honey $\delta^{13}C$ values ranging from -28.53 ± 0.19‰ to -22.89 ± 0.08‰ and protein $\delta^{13}C$ values from -29.30 ± 0.07‰ to -22.76 ± 0.03‰. Subsequent pollen analysis removed samples of mixed or uncertain botanical origin, resulting in only eight samples—six longan and two from other floral sources—passing both monofloral and non-adulteration criteria (23.5%). The findings demonstrate that combining SCIRA with melissopalynology provides a robust framework for evaluating honey integrity.

Keywords: Honey; Stable carbon isotope ratio analysis; Melissopalynology; Thailand

O - 395 Chitosan and Coffee Skin: Synergy for High-Quality of Sustainable Edible Films for Food Packaging

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Abstract

This study investigated the impact of chitosan on the quality of edible films made from coffee husks, with a focus on their physical and mechanical properties. The selection of these films was based on the potential of coffee husks as a renewable resource and their growing interest, as well as the growing awareness of the importance of environmentally friendly products. This study aimed to identify the effect of chitosan addition on the characteristics of food films based on coffee husk extract. Chitosan was added as a reinforcing agent to improve the physical properties of the films, including factors such as color, transparency, thickness, water content, and mechanical properties such as elongation, tensile strength, Young's modulus, and absorbency. Furthermore, film surface analysis was performed using AFM (ra, rq, Sa), as well as hydrophobicity and SEM testing to obtain a more comprehensive picture of the film structure. The study design used a completely randomized design with one factor, varying chitosan concentrations (1.5%, 3.0%, 4.5%, and 6.0%), and five replications were conducted to ensure the accuracy of the results. The results showed that chitosan concentration significantly affected the physical characteristics of films produced from coffee husks. The experiment showed that a 3.0% chitosan concentration produced the best quality. This finding underscores the potential synergy between chitosan and coffee husks in creating films that are not only high-quality but also environmentally friendly, opening up opportunities for the development of innovative and sustainable food-based products.

Keywords: Edible film; Coffee skin; Chitosan; Characteristics; Waste inovation

O - 397 Salicylic Acid Alleviates Chilling Injury and Enhances Antioxidant Capacity in 'Nam Dok Mai' Mango during Cold Storage

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Abstract

Chilling injury (CI) is a major postharvest problem during prolonged low-temperature storage of mango fruit, resulting in surface pitting, uneven ripening, and deterioration of market quality. This study evaluated the effectiveness of salicylic acid (SA) treatment in reducing CI and preserving fruit quality and antioxidant capacity in 'Nam Dok Mai' mango during cold storage. Mature fruits at the commercial ripening stage were immersed in a 2 mM SA solution for 10 minutes, while untreated fruit served as controls. All fruits were stored at 10 °C and sampled at 7, 14, 21, and 28 days. Physiological and biochemical attributes, including the CI index, weight loss, color parameters (L* and hue angle), firmness, total soluble solids (TSS), titratable acidity (TA), TSS/TA ratio, total phenolic content (TPC), and antioxidant activities (DPPH and FRAP assays), were monitored throughout storage. The results showed that SA treatment significantly alleviated CI symptoms, reducing the CI index by approximately 40% compared to the control. Although SA-treated fruits exhibited slightly lower physiological weight loss, no significant differences were observed between treatments. SA application also resulted in substantially higher TPC in both peel and pulp, increasing by about 20% and 54%, respectively. These enhancements indicated that SA effectively alleviated chilling injury by promoting phenolic accumulation and antioxidant activity under low-temperature conditions. SA-treated fruits further maintained significantly greater firmness and retained higher L* and hue angle values, while exhibiting lower TSS and higher TA, contributing to a reduced TSS/TA ratio during storage. This delay in biochemical changes indicates that SA treatment effectively retards the ripening process, thereby maintaining fruit freshness and potential eating quality for a longer duration. Antioxidant activities assessed by DPPH and FRAP were consistently higher in the SA-treated group across all sampling periods. A correlation analysis revealed a strong negative relationship (R^2= 0.72) specifically between the CI index and DPPH activity in the pulp, whereas correlations with other parameters were weak. This suggests that the enhanced free radical scavenging capacity in the flesh is a critical mechanism in mitigating chilling stress. Overall, the results demonstrate that postharvest SA treatment effectively reduces chilling-induced physiological damage, maintains tissue integrity, and enhances the antioxidant defense system of mangoes during cold storage, ultimately extending their postharvest life and improving marketability.

Keywords: Antioxidant activity; Chilling injury; Mango; Salicylic acid

O - 401 Protein Enrichment of Gluten-Free Bread from Brown Rice Flour Using Sacha Inchi Powder

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Abstract

Consumers increasingly prefer bakery products, alongside a rising prevalence of gluten allergies. The objective of this study was to develop protein-enriched gluten-free bread by partially substituting brown rice flour (BRF) (*Oryza sativa*) with sacha inchi powder (SIP) (*Plukenetia volubilis*). BRF was prepared by soaking in distilled water at a 1:1 (w/w) ratio for 6 h, followed by colloid milling, coagulation, cloth filtration, tray-drying at 50 °C for 24 h, and grinding. BRF contained moisture (7.83% DM), protein (8.53% DM), fat (2.84% DM), fiber (2.65% DM), ash (0.63% DM), and carbohydrate (77.53% DM), whereas SIP contained moisture (5.67% DM), protein (50.96% DM), fat (19.92% DM), fiber (17.59% DM), ash (4.93% DM), and carbohydrate (0.92% DM). SIP exhibited distinct functional properties, including water-holding capacity (22.22%), oil-holding capacity (35.00%), swelling capacity reduction (63.20%), emulsion activity decrease (7.49%), and emulsion stability increase (16.73%). Increasing SIP levels progressively reduced final viscosity, reflecting diminished starch-thickening capacity. Bread formulations were designed as T1 (BRF 100% : SIP 0% w/w; control), followed by SIP substitution in T2 (80% : 20%), T3 (60% : 40%), T4 (20% : 80%), and T5 (0% : 100%). The doughs were prepared using a fixed baker's formulation containing yeast, water, sugar, oil, salt, psyllium husk, and milk powder. The gluten-free breads were analyzed for proximate composition, weight loss, specific volume (SV), textural properties, color values, water activity (aw), and staling behavior using X-ray diffraction (XRD) over 4 days. Weight loss ranged from 12.64% to 14.99%, SV from 2.03 to 2.80 mL/g, and protein content varied from 6.01% DM (T1) to 33.25% DM (T5). From Day 1 to Day 4, hardness (g) increased (181–493%), chewiness (g·mm) rose (108–432%), cohesiveness (–) declined (4.33–15.15%), and MC exhibited a decreasing trend, reducing from approximately 40–46% on Day 1 to 37–42% by Day 4, whereas aw slightly increased from 0.960 to 0.970. XRD analysis indicated increasing crystallinity from 18–25% to 24–34% by Day 4. Overall, SIP significantly improved the nutritional quality of gluten-free bread while maintaining acceptable physical attributes and predictable staling characteristics.

Keywords: Gluten-free bread; Protein enrichment; Sacha inchi powder; Brown rice flour; Texture and staling properties

O - 426 Enhancement of *Spirulina platensis* Biomass and Metabolite Production through Co-Culture with *Lactobacillus plantarum* and *Lactobacillus casei*

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Abstract

Spirulina platensis is a microalgae known as a rich source of bioactive metabolites; however, conventional monoculture cultivation often results in limited metabolite production. This study aimed to evaluate the effect of co-culture of lactic acid bacteria (LAB), specifically *Lactobacillus plantarum* and *Lactobacillus casei*, on increasing biomass growth and metabolite production of *S. platensis*. The experiment was conducted using a completely randomized design with seven treatments, including bacterial inoculum volume of 3, 6, and 9 mL for each LAB strain and a control, with four replications. The growth and metabolite parameters observed were optical density (OD), dry weight, protein content, and total phycocyanin. Statistical analysis showed that LAB co-culture significantly affected all observed parameters ($p < 0.05$) with spirulina without bacteria as the control. *L. plantarum* at a volume of 3 mL produced the highest optical density (0.639), protein content (31.52%), and total phycocyanin (90.98 mg/L), indicating a strong stimulatory effect on Spirulina metabolite synthesis. Meanwhile, the highest dry weight was achieved in the mixed culture of *L. casei* at a volume of 3 mL, reaching 75 mg/L, indicating superior biomass accumulation when compared to the control at an optical density (0.07), dry weight (16.25 mg/L), protein content (22.7%), and total phycocyanin (6.6 mg/L). The results showed that Spirulina had a specific growth rate of 0.203% while the *L. plantarum* co-culture had a cell density of 3.6 x 10^9 CFU/ml and L. casei 3.4 x 10^9 CFU/ml. Overall, the application of the LAB-based co-culture system significantly increased the biomass and metabolite yields of *S. platensis*. This was demonstrated by the LAB strain producing CO_2 to increase the photosynthetic rate of *S. platensis* which is required to increase the biomass and metabolite yields. This approach offers a promising and sustainable strategy to increase Spirulina productivity for nutraceutical, functional food, and biotechnology applications.

Keywords: *Spirulina platensis*; *Lactobacillus plantarum*; *Lactobacillus casei*; Biomass; Metabolite

O - 428 Impact of Different Milk Fat Levels on Caffeine, Antioxidant Capacity and Bioactive Profile of Turkish Coffee

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Abstract

Milk can be used instead of water for coffee brewing, which may alter extraction behavior and the apparent functional profile of the beverage. There is limited research on how **milk fat levels** influence Turkish coffee brewing outcomes. Therefore, this study evaluated the influence of milk fat content on the antioxidant capacity and major bioactive compounds of Turkish coffee prepared with automatic Turkish coffee machine. Turkish coffee brewed with water (control, T1), with milk containing 0.1% (T2), 1.5% (T3), 3% (T4), and 4% fat (T5). Brewed coffee antioxidant activity was determined using DPPH and ABTS radical-scavenging assays and total phenolic content (TPC) were measured. Neochlorogenic acid, chlorogenic acid, caffeine, and three dicaffeoylquinic acids were monitored as marker phytochemicals. Results were expressed in percentage relative to T1. Turkish coffee samples with milk showed decrease in radical-scavenging activity (DPPH: 19.6–31.1%; ABTS: 27.6–30.5%). TPC exhibited a non-linear change where high reductions at 0.1–1.5% fat (21.5–23.0%) but smaller decreases at 3–4% fat (6.9% and 2.7% respectively) determined. Marker compounds declined with milk fat, including neochlorogenic acid (6.5–13.0%), chlorogenic acid (10.4–16.9%), and caffeine (5.4–13.0%), while dicaffeoylquinic acids showed the greatest decrease (50%), two isomers reduction was found at 25% in Turkish coffee with 1.5% fat milk. Overall, brewing Turkish coffee with milk significantly altered antioxidant readouts and phenolic marker levels, consistent with matrix effects in which milk components (particularly proteins and fat) influence phenolic extractability and assay accessibility. These findings highlight effect of milk fat level as a formulation variable for coffee brewing techniques like Turkish coffee, and future work should link the effect of changes in sensory acceptability and gastrointestinal bioavailability.

Keywords: Milk fat; Turkish coffee; Caffeine; Total phenolic content; Antioxidant activity

O - 429 Determination of the Sensory and Physical Properties of Buckwheat, Einkorn and Quinoa Added Simit (Turkish Bagel)

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Abstract

Simit is predominantly produced from refined wheat flour, which limits its dietary fibre and mineral content; therefore, reformulation using ancient grains and pseudocereals may enhance its nutritional profile and functional value. This study aims to develop simit with improved nutritional value and acceptable sensory properties by partially replacing wheat flour with einkorn, buckwheat and quinoa flours. Simit samples containing buckwheat (10%, 30%, 40%), einkorn (10%, 25%, 40%) and quinoa (10%, 15%, 25%), as well as a control sample containing 100% wheat flour, were produced. Sensory and texture analyses were performed. Eighty semi-trained panellists evaluated colour, odour, taste, texture and overall liking using a 7-point Likert scale. Caloric values were calculated from nutritional composition, and volume and density were measured. The control simit received the highest sensory scores for colour (5.59 ± 1.03), odour (5.41 ± 1.03), taste (5.31 ± 1.11), texture (4.25 ± 1.21) and overall liking (5.28 ± 1.18). The simit containing 10% einkorn flour showed similar sensory scores, and its overall liking (5.08 ± 1.10) did not differ significantly from the control. Simit with 10% quinoa also showed acceptable overall liking (4.66 ± 1.29). The least liked sample was the simit containing 25% quinoa, with low scores for colour, odour, taste, texture and overall liking (2.81 ± 1.71). The simit containing 40% buckwheat had the lowest texture liking score (2.78 ± 1.21). Instrumental texture analysis showed that hardness increased from 5.17 ± 1.45 N in the control to 14.89 ± 3.03 N in 40% buckwheat and 15.39 ± 2.32 N in 25% quinoa, while cohesiveness decreased from 0.33 ± 0.09 to 0.16 ± 0.08 at 40% buckwheat and springiness also declined. All formulations had similar energy content (578.01–599.03 kcal), while several samples, particularly 40% buckwheat, showed higher dietary fibre content (9.70 ± 1.49 g) compared to the control (6.21 ± 1.06 g). Overall, simit with 10% einkorn and 10% quinoa offered improved nutritional value with overall liking comparable to the control, supporting their promotion as healthier alternatives while preserving this traditional product for future generations.

Keywords: Simit; Buckwheat; Einkorn; Quinoa; Sensory analysis

O - 435 Mapping and Utilization of Sugarcane Bagasse for Sustainable Bioenergy and Bioproduct Pathways in East Java, Indonesia

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Abstract

Sustainable valorization of sugarcane bagasse requires both reliable regional supply data and engineered conversion routes that generate bioproducts. This study aimed to (i) estimate the volume of unused bagasse in East Java, Indonesia, (ii) assess its suitability as a supplement in mushroom baglog production, and (iii) develop activated micro-biochar from bagasse. Accordingly, the work integrated three complementary components: a regional survey of 27 sugar mills to quantify unused bagasse availability; a factorial randomized block experiment evaluating baglog formulations using bagasse:sawdust ratios (30:70 to 70:30) and biochar additions (0–5%); and micro-biochar production via pyrolysis (400–600°C) followed by H□SO□ activation (1–5 M). The survey estimated a theoretical unused bagasse generation of 1,480,684 t·y□¹. The baglog experiment showed that formulation factors significantly influenced mushroom growth and yield, with the best performance achieved at 4% biochar and a 30:70 bagasse:sawdust ratio. Activated micro-biochar produced at 600°C with 5 M H□SO□ met three of six Indonesian National Standard (SNI 06-3730-1995) criteria, indicating promising adsorbent potential but room for further optimization. Overall, the integrated evidence supports an engineered bagasse valorization platform linking supply mapping, food bioproduct cultivation, and adsorbent development. Future work will extend the platform toward bio-pellet development and comprehensive performance evaluation.

Keywords: Activated Biochar; Baglog; Bioenergy; Sugarcane Bagasse; Waste Valorization

O - 440 Effect of Soybean Cultivars on the Physicochemical, Textural, Rheological, and Microstructural Properties of Soy Yogurt

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Abstract

Soybean cultivar plays a critical role in determining the quality attributes of soy yogurt. This study compared six soybean cultivars with different nutritional compositions to evaluate their effects on the physicochemical, textural, rheological, and microstructural properties of soy yogurt. Proximate composition analysis revealed marked differences among cultivars, with protein contents ranging from 33–38 %, lipid contents from 9.1–17 %, and carbohydrate contents from 31.7–38.5 %, which not only influenced acidification behavior and water-holding capacity but also contributed to differences in microstructural organization and rheological responses. Texture profile analysis demonstrated clear cultivar-dependent differences in hardness (0.38–0.98 N) and stickiness (0.08–0.16 N), while rheological measurements revealed pronounced variations in gelation behavior and viscoelastic responses. Confocal Laser Scanning Microscopy provided direct evidence of cultivar-dependent protein network organization, explaining the observed macroscopic textural and rheological differences. Overall, these findings demonstrate that compositional differences among soybean cultivars lead to distinct structure–function relationships in soy yogurt, emphasizing that cultivar selection should be aligned with specific product quality targets rather than the identification of a universally optimal cultivar for plant-based fermented products.

Keywords: Soybean cultivars; Soy yogurt; Rheology; Microstructure

O - 441 Change in Microbiological and Biochemical Properties of Jincao Grass During Ensiling by the Lactic Acid Bacterial Co-cultures: *Lactiplantibacillus plantarum* KUB-SP1-3 and *Pediococcus acedilactici* KUB-M6

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Abstract

This study aimed to increase the economic value of Juncao grass (Giant Napier Hybrid), a new economic plant and a high-potential animal feed, via the ensiling process using lactic acid bacterial (LAB) co-cultures: *Lactiplantibacillus plantarum* KUB-SP1-3 and *Pediococcus acidilactici* KUB-M6. Laboratory-scale ensiling (50 g each) was performed to investigate the optimal moisture content of the substrate, including 30%, 50%, and 80%, under 30 ºC for a 21-day ensiling period. Microbiological and biochemical properties were observed, comparing the starter (at 5.000 logCFU/g, initial concentration) and without starter (negative control) inoculants. The results showed that pH values decreased in the range of 3.38–4.46 in both treatments. The LAB count at 50% moisture content was significantly higher in the starter (7.760 logCFU/g) compared with the control (6.510 logCFU/g) at 21 days, while the other moisture contents showed no significant differences ($p < 0.05$). The yeast and mold count was undetectable since 7-day ensiling in both treatments. The spoilage bacterial count at 50% moisture content was not detected at 1, 3, 14, and 21 days of ensiling, whereas the control maintained levels around 5.00 logCFU/g at all ensiling days. Lactic acid content was significantly higher in the starter (3.28% and 4.09% dry matter (DM) for 30% and 50% moisture, respectively) than the control (2.27% DM and 2.84% DM) after 21 days of ensiling ($p < 0.05$). Acetic acid content was significantly lower in the starter (0.50% DM) than the control (0.90% DM) at 30% moisture content ($p < 0.05$), while the other moisture contents had no significant differences ($p > 0.05$). Notably, no butyric acid was detected in either treatment. These results suggest the importance of silage ensiled by LAB starters and define an optimal condition for ensiling in a further field-scale study.

Keywords: Jincao; Silage; Lactic acid bacteria; Animal feed

O - 507 Association Between Maternal Exposure to Fine Particulate Matter (PM2.5) During Pregnancy and Birth length in Offspring: A Retrospective Study in Chiang Mai, Northern Thailand.

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Abstract

Fine particulate matter with a diameter less than 2.5 micrometers (PM2.5) is a major global public health concern. Growing evidence suggests that prenatal exposure and adverse birth outcomes, including reduced birth length, which may increase the risk of childhood stunting. Birth length is a key indicator of fetal growth and a predictor of long-term child development and health outcomes. This study aimed to investigate the association between maternal exposure to PM2.5 during pregnancy and birth length in offspring in Chiang Mai, Northern Thailand. This retrospective study analyzed 2,131 pregnant women residing in Chiang Mai, Northern Thailand, between 2022 and 2025. PM2.5 concentration data were collected from two air quality monitoring stations operated by the Pollution Control Department (PCD) of Thailand. Maternal exposure was estimated for the whole pregnancy and for each trimester and categorized as high exposure (>37.5 µg/m³/day) or low exposure (≤37.5 µg/m³/day). Linear regression models, adjusted with maternal height, nationality, gestational age, parity, infant sex and mode of delivery were employed to assess the association between PM2.5 exposure and birth length. The mean birth length was 48.4 ± 2.7 cm. Higher maternal PM2.5 exposure during the entire pregnancy was associated with shorter birth length compared with low exposure (β = −0.017 cm; 95% CI: −0.27 to 0.23), although this association did not reach statistical significance (p = 0.895). In trimester-specific analyses, high exposure during the first trimester was significantly associated with a 0.26 cm reduction in birth length (β = −0.26 cm; 95% CI: −0.50 to −0.022; p = 0.032). These findings suggest that higher maternal PM2.5 exposure may reduce birth length, with the first trimester emerging as a particularly vulnerable window for fetal growth. Further research with larger sample sizes, more detailed control of confounders, and longitudinal follow-up is warranted to clarify the impact of prenatal PM2.5 exposure on birth outcomes and early childhood growth in Northern Thailand.

Keywords: Air pollution; PM2.5; Offspring; Birth length.

Abstracts of Poster Presentation

P - 183 Determination of Bioactive Compounds and Antioxidant Activities from Bitter Melon (*Momordica charantia* L.) Fruit Extracts Using Ultrasound-Assisted Extraction

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Abstract

Bitter melon fruit (*Momordica charantia* L.) contains phenolic and flavonoid compounds with strong antioxidant properties. Efficient extraction of these bioactives is essential, and ultrasound-assisted extraction (UAE) is a promising green alternative to conventional maceration. Dried bitter melon fruit was extracted using ultrasound-assisted extraction (UAE) under a 3^2 factorial design varying amplitude (20, 40 and 60%) and extraction time (10, 20 and 30 min) at a constant power of 500 W, with maceration in 75% ethanol used as a control for comparison. The results indicated that the suitable UAE condition was 60% amplitude for 30 min, which provided the highest total phenolic content, total flavonoid content, and antioxidant reducing power with FRAP values of 11.939 ± 1.037 mg GAE/g, 112.997 ± 1.110 mg QE/g, and 16.462 ± 1.422 mg TE/g, respectively. Although the lowest IC□□ values for radical scavenging were observed under different conditions, with 0.194 ± 0.015 mg/g for DPPH at 20% amplitude for 10 min and 0.303 ± 0.011 mg/g for ABTS at 60% amplitude for 20 min. Correlation analysis showed that phenolic and flavonoid contents were positively associated with FRAP, whereas DPPH correlated negatively with phenolic compounds. Principal component analysis (PCA) explained 69.073% of the total variance, with PC1 accounting for 51.389% and PC2 for 17.684%. PCA plots confirmed that extraction conditions strongly influenced clustering patterns, where higher phenolic and flavonoid levels were closely related to stronger antioxidant activities. Furthermore, when compared with the conventional maceration method as a control, UAE significantly enhanced the extraction yield, bioactive compound contents, and antioxidant activities of bitter melon, highlighting its potential for application in functional foods, dietary supplements, and natural antioxidant products for food and wellness.

Keywords: Bitter melon fruit; Ultrasound-assisted extraction (UAE); Bioactive compounds; Antioxidant activities

P - 184 Pasting Properties, Antioxidant Activities, Anthocyanins of Indigenous Pigmented Rice Flours and Their Correlation using Principal Component Analysis

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Abstract

In Thailand, indigenous pigmented rice varieties are traditionally cultivated in upland and northern regions, characterized by higher concentrations of anthocyanins, which contribute to antioxidants. This study aimed to evaluate the functional properties and antioxidant activities of indigenous pigmented rice flours. Five Indigenous pigmented rice varieties from Thailand (Khao kum chao Morchor107:KCM, Khao kum chao Tubtim Chumphae:KCT, Khao kum chao Hommali Dang:KCH, Khao khum niao Doisaket:KND, and Khao khum niao Royal Project:KNR) were grinded into rice flour. Pasting Properties, antioxidant activities, and anthocyanin content revealed significant differences among rice varieties. Pasting Properties with KCM exhibiting the highest peak viscosity (5,076.67 ± 90.52 cP). KNR displayed shorter peak times (~4.1 min) than non-sticky types (~5.2 min), reflecting faster pasting behavior. KNR exhibited the strongest radical scavenging ability with the lowest IC□□ for DPPH (0.774 ± 0.283 mg/mL). Anthocyanin profiling revealed substantial variation. KCM contained cyanidin-3-glucoside (8.32 ± 1.83 mg/L) and peonidin-3-glucoside (738.23 ± 62.03 mg/L) at levels higher than other varieties, whereas KNR exhibited exceptionally high concentrations of both anthocyanins (C-3-G: 128.80 ± 7.16 mg/L; P-3-G: 11,431.65 ± 635.94 mg/L), greatly surpassing all other samples. The principal component analysis (PCA) revealed distinct differences among the rice samples based on their antioxidant activities. The PCA biplot explained identified two principal components that together explained 88.18% of total variance. PC1 (45.64%) was strongly associated with anthocyanins and sticky rice, while PC2 (42.53%) correlated with antioxidant parameters and non-sticky varieties. Correlation analysis showed that final viscosity, setback, and pasting viscosity were strongly associated, while Peak Viscosity was negatively related to these traits, reflecting variation in paste stability and retrogradation among varieties. Antioxidant data revealed a strong correlation between IC□□ values of DPPH and ABTS, which were moderately linked to C-3-G and P-3-G levels, whereas FRAP showed weak negative relationships, indicating an independent reducing-power mechanism. These findings highlighted that functional properties and antioxidant activities of indigenous pigmented rice flours, enhancing their potential for development into functional foods and nutraceutical products.

Keywords: Indigenous pigmented rice; Pasting properties; Antioxidant activities; Anthocyanins; Principal component analysis

P - 185 Sustainable Valorization of Pectin from Guava Pulp using Ultrasound-Assisted Extraction

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Abstract

Fruit and vegetable processing generates significant by-products, which are often discarded or degraded despite their potential bioactivity. Guava pulp (*Psidium guajava* L.) is rich in pectin, a soluble dietary fiber widely used in the food industry and possessing health-promoting properties. This study investigated the extraction of pectin from guava pulp using ultrasound-assisted extraction (UAE), considering different ultrasound amplitudes (20, 30, and 40%) and durations (10, 20, and 30 min). The commercial pectin was also analyzed for physicochemical properties compared to extracted pectin. The extraction was significantly affected by both parameters (amplitude and time). It was found that at 40% amplitude and 10 min duration, the highest yield (6.51 ± 0.84%) was obtained. The obtained pectin showed an esterification value of 85.10 ± 1.72, a methoxyl content of 14.54 ± 0.28, and a galacturonic acid content of 28.29 ± 0.07%, indicating that it was of high purity and suitable for use as a concentrate in beverage products. Principal component analysis (PCA) revealed that the first two components (PC1 and PC2) explained 81.0% of the total variation. The extraction condition at 40% amplitude and 10 min time explained 55.99% of the PC1 axis, indicating that the response values in this condition were close together and positively related, namely total dietary fiber (TDF), water holding capacity (WHC), methoxyl content (MeO), esterification value (DE), insoluble dietary fiber (IDF). Furthermore, the pectin extraction condition at 40% amplitude and 10 min time could also explain 25.04% of the PC2 axis, which results indicated that the response values in this condition were close together and positively related along the axis, namely Soluble Dietary Fiber (SDF) and Galacturonic Acid Content (GA). Notably, extraction at 40% amplitude for 10 min was strongly associated with water holding capacity (WHC), TDF, SDF, IDF, DE, and MeO, indicating that these functional properties were directly influenced by the extraction conditions. The results of this study demonstrate that UAE is a sustainable and efficient approach for valorizing guava by-products, as it improves both yield and quality while supporting waste reduction and resource sustainability in the food industry.

Keywords: Guava pulp by-products; Ultrasound-assisted extraction; Pectin; Sustainability; Valorization

P - 189 Enhancing Chrysin Stability through Co-Encapsulation with Quercetin in Nanoemulsions: Physicochemical Characteristics and Rheology

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Abstract

Chrysin, a natural flavonoid found primarily in honey and propolis, and quercetin are flavonoids with recognized antioxidant and health-promoting benefits, yet their poor aqueous solubility restricts their incorporation into functional food and nutraceutical systems. This study aimed to improve and characterize chrysin-loaded nanoemulsions and the co-encapsulation of chrysin with quercetin in an oil-in-water (o/w) nanoemulsion system, utilizing synthetic emulsifiers such as Tween 20 and Span 60. Quercetin was selected for co-encapsulation due to its complementary antioxidant properties and its reported ability to improve protection against oxidative degradation, suggesting potential synergistic stabilization when co-delivered with chrysin. The physicochemical and rheological properties of the nanoemulsions were systematically examined. Span 60-stabilized nanoemulsions exhibited smaller particle sizes and higher viscosity, reflected by increased yield stress (σ□) and consistency coefficient (K) values, along with reduced flow behavior index (n) values, compared to those stabilized with Tween 20. All nanoemulsions remained stable without visible creaming during 15 days of storage at room temperature. Co-encapsulation significantly improved viscosity, dynamic viscoelastic properties, nanoemulsion stability, and chrysin encapsulation efficiency (72.22% and 65.03% for Span 60 and Tween 20, respectively). However, encapsulation efficiency declined during storage, consistent with increases in total color change (ΔE). Overall, the findings suggest that co-encapsulation using Span 60-based nanoemulsions offers a promising strategy for developing stable delivery systems for lipophilic bioactives, advancing functional food and nutraceutical applications.

Keywords: Co-encapsulation; Nanoemulsion; Chrysin; Quercetin; Rheology

P - 190 Analysis of Physicochemical Properties and Functional Properties of Six Banana (*Musa* sp.) Varieties and their Application as Ingredient for Energy Gel

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Abstract

Banana (*Musa* sp.) is a widely cultivated tropical fruit valued for its nutritional richness and functional potential, but its high perishability limits its applications. Converting bananas into flour extends their shelf life and makes it a versatile ingredient for developing functional foods. Beyond its role as a gluten-free flour substitute, banana flour shows promise in innovative applications such as energy gels. This study analyzed physicochemical and functional properties of flours from six Thai banana varieties: Kluai Khai (KK), Kluai Hak Muk (HM), Kluai Leb Mue Nang (LMN), Kluai Hin (KH), Kluai Hom Thong (HT), and Kluai Nam Wa (NW). The study showed that except the ash content, all measured properties were significant (p <0.05) different between varieties. The moisture content of the flours was ranged from 5.4–7.4%, protein 2.12–5.58%, fat 0.09–0.41%, crude fiber 1.27–4.38%, and total carbohydrates 74.82–85.94%. Functional properties varied, with water absorption capacity of 1.00–1.75 g/g, water solubility index of 0.20–0.40 g/g and swelling power of 6.89–9.40 g/g. GI also ranged from 55.01–59.59, glucose digested from 2752.67–3572.33 mg/g, and resistant starch (RS) content from 6.62–31.06%. The Principal Component Analysis (PCA) showed 66.28% of total variance, exhibited high correlation between KK with the protein content, and the HM with the RS and GI value (42.53% of PC1). Sensory evaluation on the prototype energy gel that consisted of KK (45%), HM (45%), maltodextrin (9%) gellan gum (0.7%), and xanthan gum (0.3%) mixed and heated using double boiler with controlled temperature (65 °C) and hot-filled into a foil pouch revealed the necessity to increase the sweetness and mouthfeel from the appropriateness of sensory attributes level using Just-About-Right (JAR) analysis, altogether with the preference rating score in range of like slightly to like moderately (6.4–7.2). Significant variations among varieties indicate that varieties and chemical composition affect flour nutritional value, functionality and digestibility. The findings from this study suggested that KK and HM flours can be used as ingredients for energy gel and demonstrated potentials as carbohydrate sources which capable of conveying and sustained energy release for endurance sports and training.

Keywords: Banana flour; Nutritional properties; Glycemic index; Resistant starch; Energy gel

P - 191 Phytochemical Composition, Phenolic Profiling, and Bioactive Activities from Ethanolic Extraction of Different Parts of Mulberry (*Morus alba* L.)

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Abstract

The mulberry (*Morus alba* L.) belongs to the Moraceae family and is cultivated in many Asian countries, including Thailand. There are many uses for all parts of the mulberry plant, which are used in various fields, including food, cosmetics and folk medicine. This study was done to investigate the phytochemical properties, including phenolic compound profiling, quantification of the resveratrol content, and measurement on the SIRT1 activity, of ethanolic extract (60–80%) using three different parts of mulberry plant: fruit, leaf, and branch. It was found that mulberry leaves possessed the highest total phenolic content (45.29±1.66 mg GAE/mL DW) and total flavonoid content (34.84±2.20 mg CE/mL DW), while the branch exhibited the highest resveratrol content (12.06±2.23 µg/mL DW). The extract of mulberry branch also showed the highest SIRT1 activity (274.42±12.30%) compared to other treatments. Regarding the fruit, it contained the highest caffeic acid (2,062.55±10.35 µg/mL DW), epicatechin (172.01±1.36 µg/mL DW), *p*-coumaric acid (243.12±0.72 µg/mL DW), and myricetin (13,260.99±65.84 µg/mL DW). The Principal Component Analysis (PCA) on the phytochemical properties and phenolic compounds showed total variance of 78.64% and 68.48%, respectively. The PCA showed that mulberry branch extracted with 60% of ethanol (MB 60) exhibited high correlation between with the TPC, DPPH, resveratrol, and SIRT1 activity, along with some phenolic compounds (quercetin, catechin, and rutin). In conclusion, different parts of the mulberry plant extracted under different concentrations of ethanol showed different properties, with the MB 60 was shown to possessed high correlation with the phytochemical properties and phenolic composition. The results suggested that the mulberry plant, especially its branch extracted using 60% of ethanol, can be considered as a valuable source of bioactive compounds for food, nutraceutical, and health applications.

Keywords: Mulberry; Ethanolic extraction; Phenolic compound; Resveratrol; SIRT1

P - 195

Encapsulation of Curcumin Using Various Forms of Rice Flour in Calcium Alginate Beads

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Abstract

Curcumin (C) is an active compound in turmeric with antibacterial, anti-inflammatory, and antioxidant properties. However, it has limitations in stability. This study investigated the effects of different forms of rice flour, namely native flour (N), swelled flour (S), and porous flour (P), in encapsulating curcumin in the form of calcium alginate beads. The swelled flour was prepared by hot ethanol treatment, and the porous flour was produced by enzymatic hydrolysis. Flour characterization revealed that porous flour had the lowest yield (66.91%) compared to swelled flour (92.61%), which corresponded to its distinct porous structure. Porous flour exhibited the highest swelling capacity at 95°C and high solubility at elevated temperatures but had significantly lower peak viscosity, breakdown, final viscosity, and setback than other flours. When different forms of flour were used to encapsulate curcumin into beads (NCB: native flour-curcumin bead, SCB: swelled flour-curcumin bead, PCB: porous flour-curcumin bead), the resulting beads had yields ranging from 83.02% to 85.14%. The fresh beads measured 4.26–4.47 mm in diameter, with SCB being the largest, while the dried beads measured 3.30–4.19 mm. The encapsulation efficiency (%EE) of the different flour forms ranged from 52.72% to 59.10%, with PCB exhibiting the highest %EE. Texture analysis showed that all cooked beads had higher hardness than fresh beads. In addition, water absorption analysis at different temperatures indicated that PCB had the highest water-holding capacity. Moreover, stability tests under light exposure showed that curcumin content decreased over storage time. After 21 days in dark conditions, all bead samples retained similar curcumin levels. However, under light exposure, SCB and PCB retained significantly more curcumin than NCB. These findings suggest that encapsulating curcumin in rice flour-based calcium alginate beads is a promising strategy for protecting light-sensitive bioactive compounds and could be applied in food product innovation.

Keywords: Starch modification; Encapsulation; Curcumin; Porous starch; Alginate bead

P - 199 Effects of Plant-Derived Salts from *Caulerpa lentillifera* and *Suaeda maritima* on Blood Pressure in L-NAME–Induced Hypertensive Rats

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Abstract

Salt plays an essential role in maintaining vital physiological functions, including proper nerve and muscle activity and blood pressure regulation. However, excessive salt intake is a major risk factor for hypertension. *Caulerpa lentillifera* and *Suaeda maritima* salts are plant-derived salts obtained through water extraction and drying. These salts contain lower NaCl levels and higher concentrations of other minerals and exhibit greater antioxidant activity compared to conventional table salt. Despite these promising characteristics, their effects on hypertension have not been investigated. This study aimed to evaluate the effects of CL and SM salts on blood pressure in rats. Male Wistar rats were randomly assigned to five groups (n = 7): (1) Control and (2) LN groups, fed a normal diet containing 1% NaCl; (3) RS group, fed a reagent salt diet containing 8% NaCl; (4) CL group, fed a *Caulerpa lentillifera* salt diet containing 8% NaCl; and (5) CLSM group, fed a diet containing a combination of *Caulerpa lentillifera* and *Suaeda maritima* salts (8% NaCl). All groups except the Control received daily intraperitoneal injections of Nω-Nitro-L-arginine methyl ester hydrochloride (L-NAME; 3 mg/kg body weight) and fed high salt diet for eight weeks. Results showed that L-NAME treatment significantly increased systolic blood pressure (SBP) compared to the Control group ($p < 0.05$). The rats in the CS and CLSM groups exhibited lower SBP compared to the RS group. High-salt diet groups showed significantly increased organ indices (kidney, heart, and lung) relative to Control and LN groups. No significant differences in angiotensin-converting enzyme (ACE) activity were observed among treatment groups, although rats receiving CL or CL+SM salt diets showed a slight decreasing trend compared to the RS group. These findings suggest that plant-derived salts, which are rich in minerals and antioxidants, may help modulate blood pressure compared to conventional salt. This highlights their potential as healthier salt alternatives.

Keywords: *Caulerpa lentillifera*; *Suaeda maritima*; Plant-derived salts; Hypertension; L-name.

P - 201 Good Manufacturing Practices of Chili Paste Producing Community Enterprises in Songkhla, Thailand: Major Defect Criteria Outlook

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Abstract

Community-based enterprises (CBEs) are regarded as a means to mitigate the material poverty of the rural population through their economic development process. The venture aims to leverage local natural resources, cultural assets, and social strengths to enhance community living conditions. Products of a CBE, including food products, are mainly derived from the use of its local assets. In Songkhla province, rural residents effectively utilize chili paste production for both internal consumption and sale. The quality and safety of food products are crucial elements for the success and the sustainability of the business. From a food safety perspective, products of CBE are obliged to comply with the Good Manufacturing Practices (GMP) standard. These rural business entities are still lacking in essential features for business success, including technological capabilities, food quality and safety management, and business knowledge. This study aims, therefore, to elucidate the weaknesses and opportunities for food safety development in accordance with the GMP standard. A convenient sampling was conducted. Thirty-eight chili paste-producing CBEs, located across Songkhla province, participated voluntarily. Socio-economic data was collected through face-to-face interviews with the group leader and key group committees, utilizing a semi-structured questionnaire. A site visit observation was performed at each facility, using the GMP checklist form issued by the Food and Drug Administration of Thailand. The results indicate that among the seven major defect criteria, three criteria were not met by half of the studied CBEs. The major defect criteria for which about half of CBEs received a need improvement level were measures to manage the packaging area to prevent recontamination (44.7%), regular control over the process to reduce and eliminate microbial hazards (60.5%), and provision of annual product quality analysis results (52.6%). Areas for improvement to align with food safety standards were discussed. Strengthening GMP standards not only enhances consumer trust in food safety but also promotes sustainable economic growth and competitiveness in rural communities.

Keywords: Chili paste producer; Community-based enterprises; Good Manufacturing Practices; Local food safety; Major defect criteria

P - 204 Preparation and Characterization of Mulberry Leaf (*Morus alba* Linn.) Hydrogel Microparticles via Extrusion Microencapsulation

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Abstract

This study optimized the preparation of mulberry leaf (*Morus alba* L.) hydrogel microparticles produced by extrusion microencapsulation and characterized their stability and bioactive functionality for food applications. Sodium alginate solutions (1–3% w/v) were combined with varying levels of mulberry leaf powder and cross-linked with 10% (w/v) calcium chloride using a BUCHI B-390 encapsulator, and the resulting beads were evaluated for morphology, size uniformity, and structural integrity under pasteurization-like thermal stress (75 °C/10 min), gastric-mimicking acidity (pH 1.8), and swelling in distilled water. The optimal formulation—3.0% (w/v) alginate with 1.0% (w/v) mulberry leaf—yielded spherical, uniform microparticles that maintained integrity across temperature, pH, and swelling challenges. In parallel, the beads exhibited a total phenolic content of 0.72 ± 0.25 mg GAE/100 g and strong antioxidant activity as determined by FRAP (6.44 ± 0.58 µmol TE/100 g), DPPH (1.60 ± 0.16 µmol TE/100 g), and ORAC (37.14 ± 6.23 µmol TE/100 g) assays, a measurable 1-deoxynojirimycin (DNJ) content of 0.86 ± 0.02 µg/g. Furthermore, the α-glucosidase inhibitory activity of the beads reached 28.29 ± 2.75% at an extract concentration of 250 mg/mL, consistent with the proposed mechanism of moderating postprandial glycemia. The small and uniform particle size supports incorporation into yogurt and functional beverages, indicating an effective and scalable approach to stabilize and deliver mulberry leaf bioactives in food matrices.

Keywords: Mulberry Leaf; Hydrogel Beads; Microencapsulation; Stability; Deoxynojirimycin

P - 205 Accelerated Shelf-Life Evaluation of a Tuna Bone–Calcium Fortified Mixed-Berry Beverage in Retort Pouches

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Abstract

Calcium-fortified beverages can undergo quality deterioration during storage due to potential interactions between calcium and beverage components, which may affect stability, flavor, or appearance. Therefore, this study aimed to estimate the shelf life of a mixed-berry beverage enriched with calcium extracted from tuna bone and packaged in a flexible retort pouch. The shelf life was determined by combining accelerated storage tests (35 and 45 °C for 12 weeks) with $Q_{1\ 0}$ -based modeling. At two-week intervals, CIELAB color (L*, a*, b*) was measured to compute the total color difference (ΔE*) (designated as the critical quality attribute) alongside viscosity, total soluble solids (TSS), pH, and confirmatory sensory and microbiological assessments. Increasing storage time and temperature raised ΔE*, indicating progressive darkening. The ΔE* values ranged from 1.0 to 7.5 at 35 °C and 4.8 to 34.7 at 45 °C over 12 weeks of storage. Viscosity decreased more at 45 °C (from 0.0858 to 0.0653 Pa·s) than at 35 °C (from 0.0858 to 0.0709 Pa·s), consistent with reduced physical stability at elevated temperature. In contrast, TSS remained essentially constant (13.83–14.50 °Brix), while pH declined slightly from 4.74 to 4.72 at 35 °C and 4.74 to 4.64 at 45 °C. Using ΔE* as the endpoint in the $Q_{1\ 0}$ model, the beverage's shelf life was predicted to be approximately eight months at 25 °C. Sensory quality remained acceptable throughout storage (overall acceptance score > 6.0) and microbiological criteria complied with Ministry of Public Health standards, supporting the feasibility of tuna-bone calcium fortification in a retorted mixed-berry beverage.

Keywords: Mixed-Berry; Tuna Bone; Retort Pouch; Shelf Life

P - 206 Authentication of Organic Vegetables by Black Peanut Skin-Derived Carbon Dot

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Abstract

Organic vegetable authentication is a crucial food safety issue. Because pesticide use is prohibited during organic vegetable cultivation, the presence of pesticides is usually the primary target for the authentication test of organic vegetables. Peanut skin is the byproduct of the processing of peanut snacks. Concerning sustainable waste utilization and the richness of phenolics, black peanut skin was used to prepare carbon dots, a fluorescent probe for detecting pesticides in vegetables. Results showed that black peanut skin-derived carbon dots (BPS-CD) exhibited a quantum yield of around 6.75%, and the BPS-CD methanol solution displayed three fluorescence centers at excitation (ex)/emission (em) wavelengths of 345/410 nm, 280/315 nm, and 240/405 nm. Chlorpyrifos is widely used in vegetable cultivation due to good insecticidal effect and low price, so it was chosen as the target for organic vegetable authentication in this study. According to the pesticide detecting test, BPS-CD showed great reactivity in chlorpyrifos detection as evidenced by the change in fluorescence intensity at ex 280 nm/em 315 nm and ex 240 nm/em 405 nm in response to chlorpyrifos intervention. The functions of the fluorescence intensity of BPS-CD at ex 280 nm/em 315 nm and ex 240 nm/em 405 nm, respectively, and the chlorpyrifos concentration (0－1000 μM) were $Y = -1.0348 + 0.01766X$ (R^2 = 0.901) and $Y = 0.81582 + 0.00431X$ (R^2 = 0.988). The recovery for chlorpyrifos determination in the cabbage by BPS-CD was 83.8% (ex 280 nm/em 315 nm) and 103.2% (ex 240 nm/em 405 nm), suggesting that BPS-CD can be used to detect the pesticide in vegetables, which can be applied for organic vegetable authentication.

Keywords: Organic vegetable; Pesticide; Authentication; Black peanut skin; Carbon dot

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Safety Testing and Gastroprotective Efficacy of the *Anisomeles indica* Extract

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Abstract

Anisomeles indica is a commonly used Chinese herbal remedy in Taiwan and Asia, often used for fever relief, wind-clearing, dehumidification, and pain relief. Studies have also demonstrated gastric mucosal protective effects, attributed to its active compound, acteoside. The preparation showed good water solubility, with acteoside quantified at 55 μg per 2,000 mg of *Anisomeles indica* extract powder. However, these claims are limited to traditional uses, and the current scientific evidence is relatively weak. We conducted genotoxicity tests on *Anisomeles indica* extract powder, including the Ames test, chromosomal aberration test, micronucleus test, a 28-day repeated oral toxicity test, and a gastrointestinal mucosal protective efficacy test. We also used immunochemical staining on gastric mucosal tissue sections to detect proteins associated with inflammatory pathways, confirming the protective pathways in the gastric mucosa. The results showed that the *Anisomeles indica* extract powder was negative in all three genotoxicity tests. A repeated 28-day oral toxicity study in rats showed no toxic effects from the nematode extract powder, with a No-Observed-Adverse-Effect Level (NOAEL) of 8,000 mg/kg/day. In a gastrointestinal mucosal protective efficacy study, *Anisomeles indica* extract powder administered for 28 days demonstrated protective effects against alcohol-induced gastric ulcers. The protective pathways involved NF-kB and MAPK. This study demonstrates that *Anisomeles indica* extract powder meets the Taiwan Food and Drug Administration's testing guidelines and is safe and effective in protecting the gastrointestinal mucosa.

Keywords: Safety Testing; Gastroprotective; *Anisomeles indica*; NOAEL

P - 208 The Properties of *Ocicmum gratissimum* aqueous Extract Against Ultraviolet-C-induced Inflammation

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Abstract

Ocimum gratissimum L. (basil) is a widely used herb in ethnopharmacology, traditionally applied for treating inflammatory conditions. Previous studies demonstrated that aqueous extracts of *Ocimum gratissimum* (OGE), rich in polyphenols such as caffeic acid and isoflavones, protect skin cells from UVC-induced inflammation and damage. Building on these findings, the present study investigated the anti-inflammatory and DNA-protective effects of OGE against UVC-induced skin injury and its potential dermatological applications in a mouse model. Wounds were treated with UVC alone or in combination with OGE, and healing progress was monitored over 11 days. UVC exposure delayed incision healing (10.00 ± 0.82 days) compared to the control group (7.25 ± 1.26 days, $p < 0.05$), whereas co-treatment with 0.6 % OGE significantly shortened healing time (8.00 ± 1.15 days, $p < 0.05$). After 24 h of UVC irradiation, cyclobutane pyrimidine dimer (CPD)-positive keratinocytes in the epidermis decreased from 97.5 % in the UVC-only group to 52.5 % in the 0.6 % OGE + UVC group. *In vitro* studies using HaCaT cells showed that OGE pretreatment enhanced cell viability, accelerated wound closure, and reduced UVC-induced PARP activation, indicating anti-apoptotic effects. Proteomics and immunohistochemical analyses revealed that OGE increased expression of protective proteins such as syntaxin-3 in both HaCaT cells and mouse skin. Importantly, OGE did not compromise UVC's bactericidal activity against *Escherichia coli*. Collectively, these results suggest that OGE exerts strong anti-oxidative and anti-inflammatory effects, promoting tissue repair and offering prophylactic potential against UVC-induced damage during skin disinfection or wound management.

Keywords: *Ocimum gratissimum* (OGE); Ultraviolet-C (UVC); HaCaT cells; Proteomics

P - 209 Optimization of Protein Hydrolysates Preparation and Nitric Oxide Inhibitory Activity from Kam Kung Alga (*Chara corallina*) using Response Surface Methodology

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Abstract

Kam Kung alga (*Chara corallina*), a freshwater brittlewort (Charophyte), is recognized as an edible alga that is rich in nutrients and comparable to other freshwater macroalgae. It contains high levels of protein, along with various bioactive compounds and antioxidants. This study aimed to optimize the process parameters influencing the nitric oxide (NO) inhibitory activity of protein hydrolysates derived from Kam Kung alga using response surface methodology (RSM). Nitric oxide inhibitory activity refers to the ability of a sample (such as protein hydrolysates or bioactive extracts) to reduce or suppress the production of nitric oxide. NO is a signaling molecule that plays important roles in inflammation. The NO scavenging activity was evaluated using the Griess assay, in which NO was generated from sodium nitroprusside in aqueous solution and incubated with the sample under controlled conditions. The percentage of NO inhibition was calculated relative to the control without sample. The effects of trypsin concentration (0.66–2.34%), temperature (41.6–58.4 °C), and hydrolysis time (38.4–441.6 min) on NO inhibitory activity were investigated. Optimization was performed using a Central Composite Design (CCD) combined with RSM. The results showed that the maximum NO inhibitory activity of the tryptic hydrolysate was 141.60 µg/mL. The optimal hydrolysis conditions were identified as 1.395% trypsin concentration, 50 °C hydrolysis temperature, and 309 min hydrolysis time. The experimentally obtained NO inhibitory activity closely matched the predicted value, with a high correlation coefficient (R^2 = 0.9781). RSM analysis indicated that trypsin concentration, temperature, and hydrolysis time were all significant factors affecting NO inhibitory activity.

Keywords: Kam Kung alga; Protein hydrolysate; Nitric oxide inhibitory activity; Optimization; Response surface methodology

P - 210 Enhancing Microbial Safety of Cow Milk Through Ultraviolet Light Treatment: A Sustainable Non-Thermal Alternative to Pasteurization

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Abstract

The present study investigates the potential of Ultraviolet (UV) light treatment as a non-thermal alternative to conventional pasteurization of raw cow milk. Milk samples were treated using a UV light system. The results were compared with traditionally pasteurized milk (72 □ for 15 s) and control samples. To assess overall quality, samples were analyzed for microbial inactivation, physicochemical properties, mineral content, and aroma profile. Microbial analysis revealed a significant dose-dependent reduction in total plate count following UV exposure. The initial microbial count (5.87 $\log_{10}$ CFU/mL) reduced to 3.07 $\log_{10}$ CFU/mL following UV exposure at a dose of 3.16 J/cm^2 for 24 minutes at 24 ± 2 □. The physicochemical parameters showed minimal alterations across treatments. The pH remained unchanged (6.62 - 6.64), while titratable acidity values (0.14 - 0.15%) were consistent, indicating no significant acid development. The color analysis results revealed slight differences in lightness (L^*), redness (a^*) and yellowness (b^*) after UV exposure, whereas heat-treated milk showed a slight increase in L^*, a^*, and b^* values compared to the control. Mineral analysis revealed that major minerals such as Ca, K, and P were preserved after UV treatment. The Fe and Zn contents were slightly increased in heat-treated milk, possibly due to increased solubilization from casein micelles. UV treatment maintained mineral content without significant deviations from the control sample. Aroma profile using an electronic nose confirmed that UV treatment caused minimal alterations in key aldehydes and ketones compared to the control. Whereas heat-treated milk exhibited higher levels of Maillard-derived volatiles, contributing to a cooked flavor. Overall, the findings demonstrate that UV treatment effectively reduces microbial load while maintaining the physicochemical, nutritional, and sensory attributes of raw cow milk. The study reveals that UV processing offers a promising, energy-efficient, and sustainable approach to enhancing quality in dairy products.

Keywords: Food microbiology; Food safety; Non-thermal processing; Physicochemical properties; Aroma profile

P - 212 Evaluation of Anti-inflammatory Potential of Lipids Extracts from Catfish eggs in RAW264.7 Cells

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Abstract

The catfish (*Clarias batrachus*) is a fast-growing freshwater species that supports food security and contributes significantly to Thailand's aquaculture economy. Nevertheless, the catfish processing generates substantial by-products, such as guts and heads, which are often discarded and may cause environmental impacts. and heads, which are often discarded and may cause environmental impacts. Upcycling these by-products represents a valuable approach to adding value and converting waste into useful resources. Therefore, this study was carried out to investigate the anti-inflammatory properties of lipids extracted from catfish eggs. Lipids were extracted from catfish eggs using a modified Bligh and Dyer method with a chloroform: methanol (1:2, v/v) solvent system and were subsequently assessed *in vitro* for anti-inflammatory activity in RAW264.7 macrophages. No cytotoxic activity was observed for catfish lipids at concentrations of 12.5, 25, and 50 μg/mL in macrophages. In LPS-stimulated cells, the extract reduced NO production in a dose-dependent manner ($p < 0.05$). At the highest concentration (50 μg/mL), the NO production was markedly inhibited to 20.95% of the LPS-stimulated control ($p < 0.05$). Gene expression analysis also showed that this highest concentration markedly downregulated the expression of key pro-inflammatory cytokine genes, including *IL-1β*, *IL-6*, and *TNF-α* mRNA, which were reduced by approximately 24.72-, 37.03-, and 9.18-fold, respectively, compared with the LPS-stimulated control. The results obtained in this study indicate that catfish egg lipids exhibit potent anti-inflammatory activity without cytotoxic effects, highlighting their strong potential for use in nutraceuticals, functional foods, and sustainable valorization of processing by-products. Overall, these extracts show considerable promise as safe and effective anti-inflammatory compounds.

Keywords: Catfish; Lipids; Anti-inflammatory; Pro-inflammatory cytokines; Byproduct Valorization

P - 213 Comparison of Nutritional Composition and Food Additive Use in Animal Meat Products, Traditional and Emerging Plant-Based Meat Alternatives

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Abstract

Plant-based foods are promoted for their potential cardiovascular benefits. In Taiwan, traditional plant-based meat alternatives (TPBMAs) are primarily soy-based and linked to religious beliefs that oppose animal sacrifice. In contrast, emerging plant-based meat alternatives (EPBMAs), typically pea-protein based, are formulated to mimic the flavor and texture of animal meat, which raised concerns regarding the food additive contents. This study aims to compare the nutritional composition and food additive usage among animal-based meat products (AMPs), TPBMAs, and EPBMAs to provide evidence-based reference for consumers' choice. This cross-sectional survey was conducted in Taiwan from 2024 to 2025. A list of representative plant-based food brands was compiled from media and literature sources, then validated by experts from academia and industry. Popular products from each brand were selected as study samples. Nutrition labels of commercially packaged AMPs, TPBMAs, and EPBMAs were recorded, including total energy, macronutrients, sodium, sugar per 100 g, and food additives. One-way ANOVA, multivariable linear regression, and logistic regression models were employed for statistical analyses. The study analyzed 386 products (131 AMPs, 198 TPBMAs, and 57 EPBMAs). On average, EPBMAs contained 2.9 types of food additives per product, compared to 3.6 in AMPs and 3.8 in TPBMAs. TPBMAs exhibited the highest frequency of colorants and flavorings, while EPBMAs had the highest usage of nutrient fortifiers and semi-synthetic thickeners. Conversely, AMPs demonstrated greater use of antioxidants, color stabilizers, and binding agents. After adjusting for product types, breading, and meat of imitation, multivariable analysis revealed that both PBMAs contained significantly higher sodium (+166.8 mg/100 g for TPBMAs, $p<0.001$; +156.3 mg/100 g for EPBMAs, $p=0.001$) but lower total energy, total fat, saturated fat, and trans-fat, compared to AMPs. Notably, EPBMAs contained significantly more calories (+19.74 kcal), total fat (+2.06 g), and saturated fat (+1.16 g) per 100 g than TPBMAs. In conclusions, plant-based meat alternatives offer the advantages of lower calories and fat but are associated with higher sodium levels compared to animal products. EPBMAs contained the fewest types of food additives among the three groups. Manufacturers of PBMAs should prioritize sodium reduction and optimization of food additive formulations.

Keywords: Plant-based meat alternatives; Food composition label; Food additives; Nutrition; Sodium

P - 215 Investigation of the Refining Potential of Apolipoprotein B Fragments in Red Wine

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Abstract

Astringency is a critical sensory attribute of red wine, and its reduction remains a significant challenge for modern winemaking. Low-density lipoprotein (LDL) has recently been reported as a potential refining agent because of its tannin-binding capacity, with apolipoprotein B (Apo B) acting as the primary structural protein responsible for this interaction. However, it remains unclear whether Apo B fragments, when isolated from LDL, can independently interact with tannic acid and contribute to the reduction of wine astringency. In this study, pulse-proteolysis and dose-dependent assays were conducted to investigate the binding behavior between Apo B and tannic acid. Apo B fragments exhibited notable binding affinity, and the dose–response curves revealed distinct interaction features compared with LDL. Ovalbumin precipitation assays demonstrated that Apo B fragments reduced astringency to a level comparable to LDL (259.0 ± 42.9 mg TAE/L vs. 291.7 ± 33.6 mg TAE/L), indicating similar clarification performance. However, methylcellulose precipitation assays showed that Apo B fragments removed fewer polymeric tannins than LDL or gelatin, suggesting a selective affinity toward specific tannin subtypes. Although Apo B fragments exhibited lower overall efficiency in tannin removal compared with LDL, their ability to decrease perceived astringency remained equivalent. Furthermore, the Apo B-refined wine retained more color intensity and antioxidant capacity (97.0 ± 6.9% of control) than other treatments, with moderate changes in total polyphenols and no significant difference in total flavonoids. These results not only confirm the refining potential of Apo B fragments but also demonstrate their ability to preserve wine quality and antioxidant stability.

Keywords: Apolipoprotein B fragments; Tannic acid; Astringency reduction; Wine refinement; Low-density lipoprotein

P - 218 Synergizing Cold Plasma and UVC LEDs: Spray-Assisted Non-Thermal Platform for Next-Gen Food Safety

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Abstract

This study introduces a spray-assisted hybrid cold plasma– Ultraviolet C light-emitting diode (UVC-LED) device engineered to achieve efficient non-thermal sterilization for food applications. Traditional thermal methods such as pasteurization ensure microbial safety but often degrade nutrients, flavor, and texture. To address this limitation, the device integrates dielectric barrier discharge (DBD) cold plasma and 275 nm UVC-LED irradiation within a single treatment chamber, enabling simultaneous generation of reactive oxygen and nitrogen species (ROS/RNS) and UV-induced photolysis for enhanced microbial inactivation. A micro-spray atomization module converts liquid or semi-liquid foods into fine droplets, increasing surface area and promoting more uniform interaction with both plasma and UV light. The system was optimized by varying gas composition (O_2 /N_2 ratio), discharge voltage, and flow rate to maximize reactive species generation while minimizing heat accumulation. Optical emission spectroscopy and probe assays confirmed the presence of key oxidative radicals, while temperature monitoring showed minimal thermal rise (<5 °C), preserving product integrity. Designed for energy efficiency, modular scalability, and inline compatibility, the system represents a sustainable alternative to conventional heat-based sterilization. Based on published studies, this hybrid approach has been reported to achieve high microbial reduction potential against major foodborne pathogens (*Salmonella* spp., *Listeria monocytogenes*, *E. coli* O157:H7, *Staphylococcus aureus*, and *Bacillus cereus*). Future work will focus on microbial validation, potential oxidative by-product assessment, and scalability for industrial applications. Overall, this spray-driven cold plasma–UVC platform demonstrates a promising next-generation solution for eco-efficient, non-thermal disinfection in the food industry.

Keywords: Cold plasma; UVC-LED; Spray atomization; Non-thermal sterilization; Sustainable food safety

P - 220 Valorization of Sticky Rice-Based Thin Stillage via Single-Step SCOBY Fermentation for the Production of Low-Acid Functional Beverages

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Abstract

Thin stillage, a byproduct from traditional sticky rice-based liquor distillation, contains substantial biological components, including carbohydrates, proteins, amino acids, and organic acids, which can be utilized as a substrate for microbial fermentation. The aim of this study was to utilize sticky rice-based thin stillage as a raw material to produce low-acid bio-fermented beverages using a symbiotic culture of bacteria and yeast (SCOBY) by a single-step fermentation process, without prior ethanol fermentation. The SCOBY culture used in this study consisted mostly of *Komagataeibacter rhaeticus*, *Gluconacetobacter entanii*, *Zygosaccharomyces bisporus*, and *Brettanomyces bruxellensis*. The initial characterization of thin stillage was efficient for fermentation, with a low pH for acid-tolerant microorganisms and diverse bioactive compounds. After 14 days of fermentation at 30 °C, the total sugar content decreased from 91.42 ± 1.27 g/L to 21.20 ± 1.13 g/L, while total acidity increased from 4.14 ± 0.19 g/L to 28.93 ± 0.57 g/L. The fermented beverage exhibited enhanced antioxidant properties, particularly in terms of total phenolic content (TPC), which increased from 344.56 ± 6.02 µg GAE/mL to 424.39 ± 8.55 µg GAE/mL. Additionally, it showed elevated DPPH, ABTS, and FRAP activities, indicating improved bioactive potential. Cytotoxicity assay using Vero cells confirmed that the fermented product was non-toxic (IC□□ > 500 µg/mL), exhibits high biocompatibility and safety. Sensory evaluation revealed high consumer acceptability (94.8%), particularly in color, sourness, and overall appearance. These outcomes indicate the possibility of single-step SCOBY fermentation as an eco-friendly approach for valorizing distillery byproducts, producing safe, antioxidant-rich, low-acid beverages with potential applications in the functional food and health beverages industries. The process supports circular bioeconomy principles and sustainable resource utilization in community-scale production.

Keywords: Thin stillage; SCOBY fermentation; Low-acid beverage; Antioxidant activity; Circular bioeconomy

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Packaging Effects on Freezing Rates and Quality of Roasted Chicken.

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Abstract

The broiler industry in Thailand is experiencing significant growth. In 2025, growth is expected in domestic production and consumption, as well as in export value. Processed chicken, fresh chilled chicken, and frozen chicken account for approximately 30% of the total export value of chicken products. Additionally, modern consumers are increasingly seeking convenience and time-saving options for food preparation. Therefore, ready-to-eat frozen food products have become an attractive solution that meets their needs. Despite the high market potential, the production process must be thoroughly studied before commercial investment. Packaging plays a crucial role in protecting product integrity and conveying product quality. This study aims to investigate the effect of packaging type on freezing efficiency and yield percentage of marinated cooked chicken. Three types of packaging were compared: PA/PE Vacuum pouch (VC), Aluminum pouch (AF), and polyamide/polyethylene pouch (PA/PE). The methods began with preparing chicken drumettes weighing 50-55 grams each, which were then marinated, steamed for 10 minutes, and baked at 200℃ for 15 minutes. The 500-gram cooked product, with an average cooking loss of 39.10 ± 5.27%, was used as the baseline for analysis. The samples were then packaged in each type of packaging, with triple replicates. Each packaged product was thermocoupled and frozen in an air-blast freezer until the sample's core temperature reached -18℃. The results revealed that the type of packaging significantly affected the freezing rate ($p = 0.008$). The PA/PE vacuum pouch had the highest average freezing rate (0.58±0.08 ℃/min), and the freezing curve showed the shortest freezing time (77-100 minutes). In terms of weight retention quality, the aluminum pouch had the highest yield percentage of 94.83 ± 0.36% ($P<0.05$), which was significantly higher than those of the other packaging types. Meanwhile, the PA/PE had the lowest efficiency in all aspects. However, when evaluating the color quality changes of roasted chicken drumettes, all packaging types showed no statistically significant differences in analysis results ($p>0.05$). The lightness value (L^*) averaged between 41.93 ± 6.53 and 47.27 ± 8.09, the redness value (a^*) ranged from 12.52 ± 3.82 to 13.97 ± 1.44, and the yellowness value (b^*) was between 26.63 ± 4.46 and 27.88 ± 3.19. Therefore, when choosing packaging for frozen roasted chicken, the primary decision-making criterion should be packaging that facilitates the fastest cooling, to improve production efficiency without affecting the product's appearance.

Keywords: Chicken drumette; Freezing curves; Freezing rate; Packaging selection; Yield estimation

P - 223 Effect of the Type of Oil used as an Ingredient on the Shelf Life of Crispy Khanom La under Different Storage Conditions

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Abstract

Khanom La is a traditional sweet snack from southern Thailand and an important offering during the Sat Duean Sip merit-making festival. In recent years, it has been produced and marketed year-round in response to increasing consumer demand and its growing popularity as a local souvenir. However, a major limitation of Khanom La is its short shelf life, primarily caused by lipid rancidity, which adversely affects consumer acceptance and marketability. This study aimed to evaluate the storage stability of crispy Khanom La prepared using two different oils, palm oil and rice bran oil, as ingredients, and to predict its shelf life using kinetic modeling. The samples were packaged in aluminum-laminated pouches and stored at 30, 40, and 50°C for five weeks. During storage, the moisture content increased by approximately 1%, while water activity rose by 0.4-0.9%. The hardness of Khanom La increased from 2 to 7 N over the storage period, which may be attributed to the gradual development of structural toughness, whereas the product color became progressively lighter. The total plate count remained at approximately 3 log CFU/g throughout the five-week storage period, and no mold or yeast growth was detected for up to four weeks, indicating satisfactory microbial stability. Lipid oxidation, as indicated by peroxide value (PV), increased continuously during storage. For samples prepared with palm oil, PVs reached 17.06, 24.84, and 30.22 mEq O_2 /kg at storage temperatures of 30, 40, and 50°C, respectively. In contrast, samples prepared with rice bran oil exhibited higher PVs of 22.14, 25.59, and 31.24 mEq O_2 /kg under the same conditions. These results indicate that Khanom La prepared with rice bran oil was more susceptible to lipid oxidation and quality deterioration than that prepared with palm oil. Based on kinetic modeling using PV as the quality indicator, the predicted shelf life of Khanom La prepared with rice bran oil was 12 days at 25°C, whereas samples prepared with palm oil exhibited a longer predicted shelf life of 20 days under the same conditions. Overall, palm oil demonstrated greater oxidative stability and was therefore more suitable for the production of crispy Khanom La. Consequently, the use of palm oil is recommended to enhance product quality, oxidative stability, and commercial viability.

Keywords: Crispy Khanom La; Oil; Shelf-life; Quality; Prediction

P - 227 A Comparative Study on the Changes in Muscle Quality of Blunt Snout Bream (*M. amblycephala*) under Different Levels of Cold Stress

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Abstract

This study investigated the effects of different cooling amplitudes (5 ℃, 10 ℃, 15 ℃, and 20 ℃ from a baseline of 25 ℃) applied for a duration of 2.5 hours on blood biochemistry (cortisol, glucose, lactic acid), oxidative stress markers (total antioxidant capacity, superoxide dismutase, malondialdehyde, total glutathione), and muscle quality (texture profile analysis, taste-active compounds, and color) in blunt snout bream (*M. amblycephala*). Key analytical methods included commercial assay kits for biochemical, oxidative stress parameters and betaine content, texture profile analysis using a texture analyzer, ultra performance liquid chromatography for nucleotide, amino acid analyzer for free amino acids and colorimeter for color. Compared to the control group (25 ℃), the intensity of cold stress was identified as a key factor determining final muscle quality. Analysis of blood biochemistry and oxidative stress confirmed that moderate cold stress (10 ℃ drop) effectively alleviated oxidative damage, exhibiting a significantly lower malondialdehyde content compared to other cold stress groups ($p < 0.05$). Apoptosis analysis revealed the lowest cell apoptosis rate at this stress level, which contributed to better preservation of muscle cell ultrastructure. Correspondingly, the moderate cold stress group demonstrated optimal muscle texture, color, and flavor, accompanied by a significant increase in the hardness, L* and content of the sweet-tasting substance betaine. In contrast, severe cold stress (20 ℃ drop) induced intense oxidative stress and apoptosis, leading to elevated hydrolase activities such as caspase-3. This ultimately resulted in muscle softening, color deterioration, and flavor degradation. In conclusion, moderate cold stress shows potential as a strategy for improving muscle quality in blunt snout bream, whereas excessive cold stress has detrimental effects.

Keywords: Blunt snout bream; Cold stress; Muscle quality; Texture; Flavor

P - 229 Detecting the interaction between T1R1-VFT and Theogallin through protein stability analysis

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Abstract

Umami is one of the five fundamental tastes, and its duration serves as a crucial indicator of tea quality. Among the umami-associated constituents in tea, theogallin is regarded as the major contributor to the prolonged umami aftertaste. The umami receptor T1R1/T1R3, particularly the Venus Flytrap Domain of T1R1 (T1R1-VFT), is responsible for ligand recognition in umami sensation. Traditional tea quality assessment depends heavily on sensory evaluation, which is subjective and susceptible to inconsistency. To develop an objective alternative, we established a low-cost protein-based strategy that identifies theogallin by monitoring ligand-induced alterations in T1R1-VFT stability, thereby directly reflecting human umami perception more effectively than the electronic tongue. T1R1-VFT was produced and isolated from inclusion bodies, and its refolded binding capability was verified by fluorescence spectroscopy. Theogallin diminished fluorescence intensity in a concentration-dependent manner, with nearly complete quenching at 800 μM, suggesting a robust interaction with T1R1-VFT. Protein unfolding equilibrium analysis using subtilisin further revealed that theogallin enhanced T1R1-VFT resistance to proteolysis at 4.8 M urea. Thermal shift assays confirmed dose-dependent stabilization under optimized conditions, and a standard curve was constructed, yielding a lower limit of detection (LOD) of 7.91 μM. This concentration is far below the typical theogallin level found in tea (approximately 0.4 mM), indicating sufficient sensitivity for detecting theogallin in tea samples. In conclusion, this investigation substantiates the specific binding of theogallin to T1R1-VFT and introduces a protein-based analytical platform for theogallin. These results lay the foundation for advancing objective, quantitative methodologies to assess tea. In the future, by assessing T1R1-VFT stability changes induced by tea infusions, this approach could enable rapid comparison of umami characteristics across different types of tea.

Keywords: Theogallin; T1R1-VFT; Umami perception; Tea quality evaluation; Protein unfolding equilibrium

P - 230 Efficiency of Cellulase-hydrolyzed Jackfruit Rags Extracts to Support Probiotic Growth

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Abstract

Thailand produces over 95,000 tons of jackfruit (*Artocarpus heterophyllus*) per year. However, up to 60% of jackfruit are agricultural by-products. Jackfruit rags are a major by-product, which are rich in cellulose and represent a potential prebiotic source. This study aimed to evaluate the efficiency of extracts from jackfruit rags to support probiotic growth. Jackfruit rags powder was hydrolyzed by using cellulase (0.5% w/v) at pH 5, 55°C for 30, 60, and 90 minutes (TE30, TE60, and TE90, respectively). The growth of five probiotic strains (*Bacillus coagulans*, *Bifidobacterium animalis* ssp. *lactis*, *Lactobacillus acidophilus*, *Lactobacillus bulgaricus*, and *Streptococcus thermophilus*) were investigated. After incubation at 37ºC, TE30 showed the outstanding efficiency to support the growth of *L. bulgaricus*, *L. acidophilus*, and *B. coagulans* more than the control (polydextrose) by 72 h of incubation (4.69, 0.80, and 0.20 log CFU/mL, respectively). TE60 could support the growth of *B. animalis* ssp. *lactis* more than the control up to 1.03 log CFU/mL at 48 h of incubation. While TE90 could support the growth of *S. thermophilus* more than the positive control (polydextrose) up to 1.31 log CFU/mL at 24 h of incubation. Overall, the cellulase-hydrolyzed jackfruit rags extract effectively promoted the growth of selected probiotic strains, confirming their potential as the source of prebiotic ($p < 0.05$). Therefore, this study highlights jackfruit rags as a promising raw material for developing prebiotic ingredients, adding the value to agricultural by-products.

Keywords: Jackfruit rags; Prebiotic; Cellulase; Agricultural waste; Oligosaccharides

P - 231 Investigation of Functional Carbohydrate Components from Indigenous Plants in Thailand

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Abstract

Prebiotics are bioactive compounds that confer various health benefits to the host, with numerous studies highlighting their role in preventing and alleviating symptoms of non-communicable diseases (NCDs). Thailand, located in a tropical region, is rich in biodiversity and originate to a wide variety of indigenous plants, many of which have been reported to contain high levels of prebiotic components. Utilizing these indigenous plants for functional food development offers an opportunity to add value to underutilized raw materials while supporting indigenous agriculture and increasing farmer income. This study aimed to investigate prebiotic composition of various indigenous Thai plants, including jackfruit flesh, jackfruit rag, bracts and immature fruitlets of banana blossoms from two cultivars (Ploek-Bang and Ta-lueng), and ivy gourd leaves. Plant samples were hot-air dried at 60°C for 24 hours and ground into fine powder. Soluble fibers were extracted using two different solvents (distilled water and 50% ethanol) at 70°C for 4 hours. The extracts were filtered, and the supernatants were analyzed for total sugar and reducing sugar contents using phenol-sulfuric acid method and Somogyi–Nelson method, respectively. The amount of non-reducing sugars was then calculated and used as an indicator of potential prebiotic content. The results revealed that extraction with 50% ethanol yielded significantly higher levels of both total sugars and reducing sugars compared to water extraction ($p < 0.05$). Non-reducing sugar analysis indicated that all tested samples potentially contained prebiotic components. Among tested samples, jackfruit rag and Talung banana blossom exhibited the highest non-reducing sugar contents (282.36 ± 6.86 and 292.77 ± 8.90 mg/g sample, respectively), while jackfruit flesh had the lowest content (123.23 ± 32.92 mg/g sample). These findings suggest promising potential for the development of health-promoting food products derived from indigenous Thai plants.

Keywords: Prebiotic; Indigenous plants; Extraction

P - 234 Bioactive Properties of Extract from Endophytic Fungus *Fusarium concentricum* P2NS4 Isolated from *Piper betle* Linn.: A source of Antifungal and Antioxidant Substances

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Abstract

Aspergillus flavus and *Aspergillus parasiticus* are significant food spoilage fungi that produce mycotoxins and are harmful to human health. Metabolites from endophytic fungi (EF) are known as a potential source of bioactive compounds. This study explored the antifungal and antioxidant properties of the endophytic fungus strain P2NS4 isolated from *Piper betle* leaf. The endophytic fungus strain P2NS4 was identified as *Fusarium concentricum* based on morphological characteristics and molecular analysis. The ethyl acetate extract from the cell-free supernatant of strain P2NS4 (referred to as EAE-P2NS4) demonstrated a high total flavonoid content of 5,293.33 ± 23.57 mg, measured in Quercetin equivalents per gram of ethyl acetate extract (QE/g EAE). Additionally, it showed a total phenolic content of 92.47 mg, expressed in Gallic acid equivalents per gram of ethyl acetate extract (GAE/g EAE). EAE-P2NS4 also exhibited significant antioxidant activity in multiple assays, including 2,2-diphenyl-1-picrylhydrazyl radical scavenging activity (DPPH-RSA), 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) radical scavenging activity (ABTS-RSA), and Ferric reducing antioxidant power assay (FRAP). The EAE-P2NS4 showed antifungal activity against *A. flavus* and *A. parasiticus* with minimum inhibitory concentration (MIC) values of 2.048 mg/mL and 4.096 mg/mL, respectively. Both fungi had the same minimum fungicidal concentration (MFC) value at 4096 mg/mL. Mycelium growth and spore germination of *A. flavus* and *A. parasiticus* were effectively inhibited by the EAE-P2NS4 at MIC, showing its potential as an antifungal agent. Furthermore, the scanning electron microscopy (SEM) analysis showed that the EAE-P2NS4 could damage the cells of *A. flavus* and *A. parasiticus* by disrupting the structural integrity of the cell and by effectively inhibiting the spore germination. The EAE-P2NS4 contains a significant abundance of catechin-4beta-ol and kaempferol 3-(2",3"-diacetyl-4"-p-coumaroylrhamnoside), which are phenolic compounds detected in negative and positive modes, respectively, using Liquid chromatography-quadrupole time-of-flight mass spectrometry (LC-QTOF/MS) analysis. The antifungal effect of the EAE-P2NS4 may be due to the presence of the phenolic and flavonoid compounds, which may disrupt the fungal cell membrane, leading to cell death. These findings suggested that secondary metabolites from *F. concentricum* P2NS4 can be used as promising antifungal and antioxidant agents.

Keywords: Endophytic fungi; Secondary metabolites; Antioxidant activities; Antifungal activities; Food spoilage fungi

P - 237 The Sensory Evaluation and Characteristics of Awa-Bancha, Japanese Post-Fermented Tea at Different Brewing Conditions, Sensory Wheel and Terminology Development for Awa-Bancha

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Abstract

Awa-Bancha is a traditional Japanese post-fermented tea and known for the unique sensory characteristics derived from special regional process (anaerobic fermentation) during post-harvest processing. This unique fermentation process, created by microbial activity, modifies and enhances the flavor profile by degrading specific compounds. However, limited sensory evaluation studies have been conducted on Awa-Bancha, and optimal brewing conditions remain unclear. The purpose of this study is to evaluate the sensory properties of Awa-Bancha brewed under different brewing temperatures and to develop a sensory wheel along with a descriptive vocabulary for this traditional tea. Hedonic sensory evaluation and descriptive analysis sensory evaluation were used in this research. Three brewing temperatures were examined in hedonic analysis: cold brew (5°C, 10 hours), ambient brew (25°C, 2 hours), and hot brew (90°C, 10 minutes). Three brewing conditions were examined in descriptive analysis test: cold brew (5°C, 10 hours), hot brew (90 °C, 10 minutes), and hot brew then cold storage (90 °C, 10 minutes then put in 5°C, 10 hours). Total 30 panelists participated for hedonic analysis, and 7 trained panelists participated in descriptive analysis. The results showed that the brewed temperatures significantly affected the sensory attributes and flavor perception of Awa-Bancha. Sensory analysis results from preference-based using 5-point hedonic scale showed that hot brew has the highest acceptance score on aroma attributes (3.63) with significant difference ($p<0.005$), meanwhile cold brew has the highest acceptance score on taste attributes (3.35) with no significant difference ($p>0.005$). Sensory analysis results from descriptive sensory analysis showed that hot brew has intense vegetal and fermented aromas, while floral, umami, and sweet flavor notes were most preferred. Cold brew has strong bitterness and astringency, with a fruity flavor and a refreshing profile when consumed cold. Based on sensory evaluations, a comprehensive sensory wheel was developed to systematically represent the diverse sensory characteristics of Awa-Bancha. This study provides insights into the relationship between brewing conditions and sensory attributes of Awa-Bancha, offering practical guidance for optimizing its preparation.

Keywords: Awa-bancha; Brewing Temperature; Post-fermented Tea; Sensory Properties

P - 243 Effect of Thermo-Sonication Combined with Essential Oils on Bioactive Compounds and Antioxidant Activity in *Carissa carandas* L. Fruit Juice

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Abstract

The development of functional beverages rich in bioactive compounds while maintaining microbial safety is a major challenge in the food industry. *Carissa carandas* L., a tropical fruit abundant in phenolics and vitamin C, was selected as a model juice to investigate the effects of thermo-sonication combined with essential oils on the retention of bioactive compounds and antioxidant activity. Juice samples were inoculated with *Escherichia coli* (6 log CFU/mL) and treated by thermo-sonication at 45, 55, and 65 °C for 10 min in the presence of lemon and orange essential oils (1:1 ratio, 40 µL/mL). Microbial, chemical, and antioxidant properties were monitored for 28 days at 4 °C. The combined treatment at 65 °C achieved > 6 log CFU/mL reduction of *E. coli*, total viable count by > 4 log CFU/mL, and total yeast and mold count by > 4 log CFU/mL, confirming pasteurization-equivalent microbial inactivation. Importantly, this condition effectively retained total phenolic content and vitamin C while enhancing antioxidant activity compared with untreated juice, likely due to the release of the bound phenolics by the cavitation effect of ultrasound. Physicochemical quality attributes, including pH, total soluble solids (TSS), color, and viscosity, remained stable during storage. These findings demonstrate that thermo-sonication combined with essential oils is a promising and sustainable technique for producing safe, bioactive-rich, and antioxidant-enhanced functional fruit juice.

Keywords: Thermo-sonication; Essential oils; *Carissa carandas* L.; Antioxidant activity; Refrigerated storage

P - 244 Influence of Protein–Polysaccharide Ratio and pH on Gel Formation and Physical Properties of Mung Bean Protein–Gellan Gum Composites

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Abstract

This study investigated the effects of protein-to-polysaccharide ratio and pH on gel formation and physical properties of mung bean meal protein–low-acyl gellan gum (MBP–GG) composite systems. Composite gels were prepared at MBP–GG ratios of 1:1, 2:1, and 3:1 (w/w) under pH conditions of 5, 6, and 7. Gel properties were evaluated using texture profile analysis (TPA), color parameters (CIE L* a* b*), water-holding capacity (WHC), cooking loss, rheological behavior, microstructure (SEM), and molecular interactions assessed by Fourier transform infrared (FTIR) spectroscopy. Low pH (5) induced excessive protein aggregation, resulting in heterogeneous gel structures, darker appearance, and inferior textural properties. Increasing pH improved gel uniformity and lightness, whereas excessively high pH reduced WHC. Rheological analysis revealed that all MBP–GG systems exhibited gel-like, non-Newtonian behavior, with storage modulus (G′) consistently exceeding loss modulus (G″) across the tested temperature range. Notably, the 1:1 (w/w) MBP–GG ratio at pH 6 displayed the highest G′ values and superior thermal stability, indicating the formation of a strong and continuous gel network with pronounced shear-thinning characteristics. Among all formulations, this condition exhibited the most favorable overall gel properties, characterized by enhanced textural performance, stable water retention, low cooking loss, and uniform color, supported by a well-developed protein–polysaccharide network as confirmed by SEM and FTIR analyses. These findings demonstrate that precise control of protein-to-polysaccharide ratio and pH is critical for optimizing composite gel functionality and highlight the potential of MBP–GG systems for structured and extrudable food applications.

Keywords: Hydrocolloid; Coacervation; Alternative Proteins; Mung bean Protein; Gellan gum

P - 249 Development of calcium fortified effervescent powder by using bio-calcium from Nile Tilapia bone

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Abstract

Nile tilapia bones are low-value by-products generated from fish-cutting processes. The bio-calcium powder derived from these bones is rich in calcium, phosphorus, collagen, and other proteins, with high bio-accessibility. Therefore, it has great potential for use in dietary supplement development, particularly effervescent powders. This study aimed to develop a high-calcium effervescent powder using bio-calcium powder from Nile tilapia bones at different concentrations (20%, 25%, and 30% w/w) and to evaluate its physicochemical properties, sensory characteristics, and calcium content. The results revealed that increasing levels of bio-calcium powder led to a decrease in moisture content and an increase in ash content ($p<0.05$). Higher concentrations of bio-calcium (above 20%) also caused an increase in redness (a*) and yellowness (b*) values, especially at the highest bio-calcium powder used ($p<0.05$). Upon dissolution in water, samples with the highest bio-calcium content exhibited increased pH values, while total soluble matter was in the lowest level, compared with others ($p<0.05$). Sensory evaluation showed that the addition of 30% bio-calcium powder reduced the liking score for appearance during dissolution (below 6 in a 9-point hedonic scale) ($p<0.05$), likely due to the presence of insoluble particles. Furthermore, higher levels of bio-calcium addition tended to lower liking scores for all attributes (color, odor, flavor, taste, mouthfeel, and overall acceptance). However, the effervescent powder containing 25% bio-calcium still achieved good sensory acceptance (liking score > 7 in a 9-point hedonic scale) and provided 176 mg of calcium per serving (5 g of powder), corresponding to 17.6% of the Thai Recommended Daily Intake (RDI) for calcium. These findings indicate that fortifying effervescent powder with 25% bio-calcium from Nile tilapia bones can effectively produce a calcium-enriched functional product. Overall, this study highlights the potential of Nile tilapia bone–derived bio-calcium powder as a value-added ingredient for developing novel functional food products, thereby promoting the upcycling of fish-processing by-products and supporting sustainable production and consumption in alignment with the United Nations Sustainable Development Goals.

Keywords: Nile tilapia bones; Bio-calcium; Calcium fortification; Effervescent powder; Nutrition.

P - 263 Chemical Characterization, Antioxidant Potential, and Cellular Protection of Thai Stingless Bee Propolis Extract

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Abstract

Propolis, a natural substance derived from bees, is extensively utilized as a functional food and dietary supplement, demonstrating numerous bioactivities in both *in vitro* and *in vivo* studies. This research aimed to investigate the chemical composition and antioxidant activity of propolis extracts from *Tetragonula pagdeni* stingless bees collected from four different sources in Thailand: a melaleuca forest in Songkhla, a mangrove forest in Chanthaburi, a flower garden in Nonthaburi, and a mixed agricultural farm in Chiang Mai. Propolis samples were extracted using an ultrasound-assisted extraction with 70% ethanol. The chemical composition of the crude extract from each source was determined using LC-MS/MS. The chemical composition was varied, but ellagic acid (EA) was found in every sample. The EA content was determined using LC-DAD to be 930.32 ± 109.86, 55.92 ± 18.79, 87.21 ± 16.49, and 59.68 ± 4.84 µg/g, respectively. The total phenolic contents and the antioxidant activity of the extracts were determined by the Folin-Ciocalteu, DPPH radical scavenging, ABTS radical scavenging, and FRAP assays. The results indicated that all extracts exhibited free radical-scavenging activity. Especially the extract from the melaleuca forest (EMF) expressed the strongest activity and was selected to be analyzed by cell-based assay. The highest dose of EMF and EA on primary human dermal fibroblasts that showed no cytotoxicity was 50 µg/mL. For antioxidation, EMF and EA reduced intracellular ROS levels induced by H_2O_2, compared to H_2O_2-treated cells (65.0 ± 13.0% and 43.8 ± 2.6% vs. 100.0 ± 0.1%, respectively). To assess the cell protective effect, cells were pretreated with EMF and EA for 2 h before exposure to 50 µM H_2O_2 for 12 h. The data demonstrated that EMF and EA pretreatment significantly reduced the accumulation of senescent cells compared to H_2O_2-induced senescent cells (9.2 ± 0.8% and 11.4 ± 0.7% vs. 15.2 ± 1.7%, respectively). In conclusion, EMF possesses significant antioxidant activity which could be attributed to high EA content. Additionally, EA could be used as a marker for standardization of propolis extract from Thailand. Moreover, EMF could be a viable source for natural antioxidants for food supplements and nutraceutical applications.

Keywords: Anti-senescence; Antioxidant; Propolis; Stingless bee; *Tetragonula*

P - 265 Oligofructans Obtained from *Bacillus subtilis* TISTR 001–Fermented Sugar Exhibit Anticarcinogenic Activity in a Rat Model of Colon Carcinogenesis

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Abstract

Dietary fiber and prebiotics are non-digestible food components that beneficially influence gut microbiota, support intestinal health, and may reduce the risk of colon cancer. Recently, our study produced oligofructans by fermenting sugar with *Bacillus subtilis* TISTR 001, which exhibited prebiotic properties. However, their safety and anticarcinogenic effects have not yet been tested *in vivo*. The present study evaluated both the toxicity and chemopreventive potential of oligofructans in rats. The safety of the oligofructans was confirmed through acute and subchronic toxicity studies conducted in accordance with OECD guidelines. No abnormalities or toxic effects were observed in rats treated oligofructans. The lethal dose (LD□□) was greater than 2,000 mg/kg body weight, and the no-observed-adverse-effect level (NOAEL) was established at 2,000 mg/kg body weight, confirming the compound's safety for further biological testing. To evaluate the anticarcinogenic effect of oligofructans, 1,2-dimethylhydrazine (DMH) was used to induce colon carcinogenesis, and aberrant crypt foci (ACF) served as endpoint markers. Rats were administered oligofructans at doses of 100 and 500 mg/kg for 15 weeks. The results showed that rats given oligofructans at 100 and 500 mg/kg body weight showed a significant reduction in the number of ACF compared to rats treated with DMH. Inhibitory mechanistic studies revealed that oligofructans treatment suppressed the expression of genes related to inflammation, cell proliferation, and the Wnt signaling pathway. Furthermore, it increased the expression of pro-apoptotic genes. According to these findings, oligofructans act as anticarcinogens by modulating multiple cellular pathways involved in colon carcinogenesis. In conclusion, oligofructans derived from *Bacillus subtilis* TISTR 001–fermented sugar are safe and exhibit potent anticarcinogenic effects, primarily by modulating inflammatory responses, suppressing cell proliferation, and activating apoptotic pathways.

Keywords: Anticancer; Chemoprevention; Colon cancer; Oligofructans; Toxicity

P - 273 High-Pressure Assisted Extraction of Bio-Calcium from Blackchin Tilapia (*Sarotherodon melanotheron*) Bone Under Alkaline Condition: Physicochemical and Structural Characterization

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Abstract

Blackchin tilapia (*Sarotherodon melanotheron*) is an invasive fish species spreading throughout Thailand. Utilization of these fish for bio-calcium (BC) preparation strategically helps control their population and enhance their value. Effective pretreatment methods are essential for producing high-quality BC under alkaline condition. Therefore, this study aimed to investigate the impact of high-pressure (HP) assisted alkaline pretreatment on BC production under different conditions (400-600 MPa for 10-30 min). The physicochemical and structural properties of blackchin tilapia BC were evaluated and compared with those produced by a conventional methods (control; 28°C for 60 min under alkaline condition). HP-assisted treatments significantly increased total soluble protein (5.33-7.89 mg/ml) and hydroxyproline (0.36-0.71 mg/ml) contents in alkaline solution, compared to a conventional method (5.38 mg/ml and 0.16 mg/ml, respectively). Yield (23.93-42.79%) and particles mean diameter (d_{43}) (19.17-64.08 μm) of all HP-treated BCs decreased with increasing pressure levels and longer treatment times ($P < 0.05$). Moreover, all HP-assisted treatments significantly lowered a* (1.70-1.96) and b* (6.70-10.37) values while enhancing whiteness (76.11-79.55%) compared to the control. TBARS tended to increase when HP level and treatment time increased ($P < 0.05$). Notably, fishy odor intensity of BC for both control and HP-treated samples was markedly reduced compared to raw bone; however, the control sample exhibited stronger fish odor intensity than HP-treated samples. SDS-PAGE analysis revealed three prominent protein bands with molecular weights of 250, 133, and 116 kDa, indicating type I collagen presence in raw bone and control BC, whereas smeared bands were detected in HP-treated samples. These findings indicated that collagen degradation occurred during HP treatments, especially when higher pressure and longer time were applied. Among all samples, BC prepared under HP-assisted treatments, particularly at 400 MPa for 10 min, exhibited a high yield and desirable characteristics including reduced particle size, improved color, and a negligible fishy odor. Moreover, the HP-assisted process at 400 MPa for 10 min produced BC powder with higher calcium (26.29%) and phosphorus (10.34%) contents compared to control BC (25.32% and 10.02%, respectively). FTIR confirmed that all BC powders comprised proteins and inorganic matter in form of calcium hydroxyapatite ($Ca_{10}(PO_4)_6(OH)_2$). Thus, HP-assisted treatment at 400 MPa for 10 min proved to be an optimal condition for alkaline pretreatment, yielding bio-calcium with superior quality and promising application potential in food systems.

Keywords: Blackchin tilapia bone; Bio-calcium; High-pressure assisted extraction; Physicochemical property; Structural property

P - 277

Characterization and Quality Enhancement of Salted Shrimp (*Acetes vulgaris*) Paste: Effects of Salt Type and Enzymatic-Assisted Fermentation

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Abstract

Ka-pi, a traditional Thai fermented shrimp paste made from planktonic shrimp (Acetes vulgaris), is widely used as a condiment to enhance the palatability and umami flavor of various dishes. This study investigated the effects of salt type—sea salt (SS) and rock salt (RS)—combined with 0.1% (w/w) pancreatin-assisted fermentation on the quality of Ka-pi during different fermentation periods (0, 1.5, and 3 months). All Ka-pi samples exhibited a purplish-red color that darkened progressively over time, as indicated by significant increases in redness (a*), yellowness (b*), and browning index values ($P < 0.05$). RS-treated samples demonstrated higher salt content and darker color compared to SS-treated samples. Extended fermentation increased TCA-soluble peptide content, total volatile basic nitrogen (TVB-N), and degree of hydrolysis (DH) indices, while slightly decreasing water activity (a_w). Lipolysis and lipid oxidation intensified, as evidenced by increasing free fatty acid, peroxide, and TBARS values ($P < 0.05$). SDS-PAGE analysis confirmed the progressive degradation of myosin heavy chain and actin during fermentation. The RS-treated sample with 0.1% (w/w) enzymatic assistance (RS+E) exhibited the fastest fermentation rate and the highest antioxidant activities, determined by DPPH and ABTS radical scavenging, FRAP, and metal-chelating assays. After 3 months of fermentation, total viable count, halophilic bacteria, and lactic acid bacteria remained relatively stable due to the selective pressure of the high-salt environment, with no pathogenic contamination detected. Ka-pi produced under RS+E conditions was rich in protein, minerals, and essential amino acids, particularly hydrophobic amino acids. These findings suggested that the synergistic combination of RS and pancreatin-assisted fermentation can enhance Ka-pi quality, bioactivity, and nutritional value, offering a promising approach for improving traditional Thai fermented seafood products.

Keywords: Ka-pi; Fermented shrimp paste; Enzymatic assisted fermentation; Rock salt; Sea salt

P - 279 Development of Watermelon-Based Jelly Products for Health and Mood Enhancement

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Abstract

The rising prevalence of stress and depression has led to increased interest in mood-enhancing functional foods. This study aimed to develop watermelon-based jelly products enriched with lycopene, a bioactive compound known for its antioxidant and stress-reducing properties. The research was divided into two phases: (1) optimization of lycopene extraction from watermelon flesh, and (2) formulation and quality evaluation of watermelon jelly. Lycopene was extracted using hot air drying at 60°C combined with 6% w/w pectinase, yielding a maximum lycopene content of 66.27 µg/g. Jelly formulations were designed using a D-optimal mixture design with three independent variables: gelatin, sucrose, and concentrated watermelon juice. Among eight formulations, Formula 5 (gelatin:sucrose:concentrated juice = 4:35:35) exhibited the best physicochemical and sensory properties, with lycopene content of 143.98 µg/g and highest overall acceptability. Fourier Transform Infrared Spectroscopy (FTIR) confirmed the presence of lycopene, sugars, and gelatin. Microbial analysis showed all formulations met safety standards. These findings suggest that concentrated watermelon juice can enhance the nutritional and functional value of jelly products, offering a promising approach to mood food innovation.

Keywords: Watermelon; Lycopene; Pectinase; Jelly; Mood Food; Functional Foods

P - 280 Influence of HPMC and Crossprovidone on Quality of Plant-based Protein supplement

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Abstract

Sarcopenia influences the loss of musculoskeletal strength and mobility, increasing the risk of disability, mortality, and fall-related injuries, such as bone fracture. This research is intended to develop a plant-based protein supplement formulation with nutrient rich, favorable wettability and dispersibility in water, and convenient consumption to ensure sufficient amount of nutrient intake in elderly. To be more precise, the developed formulation is aimed at supporting and preventing sarcopenia, reducing the risk of complications, and increasing sustainable quality of life. The formulation was developed in granule form using hydroxypropyl methylcellulose (HPMC) and crosprovidone (cross linked polyvinyl N-pyrrolidone) at 0.5–1.5% and 1–3%, respectively coupled with other excipients, and subsequently evaluated in comparison with isolated-soy protein products at the same concentration. The optimal soybean-based protein formulation consisted of 1.5% HPMC and 3% crosprovidone, exhibiting an average particle size of 265.71 ± 24.28 µm. Moreover, this formulation possessed significantly superior dispersing time, contact angle, wettability (by Washburn capillary rise wetting method), and sedimentation volume when compared with isolated-soy protein products. Moreover, moisture content, pH, and water activity were within the acceptable ranges. Interestingly, increasing the proportion of HPMC significantly improved wettability and dispersibility. In contrast, higher concentrations of crosprovidone, a superdisintegrant, enhanced granule dispersibility when compared with formulations containing the same amount of HPMC. Thus, increasing the concentration of HPMC and crosprovidone in the formulation successfully improved hydrophilicity and dispersibility of the soybean-based protein. In conclusion, this study illustrates that the soybean-based protein formulation possesses favorable wettability, easy dispersibility, and stability, making it suitable for application in the sarcopenia prevention.

Keywords: Plant-based; Protein supplement; Sarcopenia; HPMC; Crosprovidone

P - 281 Influence of Pulsed Electric Field on Germination Performance and Bioactive Content of Oat Seeds

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Abstract

This study investigated the effects of pulsed electric field (PEF) treatment on germination and bioactive compounds of oat seeds. Pre-soaked oat seeds (50 mg in 150 mL water) were subjected to PEF under varying pulse numbers (50, 100, 200), pulse frequency (5 Hz), and electric field strengths (0.6 and 1.0 kV/cm). Germination percentage (G%) and germination rate index (GRI) were measured, alongside total phenolic content (TPC), antioxidant activity (DPPH scavenging), β-glucan, and γ-aminobutyric acid (GABA). PEF treatment significantly improved G% and GRI compared to control, with 100 pulses at 1 kV/cm achieving the highest germination (92.33 ± 2.52%) and GRI (0.63 ± 0.02). Antioxidant activity and TPC were maximized under moderate PEF conditions (435.29 ± 2.97 μmol Trolox eq./100 g and 51.66 ± 4.14 mg GAE/100 g, respectively). β-Glucan content slightly decreased after germination, whereas GABA accumulation increased, reaching the highest value at 200 pulses and 0.6 kV/cm (15.41 ± 0.43 mg/100 g). These findings indicate that moderate PEF treatment effectively enhances germination and functional bioactive compounds in oat seeds, offering a promising approach to improve their nutritional and functional quality for food applications.

Keywords: Pulsed electric field; Oat; Germination; Bioactive compounds

P - 282

Simultaneous Saccharification and Fermentation of Bacterial Cellulose from Agro-Industrial Residues: A Techno-Economic Evaluation

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Abstract

The utilization of cellulosic materials derived from agricultural and agro-industrial residues as feedstock for biofuel and high-value compound production has gained increasing attention. In this study, cellulose production by *Acetobacter xylinum* BIOT302 using various agro-industrial residues was investigated. Among the tested substrates, discarded coconut water yielded the highest cellulose content, producing 12.54 g/L of dry cellulose. The obtained cellulose was subsequently utilized as a substrate for ethanol production. Enzymatic hydrolysis was performed using our bacterial cellulase at 40 FPU/g substrate under optimal conditions (50 °C, 200 rpm, pH 4.8, 24 h), which yielded a maximum glucose concentration of 52.89 ± 2.80 g/L, as determined by HPLC. Notably, this process did not require any pretreatment. The hydrolyzed glucose was then fermented using *Saccharomyces cerevisiae* TISTR5339 (2.5 × 10□ cells), yielding a maximum ethanol concentration of 24.83 ± 1.91 g/L after 24 hours of fermentation in a 250 mL Erlenmeyer flask. Furthermore, a simultaneous saccharification and fermentation (SSF) process was applied and optimized. The process began at 30 °C for the first 24 hours, followed by a gradual increase of 5 °C over the next 24 hours. This approach achieved an ethanol concentration of 32.65 ± 3.10 g/L, representing a 31.5% improvement over traditional methods that involve separate hydrolysis and fermentation steps. The SSF was successfully scaled from a laboratory (2.5 L) to a pilot-scale (100 L) airlift fermenter, yielding ethanol concentrations of 30.08 ± 0.74 g/L and 25.71 ± 0.54 g/L, respectively. Finally, a techno-economic assessment was conducted to determine the process's viability for large-scale or commercial applications. The results indicate that ethanol production using bacterial cellulose derived from discarded coconut water via the SSF process is both technically efficient and economically competitive, with a production cost of 16.77 THB per liter. This process performs comparably to current bioethanol technologies used in Thailand, which rely on molasses or cassava, with production costs of 22.09 and 22.84 THB per liter, respectively, and is also comparable to those used in the United States and China, which yield a cost of 15.95 THB per liter.

Keywords: Bacterial Cellulose; Bioethanol; Cellulosic Ethanol; Simultaneous saccharification and fermentation (SSF); Techno-Economic Evaluation

P - 284 Extraction Method Effects on Mango Kernel Oil Quality and Sensory Acceptability in Chocolate Applications

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Abstract

Current trends in sustainable food production focus on utilizing agro-industrial by-products to reduce waste and add value to products. Mango seeds show promise as a nutritious, eco-friendly food ingredient. This study examined how different extraction methods affect the physicochemical and sensory properties of mango kernel oil from four cultivars: Chokanan, Kaewban, Kaewkamin, and Khiewsawoei. The results showed that Chokanan oil obtained via solvent extraction (CSE) had the highest oil content (13.37% dry weight) and contained essential fatty acids—palmitic, stearic, oleic, and linoleic acids—with a composition similar to cocoa butter. CSE oil had saturated and unsaturated fatty acid contents of 26.23 g/100 g and 24.59 g/100 g, respectively, and measured enthalpy (27.88 ± 0.74 J/g), saponification value (4.92 ± 1.87 g/100 g), iodine value (25.87 ± 1.27 g/100 g), and acid value (2.41 ± 0.85 g/100 g). Chokanan oil was also extracted using supercritical CO_2 (C-SC-CO_2) and investigated, with enthalpy 31.17 ± 0.21 J/g, a melting range of 43 ± 2.7°C, and a saponification value of 5.54 ± 3.78 g/100 g. When the C-SC-CO_2 oil was incorporated into a chocolate formulation alongside varying amounts of cocoa butter and rice bran wax (0–100 g), the oil content did not affect hardness compared with the control. However, the combination of C-SC-CO_2 oil and rice bran wax did influence free fatty acid content. Sensory evaluation consumers(n = 100) showed the highest overall liking for a formulation containing C-SC-CO_2 oil: rice bran wax: cocoa butter in a 20:20:60 ratio, scoring highest for appearance, aroma, taste, melt-in-the-mouth texture, and overall acceptability. Overall, mango kernel oil has potential as a sustainable ingredient that can partially replace vegetable oils without compromising sensory quality, while reducing mango waste and enhancing economic value.

Keywords: Mango kernel oil; Cocoa butter; Supercritical fluid extraction (SC-CO_2)

P - 288 Bioactive Compounds and Antioxidant Activities of *Ardisia polycephala* Wall. ex A. DC. Fruit Extract

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Abstract

Ardisia polycephala Wall. Ex A. DC. is a medicinal herb documented in traditional Thai medicine. Its fruits are used as a blood tonic, antipyretic, anti-diarrheal, and hepatoprotective agents. This study aimed to investigate the antioxidant constituents and activities of aqueous (APA) and ethanolic (APE) extracts from the fruits of *A. polycephala*. Total phenolic content, total flavonoid content, total antioxidant capacity, 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulphonic acid) (ABTS), 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activities and reducing power were determined *in vitro*. The results revealed that APA contained a higher total phenolic content than APE, with values of 16.91 ± 0.73 and 15.59 ± 2.33 mg gallic acid equivalents (GAE)/g extract, respectively. Similarly, the total flavonoid content was higher in APA (16.11 ± 0.56 mg quercetin equivalents (QE)/g extract) than in APE (14.65 ± 1.34 mg QE/g extract). APA also exhibited greater total antioxidant capacity than APE, with values of 2.58 ± 0.10 and 0.93 ± 0.11 mg ascorbic acid equivalents (AAE)/g extract, respectively. Moreover, APA showed stronger radical scavenging activity against both ABTS and DPPH radicals, with IC_{50} values of 1.59 ± 0.06 and 0.85 ± 0.02 mg/mL, compared to 3.54 ± 0.14 and 1.50 ± 0.19 mg/mL for APE, respectively. Furthermore, the EC_{50} values in the ferric reducing power assay were 0.42 ± 0.06 for APA and 0.63 ± 0.24 mg/mL for APE. These findings indicate that the aqueous extract of *A. polycephala* fruit is a potent natural source of antioxidants.

Keywords: Antioxidants; *Ardisia polycephala*; Extract; Flavonoids; Phenolics

P - 289 Assessing the Efficacy of Peracetic Acid as Disinfection Agent and the Biofilm Forming Ability Upon Sanitization on Chicken Carcasses in Taiwan

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Abstract

Poultry carcass cleaning and disinfection play a critical role in slaughterhouses, effectively preventing pathogenic microorganisms from entering the food processing chain. In Taiwan, chlorine-based disinfectants (such as sodium hypochlorite and chlorine dioxide) are commonly used to remove microorganisms adhering to chicken carcasses due to their low cost and good bactericidal effects. However, recent studies have indicated that chlorine-based disinfectants pose environmental hazards and health risks to slaughterhouse workers. A new, low-hazard method for carcass cleaning and disinfection is needed to replace chlorine-based disinfectants. Peroxyacetic acid (PAA), an acetic acid peroxide, has decomposition byproducts including acetic acid, hydrogen peroxide, oxygen, and water. This study aimed to evaluate whether peroxyacetic acid (PAA) can serve as an alternative disinfectant for poultry carcasses. We also compare the biofilm forming ability of residual microorganisms before and after the treatment to assess if the disinfection process has effected on biofilm formers. This research compared the antimicrobial effect on chicken carcasses by testing Aerobic Plate Count (APC), Coliforms, and *Escherichia coli* (*E.coli*) using both spraying and dipping methods with chlorine dioxide (ClO_2) and Peroxyacetic acid (PAA) at various concentrations (50 ppm - 200 ppm). The residual microorganisms were harvested from the chicken carcasses before and after each treatment. Mix-species biofilms were measured by crystal violet staining.The results showed that after treatment with a high concentration of 200 ppm PAA via the spraying method, the APC was reduced by 90%. When treated via the dipping method, all three microbial indicators were significantly reduced by over 92%. Current research results indicate that the disinfection efficacy of peroxyacetic acid is superior to that of chlorine dioxide. These findings suggest that peroxyacetic acid can be used to replace chlorine-based disinfectants. Furthermore, under both tested conditions, the PAA disinfectant left behind residual microorganisms capable of forming biofilms, a result that provides crucial information for the slaughter and processing chain.

Keywords: Food safety; Slaughterhouse; Chicken carcass sanitization; Peroxyacetic Acid; Biofilm

P - 290 Efficiency of Mechanical Extraction of Cannabinoids from Cannabis

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Abstract

In Thailand, Cannabidiol (CBD) derived from hemp is now approved for medical and commercial use. However, the extraction process typically requires expensive equipment, posing significant challenges for small-scale operators. This study aims to develop an efficient and cost-effective mechanical extraction method using cooling and alumina balls. Two methods were tested: dry ice separation and liquid nitrogen separation. A 20-gram cannabis sample was subjected to centrifugation in a ball mill. Dry ice was utilized for 5 minutes, while liquid nitrogen involved grinding with alumina balls, removing kief every minute. The yield was approximately 25% of the flower's weight, ranging from 4.65 to 1.36 grams. Following separation, decarboxylation was performed to convert CBDA to CBD at 140°C for 30 minutes. The process was followed by ethanol extraction and HPLC analysis. The CBD concentration in kief was found to be 3 to 4 times higher than in flowers, with kief showing 12.62% compared to 2.64% in flowers. The maximum CBD concentration reached was 167.40 mg/L. Statistical analysis confirmed significant differences in extraction efficiency. The study concludes that the use of cooling and alumina balls is an effective method for CBD extraction, reducing chemical usage and costs.

Keywords: Cannabidiol; Cold extraction method; Hemp processing techniques

P - 292 First Report on Collagen Recovery from Bovine Omentum

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Abstract

Bovine omentum, a fat rich tissue that supports and protects visceral organs and contributes to immune response, is mainly composed of connective tissue and fat. Following slaughter, it is considered as an inedible by-product and generally its disposal through landfills and incineration is not environmentally sustainable. Therefore, valorization of bovine omemtum by recovering high value biomolecules like collagen and other proteins such as elastin offers a promising alternative for waste utilization and bioproduct development. Crude protein and fat contents of bovine omentum were determined using AOAC methods. Acid soluble collagen (ASC) was extracted by removing non-collagenous protein and fat, followed by acetic acid (0.5 M) treatment for 48 h at room temperature. ASC was recovered by isoelectric precipitation at pH 4.5-5. The remaining residue was used to extract enzyme soluble collagen (ESC) using Protana® prime enzyme at a range of concentrations (1-10%, w/w). Yield, pH (3-14) and salt (0-24% NaCl) solubilities, functional properties (foaming and emulsifying), and amino acid content of the isolated ASC and ESC collagen were determined. All the experiments were performed in triplicate (n=3). On a wet basis, bovine omentum contained 18.79% crude protein and 42.13% crude lipid. The yield of ASC was 3.98%. ESC yield increased significantly with enzyme concentration ($p<0.05$), reaching a maximum of 15.25% at 10% (w/w). However, a similar yield (15.22%) was obtained when 7.5% (w/w) of enzyme was used ($p>0.05$). The solubility of collagen samples was highest at pH 3 (100% relative solubility) and declined sharply above pH 4. ASC had lower salt solubility than ESC, irrespective of enzyme concentration. Among ESC samples, solubility is directly correlated with enzyme concentration. Moreover, collagen samples were maintained solubility in NaCl up to 4%, and above that a marked decrease in solubility was observed. No foaming properties were observed for all the samples, while ASC possessed the highest emulsion stability and emulsion activity index. All collagen samples possessed glycine and hydroxyproline which are characteristic of collagen. These findings highlight the potential of bovine omentum as a sustainable raw material for producing functional collagen with desirable emulsifying properties, which can be utilized for food applications.

Keywords: Bovine omentum; Acid soluble collagen; Techno-functional properties; Collagen characterization

P - 294 From By-Product to Value-Added Protein: Extruded TVP Development from Sacha Inchi Press Cake

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Abstract

This study investigated the valorization of Sacha inchi press cake (SP), an oilseed by-product, to produce texturized vegetable protein (TVP) using single-screw extrusion. Nutritional, physicochemical, functional, and structural characteristics were investigated. The SP was subjected to steam pretreatment, which reduced tannin contents (0.23 – 0.18 g/100 g) and saponin content (0.28 – 0.21 mg/g), thereby improving palatability and suitability for food applications. The pretreated SP, which is called Sacha inchi press cake meal (SPM), was blended with pea protein isolate (PPI) at varying ratios of SPM:PPI (w/w) ratios for 5 formulas: Control C (0:100), Formula 1: TA (10:90), Formula 2: TB (35:65), Formula 3: TC (70:30), and Formula 4: TD (100:0). Color analysis of all samples showed decreasing lightness (L* 76.94 – 69.95) and increasing redness (a* 3.34 – 6.60) and yellowness (b* 19.43 – 21.87) with higher SPM inclusion, producing a meat-like appearance. Texture profile analysis indicated declining hardness (1684.53 – 633.77g), chewiness (770.41 – 237.57g), and cohesiveness (0.652 – 0.402) with increasing SPM level; however, Formula TA demonstrated slightly lower hardness and chewiness but maintained adequate cohesiveness, providing a firmer yet more palatable texture comparable to the commercial texturized vegetable protein (COM),which was used as reference. Scanning electron microscopy revealed that TA retained a compact, aligned, and fibrous structure, whereas higher-SPM (TC, TD) revealed a discontinuous and porous matrix, with visible voids between protein-rich and fibrous regions, indicating reduced structural cohesion. Among the formulations, 10% SPM (TA) exhibited superior physicochemical and structural characteristics. Functional properties of Formula TA were balanced, with water-holding (3.71 g/g), oil-holding (1.80 g/g), and rehydration (1.81 g/g) capacities, indicating effective hydration and lipid retention. Proximate composition showed high protein (69.42%), low lipid (2.91%), and moderate carbohydrate (23.61%) contents, while amino acid profiling revealed abundant essential amino acids such as leucine, valine, and lysine. Oleic and linoleic acids predominated among fatty acids, with no detectable trans fats. Additional analyses, including sensory evaluation, are ongoing to further validate product quality. Overall, incorporating SPM at 10% enhanced the nutritional and functional quality of extruded plant-based meat analogues, supporting resource efficiency, circular bioeconomy, and healthier protein alternatives.

Keywords: Sacha inchi press cake; Texturized vegetable protein; Single-screw extrusion; Plant-based meat analogues; Circular bioeconomy

P - 295 Hybrid Surimi–Plant Protein Systems for 3D-Printed Salmon Fillets

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Abstract

This study explored the incorporation of Bambara groundnut (BGPI), pea (PPI), and soy (SPI) protein isolates (30 or 50 g/100 g surimi) into threadfin bream surimi to develop 3D-printed salmon analogs. Firstly, hybrid inks were formulated at various water levels (85–140 mL/100 g surimi) to develop printable inks, which were optimized based on printability (shape retention/stability) and dynamic rheology, protein structure, texture, amino and fatty acid profiles, and sensory quality as compared to grilled real salmon (RS). At optimized water levels, cylinders printed from BGPI, PPI and SPI inks showed high shape retention (85–95 %) and shape stability (84–100 %), with 30 g protein giving the best structural fidelity. Power-law fitting confirmed pronounced shear thinning with high consistency indices for both myotome (ink added with shrimp oil: SO) and myocommata (without SO) inks. SPI and PPI at a level of 30 g/100 g surimi (SPI30 and PPI30, respectively) exhibited high G′ throughout frequency and temperature sweeps, indicating strong elastic networks. After steaming, hardness of gel sample added with BGPI at 30 g (BGPI30) and 50 g (BGPI50) in 100 g surimi was increased when compared to RS. Similar result was noticed for samples added with PPI30 and SPI30. Nonetheless, addition of 50 g PPI into surimi gel (PPI50) resulted in lower hardness than the remaining samples. FTIR revealed a shift from α-helix to β-sheet–rich structures, with β-sheet content rising to 61.7–65.9%, particularly in BGPI50 and SPI30. Total amino acids increased from 49.43 g/100 g in RS to 67.8–72.6 g/100 g in PPI50 and BGPI50, with essential amino acids reaching 27.8–29.8 g/100 g. Printed fillets showed higher PUFA (38.15-47.64%) and lower MUFA (25.7–31.4%) than RS (30.68% PUFA and 64.9% MUFA), while maintaining comparable DHA levels in 30 g formulations (5.40–5.66%) than RS (5.71%). Shrimp oil (15 g/100 g) acted as both colorant and PUFA-rich flavor carrier in the myotome phase. Sensory tests indicated that PPI30, SPI30 and SPI50 (surimi gel added with 50 g SPI) achieved appearance, flavor, texture and overall acceptability scores not different from RS and above the acceptability threshold, whereas BGPI fillets were least preferred. Pearson correlations linked higher consistency index (K-value, reflecting the viscosity and structural strength of the protein matrix from Power law) and β-sheet content with greater hardness and texture liking, highlighting SPI30 and PPI30/50 as the most promising formulations for printed salmon analogues.

Keywords: 3D food printing; Plant proteins; Rheology; Salmon analogue; Shrimp oil; PUFA

P - 296 Effect of Freezing Conditions in Industrial Freezer on the Stability of Microstructure Formation in Meat Analog Production by Freeze-alignment Method

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Abstract

Development of meat analogues production technique have gained increased attention as a sustainable action, driven by concerns about the potential scarcity of meat for human consumption due to the growth of the global population. The author's research group has intensively studied on meat analogue processing by using the freeze-alignment technique. In this process, raw materials (containing protein, lipid, etc.) are frozen to form ice microstructures. The ice crystals are then removed by thawing, resulting in a porous microstructure with highly connected sheet-like structures with a meat-like appearance. In this study, the potential for industrial application of this technology from the perspectives of simulation within freezers and controllability of the meat-like microstructures were investigated. The sample formulation was prepared as a slurry consisting of soy protein isolate powder (dry heat treated), sodium alginate, sodium chloride, glucono-δ-lactone, canola oil, and water. The slurry was homogenized, and the mixed samples were placed in cubic silicone molds (3.5 x 3.5 x 3.5 cm). The samples were frozen at -10 ˚C for 8 h. After freezing, the samples were removed from the molds, soaked in a 3 wt% calcium chloride solution, and stabilized at 4 ˚C overnight. Excess solution was rinsed off with deionized water before use. The obtained gel samples were subjected to different freezing methods and temperature conditions ranging from -10 ˚C to -80 ˚C. The freezing-front geometry, freezing-front velocity, and temperature gradient in a frozen zone, the temperature profiles during the freezing phases were simulated using a mathematical freezing model. The commercial finite-element analysis program COMSOL 6.1 was used to solve the mathematical model. The experimentally obtained temperature profiles during freezing were mainly used to determine the parameters in the numerical simulations based on finite element analysis. The results demonstrated that freezing temperature and freezing front rate significantly affect the formation of ice crystals, with lower temperatures and faster freezing rates producing smaller crystals. Using experimental data and simulation models, a quantitative relationship among freezing front rate, temperature gradient, and ice crystal size was established and validated against experimental observations.

Keywords: Meat analogs; Freeze alignment; Microstructure formation; Texture

P - 299 Comparative Study on Ultrasonic and Pulsed Electric Field Extraction of Phrayawan (*Curcuma Phrayawan* Boonma&sansouk) Rhizomes and Evaluation of Bioactive Compounds

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Abstract

This study investigated the effects of Ultrasonic-Assisted Extraction (UAE), Pulsed Electric Field (PEF), and their sequential combinations on the extraction efficiency, phytochemical content, and antioxidant activities of *Curcuma phrayawan* rhizomes. Rhizomes aged 6-8 months were dried, powdered, and extracted using deionized water, 50% ethanol, and 99.7% ethanol under four extraction conditions: UAE, PEF, UAE + PEF, and PEF + UAE. All extractions were performed in triplicate (n=3), and results were expressed as mean ± standard deviation. Extraction yield, total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activities (DPPH, ABTS, and FRAP assays) were evaluated. The UAE + PEF technique using deionized water produced the highest extraction yield (10.32 ± 0.79%), whereas PEF + UAE with 99.7% ethanol achieved the highest TPC (494.69 ± 0.20 mg GAE/g) and TFC (194.51 ± 0.82 mg QE/g). Antioxidant activities correlated positively with TPC and TFC, with PEF + UAE extracts exhibiting the strongest radical scavenging and reducing power (DPPH IC_{50} = 712.53 ± 6.91 µg/mL, ABTS IC_{50} = 651.73 ± 5.22 µg/mL, FRAP IC_{50} = 373.67 ± 3.79 µg/mL). The enhanced performance of the combined UAE and PEF techniques can be attributed to the synergistic effects of acoustic cavitation and electroporation, which improve solvent penetration, cell wall disruption, and mass transfer. These findings demonstrate that integrating UAE and PEF provides a green, efficient, and scalable extraction strategy for producing bioactive-rich *Curcuma phrayawan* extracts with potential applications in functional foods, nutraceuticals, and cosmetics.

Keywords: *Curcuma phrayawan*; Ultrasonic-Assisted Extraction; Pulsed Electric Field; Antioxidant Activity

P - 308 Development of a Choline Database for Thai Food and a Population-Wide Assessment of Choline Intake in Thailand

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Abstract

Choline is an essential nutrient for human health, and a deficiency is associated with health problems such as metabolic dysfunction-associated steatotic liver disease and cardiovascular disease. Research indicates that Western populations have inadequate choline intake. This issue is particularly alarming for Asian nations, where meat, a primary source of choline, is less commonly consumed. Currently, two major country-specific choline databases are recognized: the United States Department of Agriculture (USDA) and the Australian Food and Nutrient Database (AUSNUT) Choline Database. These were the only two national databases available before this study. This study established a choline database for Thai food and evaluated the choline intake status of the Thai population. Following the guidelines of the Food and Agriculture Organization/the International Network of Food Data Systems, 1,806 Thai food items were matched with the U.S. choline database, and the missForest imputation method was employed to fill in missing data. We then evaluated choline intake in adults aged 18-65 years using a nationally representative sample from the Thai Food Consumption Survey (n = 3,593). Our results showed that animal-based foods such as eggs, meat, and fish contain significantly more choline than plant-based foods. The study also revealed a potential choline inadequacy in the Thai population. On average, men consumed 192 mg daily, which is well below the recommended 550 mg, while women averaged 154 mg, also below their recommended 425 mg. The gender difference was statistically significant ($p < 0.001$). In conclusion, this study successfully created a choline database for Thailand and shows that most Thais do not meet the recommended choline intake.

Keywords: Choline database; Thai food; Thai population; Choline intake; Imputation method

P - 312 Evaluating The Effects of Different Strain Combinations on The Fermentation Aroma of Kombucha

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Abstract

Kombucha is a popular sparkling fermented tea beverage traditionally produced using a undefined Symbiotic Culture of Bacteria and Yeast (SCOBY). Due to the complexity of natural SCOBY, understanding the specific contributions of individual microorganisms remains a challenge. This study evaluated the effects of defined strain combinations on the physicochemical properties, bioactive components, and volatile profiles of kombucha. Fermentations were conducted using combinations of three acetic acid bacteria (*Komagataeibacter saccharivorans* LYC1690, *K. xylinus* LYC1696, and *K. xylinus* LYC1707) and three yeast strains (*Zygosaccharomyces bailii* LYC1691, *Debaryomyces hansenii* LYC1262, and *Z. bailii* LYC1699). The results indicated that the yeast species was the dominant factor determining the metabolic profile. Among the tested strains, *Z. bailii* LYC1699 exhibited the most vigorous fermentation activity, producing the highest ethanol content (>15,000 ppm) and total volatile compounds, characterized by a high abundance of esters such as ethyl acetate and isoamyl acetate. In contrast, *D. hansenii* LYC1262 resulted in a distinct low-alcohol profile (<500 ppm) with significantly elevated gluconic acid levels (>3,500 ppm), demonstrating its potential for low-alcoholic functional beverage development. The combination of *Z. bailii* LYC1691 and *K. saccharivorans* LYC1690 achieved the highest consumer acceptance in sensory evaluation, with an overall liking score of 7.23 on a 9-point scale. While yeasts drove the primary chemical changes, acetic acid bacteria significantly modulated the aroma complexity. Principal Component Analysis (PCA) and Agglomerative Hierarchical Clustering (AHC) of GC/MS data revealed that combinations involving *K. xylinus* LYC1707 formed distinct aroma clusters, separate from those of *K. saccharivorans*, suggesting specific bacterial influence on volatile composition. In conclusion, precise pairing of *Zygosaccharomyces* and *Komagataeibacter* strains allows for the targeted modulation of kombucha's flavor, acidity, and functional properties, offering a scientific basis for standardized industrial production.

Keywords: Kombucha; *Zygosaccharomyces bailii*; *Komagataeibacter*; GC/MS; Sensory evaluation; Volatile compounds

P - 313 Analysis of Bitter-Flavored Compounds in Young Citrus Fruits and Thinned Fruits and Development of an HPLC Analytical Method

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Abstract

Citrus cultivation and processing generate substantial quantities of non-marketable fruit, including young fruit removed during thinning and fruit discarded due to disease, cracking, insect damage, or wind damage. These citrus wastes still contain various potentially bioactive natural compounds, such as flavonoids, polyphenols, and triterpenoids. However, the bitter-tasting components present (e.g., limonin and nomilin) may limit their potential for further processing and utilization. Therefore, establishing reliable analytical methods for the quantitative analysis of bitter-taste-related compounds is a preliminary and essential step in advancing research on the utilization of citrus waste. This study selected three common citrus varieties in Taiwan: Tankan mandarin (*C. tankan* Hayata), Satsuma mandarin (*C. reticulata Blanco* × *C. sinensis Osbeck*), and Kotokan mandarin (*C. kotokan* Hayata). Samples were categorized into 2–3 maturity stages based on harvest timing for each variety. All samples were sorted after collection and stored frozen. They were subsequently crushed and homogenized to prepare whole fruit pulp for component analysis during subsequent experiments. At the current stage of research, this study has successfully established HPLC analytical conditions and standard calibration curves for 13 bitter-taste-related and bioactive compounds, including hesperetin, naringenin, hesperidin, naringin, narirutin, neohesperidin, limonin, nomilin, tangeretin, kaempferol, quercetin, and rutin. This study constitutes preliminary methodological research, focusing on establishing analytical methods and standard curve conditions. The obtained standard calibration parameters serve as the methodological foundation for subsequent quantitative analysis of bitter-related compounds in young citrus fruits and thinned fruit samples. They also support future comparative studies across different cultivars and maturity stages, as well as advance research on whole-fruit utilization of citrus.

Keywords: Citrus waste; Bitter compounds; Flavonoids; Whole-fruit utilization; HPLC

P - 315 Enhancing Calibration Transfer for β-Glucan Prediction in Sprouted Oat Using Ground and Whole-Grain NIR Spectra

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Abstract

Scattering differences between ground and intact cereal kernels remain a major obstacle for robust near-infrared (NIR) prediction models because they distort spectral features and prevent direct cross-sample transferability. This study investigated calibration transfer (CT) strategies to improve β-glucan prediction in sprouted oat grains by designating the ground spectra as the master domain and the whole-grain spectra as the slave domain. β-Glucan content was quantified using the AOAC 995.16 enzymatic method. After standard preprocessing (SNV and first derivative), five modeling strategies were evaluated using strictly non-leaking 5-fold cross-validated predictions: (i) PLS on ground spectra, (ii) PLS on whole spectra, (iii) direct standardization (DS), (iv) PCA-enhanced DS (DS-PCA), and (v) a nonlinear PLS–SVR hybrid model. Synthetic spectral perturbation experiments were additionally designed to simulate mild–severe multiplicative and additive scattering to evaluate calibration robustness under controlled mismatch conditions. Ground-based PLS provided the strongest baseline performance (RPD ≈ 1.70), whereas whole-grain PLS suffered from stronger scattering effects. Applying linear CT approaches (DS and DS-PCA) improved the transferability of the ground model to whole-grain spectra, yielding stable but moderate performance (RPD ≈ 1.06). Under synthetic perturbation, DS demonstrated markedly enhanced robustness, maintaining high predictive stability even under severe spectral distortion (RPD > 3.0), whereas the no-transfer model deteriorated rapidly. These results indicate that linear CT efficiently corrects global multiplicative scatter, while nonlinear PLS–SVR offers only marginal improvements when chemical information is weak relative to scattering effects. Overall, the combined real-sample and synthetic-scatter framework presented here provides a practical pathway for enabling reliable β-glucan quantification directly from intact sprouted oat grains. This supports rapid screening workflows, strengthens quality control in grain processing, and offers a scatter-aware calibration-transfer strategy applicable to broader food-analytics and AgriTech applications.

Keywords: Near-infrared spectroscopy; β-glucan prediction; Calibration transfer; Scatter mismatch; Spectral robustness

P - 317 Optimization and Characterization of Soluble Dietary Fiber Extracted from Edamame (*Glycine max* L.) Hulls by Plasma-Activated Water Technology

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Abstract

Edamame (*Glycine max* L.) hulls, an abundant agricultural by-product, are rich in dietary fiber but underutilized. This study investigated the optimization of soluble dietary fiber (SDF) extraction from edamame hulls using plasma-activated water (PAW) as a green, non-thermal technology. A Box–Behnken Design (BBD) was employed to optimize three extraction parameters: solid-to-liquid ratio (1:10-1:15, w/v)**,** treatment time (10–30 min), and gas flow rate (3–5 L/min). The quadratic regression model showed excellent fit (R^2 = 0.9538, $p <$ 0.0001). Optimal conditions were determined as 14.7 g/mL ratio, 25.2 min treatment time, and 3.5 L/min gas flow rate, achieving a maximum SDF yield of 7.82%. Fourier-transform infrared spectroscopy (FT-IR) revealed structural modifications in O–H stretching (3400 cm^{-1}), C–H vibration (2927 cm^{-1}), and C=O stretching (1738 cm^{-1}), confirming partial depolymerization of cellulose and hemicellulose into hydrophilic SDF. Scanning electron microscopy (SEM) demonstrated significant morphological changes: PAW-treated fibers exhibited rougher, more porous surfaces with fragmentation compared to the compact, smooth structure of control samples, indicating effective cell wall disruption. These findings demonstrate that PAW pretreatment is an energy-efficient, solvent-free method for enhancing SDF extraction and modifying fiber structure, offering a sustainable approach to valorize agricultural by-products into functional food ingredients.

Keywords: Edamame hulls; Soluble dietary fiber; Plasma-activated water; Box–Behnken Design

P - 318 Lipids from *Scomber japonicus* Eggs Suppress Inflammation in LPS-Stimulated RAW 264.7 Macrophages

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Abstract

Scomber japonicus (S. japonicus), widely distributed in temperate and subtropical continental shelf waters, particularly in the East China Sea, is an important marine resource in the ecosystems of Japan, Korea, and China. Oils derived from this species are known to be rich in omega-3 fatty acids; however, the biological activities of *S. japonicus* egg lipids have not yet been well characterized. In this study, we investigated the anti-inflammatory effects of lipids extracted from *S. japonicus* eggs using LPS-stimulated RAW 264.7 macrophages. The egg-derived lipids (25–200 μg/mL) showed no cytotoxicity and significantly suppressed nitric oxide (NO) production and inducible nitric oxide synthase (*iNOS*) expression in a dose-dependent manner. Furthermore, the lipids markedly downregulated the mRNA expression of pro-inflammatory cytokines, including *TNF-α, IL-1β*, and *IL-6*, as well as cyclooxygenase-2 (*COX-2*). The inhibitory effects were further supported by reduced activation of inflammation-related signaling pathways, as evidenced by decreased protein expression of NF-κB–associated factors (IκB-α and p65), MAPK pathway components (p-p38, p-JNK, and p-ERK), and cyclooxygenase enzymes (COX-1 and COX-2). Collectively, these findings demonstrate that *S. japonicus* eggs lipids exert anti-inflammatory effects by suppressing NF-κB and MAPK signaling pathways, highlighting their potential as a functional marine-derived bioactive ingredient.

Keywords: Food; Lipid; Marine; Biotechnology

P - 327 Comparative Effects of Finasteride and Minoxidil on Sperm Quality and Histological Changes in the Reproductive Organs of Male Mice with Testosterone-Induced Alopecia

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Abstract

Finasteride and minoxidil are widely used as treatment for androgenetic alopecia (AGA), yet their potential adverse effects on the male reproductive system remain a concern. Although these drugs are applied topically, systemic absorption has been reported, which may lead to unintended effects on reproductive endocrine and spermatogenic function. Finasteride inhibits 5α-reductase, reducing androgen conversion and potentially impairing fertility, whereas minoxidil exerts systemic vasodilatory effects. This study compared the effects of finasteride and minoxidil on sperm quality and histopathological changes in male reproductive organs in a testosterone-induced AGA mouse model. Male mice were randomly assigned to four groups (n=6 per group): normal control, AGA model (negative control), finasteride-treated, and minoxidil-treated groups. AGA was induced by subcutaneous injection of 3.5 mg/kg testosterone propionate, while normal control received olive oil. Thirty minutes after induction, finasteride and minoxidil were topically applied to the two treatment groups, and vehicle solution (propylene glycol: ethyl alcohol: water) was applied to control groups for 21 consecutive days. Finasteride significantly reduced (p<0.05) the relative seminal vesicle weight (7.20±1.17 g/100g) compared with both the AGA model (10.30±1.26 g/100g) and normal control (9.54±1.57 g/100g). No significant differences (p>0.05) were observed in testicular and epididymal weights among groups. Both finasteride and minoxidil significantly decreased (p<0.05) sperm concentrations (6.11±1.81 and 6.95±3.80 million cells/mL, respectively), compared with the AGA model (25.14±7.22 million cells/mL) and normal control (29.78±7.90 million cells/mL) groups. Additionally, both drugs increased the percentage of immotile sperm, reduced non-progressive motility, and elevated sperm head abnormalities. However, histopathological assessment showed no significant structural alterations in the testes, epididymis, or seminal vesicles in any groups. In conclusion, finasteride and minoxidil adversely affect sperm quality without inducing overt histopathological changes in male reproductive organs. These findings enhance understanding of how anti-alopecia medications may influence male reproductive function and suggest potential implications for long-term topical use in humans, warranting further clinical evaluation.

Keywords: Androgenetic alopecia; Finasteride; Minoxidil; Reproductive System; Sperm

P - 330 Production of Hop-Flavored Alcoholic Beverage from Glutinous Rice

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Abstract

A naturally sweet and low-bitterness profile is exhibited by traditional Sato due to its rice-based fermentation system, which limits the incorporation of hop-derived characteristics. To address this limitation, two hop-addition strategies were compared to evaluate their effects on microbial dynamics, biochemical changes, and product quality. Glutinous rice was saccharified using *look-pang* under solid-state fermentation for 3 days, and alcoholic fermentation was carried out with *Saccharomyces cerevisiae*. Hop extract (0.5% w/v) was incorporated by (i) submerged fermentation, in which the extract was added to the fermented rice matrix, and (ii) liquid fermentation, in which the extract was mixed into the pressed rice filtrate. Higher populations of yeast and mold, and lactic acid bacteria were observed in submerged fermentation, and greater acidification and saccharolytic activity were associated with these increases. Higher ethanol content (10.63 ± 0.05% v/v) was produced in submerged fermentation compared with liquid fermentation (8.87 ± 0.04% v/v), and this result was attributed to continued enzymatic hydrolysis of residual starch from mold inocula. Sensory evaluation using a 9-point hedonic scale with 50 untrained consumers indicated higher overall liking for the submerged-fermented beverage (7.77 ± 1.63) than for the liquid-fermented variant (7.16 ± 1.63) ($p < 0.05$). Overall, enhanced ethanol productivity and stronger consumer acceptance were achieved by submerged hop-integrated fermentation, while improved process controllability and scalability were offered by liquid fermentation.

Keywords: Sato; Hop extract; Craft alcoholic beverage; Glutinous rice fermentation

P - 331 Characterizing Rice Bean (*Vigna umbellata*) Protein Isolate under Different Extraction Conditions

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Abstract

Rice bean (*Vigna Umbellata*) is a relatively underutilized legume that is cultivated predominantly in the upper northern region of Thailand. Despite its high protein content, nutritional value, and low production cost, its practical applications in food and industrial products remain limited. This study aimed to evaluate the effects of pH (8, 9, and 10) and temperature (40, 50, and 60 °C) during the extraction process on the yield, proximate composition, functional properties, and antioxidant activity. The extraction yield ranged from 9.40% to 17.45%, with the highest yield obtained at pH 10 across all temperatures.The highest protein content was observed at pH 10 at 40 °C. Antioxidant activity showed IC_{50} values of 6.13–9.70 mg/mL (DPPH) and 5.46–9.91 mg/mL (ABTS), alongside total phenolic content (1.42–3.29 mg GAE/g) and FRAP values (4.34–5.17 µmol Trolox/g). The PCA biplot, explaining 34.22% of the total variance on PC1 and 27.78% on PC2, revealed distinct clustering patterns among extraction conditions and their relationships with functional, compositional, and antioxidant properties. Samples extracted at pH 10 at 50 and 60 °C were strongly associated with higher yield, oil-holding capacity (OAC), foaming stability (FS30), and total phenolic content (TPC), while samples extracted at pH 8 at 40 °C and pH 9 at 50 °C were associated with water-holding capacity (WAC) and FRAP activity. Antioxidant activities (DPPH and ABTS) were enhanced at pH 9 at 60 °C and pH 10 at 40 °C, whereas protein content showed an inverse relationship with OAC and yield. These results indicated that alkaline extraction under optimized conditions can effectively enhance the quality and bioavailability of isolated rice bean protein.

Keywords: Rice bean; Sustainable protein isolate; Alkaline extraction

P - 332 Optimization of Pulsed Electric Field Conditions for Wheat Sprout and its Flour Quality

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Abstract

Pulsed Electric Field (PEF) is a non-thermal technology that applies short, high-voltage pulses to improve cell membrane permeability and stimulate biochemical activity in seeds. The Samerng 2 variety, cultivated in northern Thailand, possesses high protein content and desirable baking quality. To enhance its functional and antioxidant properties, this study aimed to evaluate the effect of pulsed electric field (PEF) treatment combined with different germination times on the germination behavior, flour characteristics, pasting properties, and antioxidant capacity of Samerng 2 wheat. Wheat grains were exposed to electric field strengths of 2, 5, and 8 kV/cm with 25, 63, and 100 pulses, followed by germination for 24, 36, and 48h. Germination percentage and sprout length increased significantly with higher pulse numbers and longer germination times, with the best result at 2 kV/cm, 100 pulses, and 48h, yielding 75.00 ± 1.00% germination and 1.73 ± 0.21cm sprout length. Overall, PEF treatment combined with germination resulted in significant changes in the physicochemical and functional properties of the flour relative to ungerminated wheat. Moisture of the flour (4.23–7.39%) and water activity (0.38–0.55) increased slightly, while protein content remained stable (12.50–13.16%). Water absorption (1.01–1.25 g/g) and oil absorption (1.93–2.38 g/g) were higher, indicating changes in hydration-related properties. Peak viscosity of the flour decreased from 3546.7 to 179.7 RVU, suggesting starch degradation during germination. Total phenolic content increased from 0.48 to 1.37 mg GAE/g flour, and antioxidant activities measured by ABTS, DPPH, and FRAP were higher, reflecting biochemical modifications during germination. Principal component analysis (PCA) revealed that wheat germination traits, including germination power, sprout length, and protein, were positively correlated with antioxidant activity. Negative correlations were observed with peak and final viscosities. While moisture and water activity aligned with pasting viscosities, reflecting distinct functional responses under PEF-assisted germination. Overall, PEF-assisted germination produced germinated Samerng 2 wheat flour that displayed enhanced germination-related characteristics along with notable modifications in its functional and antioxidant attributes compared with the ungerminated flour, highlighting its potential as a functional bakery ingredient with lower viscosity and improved nutritional quality.

Keywords: Pulsed electric field; Wheat germination; Functional properties; Antioxidant activity; Non-thermal processing

P - 334 Multivariate Evaluation of Thermal Processing–Induced Changes in Functional, Physicochemical, and Nutritional Properties of Red Kidney Bean (*Phaseolus vulgaris* L.) Flour

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Abstract

Red kidney bean (*Phaseolus vulgaris* L.) is a widely cultivated, economical legume and a sustainable source of plant-based protein, especially in developing countries. This study evaluated how different thermal processing methods affect the nutritional composition, physicochemical characteristics, and functional properties of red kidney bean flour. The flour was prepared using four different heating methods which were microwave, vacuum, hot air, and boiling and evaluated for physicochemical and functional characteristics. Principal component analysis (PCA) was conducted to explore the relationships between heating treatments and the functional and physical properties of the flour. Principal component analysis (PCA) was used to explore relationships between heating methods and flour properties. The first two principal components (PC1 and PC2) explained 79.3% of the total variance, indicating good data representation. PCA revealed that microwave and vacuum heated samples exhibited the highest functional properties, including emulsion capacity, foam capacity, emulsion stability, solubility, and protein content, suggesting that these treatments effectively preserved protein functionality. In contrast, boiling was associated with higher pH values, whereas hot-air drying showed the strongest association with moisture content. Control samples were closely aligned with ash and oil absorption, indicating superior mineral concentration and lipid-binding capacity. These findings highlight that different heating treatments distinctly influence the physicochemical and functional properties of red kidney bean flour. Multiple linear regression analysis further quantified the influence of physicochemical and functional properties on protein and fiber contents. Protein content was positively correlated with water activity (a_w), emulsion capacity (EC), emulsion stability (ES), foam capacity (FC), and color parameters a^* and b^*, while negatively correlated with bulk density, moisture, L^*, fat, fiber, ash, and carbohydrate (R^2 = 99.5%). Similarly, fiber content exhibited positive correlations with aw, EC, ES, FC, a^*, and b^*, but negative correlations with bulk density, moisture, L^*, fat, protein, ash, and carbohydrate (R^2 = 99.8%). Overall, microwave and vacuum treatments emerge as the most suitable methods for producing red kidney bean flour with enhanced functional properties and preserved protein and fiber quality, supporting their use in value-added legume-based products.

Keywords: Red kidney bean; Thermal treatment; Sustainable legume-based flour

P - 337 Immune-Enhancing Effects of Lipids Extracted from *Scomber japonicus* Eggs in Immune-Suppressed Mice

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Abstract

Scomber japonicus eggs contain high levels of polyunsaturated fatty acids, particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Omega-3 fatty acids such as EPA and DHA are well known for their immunomodulatory properties. However, the effects of *S. japonicus* egg lipids (SJL) on immune regulation remain unexplored. In the present study, we evaluated the immune-enhancing effects of SJL in a cyclophosphamide (CY)-induced immunosuppressed mouse model. To improve distribution efficiency following oral administration, SJL was combined with polyethylene glycol (PEG), referred to as SJL-PEG. Mice receiving SJL-PEG (50–200 mg/kg BW) after CY injection exhibited a marked improvement in spleen index relative to the CY group. Furthermore, splenocytes stimulated with Con A or LPS exhibited enhanced proliferation and natural killer cell cytotoxicity. In addition, the treatment with SJL-PEG upregulated mRNA expression of cytokines including *IL-1β*, *IL-2*, *IL-4*, *IL-6*, *TNF-α*, and *IFN-γ*. Overall, these findings indicate that SJL possesses immunomodulatory properties and demonstrate its potential to ameliorate CY-induced immune suppression.

Keywords: Food; Lipid; Immunosuppression

P - 338

Effect of Heat Pump Drying Conditions on the Physicochemical Properties of King oyster mushroom (*Pleurotus eryngii*) Powder

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Abstract

King oyster mushroom *(Pleurotus eryngii)* is a nutritionally rich edible fungus containing proteins, dietary fiber, vitamins, and bioactive compounds with antioxidant activity. This study investigated the effects of heat pump drying at three temperatures (55, 60, and 65°C) and two durations (5.0 and 5.5 h) on the physicochemical properties of mushroom powder using a 3×2 factorial completely randomized design. Drying temperature and time significantly influenced color, moisture content, water activity (a_w), and functional properties. Lower temperatures and shorter drying times resulted in higher moisture and a_w, together with a darker color likely associated with enzymatic browning during slow dehydration. In contrast, the highest temperature (65°C) intensified non-enzymatic browning, reduced lightness (L*), and slightly decreased water-holding capacity (WHC) and oil-holding capacity (OHC), reflecting thermal effects on component functionality. Among all conditions, drying at 60 °C for 5.5 h yielded the most desirable balance of quality attributes, producing powder with light color (L* ≈ 70.1), low moisture (≈7.7%), low a_w (≈0.33), high WHC (≈3.4 g/g), and high OHC (≈1.5 g/g). These results provide clear evidence of how temperature–time combinations affect the physicochemical and functional characteristics of *Pleurotus eryngii* powder. These findings demonstrate that controlling drying conditions is essential for optimizing the physicochemical quality of *Pleurotus eryngii* powder, providing practical guidance for its application as a functional ingredient in various food products.

Keywords: *Pleurotus eryngii*; Heat pump drying; Physicochemical properties; Water holding capacity; Oil holding capacity

P - 339 Comparative Evaluation of Drying Techniques and Their Impact on the Physicochemical Quality of Watermeal (*Wolffia globosa*) Powder

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Abstract

Wolffia spp. has emerged as a promising superfood due to its exceptionally high protein and micronutrient content. However, its naturally high moisture content (95%) requires an effective drying process to maintain high physicochemical quality. This study investigated the effects of two drying methods, hot-air oven drying and vacuum drying at two temperatures (60°C and 70°C) on the physicochemical properties of watermeal (*Wolffia globosa*) powder. Fresh watermeal samples were dried under four conditions, milled into powder, and analyzed for moisture content, water activity, color, solubility, pH, bulk properties, and chemical composition. Vacuum drying at 70°C produced the most desirable physicochemical profile, yielding the lowest moisture content and water activity, along with the highest protein (26.4 ± 0.04%). Oven drying at 60°C resulted in the lightest color, while vacuum drying at 60°C produced the highest crude fiber content (13.7 ± 0.40%). FTIR analysis showed the polysaccharide core structure remained stable, minor shifts in the protein Amide I band and the O–H region indicated molecular alterations caused by the heat/vacuum drying treatments. Moreover, principal component analysis (PCA) was conducted to examine correlations among physicochemical parameters, confirming that vacuum drying at 70 °C exhibited the most favorable overall quality profile. These findings suggested that vacuum drying at 70°C is the most effective method for producing high-quality watermeal powder with enhanced nutritional content, offering significant potential for use in functional food applications.

Keywords: *Wolffia globosa*; Drying methods; Watermeal powder

P - 345 Application of Shrimp Chitosan as a Clean-Label Preservative in Squeezed Orange Juice

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Abstract

Orange juice is widely consumed globally. Nevertheless, both fresh and pasteurized products are susceptible to spoilage by acid-tolerant microbes, particularly *Zygosaccharomyces bailii* and *Alicyclobacillus acidoterrestris*, which induce sensory defects and reduce overall quality. Nowadays, natural food preservatives are more attractive to consumers as clean-label products, especially chitosan, which has been used in many food products to maintain food quality and extend shelf-life. This study aimed to evaluate the antimicrobial activity of food-grade shrimp chitosan against spoilage microorganisms and to investigate its effects on the physicochemical properties of squeezed orange juice. The result showed that the minimum inhibitory concentration (MIC) of chitosan against both *Z. bailii* and *A. acidoterrestris* was 0.004% (w/v), while the minimum bactericidal concentration (MBC) values were 0.006% (w/v) and >0.5% (w/v), respectively, indicating higher resistance of *A. acidoterrestris* to chitosan. During storage, squeezed orange juice was stored at 10 °C and 35 °C for 49 days; the addition of shrimp chitosan at concentrations of 0.05% and 0.1% (w/v) significantly retarded the growth of *A. acidoterrestris*. In addition, 0.1% (w/v) chitosan can reduce guaiacol formation, a key off-flavor compound that can cause unpleasantness for consumers, produced by *A. acidoterrestris*. Notably, the physicochemical parameters of squeezed orange juice, including pH, total soluble solids, titratable acidity, and appearance, remained stable during storage. These findings demonstrate that shrimp chitosan can serve as an effective natural preservative for extending the shelf-life of squeezed orange juice without adversely affecting its quality attributes.

Keywords: Antimicrobial activity; Chitosan; Natural preservative; Orange juice; Shelf-life extension

P - 352 Growth stimulation of *Lachancea thermotolerans* and *Saccharomyces cerevisiae* Using Pulsed Electric Field

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Abstract

Fermentation relies on microorganisms, which convert sugars into key metabolites that determine product quality. Enhancing yeast growth and nutrient uptake is therefore critical. Pulsed electric field (PEF) technology has emerged as a promising approach to improve fermentation efficiency by increasing cell membrane permeability and facilitating mass transfer. This study evaluated the growth stimulatory effects of PEF on two yeast species, including *Lachancea thermotolerans* JCM 19085 and *Saccharomyces cerevisiae* K901, cultured in YPD medium. PEF electrical field strength (0.5 and 3.0 kV/cm) and treatment duration (30 and 90 s) were varied, then cell growth was measured via OD_{660} over 48 h of incubation. The optimal condition for electropermeabilization of *L. thermotolerans* was determined to be 0.5 kV/cm for 30 sec. This treatment significantly increased the maximum specific growth rate (μ_{max}) from 0.168 ± 0.005^{b} h^{-1} to 0.228 ± 0.008^{a} h^{-1}. However, the lag time also substantially increased from 5.844 ± 0.210^{a} h to 10.257 ± 0.197^{b} h. In contrast, the optimal condition of *S. cerevisiae* was 0.5 kV/cm for 90 sec. This treatment resulted in a slight increase in μ_{max} from 0.186 ± 0.001 h^{-1} to 0.195 ± 0.001 h^{-1}, but more significantly, it substantially reduced the lag time from 9.247 ± 0.229^{b} h to 6.274 ± 0.164^{a} h. Ethanol production was quantified by HPLC analysis, revealing that PEF treatment showed an enhanced ethanol concentration produced by L. *thermotolerans* from 3.38 ± 0.06^{b} g/L (control) to 4.14 ± 0.21^{a} g/L, corresponding to an increase of approximately 22.5%. In contrast, ethanol concentration produced by S. *cerevisiae* decreased from 7.29 ± 0.15 g/L (control) to 6.77 ± 0.27 g/L after PEF treatment, representing a decrease of approximately 7.1%. Overall, the results highlight the potential of PEF as a controllable non-thermal tool for enhancing fermentation performance through species-specific electrostimulation.

Keywords: Pulsed Electric Field; Stimulation; Yeast; Specific growth rate; Lag time

P - 355 Smart Determination of Hom Thong Banana (*Musa* sp., AAA Group) Harvest Maturity through Image Processing and Multivariate Physicochemical Analysis

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Abstract

Hom Thong Banana (*Musa* sp., AAA Group) is among the most widely consumed fruits worldwide and are rich in nutrients; however, substantial postharvest losses remain a major concern for Hom Thong Banana (*Musa* sp., AAA Group)growers in Mae Taeng District. Field observations revealed that the main causes of losses during harvest were improper fruit size, failure to meet market requirements, and premature ripening on the tree (30.8%). In addition, many farmers do not count the days after cutting the banana blossom as prescribed, leading to inaccurate harvest timing. To enhance harvesting accuracy and reduce postharvest losses, this study examined the physical and chemical changes in bananas harvested at 8, 9, 10, 11, and 12 weeks, using MATLAB-based image-processing techniques on a sample size of 100 fruits. The relationships between the characteristics of raw and ripe bananas were analyzed to determine an appropriate harvest-maturity index. Color evaluation showed that the banana peel at week 9 had the highest L value (85.27 ± 0.90; $p < 0.05$), indicating the lightest color. As curing time increased, L* values gradually decreased, while a* and b* values varied slightly; week 11 exhibited the highest b* value (27.76 ± 2.07; $p \geq 0.05$). According to image-processing analysis, fruits at week 10 displayed the highest area, perimeter, roundness, and aspect-ratio measurements, consistent with their progression from the immature to the mature developmental stage.When combined with chemical and textural data (firmness and TSS), weeks 10–11 appeared to be the optimal harvest period, producing large fruits with firm texture and appropriate ripeness for both ripening and fresh consumption. Overall, these findings demonstrate the feasibility of integrating imaging and image-processing technology with physicochemical measurements to establish a reliable banana harvest-maturity index. This approach could be further developed into smart-agriculture or artificial-intelligence models to assist farmers in accurately assessing harvest age, thereby minimizing postharvest losses and improving supply-chain efficiency.

Keywords: Banana; Harvest index; Image processing technology

P - 358 Comprehensive Optimization of Foam-mat Drying Conditions to Enhance the Physicochemical Quality of Crab Paste Powder

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Abstract

The objectives of the present study were to determine the optimum conditions and evaluate the quality of instant powder from crab paste obtained from foam-mat drying. For foam-mat drying, 10% maltodextrin and Two foaming agents including methocel, a combination of methocel and carboxy methyl cellulose (2:1). The mixture was whipped and dried using a cabinet dryer with two temperatures at 60 and 70°C for 5 hour..Response surface methodology (RSM) was employed to optimize the foaming parameters, and the optimal condition was identified as 1% Methocel as the foaming agent.The optimal drying condition for crab paste foam was 70°C for 5 hours. Methocel concentration and drying temperature had negative effects on the water solubility index (WSI) and water absorption index (WAI). The nutritional composition of crab paste powder showed protein (18.79%), fat (38.92%), moisture (12.11%), ash (47.72%), fiber (1.78%), and carbohydrate (73.11%). This study demonstrates the potential of foam-mat drying as an effective process-optimization approach to enhance the quality attributes of semi-finished crab paste, thereby extending its shelf life and improving consumer acceptability.

Keywords: Crab paste; Foam mat drying; Crab paste powder; Methocel; Nutrition

P - 359 Utilization of Jackfruit Seed Flour as an Egg Yolk Replacer: Impacts on Physico-Chemical Properties and Shelf Life of Salad Dressing

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Abstract

This study aimed to valorize waste generated from jackfruit processing and consumption by utilizing jackfruit seed flour as a natural stabilizer and thickener to partially substitute egg yolk in reduced-fat, low-cholesterol salad dressing formulations. Jackfruit seed flour was incorporated at 30%, 60%, and 90% of the egg yolk weight, and its effects on the physicochemical, antioxidant, microbial, and sensory properties of the product were evaluated. Increasing levels of jackfruit seed flour decreased the brightness (L*) values (28.14±0.23 to 23.86±1.54), yellowness (b*) values (13.09±0.02 to 8.39±0.04), and total phenolic content (63.78±0.35 to 38.81±0.15 mg GAE/g), but increased redness (a*) values in the negative direction and enhanced antioxidant activity (40.70±0.58 to 83.86±0.53% inhibition). The pH values ranged from 3.04 to 3.64. Viscosity significantly increased with higher levels of jackfruit seed flour substitution ($p \leq 0.05$). Sensory evaluation using a 9-point hedonic scale showed significant differences among formulations ($p \leq 0.05$), with the highest overall liking score (6.82±0.23) observed in the 90% substitution treatment. During refrigerated storage at 4 °C for 0, 3, 5, 7, and 14 days, L* and b* values decreased significantly ($p \leq 0.05$), while a* and TBARs values tended to increase. Water activity ranged from 0.68 to 0.81, and both phenolic content and antioxidant activity exhibited a declining trend over time. Microbiological analysis confirmed product safety, with total viable counts below 30 CFU/g and no detectable yeast or mold. These findings demonstrate the potential of jackfruit seed flour as a sustainable functional ingredient for developing healthier salad dressings with extended shelf-life quality.

Keywords: Jackfruit; Jackfruit seed flour; Salad dressing; Physico-chemical; Shelf life

P - 360 Nutritional Composition and Antioxidant Capacity of Jambolan Products: Unlocking Natural Functional Ingredients for Sustainable Food Innovation

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Abstract

Jambolan (*Syzygium cumini* L.) is an underutilized tropical fruit rich in phenolic compounds and anthocyanins, offering considerable potential for value-added development within sustainable agri-food systems. This study investigated the nutritional composition, bioactive compound content, and antioxidant properties of three jambolan-based products consist of jambolan powder, jambolan mooncake (Chinese Pastry or KHANOM-PIA), and jambolan juice to evaluate how different processing formats influence the retention of functional constituents. Gallic acid content differed significantly among the samples, with jambolan powder showing the highest level (37.82±0.67 mg/100 g), followed by the mooncake (14.88±0.15 mg/100 g) and the juice (8.55±0.15 mg/100 g). Quercetin exhibited a similar trend, with concentrations of 1,441.63±49.02 mg/100 g in jambolan powder, 304.33±9.69 mg/100 g in the juice, and 81.66±0.58 mg/100 g in the mooncake. Relative sugar profiling revealed a higher abundance of individual sugars in jambolan powder. Specifically, the jambolan powder extract contained glucose (8.3±0.58 g/ml), fructose (7.9±0.48 g/ml), and sucrose (8.5±0.52 g/ml), whereas lower sugar levels were observed in the jambolan mooncake and juice. Jambolan juice presented the highest vitamin C content (208.40±0.18 mg/100 g), while the powder contained 75.58±3.95 mg/100 g. Antioxidant assessment revealed strong DPPH radical scavenging activity across all products, with jambolan powder demonstrating the greatest activity (95.11±0.24%), followed by the juice (93.88±0.19%) and the mooncake (88.77±0.30%). Total reducing capacity also peaked in jambolan powder (1.50±0.010 µmol Fe^{2+} /100 g). The superior bioactive retention observed in jambolan powder is likely attributed to minimal thermal degradation and reduced moisture, which favor the stabilization of phenolic compounds. Proximate analysis confirmed that jambolan powder was carbohydrate-rich (95.46%), whereas the mooncake exhibited higher fat and protein contents due to its formulation. Microbiological counts remained below 30 CFU/g in all samples, indicating good product safety. These levels also complied with the Thai Community Product Standard for KHANOM-PIA (TPC 115/2546), further supporting its safety and readiness for product development. Overall, jambolan powder represents a promising sustainable functional ingredient suitable for use in fortified beverages, functional bakery formulations, and next-generation health foods, supporting the advancement of frontier food innovation and the utilization of local biodiversity.

Keywords: Jambolan; Antioxidant; Phenolic compounds; Functional food; Natural ingredients

P - 363 Functional Characterization, *In Vitro* Gastrointestinal Digestion, And Cellular Uptake of Asian Seabass Gill–Derived Bio-Calcium Powders Produced with And Without Bleaching

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Abstract

Fish by-products such as gills offer an underutilized source of mineral-rich materials that can be converted into bio-calcium ingredients. In this study, bio-calcium powders (BCPs) produced from Asian seabass gills with (BCP-BG) and without bleaching (BCP-NBG) were examined for their compositional, structural, and biological characteristics. Both powders contained substantial ash (29.24–34.55%) and essential minerals, with calcium (9.03–12.65%) and phosphorus (5.34–7.32%) as the dominant elements, although their Ca/P ratios (1.30–1.33) remained slightly lower than that of stoichiometric hydroxyapatite (1.67). Bleached samples exhibited greater crystallinity (41.25%) and larger particles (41.07 µm). FTIR spectra indicated the presence of phosphate groups and residual protein components, while microstructural imaging revealed distinct morphological features between the two processing conditions. Amino acid analysis highlighted collagen-associated residues, and SDS-PAGE verified the presence of α-, β-, and γ-collagen chains in both materials. Cytocompatibility tests confirmed that all formulations supported high fibroblast viability (>89.3%). Using the Caco-2 monolayer model, both BCPs (49.5–42.2%) demonstrated superior calcium transport efficiency compared to CaCO□ (35%), with the non-bleached powder showing the highest uptake (49.5%). Although bleaching reduced Ca absorption slightly, it enhanced color and mineral purity. Overall, Asian seabass gill–derived BCPs show promise as alternative calcium sources with good digestibility and bioavailability.

Keywords: Fish gills; Valorization; Bio- calcium; Cytotoxicity; Calcium absorption

P - 365 Durian Locule Powder as Functional ingredient in the Development of Instant Sweet Potato Noodles

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Abstract

The prominence of Thailand as a major exporter of durian reflects its robust agricultural productivity and economic significance in the tropical fruit industry. Nonetheless, substantial quantities of inedible by-products, particularly durian locules, remain underutilized, which not only contributes to environmental concerns through waste accumulation but also presents an untapped biomass resource with potential functional applications. This study aims to explore the valorization of durian locule waste by incorporating it as a functional ingredient in the formulation of instant sweet potato noodles. The objective is to enhance the bioactive properties of the noodles while promoting sustainable food processing practices aligned with circular economy principles. A Completely Randomized Design was employed to evaluate five different formulations with incremental inclusion levels of durian locule powder (0.0%, 2.5%, 5.0%, 7.5%, and 10.0%). The formulation that yielded optimal functional properties consisted of 85% sweet potato starch, 10% durian locule powder, and 5% potato starch. This formulation demonstrated significantly elevated total phenolic content (31.14 ± 0.55 mg GAE/100 g DB) and antioxidant activities (DPPH = 2.19 ± 0.10 mg TE/100 g DB, ABTS = 6.28 ± 0.61 mg TE/100 g DB, FRAP = 15.08 ± 0.54 mg TE/100 g DB) from sweet potato noodle without durian locule powder (total phenolic content = 2.57 ± 0.11 mg GAE/100g DB, DPPH = 0.56 ± 0.01 mg TE/100 g DB, ABTS = 1.70 ± 0.01 mg TE/100 g DB, FRAP = 2.38 ± 0.06 mg TE/100 g DB), while the commercial sweet potato noodles either had no detectable levels of phenolic compounds and bioactive activities or showed significantly lower values. Sensory evaluation indicated an overall liking score between “neither like nor dislike” and “like slightly” (5.6–6.2), with consumer acceptance and purchase intention rates of 74.3% and 61.0%, respectively. These findings substantiate the potential of durian locule waste as a functional, bioactive-rich ingredient for nutritional enhancement of instant noodle products, offering a sustainable strategy for agro-industrial waste valorization and supporting food innovation within the framework of environmentally conscious practices.

Keywords: Durian locule powder; Sweet Potato noodle; Bioactive activities; Instant Noodle

P - 366 Physicochemical Properties and Antioxidant Activity of Subcritical Water Extracts from Cricket (*Acheta domesticus*) Powder

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Abstract

Crickets (*Acheta domesticus*) are emerging as sustainable sources of nutrients with potential applications in functional foods. This study investigated the physicochemical properties and antioxidant activity of subcritical water extracts from defatted cricket powder at different temperatures. Three grams of defatted cricket powder were suspended in 80 mL of deionized water and heated in a high-pressure resistant stainless steel reactor to the final temperature of 100, 140, 180, 220, and 260 °C at 7.98°C/min. After reaching the target temperature, the system was rapidly cooled with flowing tap water. Suspension was centrifuged to separate liquid extract from solid residue. Solid residue was freeze-dried and analyzed by scanning electron microscopy (SEM) to observe structural changes, while liquid extract was characterized for browning intensity (absorbance at 420 nm), pH, and DPPH radical scavenging activity. Results showed that browning increased with temperature, indicating enhanced Maillard reactions. Specifically, the absorbance at 420 nm increased markedly from 0.111 at 100 °C to 1.311 at 260 °C. The pH of extracts decreased slightly at moderate temperatures (6.94 at 180 °C) but increased at the highest temperature (7.28 at 260 °C), reflecting temperature-dependent chemical changes during subcritical water treatment. The DPPH radical scavenging activity increased with temperature, reaching a maximum of 37.33% at 220 °C, which was significantly higher than the 28.88% observed at 100 °C, corresponding to the DPPH free radical inhibition capacity of an ascorbic acid solution at concentrations of 120.53 µg/mL and 92.95 µg/mL, respectively. SEM analysis of the residue revealed progressive structural breakdown of the cricket powder with increasing temperature, correlating with enhanced extractability of soluble components. These findings demonstrated that subcritical water treatment effectively modified defatted cricket powder, producing extracts with enhanced antioxidant properties. This approach offers a sustainable strategy to valorize insect-based materials for functional food and nutraceutical products development.

Keywords: Subcritical water; Cricket extract; Physicochemical properties; Antioxidant activity; Maillard reaction

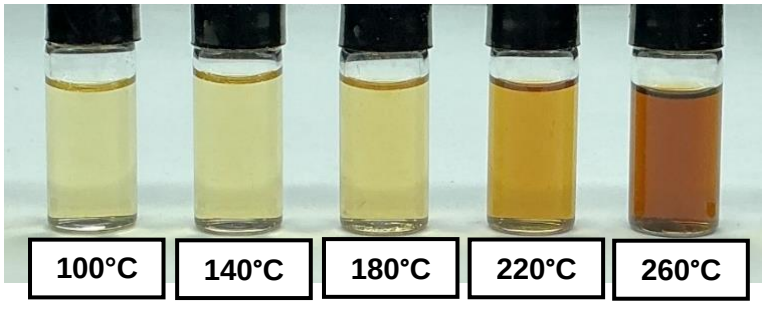

Fig.1 Cricket hydrolysates

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Development of Composite Film using Ehitosan from Mantis Shrimp Shell and Gelatin as Bioactive Carrier for Active Packaging

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Abstract

Mantis shrimp shells, which are waste materials from seafood processing, are used to extract chitosan (CS) to produce composite films with gelatin (GE). This study aims to extract CS from mantis shrimp shells and to prepare CS-GE composite films. The extracted chitosan contains 5.01% protein and 9.65% moisture, with L*, a*, and b* values of 85.06, 3.94, and 12.63, respectively. The development of CS-GE composite films shows that the films exhibit tensile strength values ranging from 31.54 to 36.78 MPa, elongation at break between 13.14% and 31.43%, water solubility from 15.93% to 77.07%, and water vapor permeability ranging from 1.48 to 2.45 × 10-10 g·m/m²·s·Pa, which increase compared to the CS film ($p < 0.05$). In addition, propolis extract (EEP) is incorporated into the CS-GE composite films at concentrations of 0, 1, 2.5, and 5% (w/w). The addition of EEP at concentrations below 5% (w/w) improves the water vapor permeability (2.45–2.12 × 10-10 g·m/m²·s·Pa). However, as the EEP concentration increases, a significant decrease in tensile strength (36.78–8.98 MPa) is observed ($p < 0.05$). In contrast, the thickness (0.058–0.106 mm) and antioxidant activity increase substantially. Furthermore, the CS-GE composite films containing EEP show lower L* values but higher a* and b* values and exhibit excellent UV light barrier properties. Based on these results, the CS-GE composite film incorporated with 2.5% EEP shows high potential for use as bioactive carrier for active packaging.

Keywords: Mantis shrimp shells; Chitosan; Composite film; Bioactive carrier; Propolis.

P - 386 Chemical Composition and Antioxidant Properties of Kombucha-like from Black Glutinous Rice CMU 107

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Abstract

Kombucha is a fermented tea beverage containing various bioactive compounds with significant efficacy. The fermentation of kombucha using alternative raw materials has gained increasing attention. This study aimed to analyze the chemical composition and evaluate the antioxidant properties of kombucha-like beverage produced from black glutinous rice (Khow Kam Jao) CMU 107, a rice developed by Chiang Mai University that is rich in anthocyanins and antioxidant compounds. The research conducted fermentation for 15 days at temperatures of 25°C and 30°C. Antioxidant activity and total phenolic compound content were assessed using 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and Folin-Ciocalteu methods. The study found the highest phenolic compound content on day 15 of fermentation. Kombucha fermented at 30°C (523.21 µg GAE/ml) showed significantly higher levels than that fermented at 25°C (333.90 µg GAE/ml), which corresponded with antioxidant activity. Color measurement values L*, a*, b*, and ΔE* at 25°C were 78.53, 17.78, 10.73, and 13.75, respectively, while at 30°C they were 81.21, 19.67, 8.83, and 7.92, respectively. Regarding acid content analysis, kombucha fermented at 25°C showed the highest citric acid content, followed by propionic acid, succinic acid, and acetic acid, respectively. Conversely, kombucha fermented at 30°C exhibited the highest acetic acid content, followed by succinic acid, propionic acid, and citric acid, respectively. This study demonstrates that black glutinous rice kombucha fermented at 30°C has potential as a health beverage rich in antioxidants, showing minimal color change during fermentation as indicated by the lower ΔE*, and suitable chemical characteristics for commercial product development. The utilization of black glutinous rice as a raw material also contributes to sustainable value addition to Thailand's agricultural products.

Keywords: Fermentation; Kombucha-like; Black glutinous rice; Fermented beverage; Antioxidant

P - 398 Application of Bacteriophages for Controlling *Escherichia coli* and Disrupting Biofilms Relevant to Food Safety

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Abstract

The increasing prevalence of multidrug-resistant (MDR) *Escherichia coli* in food production environments poses a significant threat to food safety and public health. Biofilm formation on food-contact surfaces further enhances bacterial persistence, reduces the efficacy of conventional sanitization, and facilitates cross-contamination in the food chain. As antibiotic misuse accelerates the development of resistance, alternative antimicrobial strategies are urgently needed. In this study, a lytic *Escherichia* phage, vB_EcoM_PPW9 (vECPPW9), was isolated and evaluated for its potential to control *E. coli* and disrupt biofilms relevant to food safety. Phage vECPPW9 exhibited broad lytic activity against MDR *E. coli*, high adsorption efficiency, a short latent period, a large burst size, and remarkable stability across a wide range of temperatures and pH conditions, indicating its suitability for food-processing environments. Genomic characterization confirmed the absence of virulence and antibiotic resistance genes and classified vECPPW9 as a novel member of the *Phapecoctavirus* genus (*Myoviridae*). Importantly, the phage demonstrated strong antibiofilm activity by inhibiting early biofilm formation and significantly reducing mature biofilm biomass, as shown by biomass quantification and viability assays. These findings highlight the potential of phage vECPPW9 as a biocontrol agent for enhancing food safety by effectively reducing *E. coli* contamination and biofilm-associated persistence.

Keywords: Bacteriophage; *Escherichia coli*; Biofilm disruption; Food safety; Biocontrol agent

P - 403 Effect of Tween 20 and Tween 80 on Characteristics of the Water in Oil in Water Emulsion of *Centella asiatica* Beads

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Abstract

Most bioactive compounds in extracted *Centella asiatica* are heat-sensitive during food processing. Spherification can help preserve both water- and oil-soluble compounds, while surfactants are needed to form stable emulsions. This study investigated the effects of polysorbates (Tween 20 and Tween 80) on the characteristics of *Centella asiatica* beads. Water-in-oil (W/O) emulsions of extracts obtained by 95% ethanol were prepared with Tween 20, Tween 80, or a mixture of Tween 20 and Tween 80. The ratio of extract to surfactant was 2:1. These W/O emulsions were then dispersed in a gum arabic (0.5% w/v) and alginate (1.5% w/v) solution to form water-in-oil-in-water (W/O/W) emulsions before bead formation using an encapsulation machine. The beads were evaluated for yield, size, swelling capacity at pH 4 and pH 7, texture, and polyphenol content. The production yield of the beads was 42.59 ± 0.15%. The beads were generally spherical. The largest bead diameters (3.38 mm) were obtained when the core W/O emulsions were made using Tween 80. The mixture of Tween 20 and Tween 80 produced beads with the lowest swelling capacity in both acidic (pH 4; citric and acetic acid) and neutral (pH 7; phosphate buffer) conditions with swelling values of 145.96%, 25.48%, and 189.27% in citric acid, acetic acid and neutral conditions, respectively. All bead samples exhibited higher swelling at pH 7 and the lowest swelling in acetic acid (pH 4). Springiness, cohesiveness, and chewiness did not differ among treatments, while hardness and gumminess were highest in beads produced with the Tween 20 and Tween 80 mixture. Polyphenol contents in all bead samples were low ranging from 0.61 to 0.64 mg GAE/100 g beads. In conclusion, *Centella asiatica* beads produced using a Tween 20 and Tween 80 mixture in the core (W/O emulsion), with gum arabic and alginate as the outer wall (W/O/W emulsion), are suitable for acidic foods. Beads prepared with the mixture of Tween 20 and Tween 80 exhibited the lowest swelling, suggesting a lower release of bioactive compounds, and show potential for use as functional ingredients in food products such as beverages and dairy products (e.g., yogurt).

Keywords: *Centella asiatica*; Spherification; *Centella asiatica* bead; W/O/W emulsion

P - 405 The Development of Soy Protein-Based Meat Substitute using the Freezing Process Combined with Structural Cross-linking by Transglutaminase and Alginate

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Abstract

Growing global demand for alternative proteins is primarily driven by increasing attention to environmental sustainability, health considerations, and ethical concerns associated with conventional meat production. Plant-based proteins have therefore emerged as promising raw materials for developing a meat substitute with improved structural and physicochemical attributes. Nonetheless, many plant protein-derived products still exhibit limitations in texture formation and functional quality. This study evaluated the effects of four protein-precipitating agents calcium sulfate ($CaSO_4$), magnesium sulfate ($MgSO_4$), calcium chloride ($CaCl_2$), and acetic acid at concentrations of 2.0–3.0% (w/w dry soybeans) on soy protein recovery for subsequent meat substitute production. Additionally, the influence of freeze–thaw structuring cycles (1– 3 cycles), alginate concentrations (3 – 9 %), and transglutaminase (TGase) concentrations (0.5–1.5%) on the degree of texturization (DT) and chewiness was examined using a Box–Behnken Design combined with response surface methodology to characterize factor interactions and identify optimal formulation regions. Results indicated that 3.0% $CaSO_4$ generated the highest protein yield ($p < 0.05$). Alginate and TGase concentrations significantly affected DT and chewiness ($p < 0.05$), while model optimization predicted that two freeze–thaw cycles, 9% alginate, and 1.0% TGase yielded the most desirable structural properties. Under these optimized conditions, the resulting meat substitute exhibited enhanced fibrous alignment, improved color attributes, and textural characteristics closely resembling commercial chicken nuggets. *In vitro* gastrointestinal simulation further demonstrated that the substitute possessed approximately 11.47% higher protein digestibility than chicken nuggets ($p < 0.05$). Energy density analysis showed that chicken nuggets contained an average of 6.05 ± 0.02 kcal/g, whereas the substitute contained only 2.28 ± 0.03 kcal/g, corresponding to a 2.65-fold reduction. Overall, these findings underscore the potential of optimized structuring strategies to improve the physicochemical and nutritional quality of soy protein-based meat substitute. Future investigations should focus on sensory optimization, flavor and aroma enhancement, shelf-life and stability assessment, consumer acceptance testing, and scale-up feasibility to support the development of next-generation sustainable protein systems.

Keywords: Soybean; Freezing; Alginate; Transglutaminase enzyme; Meat substitute

P - 407 Comparative Nutritional and Functional Attributes of Thai Underutilized Legumes

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Abstract

Thailand's underutilized legumes have been reported to be the future of protein supply and climate remediation in Asia and beyond; however, their utilization has been limited due to a lack of scientific evidence of usability. This study investigated the proximate composition and techno-functional properties of four Thai potential legumes: *Vigna radiata* (Mung bean), *Psophocarpus tetragonolobus* (Winged bean), *Acacia concinna* (Sompoi) and *Vigna unguiculata subsp. Sesquipedalis* (Yardlong bean) and compared with mainstream soybeans. The protein and fat contents of the Thai legumes ranged from 5.87% to 27.6% and 0.21% to 1.21%, respectively, with yardlong bean having the highest protein content and wing bean having the highest fat content. The protein and fat contents of the underutilized legumes represent up to 66.04% and 8.2% of those found in soybeans. The functional properties of the flour varied among the varieties, with water absorption capacity and oil absorption capacity ranging from 1.15 mL/g in winged bean to 3.8 ml/g in *Acacia concinna* seed; and 1.0 mL/g in sompoi mix pulp to 2.60 mL/g in soy, respectively. The water solubility index was determined as a percentage of the flour that dissolves in water, with mixed sompoi flour having the highest water solubility index of 40.5 % while sompoi pulp has the least solubility. The highest swelling power of 12.21 g/g was found in the sompoi pulp sample. All the varieties have acidic flour, with a pH ranging from 3.20 to 6.28, and a titratable acidity of 0.08 to 0.45 %, respectively. The findings of this research have practical applications in mainstream food product development, particularly in high-protein food products, such as meat analogues. This research underscores the potential of Thai legumes as high-protein food sources and their role in addressing pressing food and nutritional insecurity in Thailand and beyond.

Keywords: Functionality; High-protein; Protein; Underutilized legumes; Thailand

P - 408 Kombucha Production from Fusions of Black Tea (*Camellia sinensis*) and Mamao (*Antidesma puncticulatum*) Juice

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Abstract

Kombucha, or fermented tea, is classified as one of the most important health beverages. The production of kombucha currently involves ingredients other than tea leaves. This not only helps enhance nutritional value but also improves flavor, aroma, and the product's biological activity. The main objective of this research was to produce fusion kombucha from black tea (*Camellia sinensis*) leaves and Mamao (*Antidesma puncticulatum*) juice. The juice contained 154.47 g/L of total sugars, 10.81 g/L of total acids, and 2.94 g Gallic Acid Equivalent per liter (g GAE/L) of phenolic, and 33.46 mg Quercetin Equivalent per liter (mg QE/L) of flavonoid. Kombucha production using Mamao juice at 10% (FM10), 20% (FM20), 30% (FM30), 40% (FM40), and 50% (FM50) in tea water was tested. Black tea kombucha without Mamao supplementation served as the control. The results revealed that kombucha produced with Mamao juice had a total acid content ranging from 1.40 to 6.31 g/L, which was higher than that of the control kombucha. The ethanol content of all kombucha products ranged from 0.11 – 0.36% by volume, classifying the beverage as low-alcohol. Kombucha products made using only tea leaves exhibited a yellowish-brown color (L*=77.86, a*=10.79, b*=61.88), while products incorporating Mamao juice had a reddish-brown hue (L*=3.48-62.16, a*=25.10-43.90, b*=5.93-43.00). The concentrations of phenolic and flavonoid compounds in the kombucha containing Mamao juice were greater than those in the control. Additionally, the kombucha products incorporating Mamao juice demonstrated higher antioxidant activity than the control kombucha. These results indicate that Mamao juice is a highly potent raw material that can be co-fermented with tea leaves to produce kombucha with enhanced biological activity, making it suitable for use as a functional health beverage.

Keywords: Kombucha; SCOBY; *Antidesma puncticulatum*; Healthy drink

P - 413 Development of Gluten Free Noodles Incorporated With Tempeh Flour and Tempeh Protein Isolate

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Abstract

The growing global demand for gluten-free products has positioned them as one of the most rapidly expanding segments in the food industry. One of the rising product categories is noodles, that represent an ideal idea for gluten-free innovation due to their high consumption and the wide availability of diverse local raw materials. However, gluten-free noodles often exhibit weak structure and high cooking loss because of the absence of gluten. The absence of gluten impairs dough elasticity and structural integrity, resulting in products with inferior sensory and mechanical properties compared with conventional wheat based noodles. This study developed gluten-free noodles based on modified cassava flour (Mocaf), fortified with soybean and peanut tempeh flours and their protein isolates and also investigated their rheological properties, cooking quality, texture profile, and antioxidant-related properties. Tempeh was dried (60°C, 8 h), milled and resulting in tempeh flour. Protein isolate was produced by hexane defatting of tempeh flour, alkaline extraction (pH 12) and isoelectric precipitation (pH 4), followed by freeze-drying. Eight noodle formulations were prepared by varying four tempeh flour : tempeh protein isolate ratios (3:0, 2:1, 1:2 and 0:3) and two type of tempeh (Soy (S) and Peanut (P)) and all of this formulation were compared to a control. The protein content of the tempeh protein isolate was approximately 62% higher than tempeh flour. Storage and loss modulus of dough also improved 73.8% and 52.2% from control. Cooking yield and cooking loss of noodle increased 17% and 66.9% from control. Texture hardness and springiness increased 300% and 5% from control. Total phenolics and DPPH scavenging activity also increased for 64.37% and 11.13% after adding protein isolate, compared to control. Tempeh-based ingredients such as flour and protein isolate substantially improved texture and bioactive related attributes of gluten-free noodles, supporting further optimization toward nutritious, locally sourced functional noodle products.

Keywords: Gluten free; Noodles; Tempeh flour; Tempeh protein isolate.

P – 418 Sustainable Valorization of Off-Grade Bananas into High-Quality Syrup Using Enzyme-Assisted Extraction and Multi-Objective Process Optimization

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Abstract

Post-harvest losses of bananas in tropical regions pose a significant challenge to agricultural sustainability, resource efficiency, and food security, directly related to Sustainable Development Goals (SDGs) 2 (Zero Hunger) and 12 (Responsible Consumption and Production). This study presents an integrated process development and optimization approach for valorizing off-grade bananas (*Musa acuminata*) into a high-quality syrup using enzyme-assisted extraction (EAE). A four-factor Box–Behnken experimental design was employed to investigate the effects of pectinase concentration, cellulase concentration, extraction temperature, and incubation time on juice yield and soluble solids recovery (SSR). Response Surface Methodology (RSM) was used to develop predictive models, which demonstrated strong statistical performance (R^2 = 0.9803 for yield and R^2 = 0.9777 for SSR). To efficiently manage the trade-off between extraction yield and product quality, Gaussian Process modeling and multi-objective Bayesian optimization with Expected Hypervolume Improvement were applied to identify optimal operating conditions. The optimal extraction conditions were determined at 50 °C and 120 min using 0.3% pectinase and 0.5% cellulase, resulting in a validated juice yield of 70.9 ± 0.3%. The extracted juice was further concentrated to produce a banana syrup with ≥70°Brix. The final product exhibited a balanced natural sugar profile (42.2% sucrose, 31.6% glucose, and 26.1% fructose), desirable antioxidant activity (DPPH IC_{50} = 3.37 ± 0.07 mg/mL), low water activity (0.77), and excellent microbiological quality, meeting food safety standards without the use of chemical preservatives. With an energy value of 277.13 kcal/100 g and clean-label characteristics, the developed banana syrup shows strong potential as a natural sweetener for food and beverage applications. This study demonstrates a practical and sustainable pathway for banana waste valorization, supporting circular economy principles and offering a transferable optimization framework for agro-industrial bioprocess development.

Keywords: Enzyme-assisted extraction; Response surface methodology; Gaussian process; Bayesian optimization; Sustainable development goal

P – 419 Efficiency Of Pectin Extracted From Nam-Wa Banana Peels In Encapsulation Of *Centella asiatica* Extracts

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Abstract

Centella asiatica contains various bioactive compounds but its application is limited due to instability. Banana peels have potential as a rich source of pectin, which can be utilized in the encapsulation process. This study aimed to determine efficiencies of pectin extracted from Nam-Wa banana peels in encapsulation of *Centella asiatica* extracts. Pectin was extracted from Nam-Wa banana peels using hydrochloric acid (pH 2), citric acid (pH 2), and deionized water (pH 6-6.5). The extracted pectin was precipitated using 95% ethanol in the ratio of 1:3 (w/v) for 24 hours before drying and grinding to obtain pectin powders. Dried *Centella asiatica* was mixed with 95% ethanol in the ratio of 1:4 (w/v) for 7 days, and washed with vegetable oil to obtain *Centella asiatica* extracts. Encapsulation of *Centella asiatica* extract (core material) was performed using the mixture of maltodextrin and banana pectin (wall materials) with a spray drying technique. The ratio of the extracts to maltodextrin and banana pectin was 1:10:0.5. *Centella asiatica* extracts were determined in appearance and yield. Pectin and encapsulated *Centella asiatica* powders were determined in appearance, yield, moisture and water activity (a_w). The results showed that hydrochloric acid yielded the highest pectin contents at 7.14 ± 0.21%; however, due to safety concerns, citric acid extraction was selected instead. Citric acid provided a yield of 4.81 ± 0.25%, which was not markedly different, with a moisture content of 8.5 ± 0.09% and a water activity (a_w) of 0.44 ± 0.01%. The extraction of *Centella asiatica* resulted in a yield of 5.24 ± 0.18%. The green pigments in *Centella asiatica* extract were removed using an oil treatment, resulting in yellow extracts. The encapsulation process produced a yield of 41.43%, moisture content of 6.70 ± 0.19 % and a water activity (a_w) of 0.35 ± 0.02 %. These results indicate that banana pectin can be effectively utilized as a wall material for encapsulation, providing favorable moisture and water activity values. This demonstrates its potential for applications in functional food products.

Keywords: Pectin; *Centella asiatica*; Nam-Wa banana peel; Encapsulation

P – 420 Zinc Oxide Nanoparticles Biosynthesis from Different Agricultural Wastes and Their Properties

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Abstract

Thailand generates over 34.43 million tons of agricultural waste annually, including pineapple peels (42% of fruit weight), longan seeds (17%), and cabbage trimmings (44–66%). This study aimed to synthesize zinc oxide nanoparticles (ZnO NPs) via a green synthesis approach using extracts from "Phulae" pineapple peels, longan seeds, and cabbage leaves as reducing and stabilizing agents. The ZnO NPs were characterized for their physicochemical properties and apply for extending the vase life of gerbera flowers. Zinc oxide nanoparticles were successfully synthesized via a green method. The highest yield was pineapple peel (91.28%), followed by longan seed (90.90%) and cabbage leaves (83.56%). Characterization was confirmed by a complete conversion of zinc acetate to ZnO NPs (UV-Vis 360–370 nm), nanoscale particle sizes of cabbage leave was 56.54 nm and followed by longan seed and pineapple peel with 50.72 and 50.07 nm respectively. Moreover, ZnO NPs was applied for extending vase life of gerbera flowers as a vase solution. Effectiveness of synthesize ZnO NPs were compared with commercial ZnO NPs. The results of vase life of gerbera flowers showed that synthesize ZnO NPs were not different with commercial ZnO NPs. Both synthesize and commercial ZnO NPs could extend vase life up to 12 days while control (distilled water) was 6 days. In addition, ZnO NPs could delayed the decreasing of fresh weight and overall appearance score. These results highlight the potential as a sustainable alternative to a commercial ZnO NPs for flower preservation.

Keywords: Zinc Oxide Nanoparticles; Agricultural Wastes; Gerbera; Vase life

P – 423 Phytochemical Composition, Bioactivities, and Antibacterial Properties of Turmeric (*Curcuma longa*) from Lopburi, Thailand

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Abstract

Turmeric (*Curcuma longa*) is recognized for its diverse bioactive constituents, yet variations in extraction solvents can markedly influence its phytochemical profile and biological activities. This study evaluated the chemical composition, phytochemical constituents, antioxidant capacity, and antibacterial properties of turmeric extracts obtained via maceration using ethanol and water. Both extracts contained high levels of curcumin, and qualitative screening identified 10 major classes of secondary metabolites, including alkaloids, flavonoids, anthraquinones, coumarins, saponins, tannins, terpenoids, phenols, steroids, and cardiac glycosides. The extraction yields were 16.73% for the ethanolic extract and 19.83% for the aqueous extract. The ethanolic extract exhibited higher total phenolic content (30.85 mg GAE/g) and flavonoid content (22.68 mg QE/g) compared to the aqueous extract (23.46 mg GAE/g and 18.41 mg QE/g, respectively). Antioxidant evaluation using the DPPH assay showed markedly greater activity in the ethanolic extract (IC_{50} = 8.37 μg/mL) than in the aqueous extract (IC_{50} = 31.50 μg/mL). Antibacterial assays revealed that the ethanol extract exhibited strong inhibitory and bactericidal activity against *Staphylococcus aureus* with a minimum inhibitory concentration (MIC) of 12.5 mg/mL and a minimum bactericidal concentration (MBC) of 25 mg/mL, and against *Bacillus cereus* with a MIC of 6.25 mg/mL and a MBC of 12.5 mg/mL, whereas neither extract showed activity against *Escherichia coli*. Overall, the high curcumin content and diverse phytochemicals contribute to the strong antioxidant and selective antibacterial activities of turmeric extracts, highlighting their potential for development into pharmaceutical and therapeutic applications.

Keywords: Turmeric; Composition; Phytochemical screening; Antioxidant activity; Antibacterial activity

P – 431 Determination of Co-Flocculation Ability Between Distinct Cyanobacterial Genera and the Fungal *Penicillium* under the Antibiotic Stress by Erythromycin

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Abstract

Co-flocculation between cyanobacteria and the fungal *Penicillium* has been recently reported and emerged as a promising and sustainable strategy for biomass harvesting and environmental biotechnology applications; however, the influence of antibiotic stress on this process with distinct cyanobacterial genera remains insufficiently explored. In this study, fifteen cyanobacterial genera were screened for their co-flocculation performance with the fungal *Penicillium* under the antibiotic erythromycin exposure. The results demonstrated clear strain-dependent flocculation behaviors. Complete flocculation was observed in only three cyanobacterial strains, namely *Synechocystis*, *Synechococcus*, and *Spirulina*, with total cofloc biomass yield of 0.44, 0.47, and 0.50 g L□¹, respectively. Partial flocculation was detected in *Calothrix, Fischerella, Microcystis, Cylindrospermum, Phormidium, Hapalosiphon, Myxosarcina, Nostoc, and Fischerella*, whereas *Anabaena, Oscillatoria, Stigonema, and Chroococcu*s exhibited no flocculation under the tested conditions. Notably, cyanobacteria–fungal co-flocculation in the presence of erythromycin showed no correlation with cyanobacterial cell morphology or nitrogen-fixation capability. These findings indicate that co-flocculation efficiency under antibiotic stress is governed by strain-specific factors rather than general physiological traits. Future research will focus on elucidating the expression of genes associated with flocculation-related mechanisms to provide deeper insight into the molecular basis of cyanobacteria–fungal interactions. This co-floc technology might be applied to produce protein-rich biomass for animal feed.

Keywords: Cyanobacteria; Fungi; Antibiotic; Flocculation; Biomass

P – 432 Effectiveness of Rice Husk Biochar Combined with *Bacillus* spp. In Promoting the Growth of Pathum Thani Rice

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Abstract

Both free-living and immobilized microbes are used in agriculture, but they differ significantly in application, stability, and efficacy. Immobilized microbes generally offer greater stability and longevity in challenging field conditions, while free-living forms are simpler to produce and apply but often struggle with persistence and competition in native soil environments. This study investigated the effectiveness of chicken manure–rice husk biochar immobilized with *Bacillus subtilis* strain KJ2 in promoting the growth of Pathum Thani fragrant rice under pot-scale conditions. Initially, three *Bacillus* spp. Strains immobilized on chicken manure–rice husk biochar were evaluated for their plant growth–promoting characteristics, including potassium solubilization, phosphate solubilization, siderophore production, and auxin (indole-3-acetic acid; IAA) production. The results revealed that *B. subtilis* strain KJ2 exhibited the highest performance in all evaluated traits. Consequently, this strain was selected as the bacterial inoculant for subsequent pot experiments aimed at enhancing rice growth. The experiment was conducted using four treatments: (1) a control under normal rice cultivation conditions without bacterial inoculation or biochar amendment, (2) soil amended with non-inoculated chicken manure–rice husk biochar, (3) soil directly inoculated with a bacterial suspension, and (4) soil amended with chicken manure–rice husk biochar immobilized with *B. subtilis* strain KJ2. Growth parameters, including the number of leaves, chlorophyll content, root length, and total rhizosphere bacterial population, were measured to evaluate treatment effects. The results demonstrated that treatment 4, which involved biochar immobilized with *B. subtilis* strain KJ2, produced the most favorable outcomes across all measured parameters. This treatment resulted in an average of 33.0 leaves per plant, an average chlorophyll content of 41.6, an average root length of 27.0 ± 6.1 cm, and a total rhizosphere bacterial population of 9.2×10^8 ± 97.5×10^8 CFU/mL. In conclusion, chicken manure–rice husk biochar exhibited favorable properties for bacterial adhesion and effectively served as a carrier for plant growth–promoting bacteria. The immobilization of *B. subtilis* strain KJ2 on this biochar significantly enhanced the growth of Pathum Thani fragrant rice under pot-scale conditions, indicating its potential application as a sustainable biofertilizer in rice cultivation.

Keywords: Chicken manure–rice husk biochar; *Bacillus subtilis* KJ2; Pathum Thani rice

P – 433 Bioactive Compounds and Antioxidant Activity of Germinated Thai Indigenous Upland and Lowland Rice

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Abstract

Cultivation environment plays an important role in determining the functional quality of germinated rice. Upland and lowland rice are exposed to distinct growing conditions, which may influence the accumulation of bioactive compounds during the germination process. This study aimed to compare the bioactive compound content and antioxidant activity of germinated Thai indigenous rice cultivated in upland and lowland areas. Six Thai indigenous rice varieties were investigated, including lowland rice Hom Mali (white), Thapthim Chumphae (red), and Mali Nil Surin (black), and upland rice Dok Phayom (white), Hom Bon (red), and Med Fai (black). Brown rice samples were germinated for 24 h prior to analysis. Bioactive compounds were determined in terms of γ-aminobutyric acid (GABA) content and total phenolic content, while antioxidant activity was evaluated using DPPH, ABTS, and FRAP assays. The results demonstrated clear differences between germinated upland and lowland rice. Germinated upland rice, particularly pigmented varieties, exhibited significantly higher levels of bioactive compounds and stronger antioxidant activity than germinated lowland rice ($P < 0.05$). Germinated Hom Bon rice (upland, red) showed the highest GABA content (81.88 mg/100 g), total phenolic content, and ABTS antioxidant values, which were significantly higher than lowland rice varieties ($P<0.05$), whereas germinated Med Fai rice (upland, black) exhibited the highest DPPH and FRAP antioxid"nt v'lues, also significantly surpassing lowland varieties ($P<0.05$). Changes in total phenolic content following germination were dependent on both rice variety and cultivation environment. These findings indicate that pigmented upland germinated rice represents a valuable ingredient for functional food and beverage development.

Keywords: Germinated rice; GABA; Bioactive compounds; Thai indigenous rice; Upland and lowland rice

P – 434 Classification of Marigold (*Tagetes* spp.) Seed Quality Using Digital Imaging and Deep Learning Techniques

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Abstract

Traditional marigold (*Tagetes* spp.) seed sorting relies on visual inspection, which is subjective, labor-intensive, and inefficient at scale. This study aims to develop and evaluate an automated marigold seed classification system using digital imaging and deep convolutional neural networks (DCNNs). The research included two main phases: (1) assessment of seed quality—including germination rate, germination speed, and shoot length—in 2,740 visually diverse marigold seeds; and (2) development and testing of seven state-of-the-art DCNN architectures—including DenseNet201, ResNet50, ResNet101, GoogLeNet, MobileNetV2, InceptionV3, and EfficientNet-b0—using a transfer learning technique applied to their visual traits. Accelerated aging tests under laboratory and greenhouse conditions revealed that thick black, black-and-deep-brown, and deep-brown seeds had significantly higher seed quality than thick light-brown or thin/irregularly shaped seeds ($p < 0.05$). A total of 13,429 images of three classes of marigold seeds—(1) thick black seeds, (2) thick black-and-deep-brown seeds, and (3) thick light-brown or thin/irregularly shaped seeds—were collected and used to train the modified DCNNs. Seed classes were defined according to quality assessments and practical market preferences. The average F1-score was used to evaluate the performance of the modified DCNNs for classifying marigold seeds based on their visual traits. The modified InceptionV3 (marigold-InceptionV3) model achieved the highest average F1-score of 0.827, outperforming the other architectures in this application. The model yielded a classification accuracy of 84.7% with an average processing time of 0.179 seconds per image. InceptionV3 was selected as the optimal model due to its superior performance and efficiency across metrics compared to the other tested models. These findings demonstrate that digital imaging and deep learning can enable efficient, automated marigold seed quality classification, substantially reducing the labor and time required for sorting. This approach holds promise for supporting scalable, sustainable seed production in the agri-food sector.

Keywords: Classification; Deep convolutional neural networks; Marigold seeds; Transfer learning

P – 439 Preliminary Study on the Development of a High Fiber-Wolffia Enriched Snack Using Pineapple Pomace.

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Abstract

The global food system is under increasing pressure to improve sustainability, reduce waste, and meet rising nutritional demands. Fruit processing industries generate significant by-products, such as pineapple pomace, which constitutes approximately 30–35% of the fruit's mass during juice extraction. Although rich in dietary fiber and bioactive compounds, pineapple pomace is typically discarded, leading to environmental pollution. In parallel, *Wolffia globosa*, a nutrient-dense aquatic plant with up to 41% protein by dry weight and a complete amino acid profile, remains underutilized despite its sustainable cultivation potential. This research aims to develop high-fiber, protein-rich snack by valorizing pineapple pomace and *Wolffia globosa* through twin drum drying technology. A Simplex Lattice Mixture Design was applied using Design-Expert® software to generate the blending ratios of pineapple pomace and Wolffia with the percentages being between 20% and 80% with the total being 100%, with fixed water and binder levels. Experimental formulations were processed into sheet snacks using a twin drum dryer set at 135 °C and 414Hz, based on effective sheet formation in preliminary trials. Analysis of the sheet snacks from the formulations indicates an average water activity (a_w) of between 0.27 a_w and 0.32 a_w which suggests that the product is likely to have long shelf life with low microbial activity. Texture analysis for crispness have yielded average maximum peak forces of between 2.62 N and 9.94 N. The maximum peak force generally increased with increase in the percentage of pineapple pomace in the formulation. The low maximum peak forces in some of the samples indicate that it is possible to have a crispy product which would be desirable to consumers. Crude protein analysis has yielded average protein values of between 4.81g/100g and 0.62g/100g, protein content increased with increase in the percentage of Wolffia in the formulation.

Keywords: Pineapple pomace; *Wolffia globosa*; High-fiber snack; Plant-based protein; Twin drum drying

P – 459 Development and Characterization of Extruded Snacks from Pigeon Peas, Mushroom, and Cassava Starch.

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Abstract

The underutilization of pigeon pea and mushrooms is a significant challenge within the food system, as it prevents many developing regions from fully leveraging their potential to diversify diets and provide essential nutrients that are often lacking in most staple crops. This study developed extruded snacks from blended pigeon peas (fermented and unfermented), mushroom, and cassava starch at ratios of 90:5:5, 90:2.5:7.5, and 90:7.5:2.5. Physicochemical and functional properties of the snacks were comprehensively assessed, including protein, crude fat, moisture content, antioxidant activity, bulk density, water activity, pH, hardness, and crispness. The results showed that Protein content ranged from 18.8 to 19.6 g/100g, with no significant differences ($p>0.05$) between raw pigeon pea flours or extruded snacks. Fermented samples exhibited higher crude fat content (7.1% in raw flour, 8.4% in extruded snacks) compared to unfermented counterparts (5.9% and 5.7%, respectively). Fermentation significantly enhanced antioxidant activity ($p<0.01$), with DPPH IC□□ values improving by 750%, total phenolic content increasing by 45.5%, and FRAP and ABTS activities rose by 89.2% and 1,331%, respectively. Water activity ranged from 0.426 to 0.525, with significant variations among formulations ($p<0.05$). Texture analysis revealed that fermented snacks were notably harder and crispier than unfermented products, demonstrating fermentation's influence on textural properties. This study demonstrates that fermentation significantly enhances the antioxidant properties and nutritional value of pigeon pea-based snacks while improving texture. Additionally, extrusion processing effectively reduces water activity to achieve shelf-stable products with desirable quality attributes.

Keywords: Pigeon peas; Extrusion; Fermentation; Physicochemical properties; Snacks

P – 460 Development of Eco-Friendly Pulping Methods for Cellulose Extraction from Phulae Pineapple Leaf Waste

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Abstract

Thailand is a major pineapple producer and generates large amounts of agricultural waste from discarded pineapple leaves, particularly in Chiang Rai Province. Valorization of this biomass through sustainable pulping technologies offers an opportunity to reduce waste while producing value-added cellulose-based materials. This study aimed to evaluate and compare eco-friendly pulping methods for cellulose extraction from Phulae pineapple leaves and to assess the resulting paper properties. Four pulping approaches were investigated: (i) chemical pulping using sodium hydroxide (5 and 10% NaOH) at 121 °C, (ii) enzymatic pulping using xylanase and pectinase (100,000:30,000 IU) at 55 °C, (iii) enzyme-assisted chemical pulping with 2.5, 5, and 10% NaOH at 121 °C, and (iv) alkaline pretreatment with 1 and 2.5% NaOH at 100 °C followed by enzymatic treatment at 55 °C. Paper properties including thickness, grammage, elongation, and tensile index were evaluated. Among all treatments, chemical pulping with 5% NaOH produced paper with the highest tensile index (31.32 ± 3.94 Nm/g), comparable to commercial printing paper (30–50 Nm/g), indicating superior fiber bonding and mechanical performance. Enzyme-assisted chemical pulping with 2.5% NaOH also showed high tensile strength (29.38 ± 4.04 Nm/g) along with increased grammage, suggesting effective fiber development at reduced alkali concentration. Enzyme-assisted pulping with 5% NaOH yielded moderate tensile index (27.54 ± 3.31 Nm/g), while increasing NaOH concentration to 10% resulted in a noticeable decrease in tensile index (23.06 ± 3.72 Nm/g), indicating possible fiber degradation. Chemical pulping with 10% NaOH produced thicker paper with moderate tensile strength (27.52 ± 2.78 Nm/g). In contrast, alkaline pretreatment followed by enzymatic pulping produced paper with poor mechanical properties, with tensile indices of 9.95 ± 1.08 Nm/g for 2.5% NaOH pretreatment and 3.53 ± 0.60 Nm/g for 1% NaOH pretreatment. Pure enzymatic treatment alone was insufficient to produce usable pulp due to inadequate lignin removal. Additional analyses, including FTIR, XRD, SEM, water absorption, contact angle, and thickness swelling, supported these findings. Overall, chemical pulping with 5% NaOH was identified as the most effective condition, followed by enzyme-assisted chemical pulping with 2.5% NaOH, highlighting the potential of pineapple leaf waste as a sustainable raw material for paper production.

Keywords: Pineapple leaf waste; Cellulose extraction; Eco-friendly pulping; Enzyme-assisted pulping; Sustainable packaging

P – 463 Mycelium Sheet Production from Edible Mushrooms: A Comparative Assessment of Material Properties

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Abstract

Mycelium-based biomaterials have attracted increasing attention as sustainable alternatives to conventional packaging materials; however, their inherent brittleness limits practical applications. This study investigates the production of mycelium sheets from three edible mushroom species and compares their material properties. Mycelia of *Ganoderma* sp., *Lentinus* sp., and *Pleurotus* sp. Were cultured in potato dextrose broth at 30°C and 60% relative humidity for 12 days. The biomass was processed into sheets with and without glycerol-based plasticization (soaked in 15% w/v glycerol) and subjected to hot compression. Mechanical, morphological, and thermal properties of mycelial sheets were assessed. The results showed that mushroom species and glycerol treatment significantly influenced sheet performance. *Lentinus* sp. And *Ganoderma* sp. Had superior mycelial growth rates, reaching up to 15 mm/day, compared to *Pleurotus* sp. All sheets were hydrophilic (contact angle < 90°), although glycerol treatment enhanced elongation at break. Thermal stability ranged from 257 to 285°C. The findings illustrate the viability of edible mushroom mycelium sheets as environmentally sustainable materials for packaging applications.

Keywords: Mycelium-based biomaterials; Edible mushrooms; Mycelium sheets; Mechanical and thermal properties; Sustainable packaging

P – 465 Surface Modification of Rice Straw Fiber Sheets Using Plasma Gliding Arc and Sparking Techniques

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Abstract

Rice straw is an abundant agricultural by-product that is often disposed of through open field burning, resulting in severe seasonal air pollution. Converting rice straw into value-added fiber-based materials offers a sustainable alternative for packaging applications; however, the inherent hydrophilicity of rice straw fibers leads to poor water resistance and limited barrier performance. This study focuses on the development of rice straw fiber sheets (RSFS) and the enhancement of their water resistance using plasma gliding arc and sparking surface modification techniques. Rice straw pulp was prepared using an alkaline treatment with 3% (w/v) NaOH at 121 °C for 1 h, followed by sheet formation through hydraulic hot pressing. Plasma gliding arc surface modification was applied using hexamethyldisiloxane (HMDSO) as a precursor, with variations in HMDSO concentration, argon gas flow rate, and treatment duration to optimize hydrophobicity. The optimal plasma treatment condition was identified as 30 cc HMDSO, an argon flow rate of 8 L/min, and a treatment time of 15 min. In addition, sparking treatments were performed using Ti:Cu:Al electrodes in a 2:1:1 ratio and aluminum electrodes alone, followed by heat treatment at 120 °C for 30 min to evaluate their effectiveness as alternative coating approaches. The resulting RSFS were characterized as properties relevant to packaging materials, including water contact angle, water absorption, wetting time, water vapor transmission rate (WVTR), tensile strength, Fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). Plasma gliding arc treatment significantly increased surface hydrophobicity and improved moisture barrier performance compared to untreated RSFS. In contrast, sparking treatments showed minimal improvement, with Ti:Cu:Al performing similarly to untreated samples and aluminum sparking reducing water repellency when combined with plasma treatment. Overall, plasma gliding arc surface modification proved to be an effective and environmentally friendly method for improving the water resistance of rice straw fiber sheets. These findings highlight the potential of plasma-treated RSFS as sustainable, biodegradable packaging materials with enhanced moisture resistance.

Keywords: Plasma treatment; Gliding arc; Sparking; Water resistance; Rice straw fiber sheet

P – 466 Effects of Plant Polyphenols on Water-Holding Capacity and Quality of Frozen Bighead Carp Fillets: Insights from Molecular Docking

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Abstract

Frozen storage is widely used to preserve aquatic products but often induces water migration, protein denaturation, and oxidative deterioration, leading to quality loss. This study evaluated three plant polyphenols—resveratrol (Res), tannic acid (Tan), and dihydromyricetin (DMY)—as natural cryoprotectants for bighead carp (*Hypophthalmichthys nobilis*) fillets during frozen storage at −20 °C for 8 weeks. Fillets treated with 0.1% (w/w) polyphenols were compared with a water control and a conventional sucrose–sorbitol cryoprotectant. Changes in water distribution (LF-NMR), water-holding capacity, protein and lipid oxidation, protein secondary and tertiary structures, odor profiles, and sensory attributes were systematically analyzed, together with molecular docking simulations. Frozen storage caused a progressive shift of immobilized water to free water, accompanied by increased moisture loss, protein oxidation, and lipid peroxidation. Polyphenol treatments significantly alleviated these deteriorative changes. Resveratrol most effectively restricted free-water formation and preserved water-holding capacity and protein structural integrity, whereas tannic acid exhibited the strongest inhibition of lipid oxidation. DMY showed protective effects primarily at the early storage stage. Molecular docking revealed favorable binding of all three polyphenols to β-actin, with binding affinities of −8.0 kcal/mol (Tan), −6.5 kcal/mol (DMY), and −5.5 kcal/mol (Res), indicating distinct protein interaction modes. Overall, the results demonstrate that plant polyphenols mitigate quality deterioration of frozen fish through combined antioxidative activity and direct protein stabilization, highlighting their potential as clean-label alternatives or complements to conventional cryoprotectants in frozen aquatic products.

Keywords: Frozen storage; Water-holding capacity; Plant polyphenols; Bighead carp; Molecular docking

P – 467 Behavioral and Proteomics Studies on the Regulation of Response Speed in Mice by Whey Protein Hydrolysate Intervention

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Abstract

Response speed is a critical indicator of central nervous system function that reflects the ability to perceive and react to stimuli. This study investigated the effects of whey protein hydrolysate (WPH) intervention on sensorimotor reaction speed and underlying hippocampal mechanisms in mice. Male CD-1 mice were administered WPH (2000 mg/kg body weight) or phosphate-buffered saline daily for six weeks. Behavioral assessments included the hot plate test, the Von Frey pain, and the prepulse inhibition (PPI). Hippocampal tissues were analyzed using DIA quantitative proteomics. Results demonstrated that WPH intervention significantly enhanced reaction speed. In the hot plate test, WPH administration shortened the reaction latency to thermal pain by 14.6% compared to the control group ($p<0.05$), while combining WPH with behavioral training reduced latency by 16.7% ($p<0.05$). Furthermore, the synergistic intervention of WPH and training significantly improved responsiveness to mechanical stimuli at 0.1 g intensity and auditory stimuli at 106 dB ($p<0.05$). Proteomic profiling identified 217 differentially expressed proteins in the WPH group (Fold Change> 1.5, $p<0.05$), consisting of 87 up-regulated and 130 down-regulated proteins. KEGG pathway analysis revealed that these proteins were significantly enriched in arginine and proline metabolism as well as neuroactive ligand–receptor interactions. These findings provide evidence that WPH improves response speed through the modulation of specific hippocampal metabolic pathways, supporting its potential as a nutritional strategy for cognitive enhancement.

Keywords: Whey Protein Hydrolysates; Reaction Time; Behavior; Hippocampus; Proteomics

P – 468 Effects of Static Magnetic Field Assisted Freezing on the Freezing Kinetics and Quality Attributes of Bighead Carp (*Hypophthalmichthys nobilis*)

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Abstract

Traditional freezing equipment is often characterized by limited heat-transfer efficiency and the formation of abundant, irregular ice crystals, which can severely disrupt the muscle microstructure of aquatic products. This compromises the quality stability of frozen seafood, highlighting the need to further develop and apply emerging freezing technologies. In this study, static magnetic field (SMF) assisted freezing at different intensities (0, 6, and 10 mT) was evaluated for its influence on freezing behavior and quality evolution of bighead carp during 4 months of frozen storage. Freezing curves were recorded to characterize freezing kinetics, while thawing loss, muscle microstructure, and water distribution were determined to assess quality changes. In addition, oxidative indicators and endogenous fluorescence measurements were conducted to elucidate myofibrillar protein (MP) oxidation and structural alterations. Results showed that SMF treatment significantly reduced the phase transition time during freezing ($p < 0.05$), thereby promoting the formation of smaller and more uniformly distributed ice crystals. After storage, the 6 mT SMF group exhibited an 8.44% reduction in thawing loss, maintained more than 90% non-flowing water, and significantly suppressed malondialdehyde accumulation and yellowness ($p < 0.05$). Moreover, 6 mT SMF better inhibited MP oxidation, as evidenced by lower levels of carbonyls, disulfide bonds, dityrosine, and Schiff bases, while retaining higher sulfhydryl content and mitigating MP conformational unfolding. Overall, the phase transition time decreased with increasing SMF intensity during freezing, and 6 mT provided the most favorable outcome in preserving the frozen storage quality of bighead carp.

Keywords: Bighead Carp; Static magnetic field assisted freezing; Frozen storage; Freezing characteristics; Quality change

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